

The financial analysis for the London Underground Public Private Partnerships

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 54 Session 2000-2001: 15 December 2000



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 National Audit Office
Comptroller and Auditor General 14 December 2000

The Comptroller and Auditor General is the head of the National Audit Office employing some 750 staff. He, and the National Audit Office, are totally independent of Government. He certifies the accounts of all Government departments and a wide range of other public sector bodies; and he has statutory authority to report to Parliament on the economy, efficiency and effectiveness with which departments and other bodies have used their resources.

For further information about the National Audit Office please contact:

National Audit Office
Press Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP

Tel: 020 7798 7400

Email: enquiries@nao.gsi.gov.uk
Website address: www.nao.gov.uk



Contents

Summary	1
Lessons for future Public Private Partnerships	2
London Underground is following a thorough process for a financial evaluation	3
The Public Sector Comparators have been carefully prepared	3
The evaluation of bids has been thorough and comprehensive	6
The Public Sector Comparators need to be interpreted carefully	8
There is inherent uncertainty in modelling the costs of the London Underground infrastructure over 30 years	8
The financial models alone would provide only limited guidance to the most likely cost of a public infrastructure operation	8
There is uncertainty over the most appropriate financing approach for the cost of public infrastructure operation	9
Financial analysis does not cover all the factors affecting value for money	11
Using the financial analysis in decision-making	13
Glossary	15
Appendices	
1. The Public Private Partnership approach	17
2. Methodology	18
3. National Audit Office and Public Accounts Committee Recommendations on Public Sector Comparators	20

summary

- 1 London Transport is currently in the process of evaluating bids for the Public Private Partnerships (PPP) for the funding and management of the infrastructure of the Tube. London Underground Limited (London Underground) is the subsidiary of London Transport responsible for implementing the PPP approach. This approach involves the transfer of trains, stations, track and some 6000 staff to three separate infrastructure companies under 30 year contracts for different parts of the Tube. In March 2000, the contracts were expected to deliver £12-13 billion of capital and maintenance work in the first 15 years of the contract¹. Under the PPP approach, London Underground will retain responsibility for the operation of train and station services. Appendix 1 describes the PPP contractual framework in more detail.
- 2 London Underground has now received Best and Final Offers from bidders for two of the three PPP contracts². The bidding process for the third contract is at a less advanced stage. After considering bids, London Transport will make a recommendation to the Secretary of State for the Environment, Transport and the Regions, who will take the final decision on whether to approve the PPP contracts. On present plans, London Transport will transfer its responsibilities to Transport for London in the summer of 2001.
- 3 The Department of Environment, Transport and the Regions (the Department) and London Transport intend to award the PPP contracts to private sector bidders only if they pass two separate tests:
 - **the safety test:** whether changes to the structure of the Tube will maintain or improve current safety standards;
 - **the value for money test:** whether the bidders offer superior value for money when compared to an alternative, publicly-funded infrastructure operation.
- 4 To inform the judgement about value for money, London Underground is undertaking extensive financial analysis. It has prepared estimates of the likely cost of publicly funding the infrastructure under alternative financing scenarios, including the issue of bonds. These cost estimates, which are made for the Tube infrastructure as a whole and for the three infrastructure companies, are called Public Sector Comparators (Comparators). London Underground has also evaluated the Best and Final Offers from bidders for the PPP contracts and estimated the likely costs of each. At the core of the financial analysis is a comparison between these two sets of estimated costs.
- 5 Following a recommendation from the Environment, Transport and Regional Affairs Committee³, we decided to report on the extent to which London Underground's financial analysis resolves the value for money test. Our methodology is explained in Appendix 2. The safety test is being considered by London Transport and the Health and Safety Executive and is not part of this report.

1 *Environment, Transport and Regional Affairs Committee, 14th report 1999-2000: Funding of London Underground, HC 411*

2 *Bids have been received for the BCV infrastructure contract, covering the Bakerloo, Central and Victoria Lines, and the JNP infrastructure contract, covering Jubilee, Northern and Piccadilly lines.*

3 *Funding of London Underground, 14th report, HC 411*

- 6 The report focuses on London Underground's methodology for the financial analysis of bids and the Comparators. Negotiations with bidders are still underway, so final figures are not available. The government's policy is that information on the value of the overall or individual Public Sector Comparators would risk giving bidders an advantage in the contract negotiations and therefore could have an adverse impact on value for money. In the light of this policy, our published analysis is at the level of the infrastructure as a whole, rather than the individual parts of the infrastructure which are the subject of bids, and no absolute values for the Comparators or bids are given. We are however keeping the whole bidding and decision process under review, and will report further as necessary. Meanwhile, we have published this first report to give analysis and comment at this stage for the benefit of Parliament.
- 7 We consider that London Underground has undertaken a thorough process in estimating the costs of public sector and PPP options. The ranges of values produced from the Comparators are of some use in guiding judgement. But, as London Underground recognises, a decision taken only on the basis of where a bid lies compared to the ranges for the Comparators would be unsound. The financial analysis provides useful but incomplete insight into the value for money of alternative approaches to managing and funding the Underground's infrastructure. The financial analysis does not, and could not, take into account all the factors which are relevant to assessing the relative value for money of the alternative approaches. It is essential that decision makers understand what lies behind the figures before reaching a conclusion. The main sections explain these conclusions further.

Lessons for future Public Private Partnerships

- 8 In some past PPP transactions, the process of preparing a Comparator has been separated from the rest of the PPP procurement. In this case, London Underground has ensured that there has been close co-ordination between its own engineers, technical advisers, and financial and modelling experts. This co-ordination should serve as an example of best practice for future PPP transactions elsewhere in the public sector.
- 9 As in this case, departments should in future ensure that value for money decisions are not based on one-dimensional comparisons of single figures.
- 10 Understanding the differences between the private sector and public sector approaches to the same output specification lies at the heart of assessing value for money. In choosing the PPP option, departments must always ensure that they understand how the private sector is delivering value for money, and why, in their judgement, it would not be possible for the public sector to achieve the same value for money. We understand that London Underground intends to undertake such an analysis in this case.
- 11 Financial modelling is an inherently uncertain technique, as London Underground has clearly recognised in this case. We consider that there may be benefits for future PPP transactions, in terms of time, cost and clarity, in modelling the Public Sector Comparator on a limited basis, with fewer variables and less complexity.
- 12 The success of a Public Private Partnership requires a genuine alignment of interests between contracting parties to ensure that partnership is more than just a statement of intent. Achieving this alignment means that all parties to and stakeholders in a deal need to be engaged throughout the process.



