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1.0 INTRODUCTION

This report is submitted by WS Atkins International Limited (WSAIL) to the Government of Anguilla (GoA) and the UK Department for International Development (DFID) under Contract Reference Number CNTR 00 1995, dated 5 January 2001.

This report covers the options for developing the runway at Wallblake Airport in Anguilla and also contains identification of funding sources, discussion of financing possibilities, and environmental and social impact statements. Land costs, resettlement, planning and legal issues are also addressed.

This work follows on from a previous study submitted to the GoA and DFID by WSAIL entitled "Comparative Airport Study: Anguilla" dated June 2000 which evaluated the two proposed sites for airport development in Anguilla, namely Bremegin and Wallblake. The latter was identified as the most suitable site on economic and other grounds. Data and other information collected for this previous study was updated and amplified by site visits to Anguilla in February 2001.

The terms of reference require the production of a matrix of costs for the various identified development options. Within some options, there are also variations. These are discussed in the text.

2.0 SUMMARY

2.1 General

A study was undertaken to consider the construction of a range of options for the development of Wallblake Airport to meet the forecast requirements for the next 20 years. The resultant effects of these options with respect to environmental and archaeological issues have been assessed. In addition land acquisition costs, resettlement costs and issues, planning and legal issues have been examined and estimates of their costs and impacts undertaken. An analysis of funding options available and the financial viability of the project have been carried out.

2.2 Operational and Airport Issues

The aircraft type considered for design purposes was the A TR 72. Performance figures for this aircraft were taken from the A TR factory performance calculations and advice from American Eagle. The performance of other aircraft such as the BAe 146 and the Fokker F100 was also considered during the development of the options. The study considered three main options for runway extension. These were in line with a minimum cost development to permit operations of the A TR 72, improved performance on take off to the west and to permit full operations of the A TR 72 from either runway.

Option 1: This was the minimum cost development to allow A TR 72 operations from Wallblake Airport. Take off to the east could be carried out without restriction but take off to the west would suffer a load penalty equal to approximately 36 passengers. Take offs to the west are however a rare occurrence. The base cost of this extension is £7.20m (see Section 4).

Option 2: This included the work for Option 1 but also allowed for raising the western end of the runway. The advantages of this are to enhance the obstacle environment at the western end and reduce the weight restriction on aircraft taking off to the west. However, the impact was not as great as expected and the weight penalty for the A TR 72 would equate to about 31 people. The base cost of this option is estimated at £9.22m. A major advantage of this option is that the Government of Anguilla would be in a sound position to undertake a further extension to the East at some time in the future.

Option 3: Both options 1 and 2 are designed as Airfield Reference Code (ARC) 2 runways and safeguarding requirements can largely be contained within the width of the current site. Option 3 envisages an 852m extension of the runway to the east, requiring safeguarding for an ARC 3 runway. This results in the necessity for a much greater width in land take. However, Option 3 allows unrestricted use of both runways by the A TR 72 and would permit not unreasonably limited operations by aircraft such as the BAe 146 and the F100. The base cost for this option is assessed at £24.94m. This rises to £28.4m if all airport development options are progressed. .

The study team was made aware of the planned golf course development at the eastern end of the runway. For options 1 and 2 it is likely that the fill required could be cheaply purchased from the developers. However, Option 3 would encroach on the planned golf course and it is likely that fill would largely have to be imported. This results in a considerable increase in cost.

The study considered other requirements that would be needed to support future forecast operations at the airport. Schemes for refurbishing the passenger terminal were compared with costs of a significant extension to the terminal. The provision and viability of providing aviation fuel has been assessed and costs estimated for three schemes. Any extension of the runway generates the requirement to re-locate the road crossing the eastern airport boundary. A scheme design for this has been undertaken and cost estimates derived. In addition the requirement for extra aircraft parking areas and runway lighting has been assessed and costs derived.

2.3 Environmental Issues

The environmental appraisal has considered the key issues associated with improvement options at Wallblake Airport. The issues of note include those related to land-take as they affect landscape, ecology, agriculture and, in particular, archaeology. For the last issue, archaeological studies prior to construction will be necessary with a watching brief during construction. With appropriate mitigation, the impacts arising in relation to the above issues are regarded as acceptable. Option 2 has a greater impact on the local flora and fauna than Option 1. Although Option 2 is unlikely to have any significant overall effect on Anguilla's biodiversity, the project puts into focus the issue of gradual attrition and fragmentation of habitat on the island and the need for solid wildlife conservation initiatives in Anguilla.

The project offers an opportunity to improve on the existing infrastructure for the control of and treatment of run-off water.

Community issues form the predominant impact group pertaining to loss of property and exposure to noise.

There will be changes to the noise environment arising from the development of any of the options. Option 2 will result in the occasional exposure of western households to take-off noise. Noise issues represent one of the most significant community impacts. Resettlement is the most appropriate form of mitigation for severely affected households in the take off path with noise insulation provided as necessary elsewhere. Control of flight times will prevent night-time nuisance. Construction noise may be mitigated by the application of suitable standards to construction vehicles and plant, and control over access and time of working.

Apart from impacts on ecology, there is relatively little difference in the impacts between the options.

Contingent impacts will arise from the supply and transport of fill, depending on the source of supply. New roads may also arise as part of the development though these will probably be influenced primarily by future land use proposals in the area to the east of the airport. These issues should be subject to both strategic and site specific environmental assessments.

2.4 Social and Tourist Issues

Land acquisition requirements, resettlement needs and legal issues were examined in detail. For the minimum cost option, 14 residential and 3 residential/commercial buildings as well as one school would have to be re-located. The cost for this was estimated at £2.40m. Option 3 requires a greater land take, not only because of runway length but also because of the extra width required to safeguard an ARC 3 runway. It would also require the re-location of one more residential building. The cost for this option was estimated at £3.34m.

All three options offer viable technical solutions to the constraints imposed by the existing airport, which include:

- The fact that the runway is too short to allow the 44 seat A TR 42 aircraft operated by American Eagle to operate to and from San Juan at maximum payload on all conditions.
- The current runway cannot support the larger A TR 72 aircraft that are being deployed to the San Juan hub to serve the Caribbean destinations.
- The existing passenger terminal suffers from congestion and overcrowding.

