Annex C

Technical issues

1. In setting out this guidance we used the latest Treasury guidance as a starting point. 'The Green Book – Appraisal and Evaluation in Central Government' (HM Treasury, 2003) sets out the principles to be followed. References to the Green Book in subsequent paragraphs are to this latest edition.

Valuing costs, benefits, risks and uncertainties

2. Considering the implications of each option will involve establishing all the costs and benefits, including non-financial benefits and penalties. It will also involve analysing the effect of variations in timing, and any risks and uncertainties.

3. For a typical project, relevant costs might include:

   a. Capital costs – such as equipment, land, demolition, construction or refurbishment costs, fees and expenses, commissioning and handover costs.

   b. Running costs – such as staff costs, consumables, maintenance, rates, water and sewerage charges, power, heating, lighting, and payments for contracted-out services.

   c. Costs of other features affected. These may be associated with ease and availability of access, operational convenience, ease of communication, flexibility, environmental factors, and costs of retaining and disposing of vacated accommodation.

4. Relevant benefits would typically include:

   a. Fee income from further student enrolment.

   b. Research income.

   c. Rental or conference income.

   d. Income from third party use of facilities.

   e. Capital receipts – such as proceeds from disposal of the building being replaced.

   f. Residual value at the end of the appraisal period.

   g. A reduction in rental payments if a leased building is no longer required, and can be surrendered.

5. All relevant costs and benefits should be included, even where the costs do not involve cash expenditure. For example, the value of an asset should be included even when it is already in the institution's ownership. Such an asset could be used for other purposes or sold if it were not employed in the project being appraised, and therefore there is a cost involved in using it, the size of which depends on the alternative uses. This is known as the opportunity cost. For property, the opportunity cost is normally taken as the market value or the value in alternative use, whichever is higher. Similarly benefits, in the form of cost savings or an improved quality of output, should be included even where they do not produce a cash flow.

6. Some assets will have a value at the end of the appraisal period – the residual, exit or disposal value – which should be counted as a benefit. These assets may not be just land or buildings: ongoing businesses and intellectual property rights (IPR) can also have a residual value. Such values should be assessed in prices current at the date of appraisal.

7. When calculating residual value, land and buildings should be considered separately. Buildings generally depreciate over their lifetime, at a rate depending on standards of maintenance, but possibly also reflecting obsolescence. On the other hand the site value may remain constant, or even appreciate. Accordingly the usual assumption is that the value of the site remains unaltered in real terms. Actual increases in land prices should not normally be counted as benefits, as they would have occurred even if the project had not taken place; they would be realised equally by the ‘do nothing’ option. The building’s residual value will be that which gives the highest figure from the range of options, including refurbishment, alternative use and site value.

8. There are complex issues associated with property valuation. The Royal Institution of Chartered Surveyors Appraisal and Valuation Manual gives a detailed framework and guidance. This is an area where institutions should seek professional advice.

9. Many types of cost or benefit can be included under a number of heads, but their value must only be counted once. Examples of a double counting error are the inclusion of both rents and capital values for the same building in the same appraisal; or including what is a cost in one option as a benefit in another. The ‘do nothing’ option provides a common baseline to avoid this sort of mistake, since each option in the appraisal should represent a change from the base case.

10. Costs and benefits that can be valued in monetary terms should be allocated to the time period in which they are expected to occur. It is generally sufficiently accurate to treat all costs incurred in a particular year as falling at mid-year. However, longer-term variability in timing can significantly affect the appraisal, and the range of options should include possible scheduling variants for the same idea. Even if monetary values cannot be assigned, it is important to indicate how the timing of impacts will be spread over the appraisal period.

11. Estimates of costs and benefits should include assessments of any risks or uncertainties. It is helpful to list them all in a risk register, to ensure that none are overlooked.

This can then be used as a checklist to ensure the analysis makes proper allowance for the significant ones. Risk and uncertainty are dealt with in paragraphs 33-42 below.

Appraising non-financial aspects

12. In an environment such as higher education, many benefits of an investment decision will not be realised as a cash flow. Especially difficult to analyse will be those benefits which cannot be expressed in financial terms at all. In many cases, institutions will have to make a judgement as to the desirability of an investment's outcomes, and what is a fair price to pay for them. However, such decisions are easier if the relative merits of different decisions can be presented in a rational way.

13. Appraisals will have to handle non-financial aspects in different ways, depending on how easily they can be measured. They can be categorised as:

a. Costs and benefits which can be valued.

b. Costs and benefits which can be measured in some other way.

c. Costs and benefits which cannot be measured at all in conventional terms.

