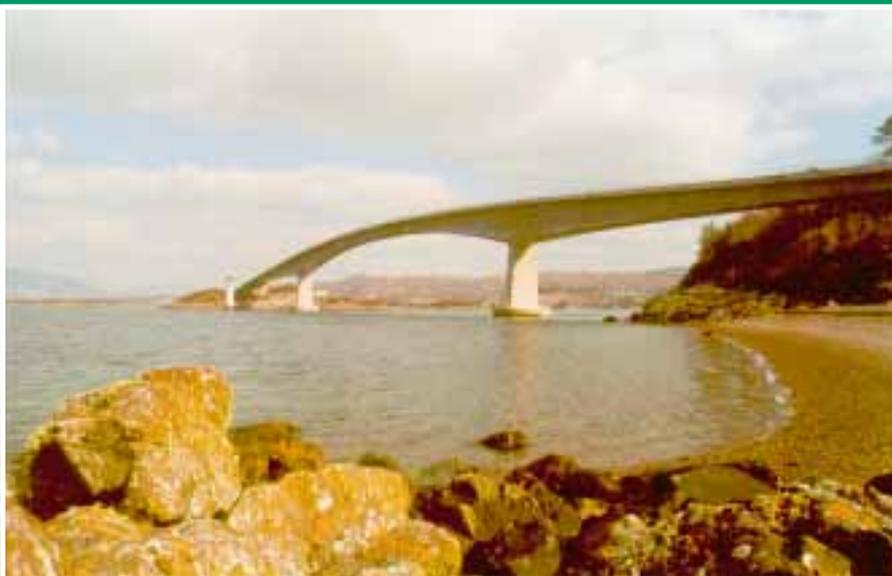


The Skye Bridge



This report has been prepared under Section 6 of the National Audit Act 1983 for presentation to the House of Commons in accordance with Section 9 of the Act.

John Bourn
Comptroller and Auditor General

National Audit Office
2 April 1997

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Preface

This report is the result of the first of the National Audit Office's examinations concerning the implementation of the Private Finance Initiative. From their previous work both the National Audit Office and the Committee of Public Accounts are familiar with the problems which have arisen from more traditional procurement methods. We and others have been greatly interested in how successful the initiative would be in addressing such problems.

In the case of the Skye Bridge contracts were signed as long ago as 1991 and the crossing was opened in 1995. As one of the earliest so far completed projects it is an excellent case study, and in itself an important milestone in the implementation of the initiative. At the same time, since the deal was done, a great amount of further work and thought has gone into defining what is good practice for such projects. The Scottish Office did not have the benefit of this in 1991, though much of what they did in the Skye case contributed to guidance which has since been issued.

The report identifies several general lessons which departments and others will wish to consider for future privately financed projects. My intention is that the National Audit Office will continue to keep the initiative under review, so that these ideas can be added to and if necessary elaborated over time.

Introduction and summary

The Skye Bridge project

- 1 This report examines how the Scottish Office Development Department (the Department) arranged the provision of a tolled road bridge to the Isle of Skye. Following an initiative by the former Highland Regional Council the Department have developed the project on the principles of design, build, finance and operate (Appendix 1). This means that the bridge has been built at the expense of a private sector developer who will operate it and receive tolls to recover the costs incurred, including costs of raising the capital to finance the construction. The bridge opened to traffic in October 1995.
- 2 The Department's primary objective for this project was the early delivery of a privately tolled crossing, to solve the problems of congestion and delay associated with the existing ferry service, with secondary objectives for satisfactory design of the crossing and for the need to contain the level and duration of tolls and achieve value for money from the public funds involved (Figure 1). The Department were concerned to limit the tolls levied on users because of the degree of monopoly represented by the crossing at this site: the bridge replaced the former ferry service and ferries crossing to Skye on other routes were seen as not providing a practical alternative for most motor traffic to Skye.

Figure 1: The Department's objectives for the Skye bridge project

Primary Objective:

The early provision of a privately tolled crossing to Skye, to solve the problems of congestion and delay associated with the existing ferry service.

Secondary Objectives:

Design - design of the crossing and approach roads to take account of the sensitivity of the environment, ensuring that any bridges are of international standing appropriate to the special setting.

Cost - deliver a toll no greater than the ferry fare, linked to inflation, paid off in 20 years, with the Government funding the approach roads.

Value for Money - achieve value for money by using public funds as effectively as possible with a tender competition for the design, build, finance and operation of the crossing including the design and build of the approach roads.

Source: The Department

- 3 Contracts for the construction and operation of the bridge were signed in 1991 between the Department and the developer, Skye Bridge Tolls Limited, who changed their name to Skye Bridge Limited in 1993. (Appendix 2 summarises the main elements of these contracts.) This company is owned by the members of the consortium which won the competition for the award of the contract, being a joint venture between Miller Civil Engineering Ltd and Dyckerhoff & Widmann AG (known as Miller-Dywidag) and BankAmerica International Financial Corporation.

- 4 Bridge users must pay tolls to Skye Bridge Limited for a maximum of 27 years or, as is expected to be the case, for a shorter period until they have amounted in total to some £24 million (measured in constant 1991 prices and discounted to 1991 base year over the lifetime of the project). In addition the Department have contributed directly some £12 million in respect of the developer's costs, and have incurred £3 million costs in developing, negotiating and supervising the contract (Figure 2).

Figure 2: Expenditure on the Skye Bridge project by the Department and users

| Payments to Skye Bridge Limited | |
|---|--------------------------------|
| • Forecast toll payments by users to be received by Skye Bridge Limited over the lifetime of the concession | £24 million ¹ |
| • Payments by the Department to or on behalf of Skye Bridge Limited for constructing the approach roads, and compensation for the cost of design changes and delay following a public inquiry | £12 million ¹ |
| Other direct project expenditure by the Department including advisers' fees, survey work, land purchase and staff costs | £3 million ¹ |
| Total payments by users and the Department | £39 million¹ |
| Indirect public expenditure reflecting loss of ferry revenue by Caledonian MacBrayne | See note 2 |

Source: The Department

Note 1: These figures are expressed in constant 1991 prices discounted at 6% a year to 1991 base year. This is how toll revenues are measured within the Skye concession contract and allows the figures to be compared on a common basis.

Note 2: In 1996-97 Caledonian MacBrayne's revenue deficit grant was increased by £1 million to reflect loss of earnings on the route. This increased requirement for external finance was however mitigated by other changes in Caledonian MacBrayne's financial plans, with the net result that total external finance for the company in 1996-97 remained as previously planned.

- 5 A Government owned company, Caledonian MacBrayne, had operated the Kyle of Lochalsh to Kyleakin ferry service and no longer receive the operating surplus previously generated on this route (£1 million in 1994-95). However, withdrawal of the service has also delivered offsetting savings to the company, from the expected proceeds of the sale of the two vessels and from avoiding the need for investment to replace those vessels had the ferry service continued.

- 6 The Skye project reflected similar arrangements for private financing of the Dartford and second Severn crossings in England. Unlike these crossings, though, the Skye bridge is not part of a major established motorway and traffic volumes are substantially lower and have been highly seasonal. Consequently the toll charges to many users of the Skye bridge are higher than at Dartford or the Severn, eg currently £5.40 for a single car trip in high season and £4.40 in the low season, though tickets are priced at £2.51 each if bought in books of ten (Dartford £1.00 all year round, Severn £3.90 from England to Wales, with journeys from Wales to England free, also all year round). Even so, except for one category of lorries, the Skye bridge toll charges are less in real terms than the fares for the former ferry service.

The National Audit Office examination

- 7 The National Audit Office examined how far the Department achieved their objectives for the project. The examination considered particularly the following questions:
- a) whether the Department's procedures for implementing the project could have been expected to produce an outcome consistent with all of the objectives (Part 1 of this report);
 - b) how far the Department achieved their design objective for the project (Part 2);
 - c) how far the Department achieved their objective for the level and duration of the tolls and the direct Departmental contribution to the approach roads, and how they controlled their costs (Part 3);
 - d) how far the project would achieve value for money (Part 4).

The National Audit Office obtained advice on the financial aspects of the transaction from Price Waterhouse. The National Audit Office's methodology is explained further in Appendix 3.

Main findings and conclusions

Primary objective: early provision of a fixed crossing

-
- 8 *Conclusion: The primary objective was clearly achieved, given that the bridge was opened in 1995, six years after the Department first accepted responsibility for the project, while the Department have stated that they would not have provided a publicly funded bridge until well into the next century, if at all.*
-

Implementation objectives

- 9 Opening the bridge has provided a number of benefits for many compared to the former ferry service. These include shorter journey times and improved reliability in bad weather, the elimination of charges once the concession is terminated, and the elimination of congestion and delay to the local community from the former ferry service.
-
- 10 *Conclusion: Overall the Department chose procedures which could reasonably have been expected to deliver an outcome in line with the Department's objectives. In some respects the way in which the Department chose to implement the procedures could have been better.*
-
- 11 The Department's procedures were based on lessons learned from the Department of Transport's procedures in the case of the second Severn crossing and the Department executed the competition in a way which left all the bidders who responded to National Audit Office enquiries satisfied that they had been treated fairly. The Department prepared the ground carefully for the competition and specified what they wanted in an open way so as to encourage innovation by bidders.
- 12 Despite their efforts to encourage bidding the Department were unable to bring competition to bear in the final stages of the deal. They received fewer bids than they had good reason to hope for, and the best bid was unsatisfactory because it did not offer scheduled toll charges which matched the former ferry fares. This left the Department to negotiate with only one bidder, who then faced the need to come forward with revised financing proposals. To overcome these difficulties and satisfy their objective for lower toll charges the Department accepted, in final negotiation with the successful bidder, an increase of nine per cent in the total tolls to be paid by users over the lifetime of the project.
- 13 The procedures used fell short of current best practice in some respects, not least because best practice in privately financed projects has developed in the six years or so since the Skye bridge deal was done. The Department appointed three of their four advisers without competition, in the case of the principal engineering advisers because of their long association with and knowledge of the project as advisers to Highland Regional Council. The Department and their advisers obtained direct confirmation of support from one of the key investors proposed by the successful bidder, relying on a strong assurance from the Bank of America that the proposed method of finance was

achievable in the current market conditions. The Department did not insist on full access to this bidder's financial model, as is now normally done because such access can strengthen the assessment and negotiation of bidders' proposals. Where certain risks would fall was left open for further negotiation in the change procedures set out in the contracts, and the Department subsequently accepted some risks they had originally sought to avoid, albeit the final allocation of risks between the public and private sectors is broadly in line with current practice in privately financed projects.

Design objective

-
- 14 *Conclusion: A public local inquiry was satisfied with the design subject to some modifications which have been carried out.*
-
- 15 The Department relied on competition to propose a design which would be consistent with their environmental and aesthetic requirements for the bridge. The Department considered that bidders were best placed to consider the trade-offs between these factors and technical and financial considerations, and to bid accordingly. The winning bidder in the competition to build the bridge therefore proposed their own design, and this design was incorporated in the contract signed in December 1991, subject to confirmation by a public local inquiry. The report of the inquiry favoured this design, subject to some changes which have been incorporated in the finished bridge largely at the expense of the Department.
- 16 The Royal Fine Art Commission for Scotland, whom the Department consulted and who gave evidence to the inquiry on design aspects, were not convinced that the Department secured an appropriate design or one worthy of the site. However the former Countryside Commission for Scotland were consulted and satisfied on design, landscape and environmental aspects, and their successors Scottish Natural Heritage are satisfied that major adverse environmental impacts were avoided during the construction of the bridge and subsequently.

Cost objectives

-
- 17 *Conclusion: The Department are achieving their financial objective that the tolls should be no higher in real terms than the former ferry fares and are on target to achieve their other objective that the concession should last no more than 20 years. The Department's own project costs of some £15 million in cash terms were higher than they planned.*
-
- 18 The achievement of the objective concerning tolls depends on future usage of the bridge, and usage to date is close to the Department's forecasts. In the event that traffic does not grow as forecast the concession could last up to 27 years. If traffic were to fall

dramatically compared to 1990 levels, tolls could rise in real terms, though this seems very unlikely given the increase in traffic that has already taken place since 1990.

- 19 The Department have paid to the developer some £12 million equivalent to some £9 million in 1988 prices or 48 per cent more than their original target of £6 million in 1988 prices. The Department considered that the increase was difficult to avoid because it was compensation to the developer for the cost of making the design changes recommended by the public local inquiry and for the delay in starting construction which arose from a late start to the statutory procedures. Though the Department expected to incur other costs, mainly in developing, negotiating and supervising the contract there were no targets for most of this other expenditure which totals some £3 million. This includes advisers' fees of almost £2 million, rather lower than such costs the Department have experienced on other similar projects, and £600,000 the Department have contributed to environmental and local road improvements near the bridge.

Value for money objective

-
- 20 *Conclusion: The Department used a competitive form of procurement which in its final stages was not as fully competitive as the Department had good reason to hope. Most of the project's constituent costs, however, were determined competitively or were clearly in line with market rates, and to this extent there is assurance that the Department selected the best available privately financed deal and secured value for money. The Department had to rely on negotiation by their preferred bidder, not competition, to determine some important financing costs. There is little against which to benchmark these costs, though they are lower than for some other later projects.*
-

- 21 The Department did not compare the terms of the proposed deal with a conventional public sector comparator. They were not required to do so then and current Treasury guidance would not require such a comparison to be made now.

The price of the project

- 22 Value for money under private finance as in other forms of procurement depends on the balance between the benefits obtained from a project and the price paid for them. The price of the deal in this case is identified in Figure 2 - tolls paid by users, the Department's contribution to the cost of the approach roads and their other costs, and any continuing expenditure arising from closure of the ferry.

- 23 The total tolls to be paid by users over the life of the concession were determined by the developer's forecast costs, after allowing for the Department's forecast contribution of £6 million. In turn these forecast costs comprised construction costs, operating costs and the cost of capital, that is the interest and dividends on the combination of loans and equity finance raised by Skye Bridge Limited to pay for the construction of the project. Most of these costs were determined competitively or were clearly in line with market-based assessments:
- the forecast construction and operating costs of the project were exposed to competition and were in line with the Department's expectations;
 - although financing for the bridge was negotiated after the competition for the award of the contract, £19 million of the external capital of £27 million was in the form of loans at rates clearly in line with the market, given the degree of risk.
- 24 Of the remaining £8 million external project finance, £7.5 million was loan stock placed with a single investor on a negotiated basis. Price Waterhouse advised the National Audit Office that the market for such finance was not well developed in 1991 and that they doubted that a formal competition would have resulted in better terms in this case. Millers and Dywidag provided the final £500,000 of external finance as equity investment to satisfy the requirement of the lenders that the project sponsors bear some of the project's main risks. Price Waterhouse advised the National Audit Office that there is little against which to benchmark the rate of return these equity investors stand to receive if all goes well, though the return is lower than that agreed in privately financed power projects arranged later than the Skye Bridge.
- 25 The return to the equity investors takes the form of a payment to them of all the cash remaining, if any, in the hands of Skye Bridge Limited the end of the concession. If, as the Department expect, traffic grows in line with the central forecast, the concession will end around the year 2010. This means that if interest rates and inflation perform as Skye Bridge Limited hoped the payment then to the equity investors will amount to £10 million (in 1991 prices), equal to a real rate of return of 18.4 per cent a year on their investment of £0.5 million.
- 26 This return would account for 11 per cent of the tolls to be paid, but this does not imply that the tolls would have been lower if the element of equity in the financing of the bridge had been reduced.