The proposed improvements to the runway therefore ensure that the A TR 72 can carry maximum passenger payloads (66 seats) under most conditions, thereby avoiding the annoying restrictions on seat availability existing at present. At the same time, the options do not support the introduction of large jets or substantially increased traffic that would signal the advent of mass tourism. The optional developments are therefore consistent with the currently stated tourism policy and should have a net positive impact on the future development of tourism on Anguilla.

2.5 Financial Issues

A detailed analysis of the various funding options and their viability has been undertaken. A base case, Option 3, was used for comparing different funding option viabilities. This was selected as it was the most likely of the three options to attract a range of funding options.

For the purposes of examining the funding options the study assumed a project capital and pre-operating expenditure of US\$35m and for the project to take two years to complete. Placing this in context of a GDP at market prices of around US\$100m, this project is clearly a significant capital outlay for the island.

It was considered that there were three funding options worth examination, namely:

- conventional project finance
- a BOT scheme
 - a Public-Private Partnership.

It was considered that privatisation of the airport is not feasible at this time as the airport is not profitable even if the revenue from Passenger Departure Tax is taken into consideration. For the purpose of discussing funding options and calculating debt service requirements, we have assumed the Option 3 development, namely the 850m extension costing US\$28.26m including terminal upgrade, parking apron, airfield lighting and navigational equipment.

Underlying all the funding options is the basic requirement of covenanting resources to secure the loans. These could be taken out on the land and buildings.

The principal problem with funding the project is that the current and forecast revenues are too low to support the debt servicing.

2.6 Conclusions

The study concluded that:

Finance. The higher cost options could not be financed without a package of soft loans and grants as well as considerable investment by the Government of Anguilla. The principal problem is that the current and forecast traffic revenues are too low. These are unlikely to generate enough funds to support both the debt servicing and the airport operating costs until post 2018.

Resettlement Costs. The minimum resettlement and land acquisition costs are estimated to be £2.40m. The resettlement and land acquisition costs for the maximum development option would be £3.34m. This is largely attributable to the extra land take required for safeguarding.

Legal and Institutional Issues. No significant legal or institutional issues have been identified for the implementation of this project. It is anticipated that all the relevant procedures have been adequately covered under the Land Acquisition Ordinance Cap 273, 1959.

Tourism. The optional developments are consistent with the currently stated tourism policy, and should have a net positive impact on the future development of tourism on Anguilla.

Environmental. There are no likely significant impacts that cannot be mitigated successfully by careful design.

Archaeological. There will be a relatively minor impact on the Forest North archaeological site. In the case of maximum development, it will be necessary to close Airport Cave.

Aircraft Operations. The minimum cost option allows operations of the A TR 72 at the eastern end of the runway. However, on the few occasions where take off's are to the west, the A TR 72 will, depending on the weather of the day, suffer a weight penalty equal to approximately 36 passengers.

Projected Costs. The total project costs are estimated to be minimally £7.20m with the maximum recommended proposal estimated at £28.40m.

Project Feasibility. The maximum option provides the best solution for the long term development of air traffic and hence tourism in Antigua. However the current and medium term forecast traffic is unlikely to be able to support anything other than the minimum cost option.

2.7 Recommendations

The study recommended that:

- a. The development of Wallblake Airport is undertaken on a phased basis.
- b. The minimum cost option, as designed, is considered as the first phase and undertaken as soon as is practicable.
- c. Land should be reserved against the requirement for the future development of the airport and, where practical, purchased on a gradual basis.

3.0 RUNWAY LENGTH REQUIREMENTS

3.1 Design Aircraft

The design aircraft is the A TR 72, planned to be operated in 66-seat configuration. This is the aircraft which American Eagle, the main airline operating into Anguilla, propose to replace the existing equipment, the 44-seat A TR 42.

3.2 Take Off Requirements

For the previous report ("Comparative Airport Study: Anguilla) American Eagle provided data that indicated that the A TR 72 required a runway length of 2073m for take off at maximum weight (zero wind, 32°C). This presumed an obstacle-free environment.

However, to identify the best cost solution required by the Terms of Reference, Avions de Transport Regional (ATR) where asked to provide ATR72 performance data based, not on maximum take off weight, but weight with a full passenger load, plus fuel for the Anguilla-San Juan sector, plus adequate diversion and holding fuel reserves.

The requirement gives a take off weight for of the ATR 72 of 45,500lb (compared with 47,400 maximum take off weight), and this weight requires a runway length of 1199m (compared with the existing length of 1097m), provided that there are no obstructions in the take off flight path. Thus take off at this weight is possible at Wallblake airport for take offs towards the east with an extension of 102m.

Take offs towards the west are, however, obstacle limited and require reductions in payload. A further extension of runway length can be provided for take offs towards the west by introducing a "Starter Strip" of 150m length at the eastern end of the runway, giving a runway length of 1349 metres. Although this improves possible payloads, it does not provide a full passenger load on the San Juan sector. This is discussed in more detail in Section 4.

3.3 Caveat

We acknowledge the considerable assistance from A TR in providing the performance data. However, the data and the conclusions drawn from it require confirmation by American Eagle to ensure that the assumptions, and in particular the assumed operating procedures that A TR have used in producing the data, correspond with American Eagle practices and procedures.

3.4 Aircraft Types

Although the design aircraft is the A TR 72, an extension of the runway to 1199m would allow a variety of aircraft types to use it. At the upper end of the range would be the BAe 146 and Fokker 100, both capable of carrying a pay load of 100 passengers. Although not able to take off towards the west with commercial payloads, take offs towards the east would be possible, not at maximum take off weight, but with commercially acceptable loads.

Some types of the 50-seat size of Regional jets such as the Embraer 135 & 145 and the Bombardier Challenger would also be able to use the runway with some limitations.

The smaller private and corporate 8-12 seat business jet aircraft types, such as the Citation series and some versions of the Falcon range, could also perform usefully. The ability to service business jets may be an important contribution to the up-market sector of Anguilla's tourism industry.

The longer runway extension of Option 3 (1799m) would, of course, allow an even wider range of aircraft, including variants of the Boeing 737, to carry useful payloads over longer ranges to use Anguilla. Such aircraft types do not, however, feature in the current air transport forecasts for the Island.