14. In practice it may be possible to put values on the benefits and costs of a decision, even though there is no market value for them that can be realised in cash terms. For instance, investments that save staff time can be compared by putting a value on the time saved; locations for a student residence might be compared by including the costs to the students of using public transport.

15. If institutions use this method of comparing alternatives, they must be careful to distinguish between the notional values, which will influence their decision on which option offers best value for money, and the actual costs which will have to be met from their budget. There is no sense in selecting an apparently attractive option if it proves to be unaffordable in cash terms. Further advice on assessing affordability is at paragraphs 57-60.

16. There may be costs and benefits which can only be assessed in non-financial terms, but which can nevertheless be quantified. For example, options may deliver more or less of an outcome, whether it is units of student accommodation, seats in a lecture theatre, or shelf space for books. Institutions can use such data to inform their decisions. It is often helpful to understand what is the incremental cost of a particular feature. In such cases, institutions will have to decide what is a reasonable price to pay for the additional benefit.

17. A different problem is posed by attributes which cannot be measured in conventional terms. For instance, alternatives may offer different levels of satisfaction under headings such as:

- the contribution to an institution's long-term strategy
- flexibility for the future

- political acceptability
- enhancement of the institution's academic image
- compliance with planning constraints
- protecting an institution's market position.

18. Institutions often have to make qualitative judgements of this kind. Their appraisal will carry greater conviction if the basis for the decision is made clear. They should therefore be explicit about the criteria used, and how they assess each option. The simplest analysis is to define the criteria that are significant in the appraisal, and rank the options in order of preference. The institution will have to reconcile the perceived benefits with the cost of each option.

19. A scoring system, even a subjective one, can help to clarify the decision process and give it more rigour. The institution must first decide what criteria are significant and how to score them; scores can be weighted to reflect relative importance. The results are only an aid to decision making, and can never relate to any absolute measure. However, even if the scores and weightings are fundamentally subjective, the institution will be in a better position to explain the rationale for its decision.

20. One such scoring system is included in the case study at Annex D.

Taxation

21. In assessing affordability, higher education institutions need to take account of tax. In particular, they have limited scope for recovering VAT. In their appraisal, institutions must include all the cash flows they will actually incur. Taxes fall under this heading, as do charges arising from the occupation of property which vary according to location, such as business rates and water and sewerage charges. In formulating cash flow statements and in determining its own preferred solution, the institution should consider the impact of VAT on both capital and recurrent items. Even when they are totally dependent on public funds, institutions must still be aware of the effect of taxation on their cash flows.

Appraisal period

22. The appraisal period should normally be the period for which the service is required, or the remaining economic life of the main asset.

23. For buildings it is essential to distinguish between the physical life of a building and the period during which it has occupational value, which may be much shorter. A new building may typically have a physical life of over 60 years provided it is properly maintained. Its occupational value will fall during that period. However, at several points during its physical life, reduction in the occupational value can be restored by refurbishment. At these points an appraisal will be required to confirm continuing need and to determine the relative merits of refurbishment, redevelopment or disposal.

24. In the absence of any other determining factor, it is sensible to use an appraisal period of 25 years for buildings, unless there are compelling reasons for choosing another figure. Since 25 years is traditionally the length of a property lease, this assumption will facilitate comparisons between freehold and leasehold.

25. In exceptional circumstances, where buildings are constructed for a specific purpose, and no market exists for the property, it may be appropriate to appraise a building over its physical life. If a property option is appraised over more than 25 years, it should be scrutinised carefully, and the cost of refurbishment or the replacement of major elements needed to retain its physical life should be included.

26. If, exceptionally, the project exceeds the remaining economic life of its building, the appraisal must still consider all the costs for the whole life of the project. These may include the costs of decanting from the building, and of refurbishment or redevelopment.

Procurement options

27. Each option being appraised may be associated with a range of procurement methods. Options may include a range of financing options, and various forms of public/private partnership. Institutions should be careful to distinguish between the cash flows associated with funding the procurement method, such as loans and interest payments, and those associated with the costs and benefits of each option. Financing options might include:

- financing capital expenditure from internal funds
- loans
- finance leases
- operational leases
- private finance initiatives (PFI)
- joint ventures
- contracting out.