Less equity would imply higher risk for the providers of debt finance and might have led to a requirement to pay higher rates of interest on the debt, increasing tolls.

- 27 In the event of lower traffic revenue growth, or adverse variations between the company's forecast and actual costs (mainly interest payments) in relation to income the return to the equity investors could be reduced or eliminated.

The benefits of the project

- 28 In addition to the user benefits from the early provision of a new fixed crossing there was a reduced peak requirement for finance from the Department, as compared with a conventionally financed bridge, and transfer to the private sector of risks which the Department would otherwise have borne.
- 29 The peak requirement for finance from the Department for the project as implemented was a total of £9 million in 1991 and 1992. Had the bridge been procured conventionally the peak requirement over the two years of construction would have been more than £22 million.
- 30 The Department will gain through the allocation of risk as between the public and private sector in the Skye bridge project, which is broadly in line with current practice in privately financed projects.

Recommendations

- 31 The National Audit Office **recommend to departments and other public bodies responsible for future privately financed projects that:**
- a) As recommended by the Public Accounts Committee and the National Audit Office for many years, advisers should always be appointed by means of competition unless there are exceptional reasons to the contrary, and cost targets for fees to advisers should be set at the earliest opportunity.
 - b) Because appropriate risk transfer is crucial to obtaining value for money in privately financed projects, it is essential that departments carry out, and document, a comprehensive analysis of all important risks to the project, showing which party or parties will bear them. It is good practice to cross reference this risk analysis with the eventual legal agreements to show how far they allocate the risks in a manner which corresponds to the analysis.

- c) Departments should check the financial robustness of bids including robustness in the face of increased project costs. These checks should take into account any contractual measures departments expect to be able to set in place to protect their own financial position, and wider sensitivities where such consequences are significant.
- d) Departments should obtain in electronic form the financial model of bidders whose proposals are to be the subject of negotiation. Not only does this practice make it easier for departments to analyse the financial sensitivities of bids, it also assists audit and any subsequent analysis, if for example something goes wrong with the project.
- e) Where bids are conditional on the raising of finance, departments should seek independent confirmation that the financing on the proposed terms is likely to be achievable. Particularly in novel or unusual cases departments should consider, or ask their advisers to consider, what might go wrong and how such circumstances might be remedied
- f) Departments should seek to ensure that as far as possible competitive pressure is brought to bear on the bidders in respect of all project costs, including financing costs. Where financing or other project costs are not determined competitively, departments should seek to cross-check the terms of the deal against the market.
- g) Departments will always have alternatives to accepting a private finance solution. Where a similar but publicly financed project is a realistic alternative, departments will have prepared a public sector comparator. But where such a project is not an option departments should carry out and document a systematic financial comparison with the realistic alternative option or options to the privately financed deal that are available, such as doing nothing or achieving the same objectives in a quite different way. This will help departments to measure the value for money of the private finance deal, and should contribute to the discipline of any negotiation concerning its terms.

Part 1: How the Department procured the Bridge

- 2.1 This part of the report examines the effectiveness of the Department's procedures for procuring the Skye Bridge project. It considers the following three key stages in chronological order:
- **planning** the procurement, including setting a strategy, assembling a team to execute it, and devising a timetable
 - **procurement**, including soliciting interest from potential bidders, bid evaluation and selection, negotiation with the preferred bidder and contract award;
 - **management of the contract after award**, that is the arrangements through which the Department ensure that the developers deliver all that the contract requires

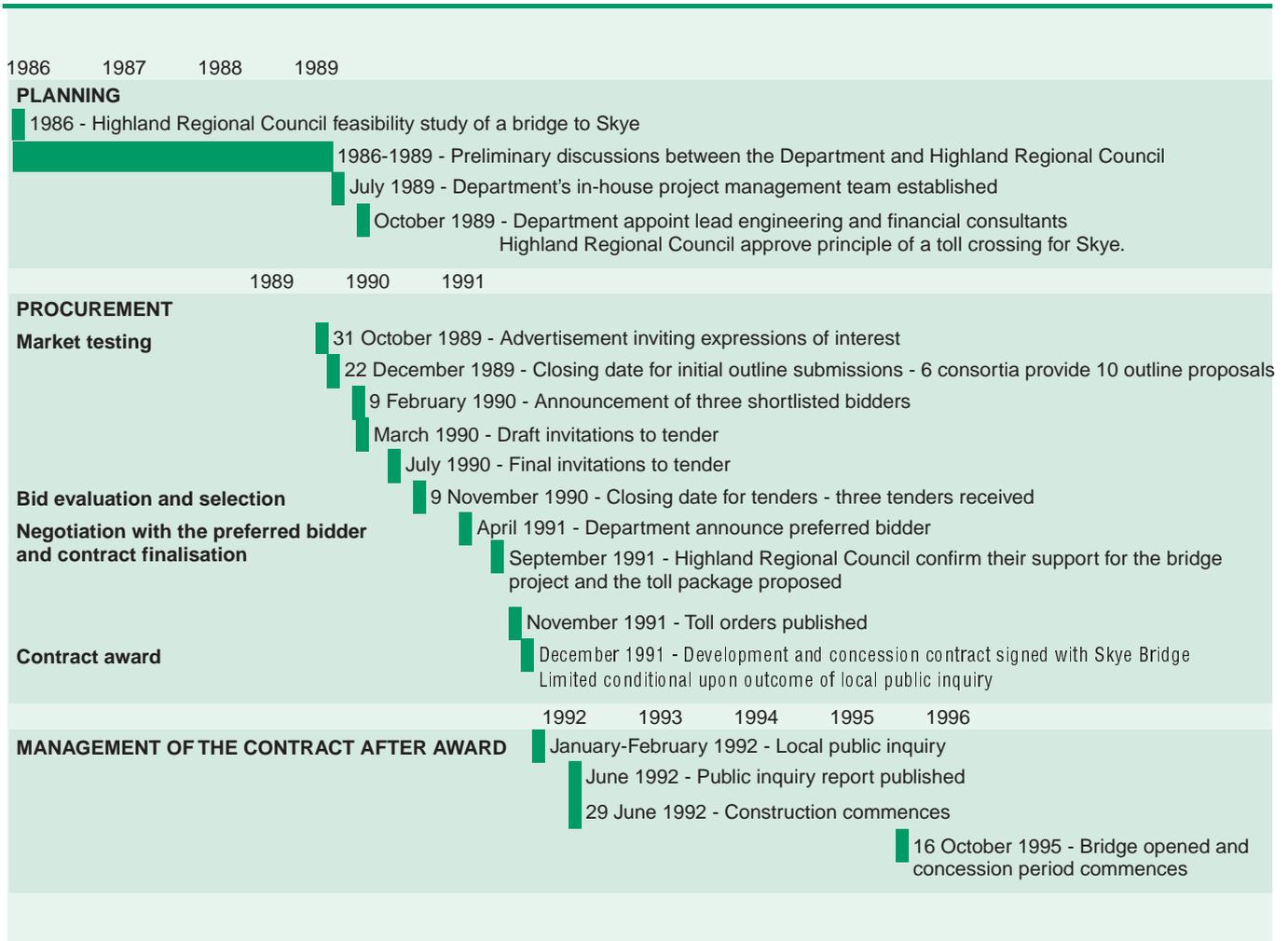
Figure 3 provides an overview of key events in each of these stages of the project's implementation.

Planning

The Department established that the bridge project was likely to provide benefits in excess of its costs

- 2.2 Since the 1960s the Department have used cost benefit analysis as a standard element of their evaluation of potential road projects. Appendix 4 gives an account of the techniques used in cost benefit analysis of road projects. These assessments quantify the economic benefit to be obtained from a proposed investment, by comparing benefits such as faster journey times and savings in delays, lower accident rates etc with the cost of road construction and maintenance.
- 2.3 Feasibility studies of the Skye bridge in 1986 and 1988 included cost benefit analysis of this kind. The analysis compares the forecast costs of continuing to operate a ferry with the costs of construction of a bridge and the quantified time saving benefits to users of a bridge from the elimination of queuing delays associated with the ferry. The result is a "net present value". If this figure is positive, it shows that the total benefits of the project exceed the total costs.

Figure 3: Key events in the Skye Bridge project



Source: National Audit Office

The figure shows key events in the life of the project, between feasibility work in 1986 and the opening of the bridge in 1995.

- 2.4 The Department reviewed and updated the analysis before signing the Skye contracts in 1991, and this showed that the bridge was expected to provide a positive net present value compared to the option of continuing the ferry.

The bridge project continues to demonstrate an expected positive return, despite increased costs incurred

- 2.5 In 1996, at the request of the National Audit Office, the Department's engineering advisors prepared a revised cost benefit analysis for the bridge. This took into account the increased project and construction costs which were known to have occurred since the

last appraisal in 1991, together with a revised traffic forecast for the bridge and other revised, updated assumptions discussed with the National Audit Office.

- 2.6 These latest results confirm that construction of the bridge is expected to provide a strong positive net present value (see Appendix 4, paragraph 15).

The Department saw potential advantages in using private finance

- 2.7 The private finance option would reduce the one-off call on the Department for public funds compared to a conventionally financed project. In their view it would therefore permit them to provide the bridge much earlier. They also considered that the private finance option was likely to provide good value for money because

- there would be scope for the private sector to innovate in the design of the bridge;
- the private sector supplier would be better placed to trade off operating costs against construction costs and thus optimise the costing of the project over its full life;
- risks in the project including significant construction risks could be placed with those parties best able to manage them or their outcome.

- 2.8 Price Waterhouse advised the National Audit Office that the design and construction phase of the Skye bridge project had some typical characteristics of a good privately financed project. In particular, the private sector would take the major part of the risks associated with the design, construction and commissioning of a difficult infrastructure project. There was, however, less scope for achieving better risk management in the post construction phase (see Figure 4).

There was a clear overall strategy which addressed many of the important issues, though some items were not analysed in sufficient detail

- 2.9 In October 1989, the Department agreed with the concurrence of Highland Regional Council to seek provision of a bridge as a private finance project (Appendix 1). By this time the Department had established a firm procurement strategy and the broad goals for the project had become clear, as reflected in the Department's objectives detailed in Figure 1.

Figure 4: Suitability of the Skye bridge project for private finance

| Characteristic | Present in Skye Bridge Project? | Price Waterhouse Comments |
|---|---------------------------------|--|
| Scope for private sector to innovate in design, construction/installation, operation and maintenance | Yes | There was considerable scope for innovation in the choice of design solution |
| Significant operation and maintenance element | Limited | The operation and maintenance costs of a bridge tend to be low in comparison to the capital costs |
| Synergies from combination of design, construction/installation, operation and maintenance | Yes | There were significant synergies between design and construction on this project. There was also synergy between the design solution adopted and the maintenance regime with the benefits of low maintenance costs associated with the selected design. |
| Exposure of the private sector to performance risk | Limited post construction | The limited exposure to performance risk reflects the minor nature of the operation and maintenance element of the project. The developer however needs to ensure that the bridge is returned to the Department's control at the end of the concession in a fit condition for the remainder of its design life of 120 years. |
| Exposure of the private sector to demand risk | Limited | The structure of the concession limited the promoters' exposure to traffic risk |
| Scope for private sector to generate third party revenue | No | No revenue apart from tolls |
| Requirement on private sector to manage significant asset replacement/ technology change during the life of the project. | No | - |
| Exposure of the private sector to residual value risk (that is the risk that the main capital asset might have limited value at the end of the concession period) | No | The Secretary of State retains ownership of the bridge throughout its life. |

Source: Price Waterhouse

The design and construction phase of the Skye bridge project had characteristics suitable for success under private finance, though in the post construction phase there was less scope for achieving better risk management than in many other projects.

2.10 The Department's primary objective was to seek early delivery of the project to an ambitious timescale, so as to maximise its potential benefits. However, as in any project of this nature, significant engineering, design and environmental challenges were involved. And the Department faced the additional complication of progressing the project as a privately financed scheme for which few guidelines were available.

2.11 The National Audit Office's examination identified three aspects of the Department's preparations from which lessons have subsequently been learned. These concerned the appointment of their advisers, the control and supervision of overhead costs, and complications arising from the statutory procedures for the scheme.

Appointment of advisers

2.12 The Department did not analyse the timing of external adviser appointments nor how they should be selected. The need to make rapid progress, once Highland Regional Council had confirmed their support in October 1989, constrained the timing of the project and led the Department to appoint their financial advisers later than was ideal. These advisers were appointed in October 1989. This was immediately after the decision to proceed with the project, but it

meant that the advisers were unable to influence the terms of the initial competition which the Department advertised at the end of that month.

2.13 In addition the Department did not appoint their environmental advisers ASH until 1990. By this time other potential advisers were retained by bidders and the Department decided to appoint ASH without competition.

2.14 Three of the Department's four main external advisers were appointed on quality grounds without competition and the fourth was appointed by an indirect process in which only Scottish-based firms were invited to participate (Figure 5).

Figure 5: Appointment of external advisers

| Advisers and their costs | Basis for appointment |
|---|---|
| <p>1. JMP Consultants Limited - engineering advisers and managing consultants</p> <p>Total fee costs to the Department £1,262,000 between 1989 and 1996, including fees for site supervision over the three year construction phase.</p> | <p>Single tender appointment in October 1989¹ at agreed fee rates for staff working on project. No ceiling fee set.</p> |
| <p>2. Quayle Munro Limited - lead financial advisers</p> <p>Total fee costs to the Department £155,000 between 1989 and 1996.</p> | <p>Appointed by JMP Limited in October 1989 as lead financial advisers for project after invitation to four Scottish-based companies selected by the Department. Remuneration at agreed fee rates.</p> |
| <p>3. ASH (Environmental Design Partnership) - environmental advisers</p> <p>Total fee costs to the Department £168,000 in 1990.</p> | <p>Appointed by JMP Limited in 1990 on the basis of a single tender. Remuneration at agreed fee rates, which the Department considered were typical for this kind of work.</p> |
| <p>4. Chartered West Bank Limited - financial advisers</p> <p>Total fee costs to the Department £39,000 in 1991.</p> | <p>Appointed by the Department by single tender in November 1990 to advise on the way forward in financing the Skye Bridge project. The Department agreed remuneration at the rates based on those agreed by the Department of Transport for similar advisory work on roads in England.</p> |

Source: National Audit Office

2.15 The Department's grounds for appointing three of their advisers without competition were:

- a) They took over the incumbent engineering advisers to the project because of what the Department saw as their unrivalled knowledge of the Skye crossing project, as advisers to the Highland Regional Council between 1975 and 1989 including the important feasibility work in 1986.
- b) They appointed their environmental advisers also without competition on the basis that the only other potential advisers whom they had identified were advising bidders.

c) They appointed additional financial advisers because of these advisers' experience and expertise on similar projects with the Department of Transport.

2.16 To satisfy themselves that the fee rates were reasonable the Department compared the proposed rates for these contracts with those paid in other similar contracts.

2.17 The indirect process by which Quayle Munro were appointed was chosen to save time by avoiding the need for a formal competition. The selection of Quayle Munro followed an earlier competition for similar advisory work for the department which had shown that the firm offered competitive rates. The National Audit Office note, however, that departments have found it is possible to carry out a competitive process for the appointment of financial advisers within a very few days

Control and supervision of overhead costs

2.18 Total advisers' fees in the Skye case are £1.7 million equivalent to 7 per cent of the forecast cost of constructing the bridge. This is lower than for a typical, conventionally procured project (where consultants' fees for preparation and supervision of 10-15 per cent of works costs would be expected) and lower than for another design and build project which the Department have since completed.

