

9 Investment

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Introduction

9.1. BAA's projections assume an investment programme of about £450 million a year at 1995/96 prices during Q3, and only a slight reduction in that level of expenditure in Q4. This chapter considers BAA's:

- (a) investment performance over Q2;
- (b) planning of investment; and
- (c) projections of investment in Q3, and its assumptions as to cost efficiency, both generally and in the specific context of Terminal 5.

Capital expenditure in the second quinquennium

9.2. Table 9.1 shows actual and, for later years, currently planned capital expenditure for Q2. It can be seen that, at out-turn prices, actual investment is now expected to amount to some £1.5 billion over the period, somewhat less than the forecast investment of £1.7 billion at out-turn prices. However, the volume of investment is likely to be greater than forecast, allowing for the reduction in construction prices (as measured by the WT index-see Chapter 10) relative to the RPI. At 1990/91 prices, actual and currently planned investment of £1.6 billion compares to originally forecast investment of £1.4 billion. Deflating actual expenditure by the RPI to compare the 'resource cost' of investment shows that by the end of Q2 BAA is likely to invest only some 3 per cent less than originally expected.

TABLE 9.1 Capital expenditure in Q2*

	<i>£ million</i>					
	1992/93	1993/94	1994/95	1995/96†	1996/97†	Total
At out-turn prices						
<i>Actual</i>						
HAL	118	193	298	300	328	1,237
GAL	17	38	69	48	69	241
STAL	<u>2</u>	<u>7</u>	<u>12</u>	<u>11</u>	<u>11</u>	<u>43</u>
Total LAL	137	238	379	359	408	1,521
<i>Forecasts at the 1991 MMC review</i>						
HAL	154	137	168	179	243	881
GAL	44	79	71	115	84	393
STAL	<u>32</u>	<u>83</u>	<u>94</u>	<u>93</u>	<u>140</u>	<u>442</u>
Total LAL	230	299	333	387	467	1,716
<i>Difference</i>						
HAL	(36)	56	130	121	85	356
GAL	(27)	(41)	(2)	(67)	(15)	(152)
STAL	(30)	(76)	(82)	(82)	(129)	(399)
Total LAL	(93)	(61)	46	(28)	(59)	(195)
At 1990/91 prices						
<i>Actual (adjusted by WT index)</i>						
HAL	135	221	331	317	321	1,326
GAL	19	44	77	50	68	258
STAL	<u>2</u>	<u>8</u>	<u>13</u>	<u>12</u>	<u>11</u>	<u>46</u>
Total LAL	157	273	421	379	399	1,629
<i>Forecast at the 1991 MMC review (adjusted by RPI)</i>						
HAL	137	116	135	137	178	703
GAL	39	67	57	88	61	312
STAL	<u>28</u>	<u>70</u>	<u>76</u>	<u>71</u>	<u>102</u>	<u>348</u>
Total LAL	204	253	268	297	341	1,363
<i>Difference</i>						
HAL	(2)	105	196	180	144	623
GAL	(20)	(23)	19	(38)	6	(55)
STAL	(26)	(62)	(62)	(60)	(91)	(302)
Total LAL	(47)	20	153	83	58	266
At 1990/91 prices						
<i>Actual (adjusted by RPI)</i>						
HAL	109	176	264	258	273	1,080
GAL	16	35	61	41	57	210
STAL	<u>2</u>	<u>6</u>	<u>10</u>	<u>9</u>	<u>9</u>	<u>36</u>
Total LAL	127	216	336	309	339	1,327
<i>Difference from forecast</i>						
HAL	(28)	60	129	121	95	377
GAL	(23)	(32)	4	(46)	(4)	(102)
STAL	(27)	(65)	(66)	(62)	(93)	(313)
Total LAL	(78)	(37)	67	12	(2)	(37)

Source: MMC study from BAA data.

*Excludes interest and inter-company capital expenditure.

†Plan at DLE price forecasts (see paragraphs 10.12 and 10.13).

9.3. There has, on the other hand, been a significant shift in the distribution of investment between the three airports compared with that previously forecast: investment at Heathrow has been (at 1990/91 prices, adjusted by the WT index) almost double that previously forecast, although that on Terminal 5 is likely to have been reduced from some £157 million at 1990/91 prices (excluding land) to some £107 million; that at Gatwick has been almost 20 per cent below that previously forecast; and that at Stansted has been less than one-fifth that previously forecast. This reflects the impact of the removal of the traffic distribution rules, which resulted in significant unanticipated growth of traffic at Heathrow, and slower growth at Gatwick and

Stansted. Whereas projects such as the further expansion of Stansted were delayed, projects undertaken at Heathrow which had not previously been included in the programme for this period included the British Airways combined operation centre, the Flight Connection Centre, the Terminal 1 International Departure Lounge, the Terminal 4 landside expansion, the Terminal 1 to Terminal 4 transfer baggage system and the Terminal 3 infill building for arriving and departing passengers (each a project with expenditure of over £15 million).

9.4. BAA also provided the following categorization of investment for the period 1990/91 to 1994/95, between activities related to airport charges, and retail and other commercial activities, many projects covering more than one of these categories, as shown in Table 9.2.

TABLE 9.2 Investment by income source, 1990/91 to 1994/95

	<i>per cent</i>		
	<i>HAL</i>	<i>GAL</i>	<i>STAL</i>
All (charges, retail and commercial)	19.3	0.0	85.3
Charges only	37.8	59.1	7.6
Charges and other commercial	8.3	1.1	1.5
Charges and retail/catering	7.9	10.5	0.0
Other commercial only	20.9	2.4	5.0
Retail only	1.0	17.9	0.5
Other (eg to reduce running costs)	<u>4.8</u>	<u>9.0</u>	<u>0.0</u>
Total	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
Total value of investment (£m)	549.5*	152.3	186.0

Source: BAA.

*Excluding Heathrow Express.

9.5. Projects classified as 'retail only' account for 1 per cent of investment at Heathrow (eg the Terminal 4 retail development and Terminal 1 airside duty-free shop), but 18 per cent at Gatwick (eg the South Terminal international departure lounge redevelopment, although also providing additional seating and circulation space, and various projects in the Gatwick Village). Projects with a mix of charges and retail/catering income (8 per cent of investment at Heathrow and 10 per cent at Gatwick) include the Europier and Terminal 2 departure lounge extension at Heathrow and the North Terminal international departure lounge extension at Gatwick. All these developments have provided significant additional seating, eg 1,100 new seats at Europier, as shown in Table 9.3.

TABLE 9.3 Additional seating provided by retail and retail/charges projects

	<i>Before</i>	<i>After</i>	<i>Net increase</i>
<i>Heathrow (totals)</i>			
Terminal 2 airside development	750	1,050	300
Terminal 1 airside development	600	2,000	1,400
Europier	0	1,100	1,100
Terminal 4 gate 8 development	500	750	250
<i>Gatwick</i>			
North Terminal international departure lounge			
Terminal	800	1,160	360
Catering	306	759	453
South Terminal international departure lounge			
Terminal	400	600	200
Catering	300	658	358

Source: BAA.

BAA's investment planning

9.6. We were told that the key issues which underlie investment decisions in BAA are: an accurate assessment of demand/opportunity; identification of a solution which is most appropriate and which maximizes shareholder values; the extent to which there is a known level of cost certainty; the availability of appropriate funding; the value that is added or subtracted from the group after taking into account all relevant cash flows; the effect on the group's profit and loss accounts; the effect on customer service quality; and the key risk factors which affect the successful outcome of the project and what is being done to control them. Discounted cash flow techniques are used to assess the incremental cash flows associated with investments. A BAA review in 1994 referred to a cost of capital of 11.5 per cent post-tax nominal, after assuming 3.25 per cent inflation, and broadly equivalent to using an 8.25 per cent post-tax real cost of capital, depending on the phasing of cash flows. A somewhat higher test discount rate (12.5 per cent post-tax nominal) was to be used for mainstream revenue-earning projects to allow for the net present cost of non-revenue earning investment, and 13.5 per cent used for retailing projects. Other risk premia are added or subtracted according to the degree of protection or exposure to construction cost, price risk, volume risk and business experience. The cost of capital is adjusted in line with economic conditions. A 1995 review suggested a figure of 12 per cent as a post-tax nominal cost of capital, on the assumption of 4 per cent inflation (broadly equivalent to 9.5 per cent pre-tax real discount rate) and 13 per cent as the test discount rate for mainstream projects such as Terminal 5.

9.7. It appears from the above that value to shareholders is a main criterion in evaluating capital expenditure. Many projects are, however, non-remunerative as they either produce no return or the return is impossible to assess. Such projects are based on an assessment of the cheapest option on a net present cost basis. BAA told us that it would not formally take account of external benefits to airlines or other users in appraising a project and did not carry out cost benefit appraisals in addition to assessing its own rate of return. However, it was a key issue in evaluating investment to demonstrate that schemes met the requirements of the users and others such as statutory authorities, and then to examine alternative ways of meeting those requirements, often in consultation with users.

The Project Handbook

9.8. BAA's projects are currently developed within a set of guidelines summarized in its *Project Handbook*, introduced in September 1995. These are intended to improve the project development and project management process by ensuring 'a consistent approach to projects across the group which meets business needs and opportunities through the optimum business solutions'. This improvement exercise is referred to as 'Continuous Improvement of the Project Process' or CIPP. BAA told us that stakeholder communications is regarded as a key activity at each stage of the design of the project up to the start of construction: the BAA development manager should, for example, consider inviting external stakeholders to the formal project evaluations at Stages A and B, and to participate in key evaluations of the design at Stages C and D. In another part of the handbook 'stakeholders' are defined as 'airlines, handling agents, concessionaires etc' and BAA told us that training for development managers also made it quite clear that airlines were BAA's key stakeholders.