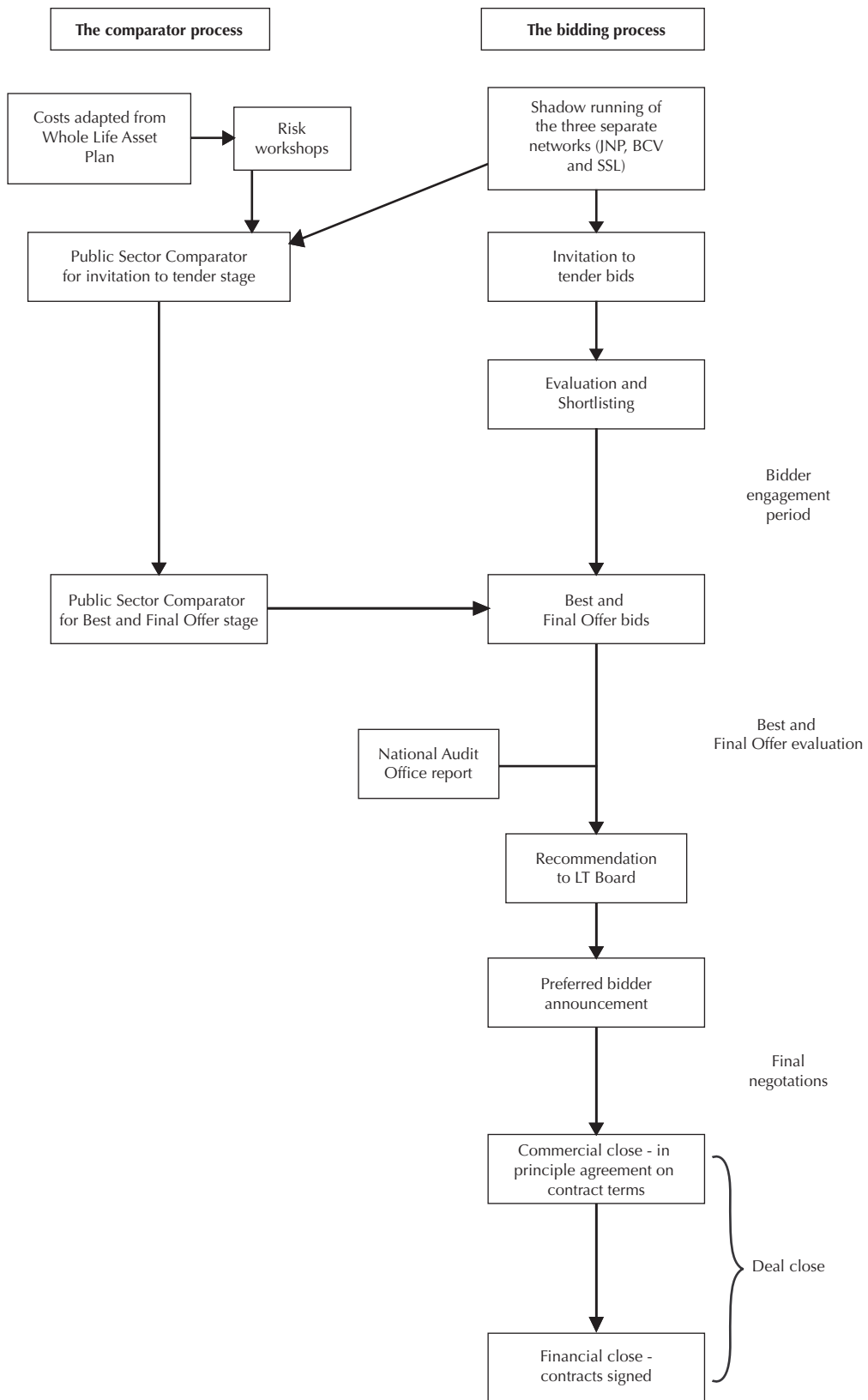
- 13 Value for money depends on a wide range of factors. Analysis of the financial implications of different options is one factor. This financial analysis typically involves three elements:
- the preparation of a **Public Sector Comparator**. A Public Sector Comparator is a benchmark against which value for money is assessed. It is typically a cost estimate based on the assumption that assets are acquired through conventional funding and that the procurer retains significant managerial responsibility and exposure to risk;
 - an **evaluation** of bids, which produces estimated costs of the private sector option;
 - and a **comparison** between the two sets of costs.
- 14 With three separate infrastructure contracts to procure, and the largest Comparator by value yet prepared by any public entity, the financial analysis in this case involves a large amount of complex information. The effectiveness of the process adopted to prepare and manage this information is therefore a key part of the overall reliability of the financial analysis.
- 15 We have found that London Underground has undertaken an exceptionally thorough process in preparing the capital and operating costs of the Comparators and the estimated costs of the bids. **Figure 1** presents the process in graphic terms.

London Underground is following a thorough process for a financial evaluation

The Public Sector Comparators have been carefully prepared

- 16 The process of constructing the London Underground Public Sector Comparators involved three stages:
- establishing a methodology;
 - producing an unbiased estimate of the costs to meet the required level of performance over 30 years; and
 - estimating the range of risks that would face a public sector infrastructure operation.
- 17 London Underground established a clearly documented methodology, which they published in March 2000. This methodology stated that the Comparators would estimate the costs of the public sector meeting the PPP performance specification. The methodology also stated that London Underground would estimate base costs, the risk margin to add to those base costs as a result of uncertainty and the likely efficiencies London Underground could achieve over time. Its intention was to ensure that risks for public sector procurement were fully and appropriately quantified, without either managerial bias towards optimism or an automatic assumption that any past shortcomings in managing risk will continue.
- 18 The base costs to meet the PPP performance specification have been carefully estimated, on the basis of London Underground's existing costings for individual assets, after attempting to strip out any contingency or margin on

1 The Process leading to the deal



those costings. This approach involved considering the scope of physical works designed to meet the performance specification to produce a Long Term Investment Plan. It appears to us that London Underground's approach to estimating the capital spending programme has been a reasonable one, although lack of past knowledge about asset conditions means that margins for uncertainty are inevitably substantial.