2.19 The Department did not establish budgets for the cost of the necessary advisers before their appointment or subsequently during the course of the project, nor for other overhead costs. The contracts with advisers did not include any price ceilings.

2.20 Good practice would have been to have managed costs within agreed pre-determined targets or limits, set at the outset and revised as necessary during the course of the work. Instead the Department consider that they exercised tight control by concentrating on monitoring and managing their advisers as the work progressed. The Department's practice is now to set pre-determined targets for such costs.

Statutory processes

2.21 In their planning, the Department recognised the likelihood of a local public inquiry as a result of toll orders being published.

2.22 They did not, however, foresee that the orders could not be published until regulations for the New Roads and Streets Works Act were made. This Act received Royal Assent in June 1991 though in accordance with convention, which in normal circumstances requires a grace period of two months before commencement, the

Department did not lay the necessary regulations before Parliament until 30 September 1991. In accordance with Parliamentary rules these regulations could not then come into force for a further three weeks. As a result, the Department did not publish the toll orders for the proposed bridge until 1 November 1991 some three to four months after they had anticipated they would be able to publish them.

Procurement

The Department handled the initial stages of the main bridge competition effectively, and limited the final competition to three bidders

- 2.23 Competition is central to public procurement as a means of securing value for money and ensuring an equitable and proper procurement process. For privately financed projects, because of the high costs for bidders of preparing proposals, it has been accepted by Government for some time that the number of bidders may need to be restricted. In November 1995 the Government specified that following short-listing no more than three or four bidders should normally be invited to provide full tenders*.
- 2.24 The Department advertised the competition to design, build, finance and operate a crossing to Skye in October 1989. This invited initial outline submissions to qualify for selection for a second, fully priced tender competition limited to three bidders.
- 2.25 In this case marketing was effective and the response to the Department's advertisement represented a good basis for competition by a public authority. Fifty-three organisations registered an interest including 14 contractors and a number of leading international engineering consultants and project finance lenders and advisors. By the Department's closing date in December 1989, six consortia, all including civil engineering contractors, made initial outline submissions with 10 outline designs.
- 2.26 The Department's evaluation of the six outline submissions concluded that all the applicants were competent. They judged that three applicants offered better quality proposals at that stage with a reasonable spread of design solutions and should provide an adequate competitive edge to the tendering process. Accordingly the Department selected these three groups to develop fully priced tender bids in competition : Miller-Dywidag, Morrison Construction and a Trafalgar House/British Linen Bank joint venture.

* "Private Opportunity, Public Benefit" HM Treasury/Private Finance Panel November 1995

2.27 The National Audit Office consulted the six firms submitting outline submissions (Appendix 3) on the success of the procurement procedures in this case. The four firms responding confirmed to the National Audit Office that they considered that the Department had dealt very fairly and positively with them during all stages of the competition.

The specification of project requirements was formulated to encourage innovation by bidders

2.28 The Department's specification of the work for outline submission purposes stated their requirement for a concession to design, build, finance and operate a fixed toll road crossing to Skye. It specified the payment by the Department of £6 million fixed in real terms to meet the capital costs of the approach roads including land. It did not specify any preferred design or route, requiring designers to use their initiative while also giving consideration to aesthetic and environmental aspects which were emphasised. Accordingly the specification left considerable scope for innovation by bidders in seeking effective design, engineering and financial solutions to satisfy the Department's requirement.

The Department took steps to foster the best response from bidders

2.29 At initial outline bid stage the Department consulted each prospective tenderer about the time required to prepare an effective bid. The bidders each concluded that at least six months would be necessary. Later, in February 1990, the Department invited the three selected bidders to comment on draft tender documents. This and subsequent discussions with the tenderers contributed to effective development of the tender proposals.

2.30 During 1990 the Department consulted the Countryside Commission for Scotland, the Royal Fine Art Commission for Scotland and the National Trust for Scotland on environmental and design aspects. The National Trust for Scotland owned land expected to be required for a bridge (depending on the route to be chosen). The Department involved bidders in this consultative process, allowing them to take account of the complex design and environmental issues which were emerging, although these matters continued to be debated well beyond the tender period (see Part 2 of this report).

There were clear grounds supporting the selection of a preferred bidder in April 1991

- 2.31 The Department applied a wide ranging and systematic approach to bid evaluation, which they completed between November 1990 and April 1991. There were separate environmental, technical and financial assessments contributing to a final summary evaluation report. The assessment team included the Department's senior professional staff, their appointed external advisors, and representatives from Highland Regional Council, and they met each of the three bidders to clarify aspects and, where reasonable to do so, negotiate improvements. The Department also exhibited publicly the design proposals made by the three bidders and continued to consult third parties on environmental aspects, including the results of this work in their assessment of the bids.
- 2.32 Though the Department required full tender bids, one of the bids was submitted on the basis that it was an indicative proposal. The Department's assessment confirmed that this bid was at a less developed stage than the other bidders' proposals, and that it involved unacceptable financial aspects and provided no realistic basis for negotiation to produce a bid meeting the Department's basic requirements.
- 2.33 The Department's assessment therefore focused on the two remaining qualifying bids. Their assessment showed the bid from Miller-Dywidag to be the clear winner. Though neither this nor the other remaining bid had satisfied the Department's objectives concerning toll levels and periods, Miller-Dywidag's bid was substantially better in this respect, was favoured on environmental grounds and involved much lower forecast construction costs (£23 million against £27 million and £31 million in the other bids). The Department concluded that Miller-Dywidag's offer provided the basis for a negotiated deal which would satisfy their key tolling requirements. Accordingly in April 1991 the Department announced Miller-Dywidag as the preferred bidder and commenced negotiations with them to finalise the bridge development and concession contracts

Within a systematic assessment overall, two aspects of the Departments evaluation were incomplete

- 2.34 In many respects - as described above - the Department's assessment of bids was thorough. However complications arose from the novelty of the project as an early privately financed scheme, and reflecting this the Department's analysis did not cover as fully as good practice now suggests should be the case two particular aspects, concerning risk transfer and certain financial aspects.

(i) Absence of a full risk analysis

2.35 The fundamental principle regarding risk transfer in private finance projects is that each risk should be allocated to the party who is best able to manage it or its outcome. With traditional public sector procurement, risk analysis has sometimes been weak, with risks - and associated costs - only apparent after the event. The final placing of risk which can be achieved in any private finance project is inevitably a matter for negotiation.

2.36 Risk comes in many forms and it is therefore important that in assessing value for money departments analyse the risks associated with the project and identify who is to bear these. In this case, although the Department recognised the importance of risk transfer issues, several of which are reflected in the contract, they did not prepare a formal risk analysis.

2.37 The final development and concession contracts signed by the Department permit changes at their request to aspects of the bridge project, for which the developer may recover from the Department any extra costs. However, because the Department wished to place as much risk as possible with the developer they did not define what such changes would comprise and they negotiated with the developer on selected risk issues as they arose. The outcome of this was that the Department compromised on risk transfer in three areas. The final allocation of risks between them and the developer is similar to the position reached in other (including more recent) privately financed projects. Specifically:

- **Design risk.** The design of crossing was sensitive to aesthetic and environmental considerations, and was expected to be subject to a public inquiry in due course.

As the result of the 1992 public inquiry the Department accepted responsibility for cost increases of £1.6 million associated with design changes for aesthetic and environmental reasons.

- **Statutory processes delay risk.** The Department transferred risks for delay from construction to the developer but not, as they had initially intended, risks for delay from the statutory processes. The developer would not accept the risk of delay from the public inquiry because they could not control this.

The actual delay arising from the statutory processes was three months. As the likelihood of such a delay became clear the Department negotiated a two month extension to the start of construction, from April to June 1992, at no extra cost to them. But in the event because of the statutory processes construction could not start before July 1992 and the Department accepted responsibility for the delay costs arising from this, subsequently agreed with the developer at £2.2 million.

In subsequent contracts the Department have introduced variable start date clauses to ensure that start date implications are reflected in tender prices offered.

- **Land cost risk.** The Department had intended that the cost of land for the project should be borne wholly by the developer but the actual cost was shared.

Because the actual land purchase costs were not known in advance, for tender purposes in 1991 the Department restricted the cost of land that the developer would bear to £300,000 (being the District Valuer's assessment of the likely cost of land at that time). In doing so they accepted the risk of any increase in the cost of land over this sum. The actual cost proved to be some £784,000 and the Department therefore paid the extra £484,000.

The Department consider that this was a reasonable outcome because generally on roads schemes liability for compensation associated with land acquisition rests by statute with Secretary of State.

(ii) Financial aspects

2.38 The Department's financial evaluation was consistent with what is now regarded as best practice but three aspects were not covered as fully as would now be the case:

- a) The Department's financial advisors carried out checks to confirm the financial and contractual robustness of bids, but did not test two sensitivities that would now be regarded as good practice. These concerned the impact on the financing of the project of possible construction and project operating cost increases. In the first instance these risks would rest with the contractor and then with the developer and would not be a matter of concern to the Department, who were in the Skye case able to set in place contractual protection.

- b) The Department's financial analysis was based on some specific modelling scenarios rather than use of a copy of the bidders' financial models. It is now a common practice for the public sector to require bids for private finance projects to be accompanied by such models in electronic form. Not only does this practice make it easier for departments to analyse the financial sensitivities of bids, it also assists audit and any subsequent analysis, if for example something goes wrong with the project. The Department's advisors checked the accuracy of key results from these models by their own calculations, to provide assurance as to the accuracy of the bidders' very complex financial projections. Access to the electronic copy might have provided extra reassurance.
- c) The Department and their advisers did not test directly whether the financing arrangements proposed by Miller-Dywidag were viable. These financing arrangements involved the raising of commercial bank debt and the sale of loan stock to financial institutions. The Department and their advisers relied on a strong assurance from the Bank of America, that the proposed method of finance was achievable, including direct confirmation from the Bank of America itself as lender. The confirmation was given as part of the developer's bid in November 1990, in the light of the then current market conditions. In the event market conditions changed, the Department sought changes in the developer's proposals and these initial financing proposals could not be implemented, as described below, causing delay.

Competitive tension in the final contract negotiations was limited

- 2.39 The selection of Miller-Dywidag as the preferred bidder in April 1991 meant that from that point the Department did not have the option to revert to any other bidder. The Department's only means of dealing with any deadlock in negotiations with Miller-Dywidag would be to withdraw from the project and either begin a new competition or abandon the idea of a privately financed bridge, which they were reluctant to do.
- 2.40 The Department's main aim in negotiating with Miller-Dywidag after April 1991 was to secure their objective of tolls for the bridge no higher in real terms than 1990 ferry fares and with a maximum concession period of 20 years. Miller-Dywidag's November 1990 bid had envisaged a schedule of tolls which generally exceeded the 1990 ferry fares in real terms and with a maximum concession period of 25 years. There were a number of other less significant

engineering and design features also requiring negotiation, but the Department did not expect other material changes in the proposed deal.

2.41 The Department negotiated significant changes in the financial aspects of the deal, leading to upward pressure on the lifetime total of the tolls to be paid by users, without increases in the direct Departmental contribution to the capital costs of the project. This was necessary partly to bring scheduled toll charges down to the 1990 ferry fares in real terms - which Miller-Dywidag's bid had not offered - and partly because it became clear during April 1991 that external finance to Miller-Dywidag would not be available on the terms assumed in their bid. The Department were concerned that these financing difficulties would in practice prevent the bridge's development and took action to assist Miller-Dywidag to achieve viable project financing.

2.42 Thus in April 1991 the Department confirmed that they would provide the necessary Government support to Miller-Dywidag to enable them to seek finance from the European Investment Bank, who were likely to be willing to lend over a longer term than commercial banks. Using finance from this Bank the consortium achieved a lower estimated cost of capital than in their original proposals.

2.43 Also in April 1991, the Department asked their additional financial advisers Chartered West LB Limited to advise on the way forward in marketing the project to potential investors. Chartered West recommended re-marketing of the loan stock by Miller-Dywidag utilising improved, independent forecasts of traffic growth. These were expected to be less pessimistic than Miller-Dywidag's earlier forecasts, and closer to the Department's forecasts and proved to be so. The Department and Miller-Dywidag accepted these proposals which were implemented.

2.44 The upward pressure on the lifetime total of tolls took the form of two further changes:

- The possibility that scheduled toll charges might exceed the 1990 ferry fares in real terms in years after 1997 if bridge traffic turned out to be very low, ie below the 1990 traffic levels on average.

This provision reduced the risks taken by lenders to the project, but the Department do not consider that it will ever be triggered.

- An increase of 9 per cent in the total toll income to be paid during the lifetime of the concession.

This provision also reduced the risk taken by lenders in the event of low traffic but, as a consequence, however high the traffic levels the tolls would be payable for longer than proposed originally in the Miller-Dywidag bid.

2.45 In June 1991 Miller-Dywidag proposed a change to permit the bridge operator to increase toll charges in real terms by up to 30 per cent if there proved to be any fall in traffic using the bridge compared to the base year of 1990. The Department accepted this proposal because they believed that in practice traffic after the bridge opened in 1994 was very unlikely to fall below 1990 levels and because they saw no alternative.

2.46 The Department secured Miller-Dywidag's acceptance of tolls at no more than 1991 ferry fares in real terms (reflecting the then current ferry fare structure), subject to the exception arrangements just described in the case of a fall in traffic. This acceptance was obtained, however, at the cost of lengthening the maximum concession required by Miller-Dywidag to 27 years. This maximum concession period reflected Miller-Dywidag's "worst case" traffic projections of nil growth over the period. The Department accepted this on the basis that their own and Miller-Dywidag's traffic forecasts indicated that in all likelihood the developer would recoup their estimated costs much more quickly, most probably within 14 to 17 years. But providing a much longer maximum concession period provided additional financial security to the developer and the investors in the project if the forecasts proved wrong.

2.47 In securing the reduction in the scheduled tolls the inevitable trade off which the Department accepted involved an increase in the total toll costs paid by users over the life of the concession. This cost is measured by a specified contract figure, the "Required Net Present Value" which measures the total toll revenue which may be collected by the operator before the concession is terminated. This sum, which is stated for contract purposes after discounting actual revenues at six per cent in real terms, increased by almost £2 million (nine per cent), from some £21.7 million in Miller-Dywidag's November 1990 bid to some £23.6 million in the final contract.

Management of the contracts after award

The Department established arrangements to supervise the construction phase of the development contract

2.48 Following the signing of the contract in December 1991 a company owned by the consortium winning the contract, Skye Bridge Limited, became responsible for the development and operation of the bridge (Appendix 2). In July 1992 the Department appointed Highland Regional Council to act as their agents to manage the construction stage of the project (Appendix 1). Acting with the Council the Department's engineering advisers, JMP, scrutinised the quality of the developer's work including compliance with specified engineering, design and construction standards. They provided regular feedback and reports to the Department, who participated in negotiations with the developer as they arose, for example on design changes required during construction. JMP scrutinised and certified as correct all contract payments to Skye Bridge Limited.

The Department have established a framework to monitor the concession contract

2.49 The Department have to be able to satisfy themselves about the accurate reporting of tolls collected by Skye Bridge Limited because the concession terminates when the accumulated revenues collected reach a defined level, and Skye Bridge Limited are then required to return control of the bridge to the Department.