9.9. We noted that the *Project Handbook* makes no direct reference to consulting airlines specifically before the project is approved. However, Stage A1.2 is called 'identify stakeholders', both internal and external, and a 'stakeholder communication plan' forms an entry in the organization section of the Project Execution Plan. Following this, for projects over £10 million, the Group Capital Projects Committee (see paragraph 9.12) is asked to give a 'view on the strategic direction of the project'. The next stage of approval by the Capital Projects Committee is for the project to proceed to full design. Prior to this (Stage B2.1) 'statutory and advisory communications' have to be made to 'BAA, business partners and external organisations' and in both the feasibility stage (Stage B) and concept design stage (Stage C) there is a requirement to 'collate stakeholders requirement for brief'. Finally, prior to 'D day' (Stage D2.1) activities include 'final consultations and agreements with all interested parties and stakeholders'. At 'D day' design is fixed and agreed by all stakeholders so that procurement and construction can begin with confidence that the design will not be changed; there is often a ceremony at which all stakeholders sign their acceptance of the design.

9.10. During construction itself, the Project Manager reports to a project board which should include representatives of airlines and other users of the future facilities.

9.11. The *Project Handbook* is now supported by detailed guidelines on processes including 'development management' and 'evaluation and approval'. The concept of a series of stages of approval with specified evaluation and approval 'gateways' is being applied.

Approval authority

9.12. The Board exercises overall control over capital expenditure, subject to formal group guidelines on the delegation of financial authority. The pattern of delegation is very much what would be expected for a company of BAA's size:

<i>Approval authority</i>	<i>Estimated project cost</i>
Board	Over £10 million
Management Committee	£2 million to £10 million
Functional Directors	£0.25 million to £2 million
Directors of subsidiaries	Less than £0.25 million

All projects over £250,000 are reviewed by the Group Finance section before approval. In January 1995 BAA set up the Capital Projects Committee as a subcommittee of the Management Committee to review in detail all projects over £2 million.

9.13. For all projects over £2 million a standard set of information and a paper in a standard format have to be supplied to the Capital Projects Committee at the 'Inception Stage', prior to the 'Feasibility Stage'. Amongst many other requirements, the paper must include 'a list of all project stakeholders, including business partners, together with a brief statement of the strategy for obtaining their agreement to the project'. Stakeholders' requirements that have been specifically excluded from the project are to be highlighted.

9.14. The Capital Projects Committee may require a further submission for approval prior to the 'Co-ordinated Design Stage'. On completion of this stage, and before the commencement of construction, there are further standard formats for the data and paper to be submitted to the Capital Projects Committee.

The overall capital investment programme

9.15. BAA's internal procedures for developing and reviewing its capital investment programme are orthodox. The Capital Projects Committee is responsible for reviewing the Group's annual proposals for investment in capital projects as part of the business planning cycle and recommending an annual capital budget to the Management Committee. These proposals are prepared from submissions from each airport, prepared in accordance with set categories and guidelines, as shown in Table 9.4.

TABLE 9.4 **Capital expenditure categorization and prioritization**

<i>Category</i>	<i>Type of project</i>	<i>Examples</i>	<i>Ranking based on</i>	<i>Priority A</i>	<i>Priority B</i>	<i>Priority C</i>
1	Mandatory	Hold baggage screening	Urgency	All	-	-
2	Growth	Terminals	Urgency	High ranked	Other	-
3	Urgent service	QSM < 3.5	Effect on customers	High ranked	Other	-
4	Attractive financial case	IRR > 15% payback < 7 year	Profitability (Net present value/ capital expenditure)	All	-	-
5	Marginal financial case	IRR < 15% payback > 7 year	Profitability (Net present value/ capital expenditure)	-	All	-
6	Other service	QSM > 3.5	Effect on customers	-	-	All
7	Replacement/ major maintenance	Pavements	Urgency	High ranked	-	Other

Source: BAA.

9.16. To give some indication of the relative scale of projects in each of the above categories, the 1996/97 investment programme can be very broadly disaggregated as follows:

- (a) Terminal 5-£34 million;
- (b) Heathrow Express-£111 million;
- (c) mandatory¹-£86 million;
- (d) capacity-£75 million;
- (e) urgent service-£23 million;
- (f) good return-£59 million;
- (g) marginal return-£8 million;
- (h) other service-£3 million;
- (i) replacement-£13 million;
- (j) other-£13 million; and
- (k) contingency-£23 million.

This categorization is, however, based on allocating to one of the subheadings projects which may serve several purposes: many of the high profile projects, for example Gate 8 at Terminal 4, would therefore be categorized as retail projects providing a good return, but would also lead to the expansion of capacity, or service improvements.

Consultation

9.17. BAA told us that it consulted extensively with airlines and their representative bodies on both the overall capital expenditure programme and individual projects. Consultations normally took place with the AOC of each airport, made up of station managers or operational managers of each airline. There was also an AOC Executive made up of airline managers elected by the general AOC membership. There were various forums for consultation: the BAA Project Board responsible for development may include airline representatives; and joint working groups including operational staff from both the airport and airlines will be involved from project conception and design through to completion and commissioning. BAA said that its objective was to take full account of customer requirements and adopt a partnership approach; this approach was embodied within the CIPP procedures, which at each stage (inception, feasibility, concept design and co-ordinated design) required all parties to sign off the project before proceeding to the next step.

9.18. BAA quoted to us various examples of airline consultation throughout particular developments. In the case of hold baggage screening at Heathrow, proposals to the DOT were made in a joint presentation in 1992 by HAL and Heathrow AOC. Trials of the smart X-ray technology were conducted in co-operation with British Airways, and a large number of airline representatives viewed the pilot scheme in action. A co-ordination group was formed in 1993 to oversee the implementation of 100 per cent hold baggage screening, with representatives from BAA, Heathrow AOC and the DOT. In 1994 each terminal formed feasibility teams, which included AOC-nominated representatives: Heathrow AOC appointed Project Co-ordinators who sat on the terminal project implementation boards, and Terminal Interface Managers who provided day-to-day liaison with the airlines and sat on the design review groups. A Group Project Board was formed in 1995, with the DOT and AOC Project Co-ordinators invited as observers. An AOC Liaison Group, reporting to the Group Project Board and involving the AOC Project Co-ordinators and their cost advisers, was formed to discuss technical issues and the sourcing of screening equipment. AOC representatives are

¹Required to meet legal obligations.

currently involved in evaluation of bag tracking (which allows screening decisions to be made while the bag is travelling through the system) and will sign off agreement prior to proceeding to the next stage: AOC and airline involvement will continue throughout implementation. Similarly, British Airways was involved in the evaluation of the Gatwick North Terminal domestic development, including signing off the development at the end of co-ordinated design before construction commenced, and weekly operational meetings were held with airline representatives to update them on progress and manage any disruption caused during the construction. There were also two joint working groups for airline consultation on the Heathrow Terminal 1 domestic arrivals development, one being responsible for passenger facilities and one considering the baggage handling of apron aspects of the project. These groups have met weekly throughout the design stages, the project taking on board the majority of the airlines' input; airline representatives also participate in the project evaluation at each stage of the CIPP process.

9.19. Airlines suggested that such consultations were exceptional: BAA told us that, under current procedures, they should now apply to all projects. Airlines were also sceptical about the extent to which BAA took their views into account for particular developments: for example, BAA's refusal to allow prominent positioning of an airline information desk in the new Terminal 1 departure lounge, the quality of facilities in some pier developments and reductions in expenditure in current developments at Heathrow Terminal 1 (see paragraph 9.53).

9.20. On consultation on the capital programme, BAA pointed to its description of the outline programme to users at the regular South East Airports Group meeting in June 1995, which was attended by airport strategy and planning experts of various representative bodies and several airlines; its offer to respond to any questions raised by airlines on the published summary of the investment programme at the beginning of December 1995 as part of the MMC's review; its further invitation to comment at the regular annual meeting with the Joint Charges Forum in January 1996; and individual presentations to British Airways (including answering all British Airways' questions of clarification in January 1996) and to Heathrow AOC and its offer of a similar presentation to British Midland.

9.21. Airlines were more critical of current arrangements for consultation, particularly on the proposed capital programme for Q3, having, they alleged, been provided with only a one-page summary of the capital expenditure plans for each airport and no details of the purpose of the individual schemes or quantified outputs (in terms, for example, of traffic throughput or service improvements) they would produce or any details of projects below £10 million. One airline specified its key requirements of the capital programme as:

- (a) the description, origin and purpose of each project, including a categorization of spend, eg mandatory, volume-driven, replacement, new initiative etc;
- (b) a consultative process for user commitment for major projects;
- (c) the scope and associated impact of each project, including the displacement knock-on effects of the development;
- (d) costs and benefits, including risk and sensitivity analysis, and value management impacts;
- (e) the deliverables of the project and measurement of success, including a project plan, together with critical dependencies;
- (f) the time-scales for delivery and cash flow by year;
- (g) milestones, where appropriate, and any interim deliverables/benefits; and
- (h) the impact on airport charges for each charging year and associated trade-off where appropriate.

Similarly, an airline representative body said that it would like to see information on what each project was going to do, how much it would cost, when it would be implemented, its effects on cash flows and charges and whether the costs were justified and substantiated.