- 19** These base costs have been adjusted to reflect possible risks and efficiencies that could arise for a public sector operation. The risks were estimated on the basis of an analysis by engineering experts of London Underground's historic record of cost overruns. For example, on design and construction risk this involved consideration of some 242 individual projects, with an average overrun of 20 per cent for various reasons including client changes of scope and funding constraints. Engineers judged that some of the more extreme overruns observed on projects were genuinely one-off and could not be taken as indicative of likely future achievement. Other overruns were judged to be irrelevant, such as the costs of new tunnelling on the Jubilee Line Extension since no new tunnelling work is envisaged in the PPP requirement.
- 20** Engineers also estimated the likely efficiencies that London Underground could reasonably expect to achieve over the next 30 years. They concluded that some moderate cost savings could be anticipated, especially for investment in the station infrastructure. However, in other areas, such as investment in new rolling stock, they assumed that little improvement was possible because of the extensive use of PPP-style contracts in those areas already.
- 21** One of London Underground's key judgements was about its ability to meet performance targets. London Underground concluded that in the past, it has failed to meet the performance improvements expected from new investments, because of its failure to integrate systems effectively. It further concluded that these performance failures would occur in future investment projects, because learning from one project was not easily transferred to the next. As a result London Underground concluded that the Comparator should include the notional additional costs that such failures to meet the performance specification would impose on London's passengers, using its standard cost benefit techniques. This adjustment also applies to bidders.
- 22** **Figure 2** summarises the risk and efficiency categories used by London Underground.

2 The risk and efficiency categories used by London Underground

Factor	Description	Impact
Relative price effect	Reflects the uncertainty surrounding the impact of inflation on different categories of cost	Small increase in costs
Unit cost uncertainty	Reflects the uncertainty surrounding the estimates of unit costs within the basic cost estimates	Small increase in costs
Investment cost uncertainty	Reflects uncertainty over the proposed scope of investment projects, which, in London Underground's experience, always increases as the project progresses	Large increase in costs of more than 10 per cent
Maintenance uncertainty	Reflects uncertainty over the proposed scope of maintenance projects	Increase in costs
Performance uncertainty	Reflects the risk that London Underground's investment projects fail to deliver expected improvements, leading to a failure to meet the PPP performance specification	Large increase in costs, mostly estimated as the economic cost of delays to passengers
Efficiency uncertainty	Reflects efficiencies that London Underground could reasonably expect to achieve over the next thirty years.	Reduction in costs

Source: National Audit Office

- 23** London Underground did not quantify all of the key risks that it identified. Instead, it summarised them in a commentary on the Comparators provided to decision-makers. For example:
- the risk that legal disputes may arise under the PPP approach has not been quantified formally because it would be very difficult to estimate reliably.
 - the potential positive impact of the introduction of the PPP structure on the efficiency of the operating company retained in the public sector has also not been quantified.
- 24** London Underground has updated the Comparators since March 2000. Revisions have been well documented, and revising Comparators as more information becomes available complies with Treasury guidance and best practice. As a result of these revisions, the value of the Comparators has increased significantly between the shortlisting stage and the Best and Final Offer stage. The main reasons for the increase have been:
- net increases in the operating base costs (around 20 per cent of the increase) as a result of more up-to-date information on the costs of the infrastructure services and revised estimates of administrative costs, for example relating to existing PFI contracts for power, ticketing and communications;
 - changes in the scope of the PPP specification that bidders are being asked to meet (around 20 per cent of the increase); and
 - bringing the method of quantifying performance risk in line with that proposed for the evaluation of bids (around 60 per cent of the increase).
- 25** London Underground is obtaining independent assurance on the preparation of the Comparators from several sources. London Underground was supported by its engineering consultants, Ove Arup, who stated that they consider the Comparators represent a fair estimate of the costs of meeting the output specification, and by its financial advisers, PricewaterhouseCoopers. KPMG, London Underground's statutory financial auditors⁴, concluded that the methodology for the Comparators complied with relevant Treasury guidance and is expected to report that the final Comparators represent a reasonable basis for estimating public sector costs. Finally, London Underground has also acted on our own comments about its approach to the financial analysis.

The evaluation of bids has been thorough and comprehensive

- 26** Running parallel to the preparation of the Comparators, and forming the second part of the overall financial analysis, London Underground has been undertaking a bid evaluation process.
- 27** London Underground prepared and is following a thorough and comprehensive bid evaluation strategy to identify which bidder has submitted the most economically advantageous bid. The competition for the two deep tube infrastructure contracts is further advanced than that for sub-surface lines. Six bidders submitted initial bids in March for two deep tube contracts⁵ on the basis of a fixed Infrastructure Service Charge and target performance levels. The initial evaluation resulted in two bidders being shortlisted in July for each infrastructure contract. The shortlisted bidders then submitted Best and Final Offers in November.

⁴ KPMG are also auditors of London Transport and its successor, Transport for London.

⁵ Three for each of the deep Tube contracts.

- 28** The initial evaluation sought specified qualities in the bidders. These were: ability to deliver the required performance; asset stewardship, including evidence of safety and environmental competence; stewardship of London Underground's staff; acceptance of the principles of partnership; and value for money compared to the Comparators. The Best and Final Offer instructions are designed to build upon the initial bid submissions.
- 29** During the evaluation of the Best and Final Offers, London Underground is considering bid deliverability, together with technical, financial, legal and commercial and risk management factors, including financial robustness. It is also considering organisational factors to judge whether the bidder would be a suitable long-term partner for London Underground. The financial evaluation calculates net present values of payment streams implied by each bid and estimates the ranges of highest and lowest values for each bid.
- 30** Financial adjustments are being made in four categories: financial, technical, impact on London Underground's costs, and legal and commercial. These will take account of areas where there are doubts about or qualifications to aspects of the bids. Bids will also be adjusted for the additional or reduced customer benefits flowing from the different levels of performance bid to the extent that these are judged to be credible.
- 31** The estimated ranges of each bid are being compared to the Comparators to inform the value for money decision. London Underground is comparing these costs over the whole 30 year contract period, and also over the first 7½ years. The purpose of the 7½ year comparison is to consider the reasonableness of bid profiles and to protect against bidders attempting to bid low to win the contract and then adjust prices upwards following the first periodic review after 7½ years.



The Public Sector Comparators need to be interpreted carefully

- 32 In spite of London Underground's thoroughness described above, our analysis has shown that there are limits, which London Underground recognises, to the weight that can be put on the figures emerging from the Comparators exercise. These derive from three areas:
- there is inherent uncertainty in modelling the costs of the London Underground infrastructure over 30 years;
 - the financial models alone would provide only limited guidance to the most likely cost of a public infrastructure operation; and
 - the costs of public operation are influenced by the choice of financing scenario, including the availability and impact of bond finance and the costs of conventional public finance. Yet there is uncertainty about what some of these costs are and how they should be assessed.