4.0 IDENTIFIED OPTIONS

4.1 Introduction

This section examines the options available for the development of Wallblake Airport in the following areas:

- . Runway Extension
- . Bulk Fuel Installation
- . Terminal Building
- Apron
- . Air Traffic Control Tower
- . Rescue and Fire Fighting Service
- . Maintenance Facilities
- . Realignment of Public Road
- . Runway Lighting
- . Car Park

The options and their associated costs are summarised in Section 4.12.

4.2 Runway Extension

4.2.1 General

American Eagle intend to replace their existing fleet of A TR 42s with a fleet comprising exclusively of A TR 72s. They currently operate approximately 75% of all scheduled flights to the airport and, if this is to continue to be the case, the airport must be developed such that it can accommodate A TR 72s. The principal limitation to their operation at the airport is the length of the existing runway; at present, a fully laden A TR 72 could not take off in either direction. This section of this report will investigate the options available such that operation by A TR 72s is possible.

4.2.2 Aircraft type and loading

The design aircraft is the A TR 72 configured to operate with 66 passengers. The critical weight for operations from the airport is the Take Off Weight (TOW). To allow unrestricted operations, this must incorporate the following:

Fuel for 165nm stage to San Juan
Fuel for 100nm diversion
Fuel for 45 minutes continued cruise
66 passengers at 216lb each.

This provides a TOW of 45,500lb. A temperature of 32°C has been assumed.

4.2.3 Existing runway

The existing runway is of asphaltic paving, has a total length of 1097m and is orientated in an approximately east - west direction. The width is 30m. The runway generally follows the gradients of the existing land, and hence the mid-section is considerably higher than the two runway ends. This, in conjunction with obstacles located to the west of the runway, necessitates the displacement of the west end threshold by 183m.

4.2.4 Design objectives/criteria

The primary objective of the project is to provide Wallblake Airport with the capability to operate A TR 72 aircraft with the maximum aircraft load of 66 passengers. This would necessitate a TOW of 45,500lb (see Section 3.2). This capability should ideally exist regardless of wind direction.

The UK Civil Aviation Authority produces a document titled 'CAP 168: Licensing of Aerodromes (fifth edition, Feb 2001)' (CAP 168). This is based upon the guidelines specified by the International Civil Aviation Organisation (ICAO) and provides the standards that aerodromes must comply with. A fundamental step in this process is the allocation of an 'Aerodrome Reference Code' (ARC). This is based, essentially, on the runway length, maximum size aircraft wing span and maximum size aircraft main gear wheel span. The minimum acceptable characteristics of an aerodrome are, generally, decreed by CAP 168 in conjunction with the ARC allocated.

An additional step in the design process is the selection of the appropriate category of navigational aids (ie instrument landing systems etc). The current CAP 168 category is 'visual' and this would be the appropriate category for the development options.

4.2.5 Runway design and cost

The design of the runway pavement results in the following construction:

Asphalt wearing course:	125mm
Base course:	100mm
Crushed aggregate base course:	350mm
Total construction depth:	575mm

Further details regarding the design are contained in Appendix B.

The costs of the various runway development options comprise the cost of the various components required to construct the runway. For this reason, considerable care has been taken to establish reliable individual item costs. It is recognised, however, that a variety of outside influences could affect these costs, thus reducing the accuracies of the cost estimates provided for the various options. The material costs used and their origins are provided in Appendix B.

4.2.6 Runway extension options

A review of the possible means of extending the existing runway such that the objectives specified above are met has been undertaken. The three most feasible and appropriate are summarised below:

- Option 1: An extension at the eastern end of the runway by 252m (including a 150m Starter Strip)
- Option 2: As Option 1 but with re-profiling of the western end of the runway.
- Option 3: An extension at the eastern end of the runway by 852m (including a 150m Starter Strip).

Option 1: Minimum cost

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This option will provide a runway of length 1 199m (ie an extension of 102m) together with a Starter Strip of length 150m. All construction work will be to the east, thus permitting a large proportion of the runway to remain operational during the works. The resultant runway will have an ARC of 2C and the maximum lengths possible for this ARC short of constructing a Starter Strip at the west end. It is shown in Drawing CK3660/09.011002 in Appendix C.

As stated in the preceding paragraph, this option will incorporate a 150m Starter Strip at the east end of the runway. The Strip will be available to aircraft taking off towards the west and, thus, its length will be included in the Take Off Run Available (TORA) in that direction. For take offs towards the east, the Strip will provide a 60m runway strip and 90m Runway End Safety Area (RESA) as recommended in CAP 168. It will not, however, form part of the TORA. A suitable RESA will be provided at the west end of the runway.

It is a requirement of CAP 168 that all runways are surrounded by a graded area known as the Runway Strip. In the case of 'visual' Code 2C runways, this must extend at least 40m either side of the runway centreline. The construction of this option, therefore, will include the preparation of such an area. Due to the existing terrain, this will be mostly above the existing ground level and will thus require a volume of fill material.

Denton Corker Marshall Ltd (DCM) are currently promoting the Conch Bay Development (see Drawing CK3660/09.01/007 in Appendix C). This development will be on land to the east and south east of the existing runway and will include an 18 hole golf course, a club house, a marina and a limited quantity of high quality accommodation. The proposed marina will be inland and will, therefore, result in the production of a considerable volume of fill material. DCM estimate that the quantity could be in the region of 280,000m³. Although they could apparently utilise this material in their development, they have informally advised that, should Option 1 be implemented, they would be prepared to provide this fill material for a nominal charge assuming, of course, that their development also proceeds. The largest single cost for this option is the provision of suitable fill material, and this possibility would, therefore, lead to major cost savings.

The longitudinal profile of this option has been calculated to allow the runway to be extended into Option 3 should this become desirable in the future.

We have been advised by ATR that in still wind conditions this option would allow an A TR 72 with a TOW of 45,500lb to take off towards the east and land towards the east with its maximum passenger load. However, a weight penalty of approximately

7,800lb would be incurred for still wind take offs towards the west. This would reduce the effective passenger load by 36 passengers. We are advised by Air Traffic Control at the airport that take offs in this direction are necessary for less than 2~ days each year. Therefore, for up to 2~ days each year, the passenger load for departing A TR 72s would be reduced from 66 passengers to 30 passengers.