2.50 Under the concession contract Skye Bridge Limited supply the Department with annual revenue forecasts and, quarterly, information on actual revenue from tolls and traffic flows over the bridge.

2.51 The Department are satisfied with Skye Bridge Limited's arrangements to maintain safe and secure arrangements for handling tolls and recording traffic flows. They monitor the information supplied by Skye Bridge Limited to confirm its reasonableness and accuracy. They have access rights both to inspect and to audit the company's financial procedures, exercising these rights once during 1996. Where the Department are concerned about any matter they may require further information, amplification or explanation to be produced.

2.52 The concession contract also requires Skye Bridge Limited to maintain the bridge in a serviceable condition, having regard to its expected 120 year design life, for the concession period. The Department have agreed the detailed arrangements and standards for Skye Bridge Limited's inspection and maintenance programmes.

The Department's engineers have access rights to the bridge to check the condition of the bridge and verify that work is being carried out to the agreed standards.

The concession contract provides sanctions for the Department in the event of unsatisfactory performance by the operator

- 2.53 The concession contract provides terms to ensure that in the event of a serious deterioration in the financial condition of Skye Bridge Limited or their failure to comply with any of their obligations the Department will be entitled to terminate the agreement, and Skye Bridge Limited will be required to return control of the bridge to the Department. Ownership of the bridge is vested with the Secretary of State at all times under the contract.
- 2.54 In these circumstances the Department will take over responsibility for collecting tolls and will look to assign the Secretary of State for Scotland's rights under the toll order to a new concessionaire for the remainder of the contract. Skye Bridge Limited will be entitled to receive all sums received directly by the Department from collecting tolls and the full consideration received from the new concessionaire, less of course the specified costs and expenses incurred by the Department in making these changes.
- 2.55 The concession contract also requires Skye Bridge Limited to arrange for an annual maintenance bond of £250,000 to be provided. The bond provides assurance to the Department that in the event of the company's failure to maintain the bridge to the required standard the Department can call on the funds from the bank providing the bond, before reaching the ultimate sanction of terminating the concession contract.

Part 2: Achievement of design objectives

- 3.1 This part of the report examines whether the Department achieved their design objectives for the Skye bridge project, to take account of the sensitivity of the environment and ensure that any bridges in the crossing are of international standing appropriate to the special setting (see Figure 1).

The design competition

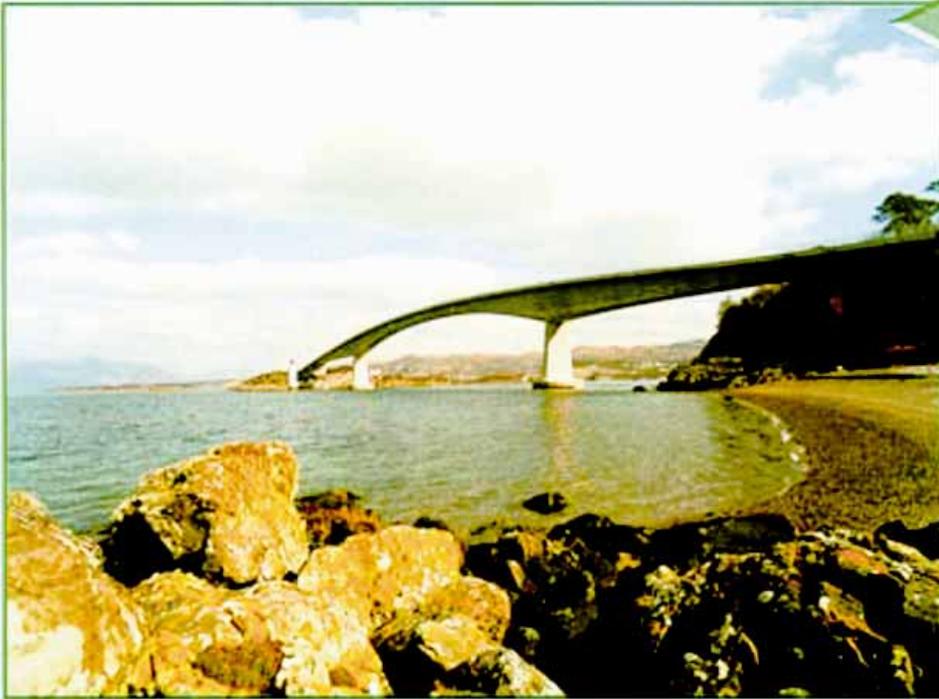
The design of the crossing involved significant aesthetic, technical and environmental challenges

- 3.2 The scenery and wildlife in the area around Skye are important nationally and internationally. In addition to the outstanding landscape there are near the crossing rare plants and a large population of otters, an internationally protected species.
- 3.3 The completed Skye crossing comprises the main bridge of 570 metres, which crosses a 400 metre wide navigation channel between Skye and the larger of two small islands off the mainland, a viaduct between the smaller of these islands and the mainland, and approach roads on both sides, on the mainland placed mostly in cuttings to minimise intrusion of the road on the rocky coastline (see Figure 6).
- 3.4 The main bridge as built involved innovative design to provide a jointless, slender frame structure, one of the longest of its type in the world. Construction involved founding the main piers of the bridge in the sea next to the main navigation channel, some 12 metres below the water surface. The cold winter climate and the remote and exposed location of the bridge involved further construction challenges.

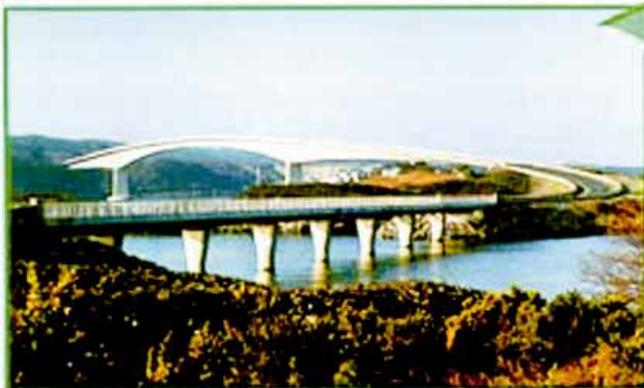
The Department relied principally on competition to help achieve the right route and a satisfactory design for the bridge

- 3.5 The initial feasibility work on behalf of Highland Regional Council in 1986, and updated at the Department's request in 1988, examined three possible routes for a crossing. It reviewed traffic, engineering, financial, economic and environmental aspects, as well as the views of local residents and businesses and concluded that:

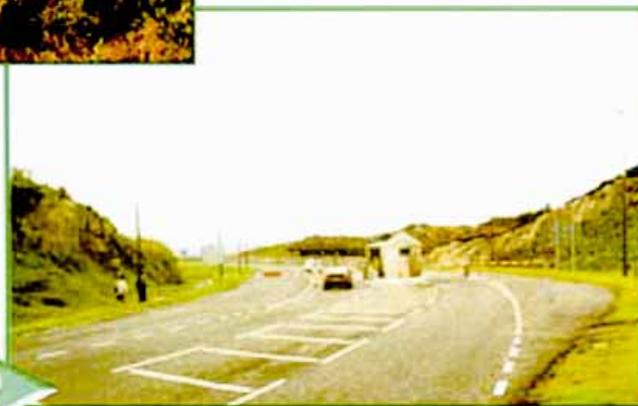
Figure 6: The completed Skye crossing



View of the main bridge crossing looking from Skye towards the mainland.



View of the crossing looking from the mainland towards Skye. The viaduct in the foreground is part of the approach roads to the bridge.



View of the toll collection point, located on the approach roads to the bridge on the mainland.

Source: The Department, National Audit Office

The completed Skye crossing provides a one and a half mile link road between the mainland and the Isle of Skye in an area of outstanding natural beauty.

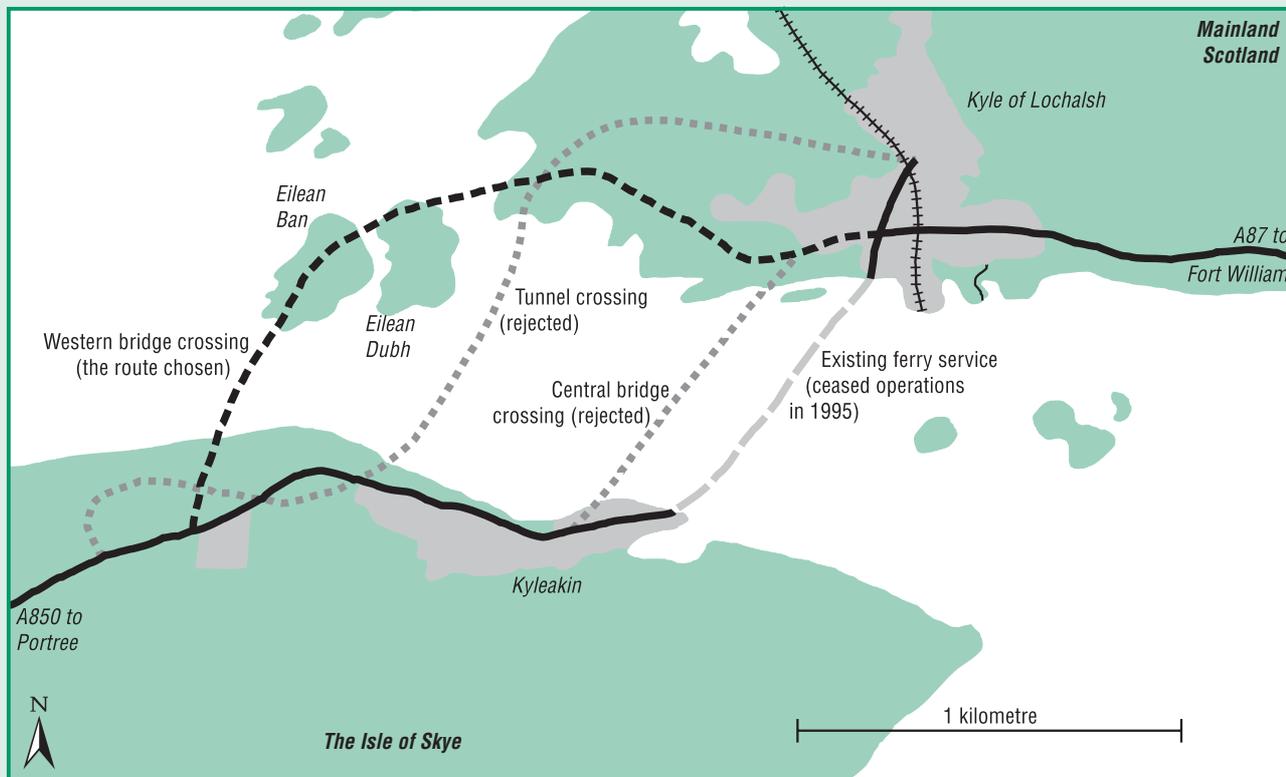
- there was substantial support amongst the local community for a bridge;
- a bridge on a “western route” appeared economically justified, but two more direct “central route” options - roughly on the line of the former ferry, one involving a tunnel - were not;
- there were environmental arguments against the western route but the difference in cost was so substantial that it was the only route that could be considered practicable.

These routes are illustrated in Figure 7.

- 3.6 Whilst the Department were satisfied that the Council’s analysis was reasonable, they recognised that it was preliminary and concluded that the best way to proceed was an international design competition.
- 3.7 Accordingly, in advertising in October 1989 the competition to design, build, finance and operate a crossing to Skye, the Department did not specify any preferred design and required designers to use their initiative while also giving due consideration to aesthetic and environmental aspects. The Department did not specify any cost limits though they indicated the need for bids to satisfy their objectives to limit the duration and level of tolls and their intention to make a fixed contribution of £6 million in 1988 prices to the costs of the approach roads. The Department also advised the designers of the requirement to consult the Royal Fine Art Commission for Scotland and other organisations concerned with environment and amenity aspects.
- 3.8 In the event all the six consortia who responded with initial outline submissions in December 1989 specified bridges crossing on the western route as the most practicable, though the selection of design solutions - notably the choice between a cable stay or a box girder bridge- varied between bidders. Figure 7 illustrates the difference between these two design choices.
- 3.9 Following the disposal of one of the three final tender submissions as insufficiently developed the Department’s assessment team evaluated and compared in detail the design options proposed by the remaining two tenderers. These offered a choice between a cable stay or a box girder bridge, and the team judged both were technically acceptable. However the box girder proposal by Miller-Dywidag was substantially cheaper and the only one likely to satisfy the Department’s requirements concerning tolls. The

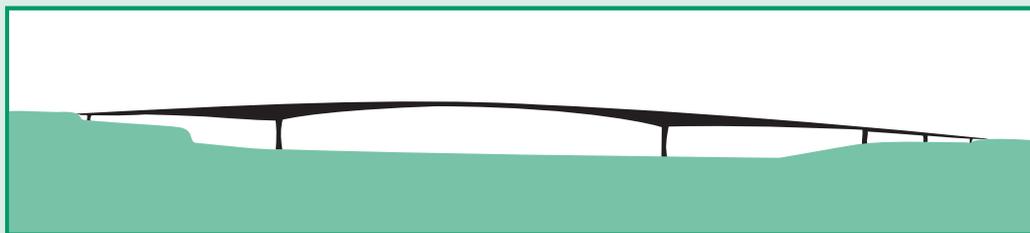
Figure 7: Skye Bridge route and design options

Route options:



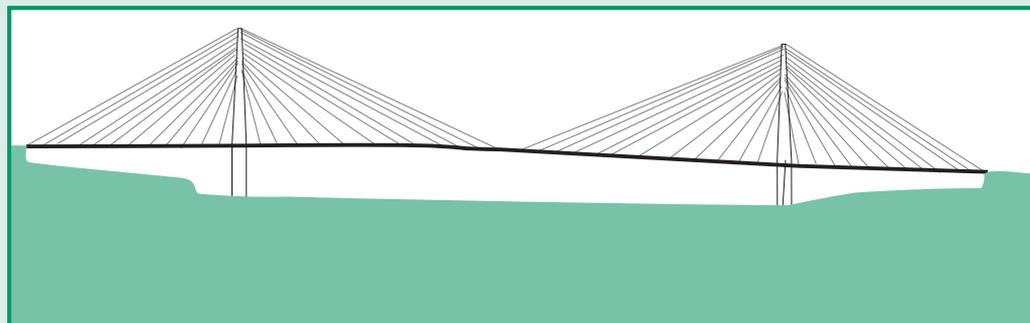
Design option (i): concrete box girder bridge

This elevation shows the accepted Miller-Dywidag design for the main bridge



Design option (ii): concrete cable stay bridge

This elevation shows an alternative design for the main bridge which was not accepted



Source: National Audit Office

The figure shows the main route options for the Skye crossing, and illustrates two contrasting design options for a crossing on the western route.

Council's earlier feasibility work had identified this type of bridge as most suitable and the bid was in line with what the Department envisaged.