There is inherent uncertainty in modelling the costs of the London Underground infrastructure over 30 years

- 33 Estimating London Underground's infrastructure costs over a 30-year period is an inherently difficult exercise. There is inevitable uncertainty resulting, for example, from the unpredictability of asset lives and the possibility of changes in the performance required from those assets. Furthermore, the performance specification requires an innovative approach to estimating costs since London Underground has not traditionally estimated costs to meet a defined performance specification, so its historic records may not provide an ideal basis for estimating costs over the next 30 years.
- 34 It is difficult to model strategic options available to public sector entities in the future. For example:
- the Comparators assume a persistent level of overrun in infrastructure investment projects over the 30 year period. It is perhaps unlikely that London Underground's managers and owners would tolerate persistent failure without decisive action. But it is difficult to define in a model exactly what action would be taken and when.
 - it can also be difficult to capture in a model the value of public sector flexibility to reflect changing priorities, or the opposite risk that a public sector entity repeatedly revises its targets and incurs excess transitional costs as a result.

The financial models alone would provide only limited guidance to the most likely cost of a public infrastructure operation

- 35 The financial model used for the Comparators produces a range of possible values. The range of the combined Comparators for all three infrastructure contracts is several billion pounds⁶ between the lowest and highest values. The model also produces single expected values, but we, London Underground and its advisers have concluded that single values should never be relied on in a financial analysis, especially given the particular characteristics of this exercise.

⁶ For reasons explained in paragraph 6, we have not given absolute values. The range referred to here is the range of net present values at a real discount rate of 6 per cent over 30 years.

- 36** As noted in paragraphs 18 to 22, the model depends on fixed inputs of base costs, which are multiplied by inputs of plausible ranges for risk and efficiency factors. These input ranges are used to generate several hundred possible values for the Comparators, from which the output ranges have been generated. The risk and efficiency factors are therefore the drivers of the ranges of values, and reflect London Underground's best judgements about the uncertainties facing a public sector infrastructure operation.
- 37** The value of each uncertainty factor depends on the elicitation of upper and lower values from engineering experts, as described in paragraphs 18 to 22 above. For example, for signalling investment, engineers anticipated an upper level of overrun of 27 per cent and a lower level of 13 per cent. In the absence of any clearer information, London Underground assumed that the most likely value was the mid-point of the upper and lower range (for example, 20 per cent in the case of signalling investment). As a result of using that assumption, the financial model might be taken to suggest that the most likely value of the public sector costs lies in the middle of the ranges which the model produces. That conclusion would be implausible. As is well known, major projects sometimes are delivered below budget, but very rarely by a wide margin below. But major projects do sometimes overrun their budgets very considerably. That should mean that the most likely outcome would be in the lower half of the range and not in the middle as in this case.
- 38** Furthermore, the modelling process appears to have considered uncertainty factors on an individual, line-by-line basis, rather than an holistic basis. Because this comprehensive approach has been used, a large number of variables over 30 years have been input into the model. In such circumstances, it is difficult to be sure that there has been no double-counting of uncertainty in different factors. A smaller model, with fewer key variables, might have made possible a more integrated analysis of the risks facing London Underground.
- 39** As a result of these issues, we and London Underground have concluded that the modelling provides some useful information about the upper and lower bounds of public sector costs over the next thirty years but cannot reliably be taken to produce a single expected value within those boundaries.

There is uncertainty over the most appropriate financing approach for the cost of public infrastructure operation

- 40** The comparison of the Public Sector Comparators and the PPP bids involves a series of financing and economic assumptions. These cover:
- the source of funding for the public sector operations - essentially conventional funding or bond funding;
 - the cost of capital relevant to each source of funding (for example, the interest costs on bonds); and
 - the government's time discount rate, which is used to discount future costs and present them as net present costs.
- 41** London Underground's conventional funding scenarios assume that the infrastructure operations are funded through a mixture of fare revenues and general government revenues. London Underground has supplemented this with bond funding scenarios, which envisage bonds issued by Transport for London in three tranches and with a credit rating based on an indicative view provided by a major credit rating agency. Including a bond scenario reflects London Underground's view that conventional funding can impose constraints on operations because, with only at best a three-year horizon of secure funding, it can hinder long-term planning of capital works. Raising bonds

directly from capital markets could provide London Underground with more secure long-term funding and enhance long-term planning. London Underground did not prepare a scenario with a government-backed bond.

- 42** In the bond scenario, London Underground assumes additional efficiency savings arising from secure finance and the end of annual funding negotiations, amounting to 7 per cent per annum off investment costs and 1.5 per cent off maintenance costs. The bond scenarios also assume some improved performance by the public sector. There is inevitably little by way of quantified evidence available on the level of possible efficiencies with bond finance, and London Underground recognises that the 7 per cent figure is a matter of subjective judgement based on its consideration of the limited evidence.
- 43** Some of London Underground's scenarios assume a government cost of capital and discount rate both at 6 per cent real. This is in line with standard investment appraisal practice in government, although a non-standard approach has also been examined in this case. The non-standard approach arises from concerns about the appropriateness of the 6 per cent real rate. In 1997, the Committee of Public Accounts noted⁷ that the Treasury's assumed discount rate of 6 per cent was at the top end of the range of values that could be justified. The Committee was concerned that the use of too high a discount rate would introduce a bias in favour of PPP-style deals over conventional funding. The Committee observed that using more recent figures for interest rates on government debt would lead to a significantly lower figure for the discount rate. The Committee recommended that it would be good practice for authorities to examine the sensitivity of financial analysis of this sort to the choice of discount rate.
- 44** In accordance with this recommendation, and given that the standard 6 per cent rate is significantly higher than the prevailing rate on government debt (between 2 and 3 per cent) and professional economists also question it as a time discount rate, London Underground is examining the impact on the financial analysis of using a discount rate of 3.5 per cent and has developed a matrix of assumptions using various discount rate and interest rate assumptions. At the time of writing, London Underground had only just completed initial figures for some of these assumptions, so we are unable to reach any conclusion on whether the figures require further refinement, their impact on the financial analysis and whether this impact has been fairly taken into account by London Underground.
- 45** Where appropriate, some of these scenarios include an adjustment to capture the impact on the government's reputation for prudence of extra borrowing, known as reputational externality⁸. There is some theoretical basis for making such an adjustment, but also, in our view, considerable scope for argument over its size. We note that the issue largely disappears if the discount rate is set at a more realistic level of 3.5 per cent.
- 46** The various financing and discounting scenarios are technically complex, and would not be necessary for most PPP contracts. They have sensibly been chosen as scenarios for this transaction because it involves unusually large sums of money, and because alternative funding sources are conceivable for London Underground, with secure fare revenues that could be used to finance direct borrowing.

⁷ 47th report, 1997-8

⁸ The standard Treasury approach uses a cost of capital and discount rate at 6 per cent. Scenarios which use a lower cost of capital than the discount rate create a bias in favour of public borrowing by lowering the implied interest costs of such borrowing. But Treasury considers that increasing public borrowing has an external cost on the government's reputation for prudence, and the reputational externality is a calculation to reflect this assumed external cost.