28. Where any form of external finance is involved, the source should only be selected after a competitive procurement exercise. Similar considerations will apply to nearly all forms of procurement, and in many cases the institution will be subject to the European Community Procurement Rules. There are a few exceptions. For instance, if the institution receives an approach from the private sector for a joint venture, then the deal can only be negotiated with the proposer of the scheme. If in doubt, institutions should take legal advice on whether EC Procurement Rules apply.

29. If a PFI solution is to be considered, there may not be enough cost data in the early stages to make an appraisal. Under these circumstances, institutions should cost a ‘reference project’ based on supplying the same outputs procured conventionally, to provide the comparator for assessing the viability and affordability of the project.

30. The full range of procurement options may not apply in every case, but the appraisal should consider all realistic combinations. For example, the decision on whether property is

to be purchased or leased should be determined on value for money grounds. Projects involving leasing property should also be appraised on the basis of buying the freehold interest in the property if it is available. If not, buying an alternative property should be included among the options, even if the institution believes there are compelling reasons for preferring a leasehold option. Similar principles apply to equipment and other types of investment decision.

31. Buying equipment or a building may offer better value for money than leasing; capital finance costs may be lower than rentals, and freehold ownership has a residual value. But in some cases there may be no property available for purchase immediately. In others, differences in quality, the earlier availability of leasehold or its greater flexibility, including the option of short-term use, may offset the benefits of purchase. When comparing freehold and leasehold options institutions should allow for the effects of tenure on running costs. For instance, the leasehold option may assign some costs or risks to the owner. Options such as PFI can offer even greater opportunity for risk sharing.

32. Some appraisal exercises involve looking at solutions that are not procurement options in the conventional sense. For instance, an institution could be faced with choosing which of several teaching methods to develop, which require the investment of staff time; or having to decide between a number of research projects. In both cases, staff time represents a resource which has an opportunity cost, and the institution is effectively appraising options for procuring teaching or research.

Valuing risk and handling uncertainty

33. Estimates of costs and benefits always involve assumptions about the future. Changes in assumptions can seriously affect the balance of advantage between options, so it is important to take account of them in the appraisal. The risk register, compiled to show all the areas of risk and uncertainty, is a good starting point. In considering how they can be handled, it is helpful to distinguish between risk and uncertainty.

Risk

34. Risk is the product of probability and consequence. If these two factors can be quantified, then the overall effect can be measured, and a risk assessment made. Depending on the procurement method, risks will have different effects. For instance, a design and build contract will transfer the financial risks of construction to the contractor. If PFI procurement is used, many more risks can be shared with the private sector. In deciding what risks to allow for, it is helpful to construct a risk matrix showing the different options under consideration and, for each one, where the effect of each risk will fall.

35. A number of techniques exist to incorporate risk in an investment appraisal, but in most cases a simple risk adjustment is most appropriate. For each variable, a cost or value can be calculated by assessing the financial impact multiplied by the probability of the event occurring. For instance, if late completion of a new building will result in a consequential cost, then the effect can be expressed in financial terms. Analysis of this sort depends on having

sufficient data to estimate the probability and consequences of the event. This might be from the institution's own experience of similar projects, or perhaps from published sources.

36. Institutions are likely to find this simple risk adjustment technique the most useful. It is particularly relevant when appraising a number of options representing different levels of risk to the institution, such as options which include procurement using PFI. It makes the effects of sharing risk readily apparent, and allows comparison between options that transfer different amounts of risk.

37. If a PFI option appears to be the most favourable, institutions will need some sort of comparator to check that the successful bid still represents better value for money than a conventionally procured alternative. In public sector procurement this is called the public sector comparator (PSC), though in the higher education sector a more appropriate title is conventionally procured comparator (CPC). The CPC is a costing of the equivalent level of service delivery procured by conventional means or, if the same level cannot be achieved, the next best option. Because the PFI supplier is likely to take a different level of risk, the comparison must be made on a risk-adjusted basis. The CPC must also include the cost of financing conventional procurement.

Uncertainty

38. Where the probability element of risk cannot be quantified, uncertainty remains, and there is still scope for testing the effects of altering key assumptions by sensitivity analysis. An appraisal should indicate the accuracy of all cost and benefit estimates. Unless the figures are certain, the effects of variability should be assessed. One way is to ensure that all possible abnormal effects have been identified, and a view taken on their significance. Another is to scrutinise critically the cost and benefit estimates, using expert advice as necessary, and taking into account experiences of cost and time over-runs for similar completed projects.

39. Sensitivity analysis involves repeating the appraisal calculation with the value of the cost or benefit set at the upper or lower end of the range of likely estimates, and possibly at some intermediate values. In addition, some account should be given of the effect of different combinations of individual elements.