9.22. One airline also suggested that, along with clarity about what infrastructure could be expected to be financed by airport charges, an agreed airport programme should be monitored, verified and enforced by the regulator. It should include timing, funding and quality guidelines, akin to a business or property development

plan. There should also be agreed procedures for changes to it and for dealing with lack of performance, progress or delivery. Without such a safeguard, it was argued, delivery of key airport operations could not be certain, nor could financial planning or customer service standards be assured. Enforcement by the regulator would, it was argued, provide the necessary certainty (possibly in conjunction with introduction of output base SLAs).

9.23. During the course of our inquiry BAA discussed with airlines how the existing consultation arrangements could be improved. It had proposed that it should update the capital programme each year, and consult airlines on the annual revisions, demonstrating the nature of the revisions and of changes to projects. Such consultation would be through the airline charges experts, the AOCs, and the South East Airports Group (a joint BAA/airline planning group) and would generally include the identification at an early stage of the projects, which airlines felt should be in the plan and the airlines' priorities amongst the projects.

Capital expenditure performance

9.24. BAA's Board of Directors is provided with regular progress reports on major projects under construction, and its approval is required for cost overruns. BAA also undertakes a small number of post-project audits and reviews in two stages: first, on project engineering and management and any lessons to be learnt from this (which are subsequently built into the *Project Handbook*) and secondly, on the financial appraisal of the projects.

9.25. We showed in Table 9.1 that total capital expenditure in Q2, after allowing for lower than expected price levels, is not likely to be significantly different to that assumed when the current regulatory formula was set. The costs of some major projects have been above that expected at the time of our previous review. For example, the Heathrow Express project was estimated to cost £200 million at 1990/91 prices. It is now estimated to cost some £350 million at these price levels (£410 million at 1995/96 prices, deflated by an RPI of 1.16). Severe delays were caused by the slower than anticipated passage of the *Parliamentary Bill* and the collapse of the tunnel in the Central Terminal Area, which also increased costs. Pier 4A was estimated to cost £27.3 million, but out-turn cost (again, deflated by the RPI) was some £31.5 million. Other projects, following revisions in scope, have cost significantly less than initially expected-for example, the complex for use of HAL, at £5.9 million, compared with £22.5 million allowed in the projection at the 1991 MMC review.

9.26. We were also given information on the initial BAA forecast of expenditure on some 55 projects (on or before the projects were approved, as opposed to the time of our last review), compared with the latest forecast of actual expenditure. Overall, the latest forecasts (at out-turn prices) were between 10 and 15 per cent above the initial forecasts made on or before approval. For 11 of the projects, the latest forecast of cost is more than 25 per cent above initial forecast, one of the most significant over-runs being the Terminal 1 to Terminal 4 transfer baggage system (latest estimated cost of £66 million compared with £37 million initially forecast). We also examined information from BAA on the 26 major projects completed in 1993/94 and 1994/95. Actual out-turn costs averaged about 6 per cent over the forecast made at or before approval. The range was, however, very wide, one project being 140 per cent over forecast (the Terminal 4 baggage transfer system) and over a quarter of the 26 projects being between 10 and 34 per cent more costly than originally planned. On the other hand, over a quarter were between 10 and 23 per cent under budget. (Although it might have been thought projects would benefit from reduction in construction costs, budgets would take any established trends in construction costs into account.) A small number of post-project appraisals we have seen pointed to various lessons to be learned for project design and management, but no systematic weaknesses.

9.27. BAA told us that it saw scope for cost savings on capital expenditure, both by the adoption of the approved project management techniques referred to in paragraph 9.8, and also through adopting world construction industry best practice. A recent study by Lynton,¹ using 1992 data, compared the construction

¹Lynton plc: The UK Construction Challenge. Can the UK reduce its construction costs without affecting quality?

costs of one project at Heathrow with the same building were it to be constructed in North Carolina. It had shown that by replacing UK with US performance parameters, capital cost savings of 32 per cent would result. Some 8 per cent of that cost differential was due to the application of US norms and standards that would not be possible were the building to be built in the UK: that element of the cost difference was therefore something which it was unlikely that BAA could change in the medium term. Many of the other reasons behind the remaining 24 per cent cost difference were largely due to external circumstances, for example US water systems had no cold water storage; because of price differences, electricity was widely used for heating instead of gas, thus saving space and cost; in the UK the external appearance of buildings was more tightly regulated due to the planning process; and US suppliers had lower costs due to a much larger and more homogenous market. Such factors would also probably not be altered by BAA in the medium term, but would depend on wider developments in the construction industry, such as a genuine completion of the European internal market and the emergence of restructured European suppliers. Despite such factors, much of the cost differential could be ascribed by Lynton to better management and higher productivity in the USA, notably through the use of standardized components and simpler design; focusing on preconstruction management; and the adoption of standardized trade practice and standard technical solutions.

9.28. Although it was difficult to split the 24 per cent differential between external institutional factors and internal management factors with any degree of precision, BAA felt it reasonable to aim for cost savings of 15 per cent within a UK environment. As a means to achieve that, BAA was developing framework agreements with more limited numbers of suppliers, as well as standardization of components and other factors as listed above. Its target of 5 per cent a year cost savings for each of the next three years would, however, only offset its expectations of an increase in construction prices from what it regarded as currently low levels (discussed in Chapter 10).

Future capital expenditure

9.29. Table 9.5 summarizes BAA's capital expenditure programme, distinguishing between investment in Terminal 5 and other investments at Heathrow, and the other two airports. Figures are at 1995/96 prices; in the financial model it is assumed that expenditure will increase relative to the RPI, on the assumption that construction prices generally will increase in real terms from their present historically low level. As shown in Table 9.5, Terminal 5 (subject to the outcome of the current planning inquiry) accounts for some 48 per cent of projected capital expenditure over Q3-some £1.07 billion out of a total of some £2.2 billion-and almost 20 per cent of expenditure in Q4.¹

¹BAA has provided the following categorization of expenditure in the first two years of Q3:

	%		%
(a) Genuine mandatory	11	(e) Marginal financial case	3
(b) Growth in throughput	57	(f) Other service projects	2
(c) Urgent service	9	(g) Asset replacement	3
(d) Attractive financial case	11	(h) Other	4

TABLE 9.5 London airports capital expenditure programme

£ million, 1995/96 prices

	1997/98	1998/99	1999/2000	2000/01	2001/02	1997/98- 2001/02	2002/03- 2006/07
<i>HAL</i>							
Heathrow Express	83.3	12.0	-	-	-	95.3	-
Terminal 5 (including Heathrow Express, Piccadilly Line extension)	32.9	137.4	278.9	335.4	284.5	1,069.1	554.4
Other specified projects	118.3	105.0	13.5	14.0	54.0	304.8	740.2
Other	<u>73.5</u>	<u>80.7</u>	<u>108.6</u>	<u>32.6</u>	<u>63.5</u>	<u>358.9</u>	<u>361.0</u>
Total	308.0	335.1	401.0	382.0	402.0	1,828.1	1,655.6
<i>GAL</i>							
Specified projects	44.0	31.4	26.7	35.8	32.0	169.9	145.0
Other	<u>29.0</u>	<u>27.3</u>	<u>18.0</u>	<u>19.2</u>	<u>14.0</u>	<u>107.5</u>	<u>82.1</u>
Total	73.0	58.7	44.7	55.0	46.0	277.4	227.1
<i>STAL</i>							
Major projects	4.9	7.1	18.0	22.0	14.0	66.0	236.0
Other	<u>8.2</u>	<u>6.1</u>	<u>6.3</u>	<u>11.0</u>	<u>8.0</u>	<u>39.6</u>	<u>46.3</u>
Total	13.1	13.2	24.3	33.0	22.0	105.6	282.3
All London airports	394.1	407.0	470.0	470.0	470.0	2,211.1	2,165.0

Source: BAA.

9.30. Our attention was drawn to the significantly lower levels of future capital expenditure assumed by BAA in its previous Business Plans. In the 1993/94 Business Plan, for example, BAA projected capital expenditure of £1,159 million over the five years up to and including 1997/98; in the 1994/95 Business Plan, it projected expenditure of £1,532 million—an increase of almost one-third over that period. BAA told us that the 1993/94 plan was a 'top-down' exercise, reflecting a general cautionary view following the Gulf War and two years of very little traffic growth. By the time the 1994/95 Business Plan was prepared, it was clear that the previous plan was unrealistic: the abolition of the traffic distribution rules in 1991 had put more pressure on Heathrow, more attention was being paid to users' requirements and service quality, and traffic forecasts were higher. Costs of some projects (such as Heathrow Express and hold baggage screening) were increased, with better understanding of their scope and complexity; other projects (such as Europier) were accelerated; new projects such as the Terminal 4 baggage system were included to meet customers' aspirations; and other new projects, such as the Terminal 1 international departure lounge, were included, which combined good financial returns with improved service.

9.31. The rest of this chapter discusses, first, the Terminal 5 project; secondly, the other major projects included in BAA's projections for the next five and ten years; and thirdly, the projections of expenditure on smaller projects.

Terminal 5

9.32. In February 1993 BAA applied for planning permission to develop a new terminal complex at Heathrow. A public inquiry to investigate all the relevant aspects of the new development began on 16 May 1995, and BAA does not expect it to finish until the summer of 1997. All airlines and airline representative bodies from which we heard strongly supported the development. We were made aware of the opposition to the Terminal 5 development from local authorities and residents in areas surrounding Heathrow. The issues arising from this opposition will be considered by the planning inquiry which is currently in progress. The Secretaries of State for the Environment and Transport are unlikely to take a final decision on Terminal 5 until April 1998. If they approve the terminal, BAA expects the project's first phase to be completed in time to open in 2003.