47 The financial analysis described in the preceding sections of this report is not sufficient on its own to ascertain which option offers best value for money. There is a wide range of other factors, which are either difficult or impossible to quantify in financial terms, and which could impact directly on the value of the different options. Such factors cover both the structure of the PPP and the implementation of that structure. They include:

- **strategic issues:** the strategic decision to award long-term contracts to the private sector involves risks and benefits. London Underground considers that the expected benefits include potential access to private sector efficiencies and skills in asset management and in managing infrastructure; and clearer incentives through a contract than exist with a wholly public sector operation. Possible risks arise from the division of responsibility for the Tube network and a potential loss of flexibility as it may become harder to re-set objectives for the infrastructure in the face of changing circumstances, such as an increase or decrease in passenger demand or shifts in the pattern of commuting from one part of London to another.
- **the PPP contractual framework:** the value for money of the PPP approach depends on the flexibility and enforceability of the contracts to be signed with winning bidders. Given that the contracts run over 30 years, some flexibility is required, but too much flexibility could allow bidders to raise prices during the course of the contract as unexpected contingencies arise. To the extent that the contract is unenforceable, bidders may in future be able to depart from prices or commercial terms agreed now in negotiations with London Underground. London Underground therefore needs to assure itself that the proposed contracts are robust, that bidders will have adequate financial capacity and that they will not be able to demand excessive increases in payment as new requirements or unexpected contingencies emerge.
- **the incentives in the performance specification:** the PPP contractual framework includes financial incentives to improve performance in three areas beyond benchmark levels: the **capability** of the infrastructure to support train services, the actual **availability** of train services and the **ambience** of the environment provided to passengers. The benchmark levels are set above current performance, (except for availability, which is set at 95 per cent of current performance). Bidders are incentivised by a payment mechanism to meet these targets and they incur penalties if performance declines. The value for money of the PPP approach depends on the extent to which this performance specification avoids perverse incentives and successfully incentivises private sector entities to deliver long-run improvements in the service provided to London Underground's passengers.⁹

Financial analysis does not cover all the factors affecting value for money

⁹ The specification balances capability, availability and ambience. There are trade-offs between the three areas. For example, passengers may tolerate poorer ambience, such as less pleasant environments from which to board trains, in return for a higher train frequency.

- **long term partnership:** London Underground will need to consider how well bidders would take to a long-term partnering arrangement with London Underground and Transport for London. In a new 30 year arrangement, co-operation on all sides is crucial and may alleviate some of the strategic and contractual risks. Building partnership in this case is complicated because of the handover of overall responsibility for the Tube to Transport for London, whose staff have not yet been directly involved in the procurement process, although they have been consulted at certain points.
 - **risk management:** the successful implementation of improvements to the Tube infrastructure requires effective risk analysis and management. Any value for money decision should be supported by a comprehensive risk analysis covering both operational risks (for example, the risk of deteriorating performance under the PPP framework) and contractual risks (for example, the risk of contract termination and change of control of winning bidders). This analysis should be clear about which party bears each risk and who is best able to manage it.
- 48** London Underground has confirmed that it will continue to take all these factors into account in its final value for money appraisal. We intend to prepare a further report after the final decision has been taken.



- 49** The preceding sections have considered the process undertaken by London Underground and the extent to which the figures from the Comparators can be relied on for decision-making. This final section provides our view of the steps that London Underground should take before it can make a final recommendation to London Transport and the Department.
- 50** London Underground recognises the limitations of the Comparators exercise. It has explicitly addressed how the financial information can best be interpreted by decision makers, in the following ways:
- it has recognised the need to focus on the risks and benefits of the various options, and not just on the headline net present values.
 - it has recognised that the financial model relies on subjective judgements, and it has now decided not to present single expected values. It has used ranges instead of single values to provide a guide to the boundaries of the Comparators.
 - it proposes to explain the content and significance of the PPP bids and the Comparators, rather than just the financial differences.
 - it also proposes to present to decision-makers a range of plausible financial figures, under different operating and financing scenarios. As part of this work, it has identified the largest factors driving public sector costs - investment in stations, signalling, track and rolling stock, and maintenance of rolling stock - and assessed the impact of changes in these factors on overall net present value. London Underground also intends to analyse the financial impact of assuming that the public sector and the private sector achieve identical levels of performance to illustrate relative cost differences.
- 51** Despite the fact that the financial analysis has limited use, it includes valuable information. London Underground should, as intended, ensure that it fully understands the source of any financial differences between the public sector and PPP options. This level of analysis will help to explain what, if any, extra efficiencies private sector entities propose to bring to the Tube, the extent to which these claims are credible and why they may not be achievable by a public sector operation.
- 52** In coming to a decision about the likely value for money offered by each of the options, due weight should be attached to all relevant factors. The financial analysis examined in this report is only one of these factors. It is not a pass/fail test, and the uncertainty surrounding the financial figures must be made clear. London Underground should continue to address the wider issues falling outside the financial analysis and discussed in paragraphs 47 and 48 of this report.
- 53** There are other factors on which London Underground places significant weight, including safety, bidders' ability to strike a timely and acceptable deal and the importance of developing a genuine partnership. It should also ensure that it makes clear the assumptions lying behind any affordability analysis that feeds into the decision. And if any material changes to the financial or

Using the financial analysis in decision-making

commercial terms arise during negotiations with a preferred bidder, London Underground should conduct a further analysis of the value for money offered compared to public sector provision.

- 54** London Transport's decision to award each contract will be made independently of the other contracts. This means that there could be a mix of public and private provision, with one or two of the three infrastructure companies managed by successful bidders and the other(s) retained in the public sector. If this option is to be given serious consideration, London Underground will need to ensure that sufficient analysis of the impact of this mix has been undertaken and that plans for coping with these outcomes exist. Such a solution would entail additional complex contractual and operational interfaces between public and private sectors, but may also offer strategic benefits by allowing more detailed benchmarking of infrastructure costs.
- 55** Regardless of which mix of public and private sector provision is selected, the successful implementation of improvements to the Tube requires effective risk management. As part of this process, London Underground should continue to ensure that it assesses the capacity of the bidders and of the public sector to manage risks; that it has undertaken a comprehensive risk analysis covering the whole 30 year period; and that effective management and monitoring arrangements for the 30 year period are in place.