40. For instance, in an appraisal of a leasehold option with a five-yearly rent review, it might be appropriate to consider cases in which the rental growth in real terms varied about the central estimate. The range used must represent a realistic assessment of the range of possibilities. It may be prudent to assume that initial estimates will be subject to the same degree of error as occurred on average in the past, unless there are reasons for thinking that they are more accurate. Such reasons should be explained and justified.

41. Income expectation is also subject to uncertainty. For example, if an option depends on additional student numbers, sensitivity analysis should be used to assess what might happen if student numbers fell. Similarly, where the project assumes income from disposing

of a property, then sensitivity analysis should address the effect if it realises more or less then its valuation.

42. It is important to minimise, and where possible remove, the likelihood that costs turn out higher than expected, or benefits and cost savings lower than expected. It may be necessary to draw a distinction between different project options, and different methods of procurement and financing, which can bring additional sensitivities to be considered. For example, some financing options are sensitive to inflation, such as loan repayments that are indexed to a specific percentage or the rate of inflation, whichever is greater. Institutions also need to assess what might happen if inflation falls, leaving them with repayments which increase in real and in cash terms.

Analysing the results

43. The principles to be applied in calculating the results of an investment appraisal are generally well understood. They are covered in other literature, and in the Green Book. The following notes provide advice on specific points that sometimes give difficulty.

Calculating the present value of costs and benefits

44. Even when all the costs and benefits, including cost savings, are expressed in real terms it will generally not be possible to compare options directly because the costs and benefits are spread over time. Almost all expenditure proposals produce benefits later than the costs. With proposals for achieving the same objective, the choice is often between extra investment expenditure now and extra operating costs in later years. To compare options, costs and benefits must be discounted so that a single figure – the net present value (NPV) – can be calculated for each option. Examples of these calculations are at Annex D.

45. To give more weight to earlier, rather than later, costs and benefits, a discount rate is applied. The discount rate determines how rapidly the value today (the 'present value') of a future pound falls away through time, just as a real rate of interest determines how fast the value of a pound invested now will increase. It reflects the 'social time preference rate' of money – the fact that normally people would rather have cash now than later, and would prefer to pay bills later rather than sooner – and must not be confused with inflation. A fuller explanation of the rationale behind discounting is in section 5.48 of the Green Book.

46. The recommended discount rate is 3.5 per cent. It is a real rate, taking no account of inflation. For further discussion on discount rates see the Green Book, Annex 6.

47. However, users must appreciate that this rate relates solely to the social time preference rate, and makes no allowance for other factors such as risk or optimism bias. It is therefore particularly important that appraisals make explicit provision for risks. In the early stages of an appraisal, before a detailed understanding of each option has been developed, it may be sufficient to make a composite estimate of the optimism inherent in the estimates of costs and benefits, using past performance as a guide. However, as the appraisal is refined,

risks will be separately identified, using the risk register as a guide, and individually costed and analysed. Further advice is in the Green Book, Annex 4.

48. The discount rate will be less than the institution's cost of borrowing. This is because the cost of borrowing will reflect the market's perception of the risks of lending to that institution. However, interest rates may not reflect the risks of a particular project, and so their use is not a substitute for analysis and costing of project-specific risks. Furthermore, interest rates are quoted in nominal terms, which reflect inflation, whereas discount calculations are normally made in real terms.

Comparing financial options

49. All other things being equal, the most beneficial option will be the one with the highest net present value or lowest net present cost. This is the appropriate basis for comparison. In the simplest cases, the costs and benefits of each option can be expressed as differences from the 'do nothing' values. However, this can lead to confusion in more complicated cases, particularly where the structure of the costs and benefits varies significantly from option to option, and from the structure of the 'do nothing' case. It can be difficult to keep track of all the variables, and there is a significant risk of double counting, with the same change being listed as a cost in one option and credited as a benefit to another. As a general rule, it is better to list the costs and benefits of each option separately, including the 'do nothing' option.

50. Use of the NPV or net present cost measure has the advantage of focusing attention on the actual costs and benefits derived from the project year by year. This is particularly helpful for institutions in appraising project options where affordability will be a key factor in decision making.

Handling inflation

51. Normally, net present values are calculated by expressing all costs and benefits in present value terms, and applying a real discount rate. This approach is valid so long as all the factors included in the calculation are affected equally by inflation. Costs and benefits should be expressed at prices applying when the appraisal is carried out. The figures will usually need to be reviewed and revised as part of the iterative process of investment appraisal, so it is important that the cost base used is clearly stated. This information is also required later for evaluation.