Consultation

The Department consulted interested organisations on environmental and design aspects

- 3.10 Throughout the tender process the Department consulted the Royal Fine Art Commission for Scotland (on design and aesthetic questions), the former Countryside Commission for Scotland (on design, landscape and environmental issues) and The National Trust for Scotland (who owned land required for the bridge). These organisations offered extensive advice, suggestions and a number of challenges concerning the design and environmental aspects of the bridge and influenced its development substantially.
- 3.11 The primary function of the **Countryside Commission for Scotland** was to advise the secretary of State on the development and improvement of facilities for the enjoyment of the Scottish countryside and for the conservation and enhancement of its natural beauty. Initially the Commission proposed an alternative tunnel crossing to minimise visual impact. They accepted, after detailed investigation by the Department, that a tunnel was unaffordable; and later they agreed that alternatives to the line of the approach roads which they had suggested were not environmentally favourable. Having accepted the principle of a bridge crossing the Commission favoured the box girder design proposed by Miller-Dywidag as the structure which would best suit the special landscape between Skye and the mainland.
- 3.12 **The Royal Fine Art Commission for Scotland** is an official body constituted specifically to advise the Government on important issues of environmental design quality. It has since 1927 been consulted on many bridge designs. This Commission endorsed the selection of the alternative outline designs provided by the three consortia short-listed in December 1989, though they considered none were yet of an international standard. During 1990 and 1991 they endorsed the principle of a box girder bridge proposed by Miller-Dywidag while making detailed suggestions involving major design elements such as whether to place the approach roads on low bridges or embankments, and the placing and treatment of the piers for the main bridge.
- 3.13 **The National Trust for Scotland** has several property interests affected by the crossing: inalienable ownership of the Balmacara estate on the mainland including Eilean Dubh; feudal superiority over Eilean Ban; and a conservation agreement over Kyle House its

garden and grounds on Skye. The Trust asked that the Department consider the alternative of a central crossing on the line of the ferry, and the Department commissioned environmental advisors ASH to compare the environmental aspects of the two routes. On this basis the Trust were satisfied that a crossing on the western route was the best choice.

- 3.14 Of the three consortia selected in December 1989 the Trust preferred the designs submitted by Miller-Dywidag, though it was concerned to ensure the best possible line of the bridge as it affected its interests. The Trust also emphasised the need to achieve the highest possible aesthetic standards in the design of the bridge, and questioned aspects of the design of the crossing, for example, the structures for the approach roads.
- 3.15 The Department's selection of Miller-Dywidag as the preferred bidder in April 1991 took into account these views, concluding that Miller-Dywidag's proposal was acceptable in principle to all consulted and preferred by most. While several aspects of the Miller-Dywidag design required further negotiation to reach an acceptable solution, they were optimistic of success as Miller-Dywidag had already demonstrated a willingness to re-examine important aspects of the design.

The Department faced diverging views by those consulted about the design of the bridge

- 3.16 Because of their reservations about aspects of the bridge design the Countryside Commission for Scotland, The National Trust for Scotland and the Royal Fine Art Commission for Scotland decided jointly to seek independent professional advice. They commissioned an eminent bridge designer to review the proposed bridge. In October 1991 their adviser, Professor Fritz Leonhardt, reported a strong preference for a cable stay bridge on aesthetic, functional and construction grounds. He also offered an alternative design for a box girder bridge which he preferred to the Miller-Dywidag proposal.
- 3.17 The Royal Fine Art Commission for Scotland considered both of Professor Leonhardt's proposals as preferable to the Miller-Dywidag design, though they favoured the cable stay solution. Although initially The National Trust for Scotland also supported the proposals, it later withdrew this in favour of supporting the Miller-Dywidag box girder design incorporating changes to enhance its appearance which the Trust based on recommendations by architects and engineers it had appointed for this purpose.

- 3.18 The Countryside Commission for Scotland opposed the cable stay bridge on the grounds that it would have a greater impact on the landscape than a box girder bridge. They supported the change to the design of the Miller-Dywidag bridge as proposed by the Trust.
- 3.19 The Department concluded that they were unable to resolve these opposing views on the basic style of the bridge. Moreover by October 1991, when these new issues emerged, financial and contractual negotiations with Miller-Dywidag were almost complete. The Department therefore faced the choice of accepting their hitherto preferred Miller-Dywidag proposal or setting aside the results of their competition at a late stage. This would have involved writing off much of the considerable investment already made by the parties concerned, and the loss of good will might have jeopardised any future chance of a privately financed crossing to Skye. Based on the results of the competition, which included bids for cable stay bridges costing at £27 million and £31 million, and further investigations commissioned in the light of Professor Leonhardt's report the Department also regarded the cost of a cable stay bridge as prohibitively expensive.
- 3.20 The Department and Ministers concluded that they should proceed with the bridge as proposed by Miller-Dywidag while seeking to negotiate acceptance of any justified and practicable changes to their design. Accordingly, and with the support of Highland Regional Council, the Department finalised the contractual negotiations with Miller-Dywidag and signed the development concession and concession contracts for the Skye Bridge in December 1991.
- 3.21 The views of the Royal Fine Art Commission for Scotland on the design of the Skye Bridge are detailed in their Fifteenth Report for the year 1991 (Cm2124, December 1992). In summary the Commission preferred Professor Leonhardt's proposals and considered that the Department failed to secure an appropriate design or one worthy of the site. In the Commission's view, this unsatisfactory result was in part attributable to an inappropriate emphasis on economy, and the risk that design quality is likely to be driven down by competitive tendering. Nevertheless the Commission commended the Department for the steps they have taken since 1992 to improve their procedures for consultation on such matters. In particular, they strongly supported the Department's recent appointment of an architectural consultant to give advice on the design of roads and bridges.

- 3.22 Scottish Natural Heritage is the successor body to the Countryside Commission for Scotland and the Nature Conservancy Council for Scotland. Its aims and purpose are to secure the conservation and enhancement of, to foster the understanding of and to facilitate the enjoyment of the natural heritage of Scotland. As part of its statutory duties, Scottish Natural Heritage provided advice during the construction of the Skye Bridge and is broadly satisfied that major adverse impacts on the natural heritage have been avoided. Scottish Natural Heritage considers though that while all the natural heritage issues arising were eventually resolved, some such issues did not receive as much attention as aesthetic questions during the design phase of the project.
- 3.23 Scottish Natural Heritage has seen the need to secure improvement in procedures for private finance projects such as the Skye Bridge, in order to protect and further the natural heritage interest. This includes the acceptance of principles which it considers the Department have already begun to take on board in their approach to later private finance projects. Scottish Natural Heritage considers that private finance projects given rise to distinctive issues for statutory consultees, which stem primarily from the tension between the extended uncertainty in the design of the project and the process for its statutory approval. It does not consider that effective protection of the natural heritage and procurement by private finance are necessarily incompatible, provided that sufficient attention is given to resolving this tension.

The results of public consultation were that most people favoured the selected design

- 3.24 As well as consulting the three interested organisations on environmental and design aspects the Department conducted consultation with the public and with Skye and Lochalsh District Council. This involved presentations during January 1990 (of the outline proposals made by the six firms responding to the initial advertisement), January 1991 (of the three tender designs) and November 1991 (of the successful Miller-Dywidag design).
- 3.25 The presentations in 1991 visited Portree, Broadford, Kyle and Kyleakin where proposals were illustrated with photo montages drawings and a 1:500 scale physical model. For the January 1991 presentation the Department invited those attending to write their views in a comments book. Many comments concerned the preferred bridge type, and those who favoured the box girder design proposed by Miller-Dywidag outnumbered those who preferred the cable-stay by a factor of two to one. The November 1991 presentation followed

publication of draft toll orders for the bridge and was a public exhibition seeking formal written comments on the draft orders and the Miller-Dywidag proposals.

Public inquiry

A public local inquiry recommended some design changes

- 3.26 The Department published for consultation the draft orders necessary to authorise the operation of a tolled road in November 1991. There were no statutory objections which would have obliged the Department to hold a public local inquiry. But the Department received over 200 non-statutory objections and because of this and the novelty of the proposals concluded that a public inquiry should nevertheless be held. This took place in January and February 1992 and made a comprehensive examination of the engineering, design, environmental, financial and contractual issues associated with the bridge project. The inquiry report to the Secretary of State, and the Secretary of State's decisions were published in June 1992.
- 3.27 On the design of the bridge the inquiry took into account the results of the Department's consultation with the public and the various organisations concerned, together with fresh proposals from some of these organisations, and new proposals such as the idea of a third design option of a causeway, viaduct and bascule bridge* crossing on a central route.
- 3.28 On the design of the bridge the inquiry reporter's conclusions in summary were:
- a) The general principle of the need for and the benefits of a bridge and the widespread support for it were established.
 - b) While the idea of a bascule bridge* offered the prospect of environmental benefits over the bridge Miller-Dywidag proposed, it would not provide uninterrupted flow for either ship or motor traffic, and its feasibility and likely costs were not determined.
 - c) The Reporter did not favour any cable stay design mainly because of its impact on the setting and the support of local residents for the proposed box girder design, while the evidence suggested that a cable stay bridge would not provide a cheaper solution. Overall the Miller-Dywidag proposal was to be preferred.

* Bascule bridge: a kind of drawbridge which may be raised and lowered with a counterpoise to open a channel below.

- d) The design changes proposed by The National Trust for Scotland and the Countryside Commission for Scotland would improve the appearance of the bridge and should be adopted. Further consideration was also required to mitigate the potential impact of the bridge on the otter population of the island of Eilean Ban on the route of the proposed bridge.
- e) the Department should make additional payments to the bridge developer to compensate for additional discounts for local users of the bridge, if these were merited so as to support the local economy; or, failing this, that the costs of the necessary design changes ((d) above) be met from contingencies or by a special contribution by the Department.

These changes and a delayed start to construction cost the Department £3.8 million

- 3.29 The Department and the Secretary of State accepted the inquiry conclusions except that concerning extra payments to the bridge developer. They rejected any payments to help support the local economy and concluded that in principle the extra costs of design changes were for the users or the developer to bear. However in practice they were satisfied that there was no scope for the developer to absorb the costs of the recommended design changes and they were unwilling to consider extending the tolling period so that the extra costs could be recouped from users. They also recognised that a large part of the increased costs related to the approach roads, the design of which had developed significantly during the consultation process. The Department's engineering advisers estimated that consequently the approach roads costs would exceed the Department's planned contribution of £6 million in 1988 prices, which had been set to meet the previously estimated cost.
- 3.30 The Department therefore agreed with Skye Bridge Limited to accept these additional costs. Subsequently, after negotiation the Department made additional payments to them of some £1.6 million for all the agreed design changes. In addition the Department agreed to compensate Skye Bridge Limited for the delayed start of construction associated with the public inquiry, July 1992. Following negotiation with the company the Department have paid some £2.2 million to the company for this item. The company consider that further compensation for these extra costs is due to them. The Department have rejected any further payment because they consider that the company have been unable to substantiate the basis for it.

3.31 The Department's total additional contribution to the project costs as a result of the public inquiry therefore total some £3.8 million.

Part 3: Achievement of cost objectives

- 4.1 This part of the report assesses whether the Department achieved their cost objective for the Skye Bridge project: to deliver a toll no greater than the ferry fare linked to inflation and paid off in 20 years with the Government funding the approach roads. It also considers how the Department controlled their costs of negotiating the terms of the project.
- 4.2 The Department's objective for the level and duration of tolls reflected their aim that bridge users should be no worse off financially compared to the alternative option of continuing the ferry service, with completion of the toll concession period as soon as seemed reasonably practicable.

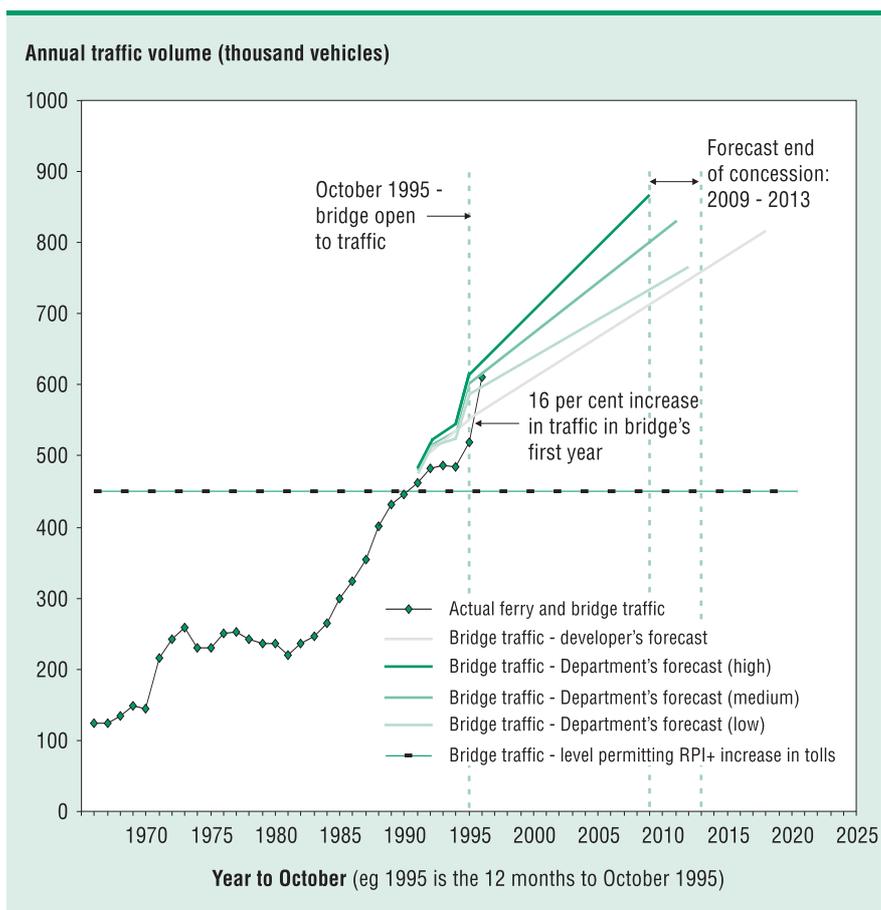
The level and duration of tolls

The Department are achieving their objective for the level of tolls

- 4.3 The Department's concession contract with Skye Bridge Limited specifies a schedule of maximum tolls corresponding with one exception to actual ferry fares in 1991. Tolls vary for different classes of vehicle and there are higher charges in the peak summer period and discounts for those purchasing books of ten tickets. The contract permits increases in tolls for inflation by reference to the retail price index, with annual increases after the opening of the bridge.
- 4.4 Accordingly on opening in October 1995 the toll for a single car trip toll was £4.30, increasing to £5.20 from May 1996 for the summer period, though tickets were priced at £2.44 each if bought in books of ten. Except for one category of lorry, tolls were lower than the ferry fares in September 1995, immediately before the bridge opened, for example a single car fare was then £5.40. This was because the bridge tolls were uprated by inflation for the period between 1991 and 1995, while the ferry operator had increased fares above inflation in this period. In January 1997 Skye Bridge Limited increased tolls to allow for inflation since the opening of the bridge, with a single car trip in the low season now costing £4.40.