Glossary

Ambience	An output measure covering the quality of the environment for passengers, including the cleanliness and general condition of trains and stations, and the provision of passenger information.
Availability	A measure of passengers' total additional journey time resulting from disruption caused by incidents attributable to the Infraco.
Base costs	London Underground's estimate of what it would spend to enhance, maintain and manage the infrastructure over 30 years in accordance with the PPP performance specification.
BCV	Bakerloo, Central, Waterloo and City, and Victoria lines.
Best and final offers	The final bids made in the competition between private sector bidders.
Capability	A performance measure of the infrastructure's ability to support train services. It is based on average journey time per passenger, for a given time of day, and for a given line or part of a line.
Cost of capital	The rate of return implicit in the sums repayable by an organisation to those bodies that provide it with funding.
Deep tube	BCV and JNP lines.
Discount rate	The percentage rate applied to cash flows to enable comparisons to be made between payments made at different times. The rate quantifies the extent to which a sum of money is worth more today than the same amount in a year's time.
Efficiencies/efficiency factors	Monetary adjustments to the public sector comparator base costs and the risk adjustments to reflect the extent to which management can reasonably foresee being able to deliver the infrastructure services in the public sector at a lower cost in the future.
Health and Safety Executive	The statutory body which includes HM Railways Inspectorate and is responsible for accepting and enforcing London Underground's railway safety case (the statement which sets out how it will handle safety).
Infrastructure companies (Infracos)	The three organisations (BCV, JNP and SSL) responsible for delivering infrastructure services to London Underground under the PPP contracts.
Infrastructure	Railway, trains, stations and depots on London Underground's network (including track, signals, tunnels, bridges, embankments, platforms, escalators, lifts).
Infrastructure service charge	The amount payable under the PPP contract by London Underground to the Infraco, as adjusted from time to time, to cover the Infraco's costs of maintaining, renewing and upgrading the infrastructure, including overheads, profit and financing costs.
Infrastructure operation/service	Work to maintain, renew and upgrade the infrastructure so as to deliver the outputs required under the PPP contract, to progressively reduce and eliminate the existing backlog in asset maintenance, and to deliver a continuous overall improvement in asset health, capability and reliability in service.
JNP	Jubilee, Northern and Piccadilly lines.

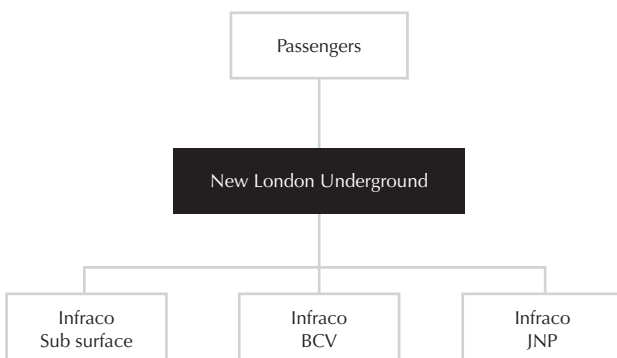
London Transport	London Regional Transport - a nationalised industry currently responsible for London Underground and answerable to the Department of the Environment, Transport and the Regions.
London Underground	London Underground Limited - a subsidiary of London Transport - responsible now and in the future for operating passenger trains and stations and being responsible for safety. It intends to award PPP contracts to private sector bidders and will be their public sector partner under those contracts. After PPP contracts are signed, it will remain in the public sector but will be transferred to Transport for London.
Long Term Investment Plan	London Underground's 30 year plan for the major projects and other capital expenditure which they estimate will be required to meet the PPP performance specification; private sector Infracos are not bound to adhere to this plan.
Output(s)	Capability of the train service; availability and ambience of train services and station services; improvements in asset health.
Periodic review	A provision in the PPP contract which, every 7½ years, allows London Underground's payments to the Infracos to be reset to take account of changed circumstances and cost increases which an "economic and efficient" Infraco would incur.
PPP	Public Private Partnership. Specifically, the partnership between the public sector London Underground and the private sector infrastructure companies under the 30-year PPP contracts.
PPP performance specification	The levels of output which the Infraco is required to deliver under the PPP contract, covering "ambience, availability and capability" for train and station services.
Public sector comparator	A benchmark against which value for money is assessed. It is typically a cost estimate based on the assumption that assets are acquired through conventional funding and that the procurer retains significant managerial responsibility and exposure to risk. In this case, it is London Underground's estimate of the cost to the public sector of procuring the maintenance, renewal and upgrade of the infrastructure so as to deliver the PPP outputs. Separate comparators exist for raising finance through (a) traditional funding such as public sector grant and (b) long term bonds.
Reputational externality	The estimated cost impact that additional borrowing would have on the Government's reputation for financial prudence.
Risk adjustments/ risk factors	Monetary adjustments to the public sector comparator's base costs to reflect the probability that, due to unforeseen events, services will not be delivered by the public sector Infraco at the cost shown in the base estimates. These adjustments are only included for risks that London Underground believes it will transfer to the private sector under the PPP contracts.
Sub-Surface Lines (SSL)	Circle, District, Metropolitan, East London and Hammersmith and City lines. These lines are only just below ground level, having been built in 'cut and cover' tunnels.
Transport for London	The body appointed under the Greater London Authority Act 1999 which has taken over London Transport's responsibilities, apart from London Underground. After the PPP contracts are signed, London Underground Limited will be transferred to Transport for London and will be answerable to the Mayor of London for the service it delivers.

Appendix 1

The Public Private Partnership approach

- 1 On 20 March 1998 the Deputy Prime Minister announced that the Government would be introducing Public Private Partnerships (PPP) to bring stable, increased investment into London Underground. The plans involved dividing London Underground into a publicly-owned operating company responsible for delivering services to customers, and three privately owned infrastructure companies. The objectives were to deliver £8 billion worth of investment in London Underground over the next 15 years, to maintain and upgrade the infrastructure, improving services for passengers and with the intention of providing value for money for the taxpayer.
- 2 Under the PPP, train and station services would continue to be planned and operated by a publicly owned, publicly accountable London Underground. London Underground would be responsible for safety on the whole of the Underground. Private companies have been invited to bid for the responsibility to maintain and upgrade the track, tunnels, signals, stations, lifts, escalators and trains under 30 year contracts to London Underground. At the end of the contracts, the assets would return to the public sector.
- 3 The line groupings that have been offered to the private sector are:
 - BCV - Bakerloo, Central, Waterloo and City and Victoria lines.
 - JNP - Jubilee, Northern and Piccadilly lines.
 - Sub-surface - Circle, District, Metropolitan, East London and Hammersmith and City lines.
- 4 Two bidders were shortlisted for the BCV and JNP contracts in July 2000, LINC and Metronet for BCV; and Tubelines Group and Tuberail for JNP. Members of each consortium are shown opposite.
- 5 This report is only concerned with the BCV and JNP groups, as the SSL bid process is on a later timescale.