52. However, if there are grounds for expecting some prices to increase significantly faster or slower than inflation, the calculation should take this into account. For example, variation in fuel prices relative to the general price level will influence the real cost of heating a building. Another factor is pay, which in many sectors has risen in real terms. Construction costs may rise or fall during a project if the contract contains price variation clauses. Any such anticipated price changes that differ from the general price level will have to be justified.

53. Some leases provide for rent reviews, typically at five-yearly intervals and upwards only. Where the resulting rents represent a real rise or fall in costs, this must be allowed for in the appraisal.

54. The simplest and the preferred method of handling inflation is to use present values and a real discount rate. Where costs and benefits follow the general rate of inflation, any changes can then be ignored. Those costs and benefits which do not follow the general inflationary trend are adjusted to reflect the relative change.

Choice of options

55. In some appraisals, analysis of the options will result in a clear-cut recommendation. Often this will not be possible: for example when there are significant uncertainties attached to costs, benefits or both; or when significant elements exist which cannot easily be valued in monetary terms, or even quantified at all, such as environmental factors. Sensitivity analysis may also indicate that some options are more robust than others.

56. Where no clear-cut optimal solution is available, or the choice between two or more options is finely balanced, the appraiser should present the balance fairly, so that decision-takers can make an informed judgement.

Assessing affordability

57. So far, this guide has concentrated on assessing the competing merits of investment alternatives taken in isolation. However, there would be little point in adopting a solution that the institution could not afford. Therefore the institution must assess the impact of the preferred option on its overall financial position. This will involve looking ahead over the life of the proposal. The institution must be careful to distinguish between those costs and benefits which have a direct impact in cash terms, and those such as opportunity costs which impact on value for money but have no effect on affordability.

58. In particular, the institution will need to look at:

a. The income and expenditure generated by the project, and its impact on the institution's income and expenditure account.

b. The effect of depreciation on the income and expenditure account.

c. The effect on the institution's cash flow, broken down into sufficient detail to show the amount and timing of any shortfalls.

d. The project and its funding in the context of the overall capital expenditure programme, to keep track of the total level of proposed investment.

e. The funding of the project, the timing of receipts and their relationship with the cash flow.

f. The effect on the balance sheet.

g. The desirability of the project when compared with others, particularly if capital is limited and capital rationing decisions are required.

59. The institution will also need to consider how the project fits with its financial strategy, and how its policies on borrowing levels and contributions from the revenue budget might be affected.

60. The institution will have to draw on the appraisal's earlier work on risk and uncertainty, since it needs to know the possible financial impact of the best and worst case, as well as the planned outcome. It will also need to know whether there are any implications for its Financial Memorandum with HEFCE, and whether any additional approvals will be required. The strength of the institution's covenant – how its credit-worthiness is perceived by the financial sector – may influence its ability to make use of the full range of finance options, as well as their cost.

Presenting the results

61. The results of an appraisal should be set out in a report covering:

- the strategic context
- the objectives
- the options considered
- the results obtained, in both financial and non-financial terms
- the preferred option(s)
- how the preferred option(s) compare with the alternatives
- how the risks have been evaluated
- the sensitivities of the preferred option(s) to variations in key assumptions
- the impact on the institution's financial position
- how and when the project will be monitored and evaluated.

A more detailed checklist is at Annex A.

62. The appraisal's important features must be set out clearly, in a logical order, and all relevant assumptions should be made clear. The appraisal should indicate how the costs are to be borne. It should also include discussion of the major unquantifiable costs and benefits, and contain sensitivity analyses of the effects of changing key assumptions. Tables setting out in detail the costs, benefits and risks of each option should be available. In addition, it is important to record such details as the price basis and the base date for discounting.

63. Even after they have taken a decision, institutions will need to keep their appraisal under review. The initial appraisal will of necessity be based on coarse data which can be refined as the project progresses. Institutions will need to confirm their initial estimates as they reach key decision points, and check that their assumptions are still valid. This is an

iterative process. In the early stages, not much will be lost if re-appraisal leads to changes in key decisions; however, scope for manoeuvre will become more limited as a project progresses.

64. The report should set out clearly the effect of the preferred option on the overall financial position, by presenting forecasts of its effect on the income, expenditure and cash flow. The impact of changes in key assumptions should be modelled, showing the effect of best and worst case scenarios. The effect on key financial indicators and budgets should be made explicit.