9.33. BAA has said that the number of passengers wishing to use London area airports, and Heathrow in particular, will continue to rise for the foreseeable future: it forecasts that unconstrained demand for the airports will have reached 114 mppa by 2005. If no further capacity is developed, the aggregate capacity of the

London airports will be some 106 to 107 mppa by the same date, in other words a shortfall in capacity relative to demand of almost 10 mppa.

9.34. The capacity shortfall forecast at Heathrow alone is shown in Table 9.6. BAA has argued that without additional capacity, passengers will be lost not only from Heathrow, but the London airports in general; the rate at which the additional capacity provided by Terminal 5 is utilized will itself be affected by constraints of runway and aircraft stand capacity at the airport.

TABLE 9.6 Heathrow: demand and capacity forecasts, 1993 to 2016

Year	Unconstrained demand for Heathrow	Heathrow capacity	
		With Terminal 5	Without Terminal 5
		<i>mppa</i>	
1993	48	49	49
2000	64	59	54
2005	78	68	50
2010	92	76	50
2015	109	80	50
2016	112	80	50

Source: BAA.

Proposed plan

9.35. The proposed site for Terminal 5, currently occupied by the Perry Oaks sludge works, is on the western side of the airport between the two runways (see Figure 9.1). BAA's plans will not be finalized until the outcome of the inquiry is known, but they include a main terminal building of some 233,000 square metres (Terminal 4 is just over 100,000 square metres) with at least two parallel satellites of some 70,000 and 75,000 square metres each. The satellites would be accessed by an underground transit system. The design would create capacity for an estimated 30 mppa, with 59 new stands, including 16 large enough to handle new generation large aircraft.

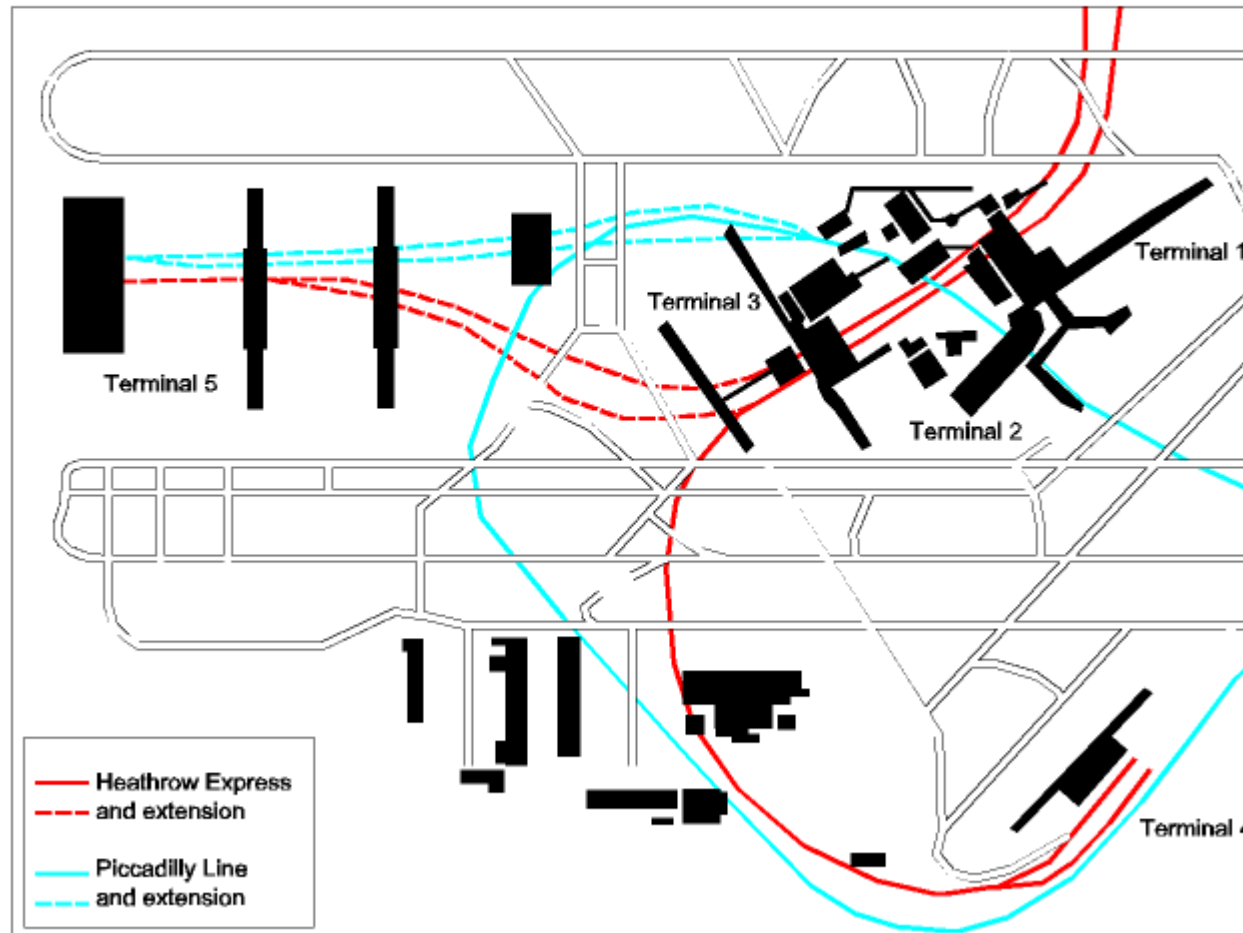
9.36. Associated with the new terminal, BAA has planned for a new dual carriageway spur to the M25, with extensions to the Heathrow Express rail link and the Piccadilly Line.

Phasing of construction

9.37. Table 9.7 shows BAA's plans to phase the development of Terminal 5 capacity. It is currently intended that during phase one BAA will clear the Perry Oaks site and construct: the M25/Terminal 5 spur road; the entire terminal core building and satellite one; and the associated infrastructure, aircraft pavement and landside facilities. In phase two it will fit out those areas of the core terminal building which have not yet been completed. Finally, phase three will involve the construction of satellite two, its associated infrastructure and the communication links to earlier phases of the project. However, it would want to be able to slow down construction should there be any reduction in rate of growth of passenger demand, which BAA, the CAA and the DOT are forecasting, or accelerate it if the reverse occurred. It would also want to be able to build Terminal 5 faster than planned should that make good business sense to the airline occupants of the terminal, and if it were compensated for providing capacity earlier than it otherwise would have done.

FIGURE 9.1

Proposed plan of Heathrow with Terminal 5



Source: BAA.

TABLE 9.7 Terminal 5: analysis of project costs

	Opening year	Capacity mppa	Construction cost constant 1995/96 prices £m
Phase 1	2003	15,000	1,270
Phase 2	2006	5,000	45
Phase 3	2008	10,000	325
Total			1,640

Source: BAA.

Occupancy of Terminal 5

9.38. The final occupancy of Terminal 5 is an important consideration in its planning and design. In consulting airlines, BAA has established three criteria for taking this decision:

- (a) capacity at the airport should be optimized;
- (b) passenger transfers between terminals should be minimized; and
- (c) the movements of airlines between terminals should be minimized, with no airline moving more than once.

9.39. BAA's initial view is that British Airways, as the largest operator with 60 per cent of Heathrow's transfer passengers, should be the prime occupant of Terminal 5. Otherwise, if its operations grow, it would need to operate out of three terminals. It has noted that a number of other airline alliances would benefit from having all their operations together in one location, but none have sufficient operations to justify the sole occupancy of the terminal.

Capital expenditure estimates

9.40. Table 9.8 shows the current estimates of the costs of the project.

TABLE 9.8 Terminal 5: analysis of project costs

	£ million	
	Constant July 1994 prices	Constant 1995/96 prices
<i>Costs to facilitate construction of Terminal 5</i>		
Public inquiry and mitigation	60	60
Perry Oaks clearance	55	56
Iver South facility	55	59
Preconstruction expenditure on design and project management	55	58
M25 spur road	45	47
Total	270	280
<i>Construction of building</i>		
Terminal	250	265
Satellite one	105	110
Satellite two	120	125
Sub-total buildings	475	500
Specialist systems	255	270
Total	730	770
<i>Civils</i>		
Airside civils	300	315
Landside facilities	110	115
Total	410	430
Project contingency	150	160
Total project	1,560	1,640

Source: BAA.

9.41. The total cost figures given exclude interest costs, which would add a further £520 million (depending on the timing of the various phases of the project). The figures also exclude associated expenditure on the extension of the Heathrow Express and Piccadilly Line from the Central Terminal Area to Terminal 5 (the figures for which are given in Table 9.10) and a number of associated works which would be remunerated separately (for example, a new visual control tower for NATS). Of the costs listed:

- (a) Some £230 million of expenditure (including interest) would have been incurred even before planning permission is received. Of this, some £133 million has already been incurred, including the costs of clearance of the Perry Oaks sludge works site.
- (b) £770 million of costs relate to the construction of buildings. Within that amount, some £270 million represents specialist systems. Some £100 million of this is for provision of a generic baggage system: this is intended by BAA as a semi-decentralized system connecting the core terminal building with the two satellites, but it is not currently intended to provide for transfers to the Central Terminal Area or Terminal 4. This category of cost also includes the Tracked Transit System (likewise only for connection between the core and the two satellites). Specialist systems include facilities such as passenger conveyors and airbridges. Airside baggage and passenger transfers to the Central Terminal Area and Terminal 4 would have to be accommodated in a new road tunnel.
- (c) Airside civil engineering works of some £315 million relate to taxiways, aprons, stands and tunnels. £115 million on landside facilities relates to facilities such as the multi-storey car parks and roads.