4 How the Tube would be run in 2001



3 Bidders for the deep tube contracts

BCV

LINC:

- Bombardier
- Mowlem
- Fluor Daniel
- Alcatel
- Anglian Water

Metronet:

- Adtranz
- WS Atkins
- Balfour Beatty
- Seaboard
- Thames Water

JNP

Tube Lines Group:

- Bechtel/Halcrow
- Amey
- Hyder
- Jarvis

TubeRail:

- Brown & Root
- Alstom
- Amec
- Carillion

- 6 The private sector would take over three infrastructure companies (Infracos), and the responsibility for delivering a large infrastructure investment programme. These companies are being asked to provide long term investment planning, professional project management and effective delivery of day to day maintenance.
- 7 Under the PPP, the private sector would not have any operational responsibilities; on the network they would mainly be responsible for the work that goes on overnight, while the system is shut down. Operations - including drivers, stations staff and responsibility for safety - would remain in the public sector.
- 8 Transport for London (TfL) is a new body, reporting to London's Mayor. It is responsible for a wide range of transport in London, primarily implementing the Mayor's integrated transport strategy. On 3 July 2000 TfL took on all of London Transport's previous responsibilities apart from London Underground. Once the competitions are completed, London Transport will be wound up and London Underground will be transferred to TfL and the Mayor.

Source: Department of the Environment, Transport and the Regions.

Appendix 2

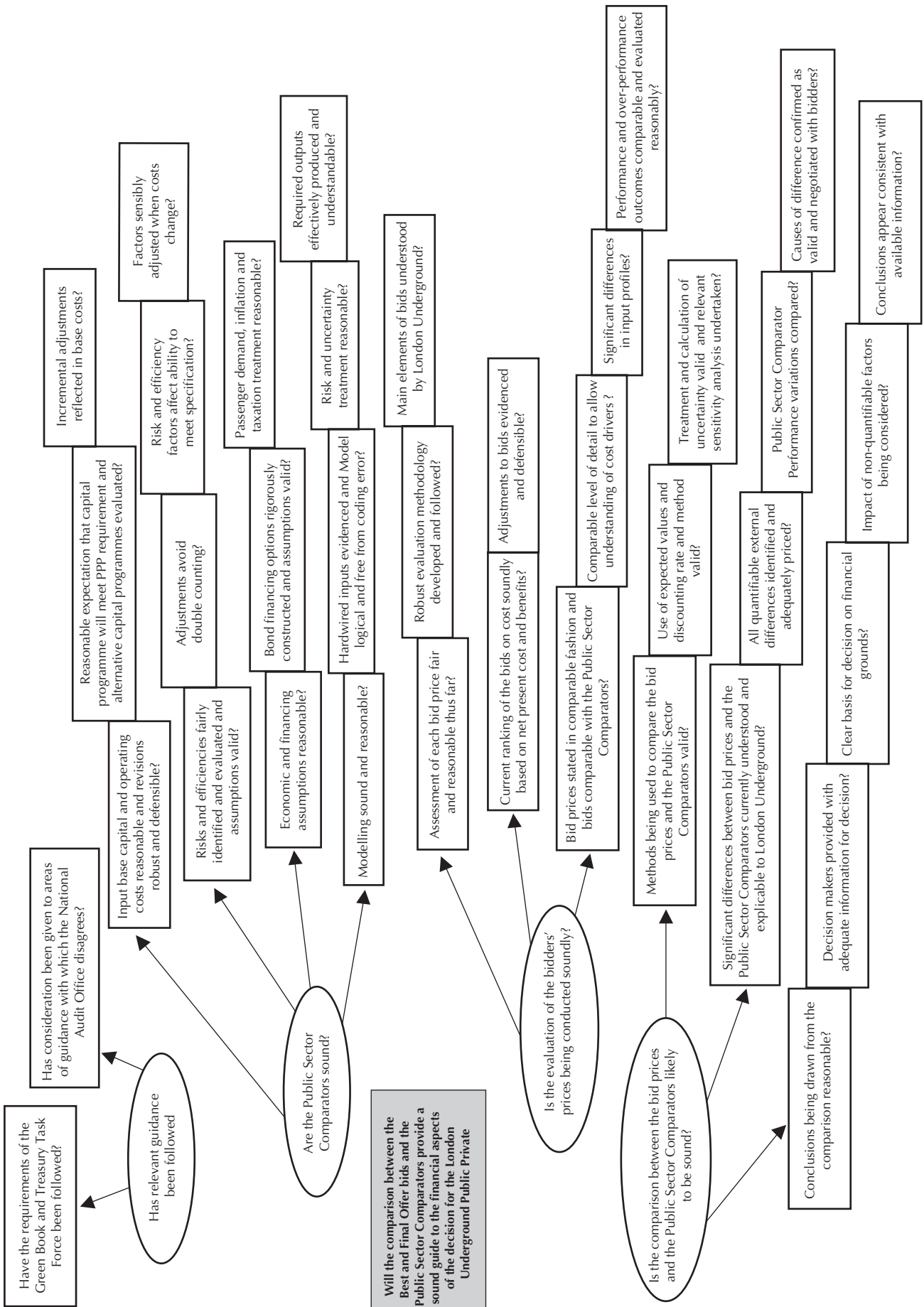
Methodology

- 1 The National Audit Office examined the Comparators and their application to inform the decision to select a preferred bidder for the proposed London Underground Public Private Partnership.
- 2 We used an issue analysis approach to designing the scope and nature of evidence required to complete the examination. That is, we set a series of high-level audit questions that we considered it would be necessary to answer in order to assess the Comparators and their use, and collected evidence accordingly. For each of the top level questions, we set a subsidiary group of questions, linked logically to the main question, in order to direct our detailed work and analysis.
- 3 The top level questions we set were:
 - whether the relevant guidance had been followed;
 - whether the Comparators were sound;
 - whether the evaluation of the bidders' prices was being conducted soundly; and
 - whether the comparison between the bid prices and the Comparators were likely to be sound.

Figure 5 summarises these primary issues and the more detailed areas considered under each.

- 4 Our main evidence came from detailed examination of the Comparator models, and information provided by the Department and London Underground's files. We also undertook interviews with key staff, and discussions with London Underground's financial advisers, PricewaterhouseCoopers. Finally we discussed issues of concern with major stakeholders in the project, such as the Mayor of London, the Transport Commissioner for London and bidders.
- 5 In addition, we appointed a Review Panel, which contained experts from outside the National Audit Office. This panel provided advice on issues and aspects of the report.
- 6 External members of the Review Panel were:
 - Professor Vic Barnett, Nottingham Trent University
 - Kingsley Manning, Managing Director, Newchurch Limited
 - Professor Tony M. Ridley CBE, FREng, Emeritus Professor of Transport Engineering, Imperial College
 - Michael C. Spackman, National Economic Research Associates
 - George Steel, Managing Director INDECO (International Management Consultants) Limited
 - Bruce O. B. Williams

5 The National Audit Office's Issue Analysis



Appendix 3

National Audit Office and Public Accounts Committee Recommendations on Public Sector Comparators

The National Audit Office has published 16 reports on specific Private Finance Initiative projects, some of which contained recommendations about Public Sector Comparators. In addition, the Public Accounts Committee's reports on some of these projects have made recommendations on the development and use of Public Sector Comparators in assessing the value for money of the deals. The following is a summary of these recommendations.