- 4.5 Exceptionally, for the reasons described in Part 1, Skye Bridge Limited may increase tolls by up to 30 per cent more than the rate of inflation should actual revenue from tolls after 1997 fall below a certain sum. This sum, specified in the concession contract, corresponds to some 450,000 vehicle crossings a year ie the 1990 traffic levels. As explained in Part 1, the Department believe that in practice traffic is very unlikely to fall below 1990 levels and the provision will not therefore be triggered.
- 4.6 In the first year of operation to October 1996 the bridge carried 612,000 vehicles, 35 per cent above 1990 traffic, and 16 per cent over the previous full year's ferry traffic (Figure 8). These results were close to the Department's traffic predictions. Traffic in this first year may have been increased exceptionally by the novelty effect of the bridge, and by a good year for tourism in general. Nevertheless,

Figure 8: Trends in bridge and ferry traffic to Skye



Source: National Audit Office; Bank of America finance model; the Department

In the first year of operation to October 1996 the Skye Bridge carried 612,000 vehicles, 35 per cent above 1990 traffic, and 16 per cent over the previous year's ferry traffic. While there is no guarantee, these first year's statistics indicate that it is very unlikely that the bridge operator will need or be permitted to seek any real increases in tolls over the concession period.

while there is no guarantee, these first year's statistics confirm that it is very unlikely that the bridge operator will need or be permitted to seek any real increases in tolls over the concession period.

The concession continues to be expected to terminate after some 14 to 18 years

- 4.7 The concession contract specifies the maximum total toll revenue which Skye Bridge Limited may collect before the concession is terminated. This is the "required net present value", set at some £23.6 million measured after discounting actual revenues at six per cent a year in real terms. The contract requires Skye Bridge Limited to cease collecting tolls as soon as they have achieved this target or 27 years after opening the bridge, even if by this date the company have not achieved the target toll revenue.
- 4.8 The 27 year maximum concession period was established as the period required for the company to collect enough revenue to recover their total forecast costs, on the conservative assumption that traffic using the bridge remained unchanged at 1990 levels, 450,000 vehicles a year over the whole period. Any increase in average traffic over this level will result in a shorter concession period. Traffic in the first year was substantially above 1990 levels. The Department expect future usage of the bridge to be at least consistent with national road traffic trends, where growth is expected to continue in the future at a rate of between one and three per cent a year. On this basis, though again there is no guarantee, the concession period is expected to be terminated within between 14 and 18 years of the opening of the bridge.

The Department's financial contribution

Putting the project in place has been more costly than the Department expected when they approved the contracts in 1991

- 4.9 The Department arranged the Skye Bridge project on the basis that the Government would pay for the cost of the necessary approach roads to the crossing. This was in keeping with the arrangements the Government had already accepted for the Dartford and Severn crossings. In the case of Skye the approach roads are defined as everything from 50 metres beyond the end bearings of the main bridge on both sides, excluding the toll collection facilities.
- 4.10 At the start of the competition for the Skye Bridge project in 1989 the Department expected to make a fixed contribution of £6 million (1988 prices) to meet the expected costs of the approach roads. £6 million was the Department's advisers' best estimate of the cost of the necessary approach roads for a bridge on the westerly

crossing route based on their updated feasibility investigation of a crossing in 1988. This commitment was accepted by the winning bidder and carried into the contract with Skye Bridge Limited signed in December 1991.

- 4.11 In 1989 the Department expected to make no other contribution to the developer's costs under the contract. They expected to incur other costs associated with the project, including advisers' fees and other miscellaneous costs, but as noted in Part 1, they prepared no estimates of these items.
- 4.12 As a result of the 1992 public inquiry the Department reassessed the costs of the approach roads in the light of the changes to the design of the crossing which the inquiry had endorsed. These changes included a much longer secondary crossing between the mainland and the islands off the mainland, extra features such as walls needed to protect the local otter population and a revised road alignment on both sides of the crossing. Based on these estimates and following negotiation with Skye Bridge Limited the Department agreed to pay the company an extra £1.2 million (1988 prices) to compensate for the extra costs incurred. In addition the Department have accepted the company's claim for the delayed start to construction of £1.7 million (1988 prices).
- 4.13 Although the Department were unable to transfer these risks to the developer they were successful in transferring other very significant construction cost risks. The extent to which Miller-Dywidag, who ultimately accepted these risks as the construction contractor for Skye Bridge Limited, suffered cost increases if any as a result is not known. This is a commercial matter for the company which they have not disclosed.
- 4.14 The total payments to or on behalf of Skye Bridge Limited are now therefore some £8.9 million in 1988 prices or 48 per cent more in real terms than the target contribution of £6 million. The Department's other costs directly associated with the project now total some £2.3 million in 1988 prices, including advisers' fees, extra land purchase costs and contributions to certain local environmental improvements which are linked to the bridge. Their total costs to date on the project are therefore £11.2 million in 1988 prices, £14.6 million in cash terms (Figure 9).

Figure 9: The direct cost of the Skye Bridge project for the Department

| Item | Outturn cost - 1988 prices | Outturn cost - actual |
|--|-------------------------------|--------------------------|
| | £ million | £ million |
| Contribution to construction costs | | |
| Approach roads | 6.0 | 7.8 |
| Design changes | 1.2 | 1.6 |
| Compensation for delay | 1.7 | 2.2 |
| Other construction related costs met by the Department | | |
| Contribution to land purchase costs | 0.4 | 0.5 |
| Advisers and agent's fees | 1.4 | 1.7 |
| Miscellaneous costs | 0.1 | 0.2 |
| Other costs | | |
| Contribution to environmental improvements in Kyle of Lochalsh and Kyleakin | 0.3 | 0.4 |
| Local road improvements | 0.1 | 0.2 |
| Total project costs | 11.2 | 14.6 |

Source: National Audit Office; the Department

This figure shows that the Department's total payments to or on behalf of Skye Bridge Limited are now some £8.9 million in 1988 prices or 48 per cent more in real terms than the target contribution of £6 million. The Department's other costs directly associated with the project now total some £2.3 million on the same price basis, including advisers' fees, extra land purchase costs and contributions to certain local environmental improvements which are linked to the bridge.

In addition, the Department have accepted other costs associated with the closure of the ferry

- 4.15 When the bridge opened in October 1995 the existing ferry service was discontinued. The former ferry operator is Caledonian MacBrayne a Government owned company who continue to operate other ferry services in Scotland.
- 4.16 The Department identified in 1991 that there would be certain costs and savings accruing to Caledonian MacBrayne as a result of the withdrawal of the ferry service. This service generated a net operating surplus and its closure, other things being equal, would reduce the company's revenue income and increase the requirement for revenue deficit grant. In 1991, before signing the Skye Bridge contracts, the Department estimated the potential annual loss of revenue income to the company at approximately £0.5 million.
- 4.17 In 1996-97 Caledonian MacBrayne estimated that the actual net loss of revenue resulting from the closure of the Kyle-Kyleakin service in the last full year of operation amounted to approximately £1 million. This higher figure reflected the increased volume of traffic on the route since the introduction of new vessels with greater carrying capacity in 1991 and increases in charges between 1991 and 1996. On the other hand closure of the ferry service also delivers offsetting

savings to the company, from the expected proceeds from the sale of the two vessels and from avoiding the need for investment to replace the vessels in due course.

4.18 The financial impact on Caledonian MacBrayne of the closure of the Kyle-Kyleakin service was therefore considered, and taken into account at the time that the decision was taken to proceed with the construction of the bridge. The economic analysis which was undertaken to ascertain the case for the bridge took into account the revenues accruing to Caledonian MacBrayne and the costs of operating the service and compared it with the costs and benefits of the bridge. It showed that in economic terms the bridge provided a better option than the continued operation of a ferry service (see Appendix 4).

Part 4: Value for money

- 5.1 This part of the report concerns the Department's actions to evaluate the value for money of the contracts to develop and operate the Skye bridge.
- 5.2 It is possible for departments to argue that good value for money has been achieved in a privately financed project where:
- the procurement process has been highly competitive at all stages, giving assurance that the best available privately financed deal was chosen; and
 - the resulting deal can be compared favourably with a public sector comparator, giving reassurance that the privately financed route provides better value for money.
- 5.3 In the case of the Skye Bridge, however, these conditions are not fully satisfied. As shown in Part 1, competitive tension did not apply fully in the final stages of negotiation.
- 5.4 Also, in 1990 the Department had ruled out preparing a public sector comparator based on a comparison with a publicly financed bridge. They concluded that this would be false and misleading, since they had no intention of funding Skye Bridge except as a privately financed project. Government guidance in 1995* is that a public sector comparator is not required for projects which do not involve public money or which would not have gone ahead other than under private finance.

Value for money under private finance depends on the balance between the benefits obtained from a project and the price paid for them

- 5.5 The Department's conventional cost-benefit analysis showed that, in total, the benefits of the project exceeded its costs. It is not the purpose of cost benefit analysis to demonstrate that the price they and users would pay for those benefits was reasonable. To illuminate the value for money of the deal, therefore, the National Audit Office examined the distribution of cost, risks and rewards

* "Private Opportunity/Public Benefit" HM Treasury/Private Finance Panel November 1995

between the Department, users and the developer, as reflected in the contract terms agreed in December 1991, and how these were determined.

The price of the project

The price of the project comprises the Department's direct and indirect expenditure and tolls paid by users

- 5.6 As shown in Part 3, the Department's direct expenditure on the bridge project totals some £14.6 million in cash terms (Figure 9), and there is potential indirect expenditure from the closure of the ferry. Users also of course pay tolls for the bridge over the lifetime of the concession contract (compared with payment of ferry fares for an indefinite period had the ferry service continued).

The total tolls to be paid by users over the life of the concession were determined by the developer's forecast costs, after allowing for the Department's forecast contribution of £6 million.

- 5.7 Figure 10 shows the total toll payments by users over the life of the concession were determined by the expected costs to the developer of building, financing and operating the bridge. This analysis is based on the developer's forecasts in 1991, accepted by the Department for the negotiation of the deal with the developer. However all values are expressed in the same way that toll revenues are measured within the Skye concession contract, allowing them to be compared on a common basis. This analysis illustrates some important features of the financing of the bridge project:

As regards the forecast project costs

- The private sector meet construction (£20 million) and operating (£4 million) costs and bear risks from these items.
- £4 million in total is the net cost of financing the bridge project, measured as the amount by which the financing costs exceed the Government's own cost of capital, which is around six per cent a year in real terms.

And as regards the forecast project income:

- Total tolls to be paid by users are £24 million, after taking account of tax to be paid by Skye Bridge Limited on their profits and the Department's forecast contribution to the cost of the approach roads.

Figure 10: Financing the Skye Bridge - key features

| Forecast lifetime payments to and from the project | Paid by/to | Amount (£ million discounted*) | |
|--|--|--------------------------------|-----------|
| Costs of the project: | | | |
| Construction costs | Contractor | 20 | |
| Operational costs | Contractor | 4 | 24 |
| External financing costs (net) : | | | |
| Debt financing costs and fees | Commercial banks and lenders | 1 | |
| Dividends | Equity investors (Millers and Dywidag) | 3 | 4 |
| Total costs borne by Skye Bridge Limited | | | 28 |
| Payments to Skye Bridge Limited: | | | |
| Tolls | Users | 24 | |
| less Taxes | Skye Bridge Limited | -2 | |
| Contribution to the cost of approach roads | Department | 6 | |
| Total payments to Skye Bridge Limited | | | 28 |

Source: Bank of America finance model October 1991

* All figures are lifetime project costs as forecast in 1991 expressed in constant 1991 prices discounted at 6 per cent a year to 1991 base year. This is how toll revenues are measured within the Skye concession contract and allows the figures to be compared on a common basis. For this presentation all figures are rounded to the nearest £1 million

The Figure shows that the total payments by users over the life of the concession were determined by the expected costs to Skye Bridge Limited of building, financing and operating the bridge. In particular:

1) The forecast project costs

- **The private sector meet construction (£20 million) and operating (£4 million) costs and bear risks from these items.** Skye Bridge Limited would contract with Miller-Dywidag to carry out the construction. The contract would be at a fixed price, transferring the risk of cost overruns and consequent losses to Miller-Dywidag, but Miller-Dywidag would have the opportunity to make a profit on the construction contract.
- **At the time the deal was signed Skye Bridge Limited were expecting to contract out operations to a third party.** In the event they have contracted operations to Miller-Dywidag, again transferring to them both the risk of loss and the opportunity for profit.
- **£4 million in total is the net cost of financing the bridge project.** Because the values above are discounted at 1991 prices assuming a discount rate of 6 per cent and inflation of 6 per cent a year, the net external financing cost of £4 million represent the extra cost of the financing compared to an interest rate of 12 per cent. The bulk of this would go to the providers of equity capital, Millers and Dywidag, providing them with a return substantially in excess of 12 per cent. If interest rates and inflation do not perform as Skye Bridge Limited hope, though, the cash available to pay dividends and thus the return to the equity investors will be reduced.

2) The forecast project income

- **Total tolls to be paid by users are £24 million.** This is the Required Net Present Value, that is the contractual figure which measures the total amount which may be collected by Skye Bridge Limited before the concession is terminated. Actual cash payments will be substantially larger because the value here is stated in constant 1991 prices and after discounting.
- **Skye Bridge Limited were expected to have to pay £2 million as Corporation tax on their profits.**
- **The Government contribution for the approach roads would be £6 million.**

Construction and operating costs were in line with the Department's expectations

- 5.8 As noted in Part 1, the Department's advisers had costed a concrete box type bridge, and this type of design turned out to be that selected by the winning bidder for the project, Miller-Dywidag. The cost they showed in their bid, equivalent to £20 million in Figure 10, was in line with the costings by the Department's advisers and much lower than the estimated costs of construction offered by the other bidders. This gave the Department reassurance that the Miller-Dywidag construction cost was reasonable.
- 5.9 Similarly, the Department considered that the operating, administration and maintenance costs indicated by Miller-Dywidag were reasonable. In particular these costs were substantially lower than the other bidders had offered.

Major elements of the financing of the bridge were in line with market rates

- 5.10 By comparison with a conventionally funded bridge, the Department's additional costs include the excess of the project cost of capital over the Government's cost of capital. The Department did not make any estimate of these costs. The National Audit Office have estimated the additional cost of capital as approximately equal to the figure of £4 million for net external financing costs in Figure 10. On the central forecasts of traffic, interest rates and inflation the return to the equity investors would account for 73 per cent of these costs.
- 5.11 Figure 11 shows the financing obtained by Skye Bridge Limited in order to secure the deal. It shows that Skye Bridge Limited is exposed to a variety of risks relating to interest rates and inflation. For example, if interest rates were to fall relative to what was assumed in 1991 (as they have in fact done), the cost of the commercial bank debt would fall, because that debt is at a rate which varies with market interest rates, but the cost of the loan from the European Investment Bank would not fall, because the interest rate on that loan is fixed. If inflation rates were lower than assumed (as they have been) then Skye Bridge Limited's income would be lower too, because the level of tolls is linked to the rate of inflation. The index-linked loan stock would then have been less costly than expected, but other debt servicing costs would remain unchanged. The net effect of these changes could be positive or negative; the risk is borne by the providers of equity capital to the project, namely, Millers and Dywidag.

Figure 11: Key financing terms for the Skye Bridge development, December 1991

| Type of finance | Amount £ million | Interest rate | Term |
|--|---------------------|---|---|
| Commercial bank debt | up to 6.0 | LIBOR ¹ + 1.25% | 14 years |
| European Investment Bank loan | 13.0 | Fixed at 10% | 18 years including a grace period of 7 years |
| Index-linked loan stock | 7.5 | RPI ² + 6% | 20 years including a grace period of 14 years |
| Sponsor capital - equity and equity-like index linked convertible loan stock | 0.5 | Estimated at 26.4% ³ (18.4 % in real terms) | Estimated at 18 years ³ |
| Total | 27.0 | | |

Source: The Department

Note 1: LIBOR - London Inter Bank Offered Rate: the interest rate applying for loans from major banks to each other, that is very low risk lending.