9.42. BAA told us that extensive work had been done to identify best practice costs. As the cost of the project using today's construction techniques is put at £1.9 billion, the forecast price of £1.6 billion implies a considerable improvement in performance, by taking advantage of product and processing improvements made over the last five years. Main sources of cost savings include:

- (a) improved site management, logistics and productivity, drawing on US best practice;
- (b) framework agreements and world-wide procurement, including standardization of design of components such as cladding, glazing, paving, and steel work at Heathrow generally;
- (c) adoption of construction best practice, by off-site prefabrication and modular construction;
- (d) design and management efficiency; and
- (e) reduction in general contingency from the assumption that if the other savings are achieved, this would itself create greater cost certainty.

9.43. BAA told us that over 70 per cent of project costs (excluding enablement costs) had been benchmarked, results of the bench-marking exercise confirming the current cost estimates as challenging. For example:

- (a) the core building, at £1,074 per square metre, compares to £1,914 per square metre at Gatwick North Terminal, £1,440 per square metre at Heathrow Terminal 4 and £1,434 per square metre at Stansted. BAA also believes the costs on this basis to be significantly below projects at Charles de Gaulle and Hong Kong airports;
- (b) the cost of satellites at £1,243 per square metre, compared with £1,615 at Stansted, £1,350 on the Europier development, and £783 at the Victor Pier development at Heathrow Terminal 4, where, however, quality and service have been relatively poor to achieve cost reduction and are now regarded as unsatisfactory;
- (c) the cost of car parks at £3,250 per space, compared with £4,000 at Gatwick North Terminal;
- (d) the cost of airfield pavement at £40 per square metre, compared with £48 per square metre at Stansted, but was a little above that on recent US developments on greenfield sites; and

- (e) on-costs of 22 per cent, compared with 25 per cent at Stansted, and were also below that of other major UK construction projects.

9.44. BAA had also compared the project with a number of other overseas airport developments, although such comparisons were difficult. Construction costs per passenger of some £23 at Heathrow Terminal 5 were the second cheapest of the eight airports for which information was available (and which ranged from £18 to £260); on service standards, floor space provision is broadly in line with overseas airports, and pier service at 90 per cent compared with a range of 60 to 99 per cent (the latter range relating to only five airport developments). Comparisons of terminal construction costs per square foot also showed Terminal 5 to be comparable to recent US developments, and below the cost of some recent European airport developments.

9.45. BAA's financial appraisal of Terminal 5 is based on incremental traffic of 30 mppa only at Heathrow, as against a 'do nothing' case: total long-term capacity at Heathrow, including Terminal 5, is assumed to be 80 mppa. BAA also, however, allowed for an element of additional throughput above the current capacity of the existing facilities before Terminal 5 itself opened, on the assumption that relatively poor service standards would be acceptable to users temporarily until Terminal 5 was open. No allowance was made for any effects on throughput at Gatwick and Stansted in the appraisal. Among other aspects of the appraisal:

- (a) income and operating costs were based on extrapolation of current best practice;
- (b) construction costs were also based on best practice (as discussed above), but subject to the Davis, Langdon, Everest¹ (DLE) forecast of increase in construction cost generally (although BAA also showed the sensitivity to the somewhat lower increase in real construction prices forecast by WT);
- (c) 4 per cent a year inflation was assumed and 9.5 per cent nominal interest rates, corresponding to 5.5 per cent real interest rates;
- (d) regulation of RPI-1 was assumed for the purposes of this exercise throughout the life of Terminal 5;
- (e) a step improvement of 25 per cent in retail income per passenger was assumed, but no other increases; and
- (f) productivity was assumed to grow by the higher of annual traffic growth or 3 per cent a year: regarded as aggressive as compared with current passenger and throughput levels.

The appraisal excluded expenditure on the extension of the Heathrow Express and the Piccadilly Line, and certain other associated projects which might be regarded as essential parts of Terminal 5, each of which was assumed to generate sufficient revenue to earn an adequate return when evaluated separately.

9.46. On the above assumptions, BAA estimated an internal rate of return (IRR) of [*] per cent and a payback period of [*] years from phase one opening after interest payments, compared with its targets for such projects of 13 per cent of IRR and 12 years' payback. On the assumption of construction costs increasing in line with the WT index, the post-tax nominal rate of return would be [*] per cent. The negative net present value at BAA's 13 per cent target rate of return would be some £[*]. BAA has carried out a number of other sensitivity analyses, which show a range for IRR of between [*] and [*] per cent: BAA's general view is that the current level of airport charges, of RPI-1 assumed throughout the life of the project, is 'not one which would encourage a reasonably minded company to invest'; indeed 'the IRR, cash and earnings effect for investment which is large enough to cripple the company are simply unpalatable on a regime of RPI-1'. On such grounds, BAA argued that for airport charges to increase at RPI-1 over the longer term is unsustainable.

¹DLE are a firm of quantity surveyors which publish forecasts of construction costs and have advised BAA on construction cost forecasts.

*Figures omitted. See note on page iv.

9.47. At BAA's proposed value of X (RPI-0, RPI+ 2, and RPI-1 thereafter: the limit of what it feels would be acceptable to users), the rate of return would still fall short of BAA's target: BAA believes it would have to find additional process improvements, the source of which is not clear, to bridge the difference. The poor returns on Terminal 5 reflect in part the high marginal cost of expanding capacity at Heathrow, although there is little doubt that these would be exceeded by passenger benefit. By increasing charges to above what they may otherwise be to generate reasonable returns on investment, additional revenue may be generated from existing levels of traffic, which would not be taken into account in BAA's current method of appraising Terminal 5 (although ultimately the costs of other facilities would be increased as they were redeveloped to provide comparable quality to Terminal 5). Arguably, therefore, an adequate rate of return could be earned on Terminal 5, as long as there was an expectation of a reasonable return for Heathrow as a whole. The rates of return to BAA and other financial ratios are summarized in Table 9.9.

TABLE 9.9 Summary of BAA's appraisal of Terminal 5

	RPI-1		RPI-0, RPI+ 2, then RPI-1	
	DLE	WT	DLE	WT
IRR (post-tax nominal) (%)	[
Net present value at 13% (£m)				
First year of positive cash flow (after interest)				<i>Figures omitted.</i>
First year of contribution to earnings				<i>See note on page iv.</i>
Net effect on cash flow until 2006/07 (£m)				
Net effect on earnings until 2006/07 (£m)]

Source: BAA.

9.48. As noted in paragraph 9.32, all airlines from which we heard strongly supported the development of Terminal 5, although, as discussed further in paragraphs 9.54 and 9.55, there were criticisms of aspects of the proposals. In contrast to the relatively poor financial return to BAA shown in Table 9.9, the CAA estimated the benefits of the project to passengers to have a net present value of almost £12 billion. That figure was based on an estimate of the charges that would be necessary to reduce the amount of traffic to the level of capacity without Terminal 5, as an estimate of the value passengers attach to using the airport from which they would be excluded by capacity constraints.

Major projects

9.49. Table 9.10 shows the major projects included in the BAA investment programme: the following notes give an outline of the background to some of these projects and the reasons why they are required (each project being cross-referred in Table 9.10 to the associated expenditure):

Heathrow

- (a) The Terminal 1 arrivals domestic baggage reclaim, involving a move to the first floor, was intended to improve the current very crowded facilities in Terminal 1 and also related to work on the Heathrow Express.
- (b) The Terminal 2 check-in development related to a cramped and poorly lit area at present; it involved moving check-in desks to give more room behind them, and increase the depth of the building, also allowing full baggage screening to proceed. The scheme was cheaper than those put forward at the time of the previous inquiry, and related very directly to low scores on the QSM.
- (c) Pier 5 in Terminal 3 was intended to extend the current pier to bring the level of pier service up to standard.

TABLE 9.10 Major projects in BAA capital expenditure

£'000, 1995/96 prices

	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total cost
Heathrow											
<i>Major projects</i>											
Terminal 1 arrivals-domestic baggage reclaims (a)	9,121	0	0	0	0	0	0	0	0	0	9,121
Terminal 2 check-in development (b)	14,500	7,707	0	0	0	0	0	0	0	0	22,207
Terminal 3 Pier 5 extension (c)	4,303	13,905	0	0	0	0	0	0	0	0	18,207
Transfer baggage system (d)	4,660	0	0	0	0	0	0	0	0	0	4,660
100% hold baggage screening (e)	21,919	5,494	0	0	0	0	0	0	0	0	27,414
Terminal 5 phase 1	28,253	126,875	251,563	279,343	246,094	205,712	35,000	0	0	0	1,172,840
Terminal 5 phase 2	0	0	0	0	4,375	14,306	18,345	14,642	18,681	5,893	76,240
Terminal 5 phase 3	0	0	0	0	0	0	17,500	35,422	56,962	116,024	225,908
Heathrow Express	83,291	12,009	0	0	0	0	0	0	0	0	95,299
Heathrow Express-Terminal 5 extension	4,630	9,339	15,881	26,409	14,922	5,942	0	0	0	0	77,123
Piccadilly Line extension	0	1,169	11,491	29,642	19,129	8,970	968	0	0	0	71,367
Total major projects	170,678	176,499	278,934	335,393	284,519	234,929	71,813	50,064	75,643	121,917	1,800,388
<i>Additional projects to 2000/01</i>											
Terminal 3 south office block development (f)	11,617	3,138	0	0	0	0	0	0	0	0	14,755
Terminal 4 baggage system enhancement (g)	8,751	6,000	0	0	0	0	0	0	0	0	14,751
Terminal 4 arrivals facility improvements (h)	4,518	0	0	0	0	0	0	0	0	0	4,518
Passenger loading bridge refurbishment (i)	2,618	3,511	2,292	0	0	0	0	0	0	0	8,421
Shuttle lounge extension (j)	5,722	0	0	0	0	0	0	0	0	0	5,722
HVAC works and refurbishment (k)	2,137	3,179	0	0	0	0	0	0	0	0	5,315
Improvements to eastern perimeter roads (l)	3,442	1,748	0	0	0	0	0	0	0	0	5,190
Stands Terminal 4 Island Site (m)	1,721	6,237	0	0	0	0	0	0	0	0	7,958
Flight path redevelopment (n)	431	1,986	1,910	0	0	0	0	0	0	0	4,327
Victor Stands reconfiguration (o)	0	2,860	0	0	0	0	0	0	0	0	2,860
Development east of Victor Pier (p)	860	7,151	0	0	0	0	0	0	0	0	8,012
Cargo tunnel refurbishment (q)	6,333	3,134	0	0	0	0	0	0	0	0	9,468
British Airways cargo lease purchase (r)	0	15,892	0	0	0	0	0	0	0	0	15,892
Northside Gyrotory Road System (s)	5,163	1,192	0	0	0	0	0	0	0	0	6,355
Noise insulation schemes vortex protection (t)	4,908	4,926	2,750	0	0	0	0	0	0	0	12,581
Water quality upgrade (u)	2,581	3,933	1,490	0	0	0	0	0	0	0	8,005
Transfer baggage enhancement (v)	0	7,945	0	0	0	0	0	0	0	0	7,945
Total additional projects to 1999/2000	60,800	72,833	8,443	0	0	0	0	0	0	0	142,075