National Audit Office recommendations

The Private Finance Initiative contract for the new Dartford and Gravesham Hospital (HC 423, 98/99)

The costs of the Public Sector Comparator will include provision for possible cost overruns. The accuracy of these calculations might be improved by refining the data available on cost overruns on past traditional procurements to be consistent with the status of the cost estimates used in the Public Sector Comparator under review. The calculations of the various provisions for cost overruns should be reviewed carefully to avoid any possible double counting.

The Newcastle Estate Development Project (HC 16, 99/00)

Where the Private Finance option has a higher direct cost to taxpayers, departments should, before signing the deal, consider carefully the indirect benefits in terms of risks reduced or transferred to the private sector and the value to their operations of higher service quality. If quantification is not possible, they need to set out clearly and comprehensively how they have arrived at the conclusion that the unquantifiable benefits outweigh the quantifiable costs.

The Contract to complete and operate the A74(M)/M74 Motorway in Scotland. (HC 356, 98/99)

The Department's assessment of the cost of traditional procurement reflected in their Public Sector Comparator was based on sensible methods. We recommend that departments should: invite an independent contractor to participate in the development of the Public Sector Comparator as this can provide an important perspective on project risks; and adopt a value engineering approach in their assessment of the most economical public sector alternative.

The Skye Bridge (HC 5, 97/98)

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.

The Contract to develop and operate the replacement National Insurance Recording System (HC 12, 97/98)

When assessing the value for money offered by bids, any Public Sector Comparators should be based on the best available information but the degree of precision required in any case should be considered before committing resources to the calculation of a comparator.

The New British Embassy in Berlin (HC 585, 99/00)

Departments should put themselves in a position to identify the reasons for major differences between the bids and the Public Sector Comparator, both in overall terms and in different elements such as construction and operating costs.

The first four Design, Build, Finance and Operate roads contracts (HC 476, 97/98)

Where the result of a comparison is very sensitive to key assumptions, such as, the discount rate, there is a limit to how far it might be worthwhile refining the calculation. Spurious accuracy may result. In such cases a Public Sector Comparator provides indicative figures only.

Public Accounts Committee Recommendations

The Private Finance Initiative contract for the new Dartford and Gravesham Hospital (HC 131, 99/00)

The preparation of Public Sector Comparators, and their comparison with the option of using the Private Finance Initiative, is a complex exercise. We therefore look to public sector bodies to prepare public sector comparators carefully and we recommend that they should subject these to independent checking to minimise the risk of undetected errors.

The Public Sector Comparator did not take into account the improvements in traditional procurement which are now being achieved as a result of lessons learned on previous projects. Public bodies should not assume, when preparing such comparators, that their past performance will continue unchanged in the future, especially where that past performance has been particularly poor. We recommend that, instead, they should make reasonable assumptions about their ability to improve their future procurement performance.

The Newcastle Estate Development Project (HC 104, 99/00)

The Department did not prepare a Public Sector Comparator, which would have calculated the cost of constructing a similar estate using public funds. The deal will bring many benefits compared to the existing estate but this does not mean it will be better value for money than a conventionally-financed project. Many of the benefits relate to the improved working conditions and the improved reliability of accommodation resulting from new buildings. A proper value for money appraisal would have indicated which procurement option - public finance or a private finance deal - offered the best way of redeveloping the estate. The Department failed to conduct such an appraisal and hence the value for money of the deal is uncertain.

The Skye Bridge (HC 348, 97/98)

Because every decision to proceed with a privately financed project must involve rejecting some alternative, systematic comparisons are the key to prudent decision making in this area. We criticised the Department for not having carried out such a comparison.

The Contract to develop and operate the replacement National Insurance Recording System (NIRS 2) (HC 472, 97/98)

Sound decisions as to whether a Private Finance Initiative solution offers value for money will normally require a systematic comparison to be made with a properly costed alternative option or options. In the case of NIRS2, the original Public Sector Comparator did not take account of efficiency improvements arising from the outsourcing of certain operations and did not therefore provide a realistic

comparison. Where, as in this case, there is a very large difference between the comparator and the bids received, there may be grounds for checking both the reasonableness of the costings in the comparator and that the bidders have properly understood the required service specifications. In all cases, however, we expect departments to devote such resources to working up a comparator as are appropriate in the circumstances. The comparator should be robust enough to provide a sound guide to the exercise of judgement, but it does not necessarily have to be calculated to the finest accuracy.

The first four Design, Build, Finance and Operate roads contracts (HC 580, 97/98)

The assessment of whether these four road projects are likely to offer better value for money than the conventionally procured alternatives rests on complex calculations. It also requires the exercise of judgement to define the costs of the conventional alternatives, to evaluate the benefits of transferring risks to the private sector, and to take account of differences in timing of payments of public money. We expect departments to carry out such assessments in a way which is sufficiently robust to support their decisions and which avoids spurious precision.

The PRIME Project - The Transfer of the Department of Social Security Estate to the Private Sector (HC 548, 98/99)

We are not convinced that the Department's Public Sector Comparator fully reflected the potential for achieving efficiencies within the public sector. We recommend that in future departments preparing Comparators for deals of this kind do not assume that their past performance continues unchanged in the future, particularly where that past performance has been unacceptably poor. We further recommend that, in preparing their Public Sector Comparators, departments make reasonable assumptions about the ability of the public sector to improve the efficiency of their estate management.

National Savings Public-Private Partnership with Siemens Business Services (SBS) (HC 566, 99/00)

In reaching a decision on whether the proposed deal with SBS would be good value for money, National Savings prepared Public Sector Comparators both on the basis that capital funding would be made available to modernise the operational service, and on the basis that such funding would be constrained by annual spending limits. Although the Private Finance Initiative deal had been considerably cheaper than the Public Sector Comparators under both scenarios, the gap was much less if full public sector funding was assumed to be available. This illustrates the importance of constructing public sector comparators on the basis of unconstrained funding, and not just on a constrained basis, in order to reach a properly informed decision on the value for money of Private Finance Initiative deals.