Option 2: Raising of west end

This option is similar to Option 1, but with the additional raising of the west end of the existing runway by an elevation of slightly over 5m. This construction will be combined with the provision of a suitable RESA at the west end of the runway. Drawing CK3660109.01/003 in Appendix C illustrates the proposal.

As with Option 1, CAP 168 requires the provision of a runway strip, extending 40m either side of the runway centreline and this will require a considerable volume of fill material. As with Option 1, DCM have informally advised that they would be prepared to provide the fill produced by their development, should it proceed, for a nominal charge. DCM anticipate the Conch Bay Development producing approximately 280,000m³ of fill material, and the proposed elevation of the west end has been calculated to optimise the use of this material. Again, this would lead to a significant cost saving for the airport development.

Although the declared distances for this Option will be the same as for Option 1, the weight penalty for A TR 72 take offs to the west will be reduced as a result of the raised west end alignment. It is envisaged that the weight penalty would, in this case, be 6800lb, equating to 31 passengers. Therefore, for up to 2~ days in total per annum, the passenger load for departing A TR 72s would be reduced from 66 passengers to 35 passengers.

Option 3: Full development of ARC 3 runway

This option will provide a runway of length 1799m (ie an extension of 702m) together with a Starter Strip of length 150m. All construction work will be to the east, thus permitting a large proportion of the runway to remain operational during the works. The resultant runway will have an ARC of 3C and the maximum lengths possible for this ARC short of constructing a Starter Strip at the west end. It is shown in Drawing CK3660109.01/004 within Appendix C.

As stated in the preceding paragraph, this option will incorporate a 150m Starter Strip at the east end of the runway. The Strip will be available to aircraft taking off towards the west and, thus, its length will be included in the TaRA in that direction. For take offs towards the east, the Strip will provide a 60m runway strip and 90m RESA as required by CAP 168. It will not, however, form part of the TaRA. A suitable RESA will be provided at the west end of the runway.

As with the other two options, CAP 168 requires the provision of a runway strip. In the case of a 'visual' runway with an ARC of 3C, this must extend at least 75m from the centreline of the runway, considerably further than for options 1 and 2. Due to the nature of the existing terrain and the requirement for the runway longitudinal profile to meet the requirements of CAP 168, the majority of the runway extension will be on an embankment. The considerable width of the runway strip will result in a large requirement for fill material.

DCM have informally advised that the proposed Conch Bay Development will include high quality accommodation units in the vicinity of the eastern flight path (see Drawing CK3660/09.011007 in Appendix C). They believe that the proposed proximity of the eastern end of the runway to the development would cause unacceptable aircraft-generated noise in the area of this accommodation. This would clearly have significant financial implications for the development. Consequently, they have advised that they would not be prepared to voluntarily provide any fill material from their site to the airport development, should this runway option be progressed.

The longitudinal profile of this option has been calculated to allow it to be constructed as a separate project some time after the construction of Option 1 and/or Option 2 such that disruption is minimised.

We have been advised by ATR that in still wind conditions the TORAs provided by this option would be sufficient for an ATR 72 to take off in either direction with a TOW of 45,500lb and to land in either direction with its maximum passenger load.

Table 4.1 provides a summary of the advantages and disadvantages of each option.

**Extension to Wallblake Airport Runway
Options and Funding Study Anguilla**

DFID Contract No. CNTR 00 1995
Draft ReDOrt

Option	TORA to east	TORA to west	Advantages/disadvantages
1	I 199m	I 349m (including 150m Starter Strip)	<p>Advantages:</p> <ul style="list-style-type: none"> - Unrestricted operation of A TR 72 towards east - Restricted operation of A TR 72 towards west - Relatively inexpensive - Conch Bay Development have informally agreed to provide fill material for a nominal charge - Maximises runway length for an ARC of 2 - Vertical alignment of extension will allow further development to options 2 and 3 <p>Disadvantages:</p> <ul style="list-style-type: none"> - Weight penalty equivalent to 36 pax when taking off to west (2.5 days/year?)
2	1199m (with raised western profile)	1349m (including 150m Starter Strip and raised western profile)	<p>Advantages:</p> <ul style="list-style-type: none"> - Unrestricted operation of A TR 72 towards east - Conch Bay Development have informally agreed to provide fill material for a nominal charge - Optimises use of predicted quantity of fill material provided by Conch Bay Development - Maximises runway length for an ARC of 2 - Vertical alignment of extension will allow further development to Option 3 <p>Disadvantages:</p> <ul style="list-style-type: none"> - Weight penalty equivalent to 31 pax when taking off to west (2.5 days/year?)
3	1799m	I 949m (including 150m Starter Strip)	<p>Advantages:</p> <ul style="list-style-type: none"> - Unrestricted access of A TR 72 in both directions - Will permit operation by medium sized non-design aircraft - Maximises runway length for an ARC of 3 <p>Disadvantages:</p> <ul style="list-style-type: none"> - Conch Bay Development opposes the scheme and will not voluntarily provide fill material - Expensive

Notes: I. TORA is 'Take Off Run Available'
Table 4.1: Summary of runway extension option advantages and disadvantages

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4.3 Bulk Fuel Installation

4.3.1 Introduction

The airport currently has no provision for the supply of aircraft fuel, resulting in a requirement for aircraft to 'tanker' fuel for their return journey on their inbound leg. This increases aircraft operational costs and can restrict their routings. Though a means of providing fuel at the airport is not an essential component of the runway extension project, it would considerably improve the service that the airport could offer aircraft operators.

The existing provision of facilities in the locality of the airport could assist the provision of fuel to the airport, and these facilities are therefore described further.

The primary electrical generation facility for Anguilla is located slightly to the south of the airport (see Appendix C, Drawing CK3600/09.0 1100 1). This is oil powered, with the oil being brought to Anguilla by ship and off-loaded into one of the bulk fuel installations located approximately one mile south of the airport (see Appendix D, Photograph 1). The installations are operated by Shell and Delta Petroleum Anguilla Ltd and the former is linked to the power station by a single pipeline of approximately 90mm external diameter (see Appendix D, Photograph 2). At the time of the site visit (February 2001), Shell were servicing the contract to provide oil to the power station. However, it is understood that the contract will be re-assigned to Delta in the near future.