£'000, 1995/96 prices

	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total cost
Heathrow											
<i>Additional projects 2000/01 to 2006/07</i>											
Eastern development (w)	0	0	0	0	10,000	10,000	15,000	10,000	0	0	45,000
Northern development (x)	0	0	0	8,000	2,000	3,290	2,000	2,000	7,000	0	24,290
CTA development (y)	0	0	0	0	30,000	50,000	110,000	130,000	120,000	60,000	500,000
Southern development (z)	0	0	0	0	0	5,000	7,000	8,000	9,000	10,000	39,000
Airline relocation (see (y))	0	0	0	0	0	10,000	20,000	20,000	0	0	50,000
Provision for new large aircraft (aa)	0	0	0	0	5,000	10,000	10,000	15,000	20,000	15,000	75,000
Hold baggage screening (ab)	0	0	0	0	0	5,000	10,000	10,000	10,000	0	25,000
Public transport initiatives (ac)	0	0	0	0	0	0	10,000	0	0	0	10,000
Additional projects-2000/01 to 2006/07	0	0	0	8,000	47,000	93,290	184,000	195,000	156,000	85,000	768,290
Land acquisition	3,000	5,000	5,000	6,000	7,000	7,000	5,000	5,000	5,000	5,000	53,000
Rump	73,529	80,732	108,624	32,606	63,481	72,373	69,187	71,936	71,357	76,083	719,911
Total airport	308,007	335,065	401,000	382,000	402,000	407,593	330,000	322,000	308,000	288,000	3,483,665
Gatwick											
<i>Major projects</i>											
Redevelopment of Pier 1 (ad)	4,363	3,894	0	2,204	0	0	0	0	0	0	10,460
South terminal departure baggage system (ae)	0	0	0	3,673	5,000	10,000	0	0	0	0	18,673
Extension to Pier 2 (af)	0	0	0	0	0	0	5,000	10,000	0	0	15,000
North Terminal avenue extension (ag)	0	2,281	1,528	0	0	0	0	0	0	0	3,808
North Terminal domestic/international coach station (ah)	0	0	0	1,469	4,000	0	0	0	0	0	5,469
North Terminal departure lounge extension (ai)	3,012	5,165	0	0	0	0	0	0	0	0	8,177
North Terminal satellite/pier phase 1 (aj)	0	0	0	20,000	15,000	5,000	0	0	0	0	40,000
North Terminal core capacity (ak)	0	1,589	4,584	0	0	0	13,000	14,000	0	0	33,173
North Terminal satellite/pier phase 2 (al)	0	0	0	0	0	0	0	0	5,000	15,000	20,000
Additional stands	0	7,945	3,820	0	0	5,000	5,000	0	5,000	0	26,766
Cargo facilities	0	0	3,000	0	0	0	5,000	0	0	0	8,000
Visitor attraction (am)	10,756	0	0	0	0	0	0	0	0	0	10,756
100% hold baggage screening	14,238	1,142	0	0	0	0	0	0	0	0	15,380
Total major projects	32,369	22,016	12,932	27,346	24,000	20,000	28,000	24,000	10,000	15,000	215,663

£'000, 1995/96 prices

	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total cost
Gatwick											
<i>Additional projects (an)</i>											
MSCP6	860	0	0	0	0	0	0	0	0	0	860
Extension to Pier 4	1,721	0	0	0	0	0	0	0	0	0	1,721
South Terminal departure lounge extension	0	1,986	5,731	0	0	0	0	0	0	0	7,717
South Terminal refurbishment	1,549	2,383	2,292	2,204	0	0	0	0	0	0	8,429
South Terminal check-in capacity	1,721	0	0	0	0	0	0	0	0	0	1,721
MSCP4 South Terminal	1,980	1,033	0	0	0	0	0	0	0	0	3,012
Pier 2 refurbishment	2,108	2,383	0	0	0	0	0	0	0	0	4,492
South Terminal baggage reclaim extension	0	0	2,369	0	0	0	0	0	0	0	2,369
Provision of common user terminal equipment	0	0	0	2,204	0	0	0	0	0	0	2,204
Pier 3-convert transit to walkways and segregate	0	0	0	0	5,000	5,000	0	0	0	0	10,000
South Terminal arrivals concourse extension	0	0	3,393	0	0	0	0	0	0	0	3,393
Arrivals/departures segregation in Pier 2	0	0	0	0	0	0	0	0	17,000	8,000	25,000
Transfer facilities	1,721	1,589	0	0	0	0	0	0	0	0	3,310
River Mole diversion	0	0	0	0	0	0	2,000	3,000	0	0	5,000
Access improvements/car parks	0	0	0	4,000	3,000	2,000	4,000	2,000	1,000	4,000	20,000
Total additional projects	11,660	9,376	13,782	8,407	8,000	7,000	6,000	5,000	18,000	12,000	99,227
Rump	28,973	27,329	18,026	19,246	14,000	13,000	16,000	14,000	19,000	20,000	189,574
Total airport	73,003	58,720	44,741	55,000	46,000	40,000	50,000	43,000	47,000	47,000	504,464
Stansted											
<i>Major projects (ao)</i>											
Aprons phase 3	1,032	2,383	4,000	4,000	0	0	0	0	0	0	11,417
Taxiway linked to Delta Cul-de-Sac	0	0	0	5,000	0	0	0	0	0	0	5,000
New Balancing Pond	431	1,589	0	0	0	0	0	0	0	0	2,019
Satellite 2	1,721	2,383	0	0	5,000	0	0	0	0	0	9,105
Track transit system development	1,721	794	0	0	0	0	0	0	0	0	2,516
Terminal A core retail extension	0	0	5,000	10,000	0	0	0	0	0	0	15,000
Terminal A core extension	0	0	0	0	0	0	15,000	15,000	0	0	30,000
Satellite 3 phase 1	0	0	9,000	3,000	0	0	0	0	0	0	12,000
Satellite 3 phase 2	0	0	0	0	8,000	9,000	0	0	0	0	17,000
Satellite 4	0	0	0	0	0	5,000	15,000	15,000	0	0	35,000
Terminal B	0	0	0	0	1,000	2,000	3,000	17,000	60,000	80,000	163,000
Total major projects	4,905	7,151	18,000	22,000	14,000	16,000	33,000	47,000	60,000	80,000	302,056
Rump	8,171	6,059	6,259	11,000	8,000	6,407	7,000	13,000	10,000	10,000	85,896
Total airport	13,076	13,210	24,259	33,000	22,000	22,407	40,000	60,000	70,000	90,000	387,953
Total South-East	394,086	406,995	470,000	470,000	470,000	470,000	420,000	425,000	425,000	425,000	4,376,081

Source: BAA.

Note: Project costs are as given by BAA at 1996/97 prices, deflated by 1.08 (the increase in construction prices assumed by BAA in that year) to 1995/96 prices.