Note 2: RPI - Retail Price Index

Note 3: The return to these investors and the timing of any payment is dependent upon the financial performance of Skye Bridge Limited and is not fixed. The actual rate of return depends on a range of variables including actual traffic flows, inflation, and whether or not the developer's estimated costs prove accurate. This estimate was based on the developers' accepted financial model.

- 5.12 The National Audit Office commissioned Price Waterhouse to evaluate whether the terms of the financing achieved were reasonable in the light of the risks involved in the project and accepted by investors and the financial markets at the time. Price Waterhouse concluded that the overall financing structure for the project and the terms obtained appeared reasonable (see Figure 12). Their assessment noted, however, that there is no clear benchmark for two elements of the external financing, namely the index-linked loan stock and the equity. These are the two highest risk elements in the financial structure.
- 5.13 As regards the loan stock of £7.5 million Price Waterhouse advised the National Audit Office that the market for such finance was not well developed in 1991 and that they doubted that a formal competition would have resulted in better terms in this case.
- 5.14 As regards the equity, the developers had hoped to follow the example of both Dartford and Severn and to use a financial structure which did not call for equity. Both the European Investment Bank and the lender of the loan stock insisted on an equity injection by the two parties to Miller-Dywidag, Miller Civil Engineering Limited and Dyckerhoff & Widmann. Such an injection reduces the risks to lenders that they will not be repaid. It also provides evidence of a continuing commitment to the success of the project by the developer. Thus the introduction of the equity was intended to improve the terms on which the debt could be raised. Price Waterhouse advised the National Audit Office that there is little against which to benchmark the rate of return these equity investors

Figure 12: Price Waterhouse assessment of terms of financing for the Skye Bridge

Capital structure

There is a very high proportion of debt (98 per cent) to equity, including equity-like sponsor loan stock (less than two per cent), with a significant element of index linked stock (28 per cent). This is helpful to project finance since such debt is generally cheaper to service and would result in lower tolls.

Both the Dartford and second Severn crossings, agreed around the same time as Skye, were financed by loans with no significant equity element. However both projects offered different - and generally lower - traffic and operating risks which removed the need for any significant equity financing.

Payment terms

The bank debt for Skye was serviced at variable interest rates, set at 1.25 per cent above the LIBOR. Although there was no competition to provide this debt, this rate was very much at the lower end of the range banks generally would have sought for this type of project in 1991.

The European Investment Bank debt was at a fixed rate, the normal arrangement for this bank, 10 per cent a year. This looks reasonable given that at the time UK minimum lending rate was 10.5 per cent a year.

The loan stock was at six per cent over RPI, suggesting a real gross redemption yield of some 6.6 per cent at the time. Real yields on similar gilts at the time were about 4.5 per cent. Price Waterhouse pointed out that the implied risk margin of two per cent needed to be considered against the background of the small number of institutions willing to fund this type of project, and Price Waterhouse's experience of significantly higher risk margins on other such projects.

The equity element of finance was less than two per cent of the overall capital. Based on the developer's projections the likely return was 26.4 per cent a year or 18.4 per cent in real terms. There is little to benchmark this against, though independent power projects which were financed rather later than the Skye project included equity elements with returns generally over 20 per cent.

Subsequent changes in interest rates

Interest rates generally have fallen since the Skye project. However it does not follow that the equity share holders are making significantly higher profits as a result, because:

- interest costs on almost 50 per cent of the debt is fixed;
- while nominal interest rates have reduced so has inflation; the tolls are linked to inflation and thus the revenues flowing into Skye Bridge Limited will also have reduced.

Source: Price Waterhouse

stand to receive if all goes well, though the return is lower than that agreed in privately financed power projects financed later than the Skye Bridge.

- 5.15 On receipt of the developer's proposals for the financing package the Department challenged the rate of return on the equity. The developer justified the figure by reference to the returns which the Department were advised were achievable on other projects. As providers of the highest risk capital for the project, the equity-holders would receive whatever money, if any, was left over at the end of the concession. The amount of capital they provided was determined by negotiation between them and the providers of debt finance. Figure 10 shows that on the central traffic case the equity providers would receive a substantial sum expressed in discounted terms, provided that interest rates and inflation also perform as originally assumed. That corresponds to a payment to the equity-holders of some £10 million (1991 prices) at the end of the concession.

Project benefits

The deal provides benefits to users and to the Department

- 5.16 **Users will gain.** The main benefits to users are: tolls which are with one exception lower in real terms than the previous ferry fares; significantly shorter journey times and greatly improved reliability in bad weather compared to the former ferry service; the complete elimination of charges once the concession is terminated; and the elimination of congestion and delay to the local community which arose from the former ferry service.
- 5.17 **The Department will gain by a reduced peak financing requirement compared to that of a conventionally funded bridge.** Figure 13 shows a comparison between the Departmental contribution to the privately financed bridge project and the forecast cost of construction of the whole project, derived from the successful bid. If the Department had chosen to build the bridge as a conventionally financed project their construction costs might have differed from the winning bid in the privately financed project. The figure probably understates therefore the extent to which a conventional bridge would have made its peak demand on public expenditure.

Figure 13: The Department's contribution to the construction costs of the Skye bridge

| | 1991 £ million | 1992 £ million | 1993 £ million | 1994 £ million | 1995 £ million | Total £ million |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| The developer's forecast construction costs (forecast in 1991, 1991 prices) | 12.3 | 9.6 | 3.0 | 1.0 | 1.4 | 27.3 |
| The Department's contribution (actual payments, 1991 prices) | 3.0 | 6.0 | 0.9 | 0.7 | 1.0 | 11.6 |

Source: National Audit Office; the Department

The benefits of the Skye bridge project include a reduced peak financing requirement compared to that of a conventionally funded bridge.

- 5.18 **The Department will gain also through transfer of risks to the developer and to the external financiers.** By fixing at the outset the total tolls and the Departmental contribution to the approach roads, the deal transfers risk to the developer and to the external financiers. Cost overruns in construction, operation, or financial management fall either on Skye Bridge Limited or on the contractor, Miller-Dywidag. Losses falling on Skye Bridge Limited reduce or eliminate the returns to the equity investors, Miller Civil Engineering Limited and Dyckerhoff & Widmann, and losses thereafter will mean that the external financiers will not get all of their money back.

- 5.19 By comparison with continuing the ferries, the deal transfers some traffic risk to the developers. In the event of very low traffic in future years the maximum concession period of 27 years might be reached before the total tolls paid had amounted to the contractual figure of £23.6 million. Had the ferries continued in operation, such a shortfall in traffic would potentially have increased Caledonian MacBrayne's financing requirements and would thus have fallen on public expenditure.
- 5.20 The Department did not try to quantify the value to them of the risk transfer

The extent of risk transfer is in line with similar privately financed projects

- 5.21 Figure 14 shows how the major risks were dealt with both in the tender stage and in the development and concession contracts. The Department's expectations on risk transfer at tender stage were unclear in some areas (items 4, 7 and 11). The risk analysis also shows some differences in the risk position at tender and final contract (items 9 and 10).
- 5.22 The analysis shows that the developer did not accept full responsibility for all of the more important (potential high impact - items 1, 4, 6) risks of the project. In particular, the Department took the risk of increases in construction costs arising from the public local inquiry. This is still widely regarded as normal practice, although there are some current cases in which bidders are being asked to bear elements of public inquiry risk. In this case though, as shown in Parts 2 and 3, the impact has been to substantially increase the price of the project for the Department compared to the position accepted at the outset of the contract.
- 5.23 In the light of this analysis, the National Audit Office sought the views of Price Waterhouse on whether the risk allocation was in line with current best practice in privately financed projects. Price Waterhouse concluded that the risk allocation as finally settled is broadly in line with other similar projects.

Figure 14: Skye bridge - risk allocation

| Risk item | Potential impact on project viability and/or costs | Department's intended allocation at tender stage | Actual allocation in development and concession contracts |
|---|--|--|---|
| 1. Legislation to enable private financing of roads and bridges | High | Department | Department |
| 2. Surveys and investigations | High | Developer | Developer |
| 3. Design (excluding planning matters) | High | Developer | Developer |
| 4. Planning: cost increase or delay due to public local inquiry | High | Unclear | Accepted by Department post contract |
| 5. Construction of approach roads and bridge | High | Developer | Developer |
| 6. Traffic | High | Shared | Shared |
| 7. Financial risk: | | | |
| Interest rates | Medium | Developer | Developer |
| Inflation | Low | Shared | Shared |
| Changes in corporation tax rates | Medium | Unclear | Shared |
| 8. Force majeure | Medium | Largely the Department | Largely the Department |
| 9. Land acquisition | Medium | Developer | Shared |
| 10. Latent and inherent defects | Medium | Developer | Shared |
| 11. Changes in VAT treatment of project | Medium | Unclear | Department |
| 12. Hand back condition | Medium | Developer | Developer |
| 13. Bridge maintenance and operation | Low | Developer | Developer |
| 14. Maintenance of approach roads | Low | Department | Department |

Source: Price Waterhouse

Appendix 1: Responsibilities for the Skye Bridge project

- 1 This appendix describes the responsibilities of the Department and the former Highland Regional Council for the provision of roads in Scotland, and the role of each in implementing the Skye Bridge project. Highland Regional Council were succeeded by Highland Council from April 1996, as part of the reorganisation of local government in Scotland.

The Department exercise central government's responsibility for managing national roads in Scotland

- 2 The Department are responsible on behalf of the Secretary of State for Scotland for the construction and maintenance of national roads in Scotland under the Roads (Scotland) Act 1984. National roads are the national network of primary roads for through traffic consisting of motorways outside cities and all other roads designated as trunk roads under the Act. They account for some 3,250 kilometres or around six per cent of the total Scottish roads network. Other roads are the responsibility of local authorities.
- 3 In 1996-97 the Department forecast expenditure of £226 million on the national network, representing investment in major construction, improvement and repair projects (£171 million) and maintenance and other current expenditure (£55 million).
- 4 While around 120 professional, policy and administrative staff of the Department's national roads directorate are responsible for implementing this programme private sector involvement is also central to it. Since 1991 the Department's contracting strategy has been to allow contractors more opportunity to influence design, and to give them the incentive to exercise their innovation and expertise to contain costs. Under this strategy most major contracts since 1991 have been awarded on a lump sum fixed price basis, including increasing use of "design and build" contracts where a single contractor is responsible for all aspects of design and construction at a fixed price. Under the Private Finance Initiative the Department

are seeking to complete major new projects under “design, build, finance and operate” contracts, for example the £160 million upgrading to motorway of the A74 link with England.

Other roads are the responsibility of local government

- 5 Following reorganisation of Scottish local government from April 1996 there are 32 local roads authorities in Scotland. These authorities own and manage all public roads outside the national network, almost 50,000 kilometres, including “A” class local principal roads and other local classified and unclassified roads. In 1995-96 these authorities projected expenditure on roads provision and maintenance of some £160 million.
- 6 In addition to their direct responsibilities for local roads, local authorities may act as agents on behalf of the Secretary of State to manage construction and maintenance works on national roads. Local authorities are responsible for all routine maintenance of national roads in Scotland, under contracts the Department awarded in 1996. They have also acted as the Department’s agent for procuring new road schemes in cases where the scheme lies on the boundary between the national and local roads networks.

The former Highland Regional Council played an important role in the inception of the Skye bridge project

- 7 The first proposals for a bridge crossing between the Isle of Skye and mainland Scotland date back almost 60 years. In 1985 Highland Regional Council commissioned feasibility work from engineering consultants JMP to examine the economic justification and the social and economic impacts of a Skye bridge, and to identify possible routes. This work, completed in 1986 and updated in 1988, demonstrated that a bridge could be economically and environmentally justified. However the Council could not fund the estimated construction costs which exceeded their entire annual roads budget, and in 1986 they commenced discussions with the Department on how a bridge might be provided.

The Department accepted responsibility for the Skye bridge as a national roads project in October 1989 and continued to consult Highland Regional Council

- 8 The Department were satisfied that the Council’s analysis was reasonable, but they considered a bridge to be a low priority. Though the bridge would improve links between the mainland and the Western Isles, and thereby provide a sensible extension to the national road network, competing demands for investment on more heavily used roads elsewhere in Scotland were expected to provide a

higher economic return. In 1988 the Government stated that they saw little prospect of providing a publicly funded bridge to Skye within the next 20 years, although they were prepared to consider making a contribution towards the construction costs of a privately financed bridge in order to make this viable. This coincided with some construction companies expressing interest in such a solution.

- 9 Following a meeting between the Council and the responsible Minister in August 1989, and the Council's formal request in October 1989, the Department agreed to seek provision of a bridge as a private finance project. They immediately took forward procurement of the bridge as a national road under a competition for a design, build, finance and operate contract (see Part 1). From this point the Department took prime responsibility for the bridge though they continued to consult with the Council on aspects of the project, as is normal where there are significant local interests to be considered.
- 10 In September 1991, prior to the award of contract to the selected developer in December 1991, the Department consulted Highland Regional Council to confirm their support for the bridge project and the toll package then proposed by the developer. In ratifying these proposals the Council took into account a wider undertaking made by the Minister in September 1991 concerning infrastructure investment in the region. This provided assurance that the Government were "keen to progress improvements on the A830 Mallaig road as quickly and efficiently as practicable".
- 11 The section of the A830 in question is the 25 kilometres between Mallaig and Lochailort. The Department began improving this section in 1978 with a small project at Loch Nan Uamh followed by both the Mallaig to Lochan Doilead and Lochailort to Polish Bridge sections which were completed in 1988 at a cost of £5.4 million. Since then the Lochan Doilead to Kinsadel section at £9.6 million has been completed (1994) and the Polish Bridge to Loch Nan Uamh section at £6.5 million estimated is now under construction. Two sections remain under consideration, Arisaig to Kinsadel and Loch Nan Uamh to Arisaig.

Highland Regional Council acted as the Department's agent during construction of the Skye bridge

- 12 In July 1992, at the start of the construction works for the bridge by the selected contractor, the Department appointed Highland Regional Council to act as their agents to manage the construction stage of the project. Acting with the Department and their engineering advisers, the Council scrutinised the compliance of the

developer's work with the specified contract terms, including engineering, design and construction standards. The Council were also responsible for certifying and making contract payments to the developer drawing on advances from the Department.

- 13 The Department have retained responsibility for monitoring the operation of the toll concession contract following the opening of the bridge in October 1995, as detailed in Part 1.

Appendix 2: Main features of the Skye Bridge development and concession contracts

- 1 The Department awarded two contracts in December 1991 for the provision of the Skye Bridge: the development contract and the concession contract.
- 2 The contractor in both cases is Skye Bridge Tolls Limited, now trading as Skye Bridge Limited.
- 3 Skye Bridge Limited are a private company formed for the purpose and owned by the consortium winning the Department's competition for the crossing. The members of the consortium are:
 - a) a joint venture between Miller Civil Engineering Ltd and Dyckerhoff & Widmann AG (known as Miller-Dywidag);

Miller Civil Engineering Ltd are a wholly owned subsidiary of the Miller Group Ltd, a British-owned private limited company with headquarters in Edinburgh. Dyckerhoff & Widmann are a German public company with headquarters in Munich.
 - b) Bank of America International Financial Corporation.