The following three options for the provision of aircraft fuel to the airport were considered:

4.3.2 Option A: Off-site Bulk Fuel Installation

Fuel would be transported to the island by coaster and unloaded via the existing ship-to-shore pipelines. It would then be stored in new tanks within the existing Shell or Delta compounds. Delivery to the airport would be by road tankers, travelling along the existing and re-aligned road network.

The advantages and disadvantages associated with this option are as follows:

Advantages:

- Use of existing fuel compounds will not necessitate construction of new compounds.
- Use of existing unloading facilities will reduce costs.
- Fuel compound will be operated by Shell or Delta, thus reducing administrative support required near airport.

Disadvantages:

- Fuel compound will be operated by Shell or Delta, thus tying the airport to a particular contractor.
- Will require upgrade of existing road between fuel compounds and airport.
- Road tankers will be required to travel back to the Shell or Delta compound to refill.
- This could cause unacceptable delays when the airport becomes busier.

4.3.3 Option B: On-site Bulk Fuel Installation, delivery by pipeline

As commented upon above, the contract to supply oil to the power station will be transferred from Shell to Delta in the near future. It may be possible, therefore, to extend the Shell-owned fuel pipeline from the power station to a Bulk Fuel Installation (BFI) located to the west of the fire station within the airport grounds. In this situation, fuel would be transported to the island by coaster and unloaded via the existing ship to shore pipelines directly into the pipeline running to the airport. After storage in the airport BFI, the fuel would be delivered to aircraft using road tankers.

Advantages:

- Airport could operate the BFI and would therefore retain the freedom to appoint suppliers as it sees fit.
- Should it choose, the airport could outsource the operation of the BFI to a specialist fuel operator, thus reducing their administrative burden.
- Will utilise existing fuel pipeline, thus reducing requirement for road tankers. Use of existing unloading facilities will reduce costs.

Disadvantages:

- Will require purchase or lease of fuel pipeline from Shell. Shell advise that the pipeline currently transports approximately 220 barrels of oil each day to the power station, and that they are investigating leasing or selling the pipeline to Delta to allow its continued use servicing the power station. Joint/shared use would be inappropriate.
- Will require construction of new fuel compound at airport.
- Will require construction of extension of existing pipeline across the runway.

4.3.4 Option C: On-site Bulk Fuel Installation, delivery by road tanker

In this option, fuel would be transported to the island by coaster and unloaded via the existing ship to shore pipelines into road tankers. These would transport the fuel to a BFI constructed to the west of the existing fire station. After storage in the airport BFI, the fuel would be delivered to aircraft using road tankers.

Advantages:

- Airport could operate the BFI and would therefore retain the freedom to appoint suppliers as it sees fit.
- Should it choose, the airport could outsource the operation of the BFI to a specialist fuel operator, thus reducing their administrative burden.
- Use of existing unloading facilities will reduce costs.

Disadvantages:

- Will require construction of new fuel compound at airport. May require upgrade of existing road running to coastal facility.

4.3.5 Selection of preferred option

It is unlikely that the Shell pipeline will become available exclusively to the airport, as it is believed that Shell intend to lease or sell it to Delta to allow them to service their contract with the Power Station. Its capacity, at 220 barrels per day, greatly exceeds the requirements of the airport and, therefore, it would theoretically be possible for the two users to have joint use of it. The procedures necessary for this arrangement are complex and result in wastage of oil. With pipelines of considerable length, these wastages do not result in significant increases to unit costs. However, with a pipeline of this length, the wastages are such that this style of operation is unrealistic. Consequently, Option B should not be considered further.

Option A offers limited short term cost advantages over Option C. However, Option C is better placed to serve the long term interests of the airport, both by providing the airport with greater control over the facility and by facilitating more efficient refuelling of aircraft. To this end, Option C is considered the preferred option and will, therefore, be considered in more detail.

4.3.6 Preferred Option

The facility will be required to provide both Jet A I and A vgas. Both fuel types require 24 hours to settle after discharge into storage tanks. To this end, two tanks should be provided for Jet AI, one for settling and one for use. The quantity of Avgas required will be somewhat lower. It is, therefore, envisaged that a single road tanker could hold sufficient supply of A vgas for a 24 hour period, and, therefore, only one static A vgas tank will be required. Each of the three tanks envisaged should be standard 50m³ capacity .

The tanks should be located within appropriate environmental bunding, and the area should be drained via Class I drainage interceptors. The compound will require lighting and should be retained within a suitable security fence, which additionally should include limited staff facilities and sufficient space for two additional tanks in the future.

A similar facility in the UK would cost in the region of £450,000. We estimate that this figure should be increased by 25% to allow for additional costs associated with its provision in Anguilla. A cost of £560,000 has therefore been estimated.

The existing road running north from the coastal fuel compounds is un-metalled (see Appendix D, Photograph 3). We are advised that agreement to fund the resurfacing of the road has been reached between Shell, another private company and the Government and it is assumed that this will be completed before the construction of the BFI.

It is envisaged that two articulated tankers would be utilised to transport the fuel to the airport and a further two rigid tankers utilised to re- fuel aircraft. This provision provides a limited level of redundancy to allow for planned maintenance etc. It is estimated that provision of these four vehicles would cost approximately £850,000.

A total cost of £ 1,410,000 has been estimated for the provision of a suitable fuel supply facility at the airport.

4.3.7 Development options

Following the above analysis, the development options considered most appropriate and considered in the Development Cost Matrix are:

Option 1: 'Do nothing' option

This option envisages no provision of fuel at the airport. The direct cost is, therefore, zero.

Option 2: Provision of bulk fuel installation

This option envisages the provision of a BFI as described above in Option C. The all-inclusive cost of this option is estimated to be £1,410,000.

4.4 Terminal Building

4.4.1 Introduction

The existing Terminal building was constructed as a high ceiling reinforced concrete frame single storey building covering a ground area of approximately 1,100m² (see Appendix C, Drawings CK3660/09.011001 and CK3660/09.011009 and Appendix D, Photograph 4). Since construction in the late 1980s, a first floor has been added (within the existing building) over the central and eastern areas. This provides accommodation for the airport manager, the deputy airport manager, the airport manager's secretary, the airport project office, a meeting room, the accounts office and an American Eagle airline office. The ground floor of the building contains the check-in area, departures lounge, arrivals area and restaurant.