- (d) The transfer baggage system related to the tunnel for baggage transfer between Terminals 1 and 4.
- (e) Expenditure on hold baggage screening within the plan period represented finishing the project, the bulk of the expenditure on which will have occurred before Q3.
- (f) The South Wing redevelopment provided for a strategic increase in check-in capacity at Terminal 3. The ground floor would incorporate 30 additional check-in desks and a further 2½ floors of offices would increase the quantity, quality and choice of space available to tenants in the Central Terminal Area.
- (g) The Terminal 4 baggage system would be enhanced to accommodate 100 per cent hold baggage screening and to integrate with the transfer baggage system. The project was aimed at meeting British Airways' departure baggage requirements and would include a mechanized container handling system.
- (h) Terminal 4 arrivals facility improvements involved the provision of an additional 600 square metres of arrivals concourse space, increased baggage reclaim capacity and modifications to the queuing zones in immigration.
- (i) This was a phased programme for the refurbishment of existing loading bridges at Heathrow.
- (j) Extension of the shuttle lounge, the domestic lounge used by British Airways at Terminal 1, was to meet demand. CIP capacity would also be increased.
- (k) HVAC works and refurbishment involved the replacement of time-expired heating, ventilation and air conditioning systems in mainly apron and pier tenanted areas.
- (l) Improvements to the Eastern Perimeter Road involved the construction of a new road to reduce traffic on the current road (across which Boeing 747s were occasionally towed to and from British Airways' maintenance facilities).
- (m) The Stands Terminal 4 Island Site project would increase stand capacity as part of increasing throughput to 60 mppa.
- (n) The Flight Path redevelopment would increase car parking capacity through a land swap with local authorities and environmental improvements.
- (o) The Victor Stands reconfiguration was originally intended to take Boeing 777s, but this was now thought to give rise to `blast problems': hence the airport was looking at the project again, although some reconfiguration would be necessary.
- (p) Redevelopment east of Victor Pier was intended to reduce coaching and also to increase stand capacity to allow 60 mppa throughput (the site was currently occupied by Huntings).
- (q) The cargo tunnel was being refurbished to replace time-expired equipment and to meet health and safety standards.
- (r) BAA intended to buy out the interest in British Airways' existing lease in the cargo area and grant the airline a new, longer lease.
- (s) Improvements to the North Side gyratory road system related to what was currently a very complex junction, and would allow traffic to move more smoothly.
- (t) Noise insulation schemes were designed to mitigate the effects of aircraft noise on local residents by providing secondary or double glazing to various properties within the high noise contour areas: this is currently an experimental scheme, the figures being to cover the ultimate cost.
- (u) Water quality upgrade was to meet higher standards imposed by the National Rivers Authority for run-off water entering the public water courses.

- (v) Transfer baggage enhancements were aimed at improving the existing transfer baggage process and facilities within the Central Terminal Area. As yet, no firm plans had been drawn up for the project.
- (w) The additional projects in Q4 represented the kind of things the airport was likely to have to do. The first of these, the expenditure on Eastern Development (the area around Hatton Cross), was for a possible park and ride scheme, although this has not yet been fully costed.
- (x) The Northern Development related to dualling the northern perimeter road to improve internal circulation and provide additional car parking. In this context it was pointed out that some 34 per cent of passengers currently arrived at the airport by public transport (better than any other European airport) which was forecast to increase to 38 per cent with the Heathrow Express. BAA's target for the Terminal 5 project was for 28 per cent of passengers to use public transport, with 50 per cent as a long-term goal for Heathrow as a whole, although this also depended on wider transport policies.
- (y) The Central Terminal Area redevelopment made provision to ensure that airlines remaining in the central area would have facilities comparable with those of Terminal 5; the opening of Terminal 5 would also result in a reshuffle of aircraft movements between the current facilities. Among the possible projects it might cover were extending the arrivals area at Terminal 3 over the current Terminal 3 coach station; the renovation and improvement of the baggage system and immigration area; the adding of international traffic to Terminal 1; additional VIP facilities; to create an additional pier to Terminal 2 to increase pier service; possible redevelopment of the multi-storey car park; and changes to the transfer baggage system necessary when airlines moved around. As well as improvements of ambience and space to provide a level playing field for Terminal 5, reconfiguration of stand areas to allow for larger aircraft would be necessary. Unlike options previously considered, current plans involve refitting of the central areas rather than demolition and rebuilding; but any pier redevelopment would be expensive because of the need to segregate arrival and departing passengers. The £530 million currently put forward as the cost of this scheme was a rough estimate of the magnitude of investment that would need to be made.
- (z) The Southern Development related to an area which was worn out and needed improved landscaping, which HAL believed it would be under pressure to do. The principle development involved was at Terminal 4, which would need remodelling, since it would then be some 18 years old. It would have to handle a broader mix of traffic with a higher proportion of non-UK passengers, which would affect arrival and immigration facilities. The project would also involve a different retailing pattern.
- (aa) Provision for new generation large aircraft (for which British Airways was a front-running buyer) and the increasing size of aircraft in airline fleets necessitated major stand works and would allow expansion of throughput of the airport to 80 mppa, although the timing of the need for such a project was very uncertain. Heathrow's major competitors could already handle such aircraft.
- (bb) Hold baggage screening expenditure represented the replacement of the first tranche of hold baggage screening facilities by the next generation of such facilities.
- (cc) Public transport initiatives were also a rough estimate, although the airport was confident that something would be required to do more to help public transport.

Gatwick

- (dd) The various major projects listed in BAA's submission were primarily to increase the throughput of the airport from the current 22 mppa to between 33 and 34 mppa. The first of these projects, the redevelopment of Pier 1, was necessary to achieve BAA standards for air jetty service in response to complaints from passengers and airlines. Given the potential for more domestic traffic to move to the North Terminal, Pier 1 would need to be rebuilt to increase international traffic at the South Terminal, and to segregate arrival and departing passengers.

- (ee) The South Terminal departure baggage system was currently a large and complex area which suffered from breakdowns and gave rise to complaints from airlines and agents: it needed complete replacement. The upgrade would include a bar code reading system and increased capacity.
- (ff) The extension to Pier 2 would increase pier service from the current 80 to 85 per cent, and provide stands for one or two new generation large aircraft.
- (gg) The North Terminal avenue extension involved squaring off the terminal building, providing more retailing and seating.
- (hh) The North Terminal domestic/international coach station project resulted from a number of carriers wanting to move from the South Terminal to the North Terminal and greater growth than originally designed for, and was also to make use of the present international coach station for domestic traffic.
- (ii) The North Terminal departure lounge extension involved a southward extension over the domestic facility as the North Terminal became closer to its capacity than the South Terminal: the international departure lounge was the main limitation to the capacity of the North Terminal.
- (jj) The North Terminal satellite/pier phase one would increase pier service, which had been up to 75 to 80 per cent, but had now fallen due to the volume of domestic traffic. BAA had looked at the possibility of a connector to a remote satellite (which would be on the area currently used for parking), but currently believed it would be sufficient to provide an underground walkway from the North Terminal.
- (kk) The North Terminal core capacity expenditure was intended for when airport throughput reached some 31 mppa, and would increase throughput further to 35 mppa. It was to be regarded as indicative expenditure, which had not yet been fully costed, and it would entail expansion of facilities such as check-in and baggage reclaim, and would also require further planning permission.
- (ll) North Terminal satellites/pier phase 2 was also an indicative order of magnitude, since it was felt that some such expenditure would be necessary towards the end of Q4. One option was a remote satellite to which passengers would be bussed from the South or North Terminals: but the expenditure might not be enough if airlines did not like this approach.
- (mm) The visitor attraction would involve extending the South Terminal at its north end at the high level. It would aim both to inform visitors about the airport, but also provide interactive games, virtual-reality facilities, etc. Some 500,000 people currently visited Gatwick as visitors, not passengers, but it was also felt that such an attraction could attract more transit traffic (now some 14 per cent of the total). The project could be held up by local authority concerns over increased road traffic.
- (nn) Other projects included expansion of the multi-storey car park at the North Terminal for capacity reasons; extensions to Pier 4 to give three extra stands (of which only one would be pier-served); further refurbishment of the South Terminal; the extension of the South Terminal baggage reclaim underneath the Visitors Centre; provision of common user terminal equipment at check-in points, which had not yet been installed at Gatwick; replacement of the current transit system to connect to the satellite at the South Terminal, which would soon be obsolete and was not strictly necessary, but had been partly intended as a trial for the North Terminal satellite system; provision of facilities for the long-standing requirement to segregate arrivals and departures; provision of improved transfer facilities, which were again not clearly defined, but to meet the growing numbers of transfer passengers both in the North Terminal and between the South and North Terminals; diversion of the River Mole to open up further areas for cargo facilities; and, finally, access improvements in car parks, which were also not particularly clearly defined, but for which additional capacity would at some stage be needed.

Stansted

- (oo) BAA explained that expenditure at Stansted represented phased development of apron and terminal capacity in line with the expected growth in demand at Stansted, but with the hope of deferring extension of such facilities for as long as possible. Expenditure on a second terminal would only be undertaken once it became apparent that the existing building would reach the full capacity of 15 mppa, although planning permission would be sought soon. Any second runway would not be built until after 2010, and also depended on the outcome of studies into a possible close parallel runway at Gatwick.

'Rump' capital expenditure

9.50. Capital projects classified under 'rump' capital expenditure are those which are neither within the major or additional projects, but cover several types of expenditure, namely:

- (a) replacement or refurbishment of existing assets;
- (b) minor developments related to alleviating specific capacity pinchpoints;
- (c) minor projects which are primarily revenue generating (eg for retail and property);
- (d) expenditure necessary for safety/security and environmental purposes;
- (e) expenditure on infrastructure projects, such as service access;
- (f) expenditure needed to increase productivity;
- (g) expenditure needed to improve service standards; and
- (h) other, eg expenditure on community projects, staff facilities, etc.

In practice, however, many projects will cover several of these categories: BAA thus regarded it as impossible to forecast rump expenditure by category.

9.51. In assessing the reasonableness of rump expenditure, BAA pointed to:

- (a) projections of rump capital expenditure as against depreciation: rump expenditure generally falling short of accounting depreciation;
- (b) analysis of past expenditure: BAA's figures show that in 1994/95 expenditure on projects of £5 million or less amounted to some £129 million, a little above the overall average for the forecast period. An analysis of the larger of those projects suggested that the main categories of expenditure related to the categories in paragraph 9.50 (b), (c), (d) and (g); and
- (c) analysis of current expenditure: BAA conducted similar analysis for 1995/96. Some £120 million of expenditure was on non-major projects in that year, of which some £90 million was on projects of over £100,000. About half of these projects were primarily for replacement/refurbishment and a further quarter for alleviating specific capacity pinchpoints and improving service standards. Remaining expenditure was classified as revenue generating; safety, security and environment; and infrastructure. BAA's projections of rump expenditure, therefore, are broadly consistent with past trends, although the profile of that expenditure (for example, the significant reduction in certain years) also reflects BAA's assessment of the overall limits to its investment programme that it believes can be prudently financed.