Development contract

- 4 Skye Bridge Limited contracted with Miller-Dywidag for the construction of the bridge and, in a separate contract, for its operation. Skye Bridge Limited also raised the finance for the project, which, as is common in such projects, is secured on the revenues and assets of the project itself. (These assets do not include the bridge itself, which remains the property of the Secretary of State throughout the concession.) The owners of Skye Bridge Limited did not borrow in their own names or on their own credit to finance the project. This means that any liability which falls on Skye Bridge Limited has to be covered by toll revenues, by loans from external financiers or from equity capital put up by the owners of Skye Bridge Limited: the liability of the owners is limited to the equity capital they have put up.

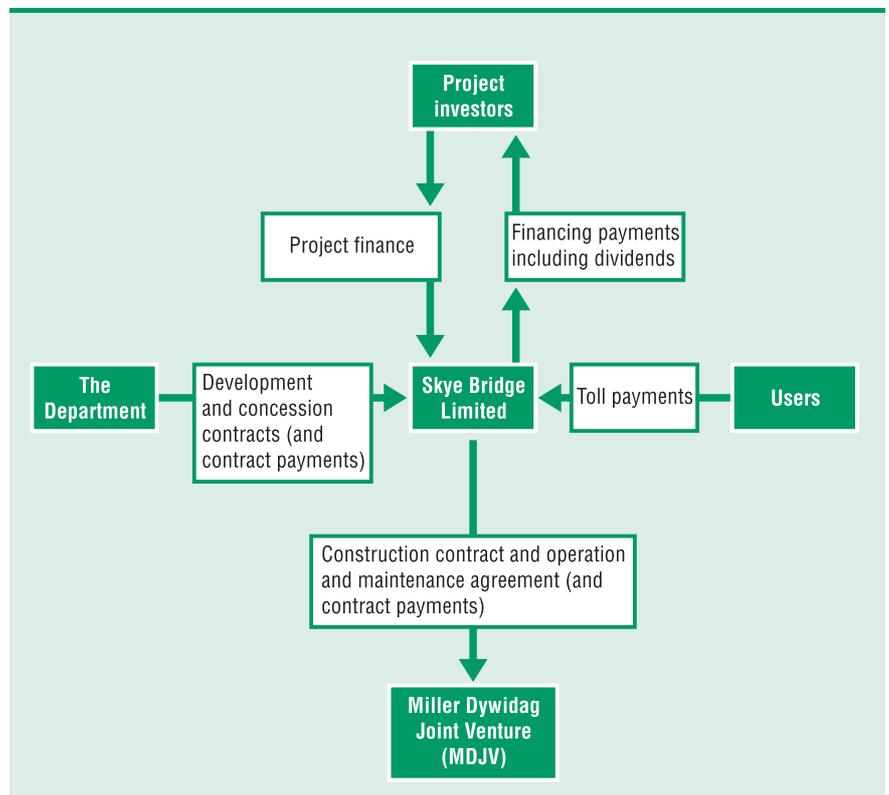
- 5 Under the development contract Skye Bridge Limited had to secure the design and construction of the Skye bridge and its approach roads to the Department's specified technical requirements, within the specified period of three years from commencement. As noted above Skye Bridge Limited have entered into a construction contract with Miller-Dywidag who, with their sub-contractors, have designed and constructed the bridge.
- 6 In consideration for this the Department were required to pay Skye Bridge Limited £6 million in 1988 prices, index linked to the date of payment and the achievement of defined completion milestones. In addition they have paid by agreement a further £3.8 million for the cost of changes arising from the 1992 public inquiry. The Department's total actual payments to the developer are £11.6 million, equivalent to £8.9 million in 1988 prices.
- 7 The Department appointed Highland Regional Council to act as their agents to manage the construction stage of the project. The Council in turn appointed engineering advisers to scrutinise the quality of work including compliance with specified engineering, design and construction standards. Drawing on funds advanced from the Department Highland Regional Council have made the contract payments due to Skye Bridge Limited, after scrutiny and certification by their engineering advisers.
- 8 Skye Bridge Limited had to bear the costs of any changes they proposed to their design, which had to be approved by the Department. The Department had to bear the costs of any design changes caused by changes in legislation or by other changes they require.

Concession contract

- 9 Under the concession contract the Department have assigned to Skye Bridge Limited the rights, under toll orders which may be issued from time to time, to charge tolls for traffic using the crossing.
- 10 The contract specifies the basis for calculating maximum tolls, linked to a schedule of tolls corresponding broadly to actual ferry fares in 1991 with adjustments allowed for inflation. Skye Bridge Limited may operate the concession for a maximum of 27 years, or until the net present value of accumulated revenues collected total £23.64 million if this occurs earlier.
- 11 Skye Bridge Limited responsibilities are to:
 - a) maintain and repair any damage to the main bridge for the period of concession;

- b) remedy any defects in the approach roads during the first year of use;
 - c) provide a maintenance bond of £250,000 to cover any disputes over the standard of maintenance;
 - d) hand the bridge back to the Secretary of State in a fit condition for the design life of 120 years;
 - e) remove the toll collection facilities at the end of the concession period.
- 12 The contract provides for the Department to have access to Skye Bridge Limited's financial records and to the bridge to audit the collection of tolls and to verify that the bridge is well maintained.
- 13 Figure 15 below summarises the interactions between the five parties principally involved: the Department; Skye Bridge Limited; Miller-Dywidag; project investors; and bridge users.

Figure 15: Main features of the Skye Bridge development and concession contracts



Source: National Audit Office

Appendix 3: Methodology used by the National Audit Office

Scope of this study

- 1 The National Audit Office examined how far the Department achieved their objectives for the project. Since the Department's primary objective, the early provision of a privately tolled crossing to Skye, had clearly been achieved, the National Audit Office's examination focused on the achievement of the Department's secondary objectives, which were as follows:
 - Design - design of the crossing and approach roads to take account of the sensitivity of the environment, ensuring that any bridges are of international standing appropriate to the special setting.
 - Cost - deliver a toll no greater than the ferry fare, linked to inflation, paid off in 20 years, with the Government funding the approach roads.
 - Value for Money - achieve value for money by using public funds as effectively as possible with a tender competition for the design, build, finance and operation of the crossing including the design and build of the approach roads.

Main aspects of the National Audit office's methodology

- 2 The examination covered:
 - procedures: how the Department went about the task

The purpose of this part of the National Audit Office's examination was to assess the extent to which the Department's procedures were well chosen and likely to give an outcome in line with their objectives. When there are, as in this case, departmental objectives which cannot be quantified, well chosen and well executed procedures give some assurance about the outcome even if it cannot be measured.

- outcome: how far the outcome did in fact meet the objectives.

This part of the examination involved assessment and where possible quantification of the eventual outcome of the Department's work, including reviewing the Department's own assessment of the outcome.

3 To carry out the examination, the National Audit Office:

- collected information about the deal;
- used external technical experts to advise on specific issues
- evaluated the information and advice received.

Collection of information

4 The National Audit Office collected information from the following sources:

- a review of the Department's files relating to the transaction and of the legal agreements underpinning it;
- a review of the proceedings and report of the public local inquiry;
- examining Departmental officials and advisers on how they handled the negotiation of the deal;
- interviews with representatives of the winning consortium
- organisations or individuals having a substantial interest in the project (Figure 16 lists those consulted).

Use of external technical experts

5 The National Audit Office engaged Price Waterhouse Project Finance, to advise on the extent to which the Skye Bridge deal was in line with what has emerged 5 years later as standard or best practice in privately financed projects.

Figure 16: Organisations consulted by the National Audit Office

The private sector developers

- Skye Bridge Limited, the Department's contractor for the development and operation of the Skye bridge.
- Miller Construction Limited and Bank of America, on behalf of the joint venture consortium winning the competition for the Skye crossing.

Other firms involved in the competition for the crossing

- Morrison Construction Group Limited.
- Sir Robert McAlpine Limited.
- Norwest Holst Construction Limited.
- Trafalgar House Construction (Special Projects) Limited.
- Lilley Construction.

Interest groups

- Skye and Kyle Against Tolls (SKAT).
- Skye Bridge Appeal Group.

Organisations concerned with design and environmental aspects

- The National Trust for Scotland.
- The Royal Fine Art Commission for Scotland.
- Scottish Natural Heritage, the successor body to the Countryside Commission for Scotland.

Local authority

- Highland Council

Source: National Audit Office

Evaluation of the information collected

Procedures

- 6 The National Audit Office examined the procedures used by the Department to see:
 - a) how the major decisions taken by the Department impacted on the achievement of the Department's objectives;
 - b) whether the procedures followed good practice for transactions of the kind involved in the Skye Bridge;
 - c) in particular, how effectively competition was brought to bear throughout the process.

Outcome

- 7 The National Audit Office's approach to evaluating the outcome was to consider what tests would be appropriate to test the achievement of each objective individually, as follows:

Design objective

- 8 The principal test of the achievement of the objective that environmental sensitivities should be taken into account and that any bridges be of international standing was the outcome of the

1992 public local inquiry. The National Audit Office also consulted organisations who were interested in the environment and design aspects of the project.

Cost objectives

- 9 The evaluation of the Department's achievement of their objectives as to the amount and duration of the tolls and the direct Departmental expenditure on the project focused on the following questions:
- Whether the legal agreements stipulate that tolls may not exceed real ferry fares, and if not, what limit are placed on the amount by which the tolls may rise above the real ferry fares?
 - Whether the legal agreements stipulate that the concession shall terminate within 20 years, and if not how likely it is that a concession period longer than 20 years might be required?
 - Whether the Department limited their financial contribution to funding the approach roads only?
 - How they controlled their costs on arranging the project?

Value for money

- 10 The evaluation of how far the project would achieve value for money considered the following questions:
- Applying the Department's standard economic tests, was the project a good use of resources as planned and as executed?
 - Were there other tests of value for money applied by the Department?
 - What is the distribution of contract costs, risk and rewards between the Department, users and the developer? Can the contract costs be related to the expected benefits of the project?
 - Were contract costs determined competitively, or if not are they consistent with market- based comparisons?

Appendix 4: The Department's cost benefit analysis

- 1 This section explains the Department's cost benefit analysis techniques and how they were applied in the Skye case.
- 2 Since the 1960s the Department have used cost benefit analysis as a standard element of their evaluation of potential road projects. Such assessments quantify the economic benefit to be obtained from a proposed investment, by comparing benefits such as faster journey times and savings in delays, lower accident rates etc with the cost of road construction and maintenance.
- 3 The Department's cost benefit assessments of the Skye bridge were based on these standard techniques. They involved a comparison between the options of a bridge or continuing the existing ferry service. The costs and benefits of each option were estimated to establish whether the additional costs of the bridge would be a good use of scarce economic resources due to the benefits it would bring compared to continuing the ferry service.

The basis for estimating bridge construction and operating costs

- 4 The construction and operating costs of the bridge are relatively easy to determine. Construction costs can be estimated using the market prices for materials and labour etc to be used. The Department's engineering advisers made estimates of the costs of these items.

Estimating other bridge costs

- 5 Using the bridge means that vehicles have to travel slightly further than they would using the ferries, thus increasing slightly the operating costs. The Department have standard values for the impacts of increased distances on vehicle operating costs, petrol, tyres etc. and these were included as a cost of the bridge in the assessment.

The basis for estimating the benefits of a bridge

- 6 The benefits of constructing a bridge are less straightforward to determine as markets for these benefits - for example time savings - do not explicitly exist, though the Department has a methodology for valuing these savings.

Time savings

- 7 The assessed benefits of the bridge are largely in the form of time savings. These are seen as benefits because people do not generally travel for the sake of the journey itself, but for the enjoyment they get at their destination, so a reduction in travel time will allow them to reach their destination sooner. The notion of people valuing time savings can be illustrated by the fact that some are prepared to pay significantly more to travel by air than by slower modes such as long distance rail.
- 8 In the case of the bridge, the benefits arise from savings in time required to make the crossing between Kyle and Kyleakin, and in the amount of time previously spent waiting to board the ferries, particularly during the busy summer season when queues grew long. The Department estimated that the bridge would on average save some 14 to 18 minutes per vehicle over the year, after allowing for necessary queuing at the toll plaza on the bridge. The delays involved were measured using surveys of ferry travellers in 1991, and costed at standard time savings values, as applied in other roads investment appraisals.
- 9 Different values are used for savings in work time and non-working time, and these are applied to proportions of vehicles in each mode, again based on ferry survey data. Thus for the assessment the Department assumed that 90 per cent of traffic using the bridge will be cars, and 85 per cent of these will be in non-work time; 10 per cent of total traffic was assumed to be work vehicles other than cars, such as heavy goods vehicles.

Appraisal period and traffic forecasts

- 10 The Department's assessments were based upon a 30 year time horizon, the standard period for road project assessments, requiring the Department to allow for the effect of traffic growth over that period. For example if traffic grows over time, ferry delays would be expected to increase - because of the fixed capacity of a ferry - so the time savings benefits gained by using the bridge will increase.
- 11 The starting point for the Department's bridge traffic forecasts were the latest available ferry crossings data, increased for an expected one-off increase in traffic of ten per cent once the bridge was open.

The Department applied standard national forecast traffic growth rates to this base figure to derive forecasts over the 30 year appraisal period. Traffic forecasting involves a degree of uncertainty so a range of high and low growth forecasts were used - again using standard values - and a weighted average taken to derive the final figure for time saving benefits.

Discounting

- 12 It is essential in cost benefit analysis that all money values are assessed on a constant basis. The costs and benefits occur at different times over the appraisal period and the figures must take account of inflation. The Skye bridge appraisals were therefore stated in constant 1988 prices.
- 13 Appraisals must take account also of the fact that costs and benefits have different values depending on when they occur: people usually prefer to incur costs later and receive benefits sooner. In practice this effect is accounted for by applying a “discount factor” which determines how quickly the future value of money decreases over time. This is similar to the way in which a real rate of interest determines how quickly the value of money increases over time.
- 14 For their Skye bridge assessments the Department used a real discount rate of 8 per cent a year which is the standard rate for road investment appraisals. Figures discounted in this way are described as “present values” and the year to which they are discounted is the “present value year” - in the Skye case this was 1988.
- 15 The present value of costs of the Skye bridge was compared with the present value of benefits to derive the net present value (NPV) of the bridge. In 1996 at the request of the National Audit Office the Department’s advisers performed an analysis based on the latest costs and benefits. This analysis gave a weighted average NPV of **£6.5 million** in 1988 prices, discounted to 1988. This shows that the present value of benefits gained from the bridge outweighs the present value of costs so the bridge is a worthwhile use of economic resources using standard appraisal assumptions.

Treatment of wider costs and benefits

- 16 The Department’s cost benefit analysis included only benefits for which an established method of quantification exists. It did not include other non-quantifiable costs and benefits such as the impacts of the bridge on the environment, though environmental factors were subject to separate assessment.

- 17 Some of those living on the island consider that their special lifestyle has been lost due to the bridge, which they would see as a cost which the Department's cost benefit analysis did not take into account. However, there are other impacts which would be considered as benefits by others which were also not explicitly included in the appraisal. For example, further economic benefits due to an increase in tourism which may occur due to easier access from the mainland.

Reports by the Comptroller and Auditor General Session 1997-98

The Comptroller and Auditor General has to date, in Session 1997-98, presented to the House of Commons the following reports under Section 9 of the National Audit Act, 1983:

| | |
|--|------|
| Regulation and Support of Charities..... | HC 2 |
| Managing the Millennium Threat..... | HC 3 |
| University of Portsmouth..... | HC 4 |
| The Skye Bridge | HC 5 |