The airport advise that the Terminal currently handles the passengers for the following scheduled aircraft each week:

Airline	Aircraft type	Number of landings / week
American Eagle	ATR 42	21
LIAT	DASH 8	7

Table 4.2: Scheduled flights to Anguilla

Table 4.2 indicates that the airport currently handles approximately three A TR 42s and one DASH 8 each day. American Eagle plans to replace their fleet of A TR 42s with 66 seat A TR 72s in the near future. Coupled with a likely growth at the airport of 50% in the next 10 years, it would probably not be unrealistic to assume that the airport will, by then, be handling three A TR 72s and one or two DASH 8s each day. In addition to the scheduled flights, the Terminal handles passengers carried by Trans Anguilla, Windward Islands Airways International, Air Anguilla and Tyden Air., using at present mainly Twin Otter and B-N Islander aircraft, respectively 19 seats and 8 seats.

The components of the Terminal are considered further below:

4.4.2 Check-in area

The check-in area comprises check-in desks for Trans Anguilla, LIAT, Windward Islands Airways International, Air Anguilla, American Eagle and Tyden Air, as illustrated in Photograph 5 within Appendix D. The desks include mechanical weighing machines and direct access through to the baggage handling area behind the six airline offices (see Appendix D, Photograph 6). Baggage is transported from here to aircraft using a combination of light trucks and tugs and trolleys. The current allocation of check-in desk space allows American Eagle to check-in two queues of passengers concurrently. It is common for two, and sometimes all three, of the American Eagle flights to depart at approximately the same time. This leads to long queues and congestion in the check-in area. This results in delays and unacceptable service levels for passengers.

Toilets and a gift shop access into the check-in area.

4.4.3 Departures lounge

The departures lounge currently occupies the middle section of the Terminal (see Appendix D, photographs 7 and 8). Passenger entry is via the Departure Tax and Immigration Control Desk (see Appendix D, Photograph 9). All passengers are required to pass through a single portal frame metal detector whilst their baggage is examined by a single standard baggage screening system. The departures lounge seating area is split into two parts, the main area within the original Terminal, and an annex connected to the main area and immediately to the south. The existing layout provides approximately 50 seats in the main area and 20 seats in the annex. The main area was constructed to incorporate a bar and two duty free retail areas. These do not appear to be used at present, and refreshments are provided by a single vending machine. The departure lounge, in its current configuration, can accommodate the passengers for one complete aircraft load with relative ease, but becomes overcrowded when two or more aircraft loads of passengers are within the area.

4.4.4 Arrivals area

The arrivals area is located to the east of the Terminal building. Arriving passengers are guided from the apron into the immigration hall, from where they pass through one of four Immigration Control desks (see Appendix D, Photograph 10). Passenger baggage is unloaded through the east wall of the Terminal building (see Appendix D, Photograph 11) directly into the baggage reclaim area (see Appendix D, Photograph 12). This is, essentially, a shelf along the opening in the wall, where baggage can be stacked. The capacity of the existing layout is restricted and the area can become congested if passengers and their baggage arrive in the reclaim area at different times (for example, if the passenger is delayed at the Immigration Control desks). A luggage store adjacent to the reclaim area is available for the storage of unclaimed baggage.

Following baggage/passenger reconciliation, the passengers pass through the Customs area (see Appendix D, Photograph 12) and on to the arrivals concourse. From here, they leave the Terminal by taxi, private car or on foot.

4.4.5 Restaurant

The restaurant is located at the south end of the check-in area. It incorporates a bar and seating, both within the main Terminal building and in the apron viewing area. It is the only catering facility in use at the airport, and consequently is relatively busy, especially when flights are delayed.

4.4.6 Effect of future passenger growth

Current forecasts indicate that the passenger throughput at the airport will increase by approximately 50% by the year 2010. Additionally, American Eagle plan to replace the ATR 42s currently operating their service with ATR 72s. The latter aircraft will probably operate with loads of up to 66 passengers, as opposed to the 42 carried by the ATR 42s.

4.4.7 Development options

Three development options have been considered, ranging from a 'do nothing' scenario to the construction of a new Terminal building to handle arriving passengers only. These options are considered below.

Option 1: 'Do nothing' option

The existing levels of passengers at the airport already create congestion in various areas. If no changes are made to the operation of the Terminal, it is anticipated that the effect would be as follows:

Check-in area: Already at capacity handling American Eagle flights. Delays experienced by passengers checking in, and general congestion in the area would be unacceptable. Toilets and shop are probably adequate.

Outgoing baggage handling area: This area is probably adequate although some congestion would be expected.

Departure lounge: Seating is currently available for approximately 70 passengers. Consequently, there would be unacceptable overcrowding if passengers for two scheduled aircraft were attempting to use the lounge at the same time.

Departure Tax and Immigration control point: This desk would probably be able to cope with the additional flows, although some delays would occur. Departing passenger and baggage screening point: Some queuing would be expected.

Restaurant: This is relatively busy with the existing numbers of passengers and overcrowding would be expected with 50% extra passengers.

Immigration control point: Even with all four desks manned and open, a fair degree of queuing would occur.

Baggage reclaim area: This area would become particularly congested if more than one aircraft arrived within the same 30 minute period.

Customs post: No significant queuing expected.

Due to the nature of this option, it would incur no direct additional capital cost.

Option 2: Minimum cost option

This option would not result in the creation of any additional space, but would attempt to optimise the use of the existing areas. Envisaged actions and their effects are as follows:

Check-in area: Re-allocation of airline desks. This could either be on a full time basis or, preferably, using the Common User Terminal Equipment (CUTE) system utilised at some other airports. As the name CUTE suggests, check-in desks are standardised and are allocated to airlines as required. Airlines would be encouraged to vacate desks when they do not require them if the charges were calculated on, for example, an hourly basis. CUTE would not affect the allocation of airline offices, but could require additional airline personnel to ensure that all desks allocated to a particular airline were manned. It is thought that this system could satisfactorily resolve the envisaged overcrowding problem.

Departure lounge: A thorough assessment of the existing seating layout and the procurement of some new seats could probably result in a seating capacity of up to 100 passengers in the lounge. It is understood that the VIP lounge is rarely used by VIPs. Consequently, it may be possible to convert some of this area into seating for Departures Lounge passengers. This would ease the envisaged overcrowding problem, but overcrowding would still be likely if two or more A TR 72s were scheduled to depart at similar times.