Issues raised on BAA's capital expenditure

9.52. More detailed views of third parties on BAA's investment programme are included in Chapters 12 and 13. None of the airlines from which we heard had suggested that BAA's capital expenditure was excessive. Some complained that they had seen insufficient details of the programme to be able to comment adequately, although BAA has said that, having published the outline of the programme in preparation for the current review, it had been open to any airline to ask for further details or discussions, which they had generally not done.

9.53. Various airlines have pointed to other instances of previous inadequate investment in operational facilities or projects built too cheaply at too low a standard, in contrast to investment in revenue-generating retail facilities. Particular examples quoted include:

- (a) The Victor Pier at Heathrow Terminal 4, which, it is claimed, is poorly designed and involves a long and arduous walking distance for passengers because of inadequate travolator facilities and steep inclines. BAA acknowledged that the external visual appearance and design of the pier could be better. This was a partial reflection of its previous strategy of using contractors to design, build and construct, whereas it would now take design responsibility itself and ensure that airlines are more involved in planning. However, the walking distances are a reflection of the pier/stand configuration which was developed to meet airline demand: the walking was not arduous and met current guidelines.
- (b) Similarly, on Pier 4A, airlines have complained about its low quality of design and BAA's refusal to install essential facilities such as travolators and fixed electrical ground power until after completion, requiring costly 'retro fitting'; the continued inadequacy of Pier 4A facilities; and the limited length of the pier in order to reduce cost, which has left a number of stands still requiring coaching. BAA said that Pier 4A was a temporary structure which would become obsolete when new generation large aircraft were introduced, and had a high passenger QSM rating; the aesthetics were a matter of taste and not, in BAA's view, of poor quality.
- (c) Reduction by BAA in expenditure on the domestic arrivals facility at Terminal 1 (with insufficient provision of feeds to the baggage reclaim/delivery facilities) and on the redevelopment of Gate 5, also in Terminal 1, from the levels regarded as appropriate by airlines. BAA told us that the Terminal 1 domestic arrivals project met all of BAA's capacity and design requirements and that the system capacity was broadly in balance for the expected traffic mix: a second feeder belt would be under-utilized and of marginal benefit, whilst involving considerable additional cost. HAL would enter into an SLA to provide labour to assist in delivery of bags into the hall in the event of failure of either delivery belt, which it believed to be a more efficient and cost-effective solution. With regard to the Gate 5 project, BAA said that more elaborate schemes could not be developed within the time-frame specified by the user airline.
- (d) Insufficient expenditure on the international departure pier in Terminal 1, with poor-quality gateways and the pier itself in poor state of repair. BAA accepted that this was an old structure, but denied that the quality was impaired, apart from visual appearance.
- (e) Poor domestic facilities at Gatwick South Terminal and poor international facilities at Pier 2 of the South Terminal. BAA again disagreed that these facilities were poor, though visual appearance reflected the age of the structure.

9.54. The main criticism of the capital expenditure programme was the absence of any additional expenditure on transfer baggage systems at Heathrow, first, between Terminals 1, 2 and 3; but secondly, the absence of adequate transfer systems in the planning of Terminal 5. Heathrow AOC commented that there were no aspects of the investment programme which it would wish to be removed from BAA's programme in order to accommodate any additional expenditure on transfer baggage facilities. There was also criticism of insufficient planned investment to improve some of the existing facilities, in particular the international pier at Heathrow Terminal 1 (which BAA told us would be redeveloped as part of the Central Terminal Area redevelopment) and Pier 2 and domestic facilities at Gatwick South Terminal. BAA told us that the domestic facilities at Gatwick would soon be redeveloped: but the costs of redeveloping the interna-

tional pier (as with the Heathrow Terminal 1 international pier) would be increased by the DOT's requirement to segregate arriving and departing passengers.

9.55. On Terminal 5, although the principle of that development was agreed by all airlines, there was criticism of the phasing of the project and the omission of facilities they considered to be essential. For example, some airlines suggested that more expenditure should be incurred in phase one, allowing for quicker transfer of traffic from other terminals and a more comprehensive redevelopment of the existing Central Terminal Area terminals. There was also criticism of the absence of inter-terminal baggage transfer systems (other than a road tunnel) and a long-term 'master plan' for the airport, including any coherent strategy for the comprehensive redevelopment of the Central Terminal Area.

9.56. We sought the views of two American experts on airport planning-Professors Simpson and de Neufville-on the Terminal 5 development. In brief, while agreeing totally with the desirability of undertaking the Terminal 5 development, they questioned the amount of transfer traffic likely to use Heathrow if the runways were continually operated without spare capacity, which would prevent scheduling waves of connecting arriving and departing flights; also whether there was sufficient provision for transfer of passengers and baggage between Terminal 5 and the existing facilities. They felt that the absence of modern inter-terminal transfer facilities would lead to loss of transfer passengers to other European airports with more convenient interchanges. They also criticized the apparent absence of a 20- to 30-year strategy that would involve the more wholesale redevelopment of the Central Terminal Area. Such development could, for example, include the replacement of much of the Central Terminal Area with further satellites connected by tracked transit systems and baggage transfer systems either to Terminal 5 or to a new core terminal building in the central area. Such development, replacing the current system of piers in the Central Terminal Area, would allow much easier access to stands from runways, with significant operating cost savings to airlines in congestion and fuel costs. It could also involve construction on the current cross-wind runway which is rarely used. BAA's view was that such a proposition would be impossible as there would not be enough capacity in the Terminal 5 development to allow both for the closure of existing terminals, even on a phased basis, and the transfer of other traffic to Terminal 5, to enable any such comprehensive redevelopment to take place. Any redevelopment along those lines would be very expensive, disruptive and lead to huge asset write-offs. Construction on the current cross-wind runway would also significantly reduce operational flexibility. Consideration of options for redevelopment of the Central Terminal Area were, however, still at a relatively early stage and a link to Terminal 5 was still a possibility: detailed planning on the redevelopment of the Central Terminal Area, on which work was now starting, would involve full consultation with airlines. On the implications for transfer traffic, BAA pointed out that, given that demand for Heathrow would exceed capacity before the opening of Terminal 5, the proportion of transfer passengers would decline, from the current 34 to 20 per cent, but without in any way reducing the need for Terminal 5. Professors Simpson and de Neufville also criticized the rate of return sought by BAA on the project, a comment made by other parties who regard Terminal 5 as a relatively low-risk investment.

9.57. The CAA raised with us a possible 'top-down' approach to the capital expenditure programme. Applying the annual percentage rate of growth to the current gross value of assets would suggest a need for investment for growth in traffic through Q3 of little more than £100 million a year or for replacement of more than £110 million a year: suggesting that as much as half of the capital expenditure programme, or as much as £200 million a year, appeared to be spent on enhancement of current facilities, which could be difficult to justify. BAA's programme does, however, require expenditure of some £200 million a year on Terminal 5 alone during Q3: suggesting that the lumpiness of such a major development requires significantly more expenditure to meet the longer-term growth in demand than assumed by such a methodology. Given the scale of the investment programme, we employed Crump Newberry & Partners (Crump Newberry), a firm of chartered quantity surveyors, to examine the costs of one recently completed project (the Gatwick North Terminal domestic facilities), one project soon to be undertaken (Heathrow Terminal 2 developments), and elements of the Terminal 5 proposals. On the first two of these projects, Crump Newberry commented that aspects of costs appeared high-they felt, for example, that the cost plan for Terminal 2 could in some cases be up to 10 per cent above competitive rates, and that BAA's procurement and project management methods were reflected in high management and on-costs, but with potential benefits to flexibility and management control of the projects. (With those methods, BAA employed the design team and engaged a construction manager to co-ordinate design and construction and to supervise activity; there is therefore no main contractor, but construction is divided into work packages carried out by contractors co-ordinated by the Construction Manager, requiring additional layers of supervision.) They

did, on the other hand, regard BAA's cost targets for Terminal 5 as very demanding. BAA told us that it regarded construction management as the only viable strategy in an operating terminal. Further cost savings could not, in its view, have been made in the Gatwick North Terminal project without compromising the quality of the buildings.

9.58. Criticisms were also made by airlines of the rate of return required by BAA on its investments. In its hurdle rates, BAA deducts from its (post-tax nominal) test discount rate of 13 per cent: 1 per cent if fully protected from construction risks; 1.25 per cent if fully protected from price risks; and a further 1 per cent if fully protected from fluctuation in passenger numbers: ie a minimum rate of 9.75 per cent post-tax nominal if protected from all three factors. Airlines complained that this was excessive for investments where airlines bear all risks, citing the Terminal 1 to Terminal 4 baggage tunnel, and the reconstruction of the Terminal 1 baggage hall, and suggested that a real pre-tax rate of return of 6 per cent would be sufficient for such projects (as determined by the Office of Electricity Regulation for analogous investments by the National Grid). BAA told us that it still bore significant risks for such projects. It had, for example, to absorb part of the additional costs of the Terminal 1 to Terminal 4 baggage tunnel (although these would now be in the asset base of relevance in setting airport charges), but the 9.75 per cent post-tax nominal rate used in such circumstances would probably not be significantly different to a 6 per cent pre-tax real rate. Airlines also criticized BAA's unwillingness to allow airlines to develop facilities themselves.