Departing passenger and baggage screening point: Following further assessment, it may be necessary to alter the layout of this corridor such that passengers can be served from two desks concurrently.

Restaurant: It is not readily possible to increase the capacity of the existing restaurant. However, if additional facilities were provided in the Departures Lounge (possibly using the existing bar area and one of the concessions) it may be possible to reduce demand by encouraging departing passengers to use these.

Immigration control point: It is not readily possible to increase the capacity of this facility and, therefore, some queuing would be expected.

Baggage reclaim area: The provision of additional shelving/tables/floor layout areas within the area between the Immigration Control Point and the Customs Post would allow the storage of more baggage awaiting collection. It is likely that congestion would still occur, and it may be necessary to employ additional staff to ensure that the area remains 'tidy'.

Customs post: This area should suffice in its current state.

As discussed above, the airport will probably handle up to three ATR 72s and one or two DASH 8s each day in 10 years time. The existing Terminal, with the above modifications, could probably handle anyone of these aircraft with relatively minor congestion. Should three fully laden ATR 72s arrive within a short period, the Terminal would become congested. Attempts should, therefore, be made to ensure that American Eagle and LIA T schedule their flights such that the number of aircraft on the apron at anyone time is minimised.

Due to the nature of the above works, it is not possible to accurately estimate their cost. However, it is thought likely that the initial capital cost would be in the order of

£150,000. Additional ongoing costs would be incurred by the requirement for additional staff.

Option 3: Construction of new Arrivals Terminal

This option envisages the construction of an Arrivals Terminal on the land adjacent and to the east of the existing Terminal. The proposed Terminal would cater solely for arriving passengers, and would hence comprise immigration control point, baggage reclaim area, customs area, airline offices, airport offices, a meeters & greeters area and, probably, a limited refreshment service. The proposed building would have a minimum design life of 20 years, and a 100% increase in the number of passengers using the airport is therefore envisaged. The footprint of the building would be approximately 1,000m², comparable to the existing Terminal.

The existing Terminal would be modified to cater solely for departing passengers. The modifications would include the provision of additional check-in desks, an extended departure lounge, a larger restaurant, a larger and more secure viewing area, enhanced airline and airport offices, a second departure tax and immigration control point and improved baggage and passenger security screening facilities.

It is estimated that the cost of constructing the proposed Arrivals Terminal would be approximately US\$110 per square foot, including all fittings and equipment but excluding air conditioning and any floors above ground level. Consequently, the cost of an appropriate building would be in the region of £910,000. Similarly, the cost of modifying the existing Terminal as described is estimated to be approximately £200,000, giving a total cost of this option of £1,110,000.

4.5 Apron

4.5.1 Introduction

The current layout provides 10 aircraft stands and is shown in Photograph 13 within Appendix D.

As commented upon in Section 4.2, the airport would have an aerodrome reference code of 2C if either options 1 or 2 were implemented and a code of 3C if Option 3 was implemented. Both categories assume a 'visual' approach, as at present. Certain obstacle limitation surfaces associated with the airport are dependent on the airport's aerodrome reference code. Of particular relevance to the airport apron is the transitional surface extending upwards from the outer edge of the runway strip. The runway strip for options 1 and 2 extends 40m from the runway centreline and the transitional surface then climbs at a rate of 1:5, whereas for Option 3 the strip extends by 75m from the runway centreline and the transitional surface climbs at a rate of 1:7.

The transitional surface associated with options 1 and 2 will not affect the use of the apron when handling aircraft up to the size of an ATR72. However, should Option 3 be implemented (thus increasing the aerodrome reference code), larger aircraft such as the ATR 72 would only be able to park on the stands on the northern half of the existing apron, thus limiting capacity for these aircraft to three. Smaller aircraft would still be able to use the southern apron stands.

The following development options have been considered:

Option 1: 'Do nothing' option

The existing apron will have adequate capacity to handle planned scheduled movements over the next 10 years, so long as only either Option 1 or Option 2 are implemented. Should Option 3 be implemented, capacity would be restricted and there could be periods of time when the airport would have to limit the number of larger aircraft at the airport. It is also possible that, at times, the airport would have inadequately paved apron capacity to accommodate all light aircraft and some would be required to park on the adjacent grassed area.

Congestion on the apron would be exacerbated if the airport commenced aircraft refuelling operations utilising road tankers.

Option 2: Provide increased apron area

An extension of the existing apron to the east would allow greater operational freedom. An increase in size of approximately 50% would eliminate the need to park aircraft on grassed areas and would provide adequate capacity for the next 10 years for larger aircraft. Locating the extension towards the east of the existing apron would also allow ready access from aircraft to the new Arrival Terminal building identified in Section 4.4.

The existing apron has a size of approximately 12,000m² and the proposed extension would be approximately half this size. It is envisaged that the cost of this would be in the order of £250,000.

4.6 Air Traffic Control Tower

The existing facility is relatively new (see Appendix D, Photograph 14) and it is envisaged that this will be adequate for the aircraft movements envisaged for at least the next 10 years.

4.7 Rescue and fire fighting service

The existing airport rescue and fire fighting building is located to the west of the Terminal and comprises two vehicle bays and associated office/administrative areas (see Appendix D, Photograph 15). At the time of the site survey, the airport had three fire fighting appliances, all fitted with overhead monitors.

Table 8.1 of CAP 168 provides 'RFF Categories' based on overall aircraft length and maximum fuselage width. In the case of aerodromes operating A TR 72s, the Category is 5 as opposed to 4 for the operation of ATR 42s. This increase in category will have, amongst others, the following effects:

Availability of extinguishing media: Table 8.2 of CAP 168 (reproduced in Appendix E) specifies the quantities of extinguishing material to be held at airports. These quantities vary depending on the Category, and the airport will be required to hold additional quantities of materials if the Category is to be increased to 5.

Availability of Appliances: Section 12.3 of CAP 168 decrees that at airports with a Category of 5 to 7 there must be at least two foam producing appliances with aspirating monitors. These should meet the requirements set out in Appendix 8A of CAP 168. The airport currently has three appliances and it is therefore assumed that this requirement is satisfied.

Manning of Appliances: Section 9.2 of CAP 168 decrees that, for Categories 4 to 9, the UK CAA should be consulted to determine the required manning of appliances. It has been assumed that, following additional training, any extra manpower necessitated by the increased Category could be provided by other departments at the airport on a dual-training basis.

Radio communications: Section 20 of CAP 168 states the minimum acceptable requirements. These do not increase if the Category is upgraded from 4 to 5.

Assuming that the current provision of fire appliances complies with the requirements of CAP 168 for a Category 5 airport, we estimate that the other measures required such that the airport can move from Category 5 to Category 4 will cost in the region of £100,000. This cost will be incurred if any of the runway development options are progressed.

4.8 Maintenance Facility

The Maintenance Facility is located to the west of the Terminal. It is a steel frame building (see Appendix D, Photograph 16) and it is understood that it has adequate capacity for the increased passenger movements envisaged at the airport during the next 10 years.

4.9 Realignment of Public Road

At present, a public road runs along the existing north east, east and south east boundaries of the airport, as shown on drawing CK3660/09.011001. The existing road is metalled but is generally in poor condition. Additionally, its geometric layout does not meet current UK standards for a road of this type.

All three runway extension options will result in sections of the road falling into the proposed runway strips and side transitional slopes, both as defined in CAP 168.

Following discussions with the Land Surveys Department, it is proposed that a new road is constructed running west to east parallel with the existing runway, and linking the existing road to the west with the existing unmade public road to the east of the airport. This unmade public road will require minor realignment and upgrade to full metalled width from the point where it connects to the proposed road through to the junction with the public road running north from the Shell/Delta fuel depots (see drawing CK3600/09.011001). It is planned that this latter road will be surfaced as part of a separate project prior to the commencement of the airport extension project. The approximate lengths of the two sections of new road are as follows:

New road:	1,100m
Realigned road:	1,900m
Total road construction:	3,000m.

Informal discussions have been held with Denton, Corker Marshall Ltd, the developers of the proposed Conch Bay Development, regarding the alignment of this road. They have indicated that they would be keen to discuss the re-location of the north-south section of the above proposed road towards the west. This would only be possible if either runway option 1 or 2 was constructed and would have the advantage that road construction costs would be reduced. Additionally, it would allow the developers a larger unbroken area for their golf course and they may, therefore, be prepared to help finance the diversion. The primary disadvantage of this re-alignment would be the limitations that it would place upon future extensions of the runway.

The new road should be of standard two lane width, and an overall width of 7.3m has therefore been assumed. Based on unit costs provided by the Land Surveys Department, the cost of the new road construction will be approximately £35/m².

Additionally, it will be necessary to purchase the land upon which the new section of the road will be built. A width of 12m and a purchase cost of US\$100,000/acre has been assumed for this. To reflect the smaller elements of land to be purchased, this purchase cost is considerably higher than that used elsewhere in this report for the purchase of larger plots of land.

The land purchase cost would be approximately £225,000 and the construction cost of the new road approximately £765,500, indicating an overall cost of £990,000 say £1 million.

4.10 Runway Lighting

The only essential lighting required for the extension to the runway is runway edge and end lighting. These have been costed at a rate of £30,000 to cover end lighting and fixed costs and a further £133 per metre length of runway. These costs assume that the existing control equipment and wiring is adequate.

4.11 Car Park

The size of the existing car park appears adequate for the planned 50% increase in passengers travelling through the airport. We are advised that the previous flooding associated with the car park has been rectified.

4.12 Summary of development options and associated costs

Table 4.3 provides a matrix summarising the development options investigated and their estimated costs.

5.0 ENVIRONMENTAL APPRAISAL

5.1 Introduction

The environmental appraisal of development options being considered for Wallblake Airport undertakes a brief review of the principal environmental issues, and considers the nature of the impact and the strategies for mitigation. Material for the review has been derived from previous documentation (see Section 5.5, References) and from information gained during visits to Anguilla made for the purposes of a comparative study (November 1999) and for the development of options for Wallblake (February 2001). During the visits a number of government departments and agencies were consulted, including those with key environmental responsibilities, the Anguilla National Trust, the Agriculture Department and the Department of Fisheries and Marine Resources.

The appraisal considers the environmental implications of two runway extension options to the east of the existing airport. The additional option for regrading works to the western end of the runway is not considered likely to generate any significant environmental impacts apart from those general effects of construction activity which are considered below. The western regrading is likely, also, to be undertaken in association with the eastern extension. The assessment therefore only considers the comparative effects of the runway extension proposals.

5.2 Existing Conditions

5.2.1 *Landform and Land-use*

The existing airport at Wallblake is situated in the centre of Anguilla with the runway orientated along an approximately east-west axis at a height above sea level of approximately 30 metres. To the west of the airport the land rises gently to the highest point of the island, North Shannon Hill, 66m high, some 2.5 km distant. The airport terminal is situated on the northern side of the runway close to its eastern end and from here the land dips downwards to the east with the existing runway terminating close to the 24m contour.

From the east end of the runway, a broad shallow valley extends in an E-SE direction descending to 14m above sea level at around 1 km from the runway. An unmade public road runs northwards across the valley from Forest Bay. The valley sides are thickly vegetated with scrub and there are frequent bare limestone outcrops. The valley floor, known as Forest Bottom, comprises open grassland with scattered clumps of scrub. This area to the east of the airport is termed The Forest and is sparsely populated and currently, apart from some stock grazing on the valley floor, little used. The land to the north of Forest Bottom rises relatively steeply towards the settlement of Rey Hill around 0.5 km to the north at 40m above sea level.

The land to the north, south and west of the airport is more densely populated with somewhat dispersed housing and light commercial developments with much green space, garden land and occasional small fields of pasture or allotments between. The main settlement and administrative centre, The Valley, is situated around 1 km to the north. To the south of the runway at its eastern end, is the as yet lightly developed Corito Industrial estate and the main electricity generating station, powered by oil piped from the fuel terminal at Corito Bay. The island's solid-waste disposal site is situated just to the north of the terminal. Access is gained to these industrial sites via a road from George Hill, running along the southern perimeter of the airport, or via the road that passes the main terminal building and runs along the northern and eastern perimeter fence.

5.2.2 *Water Resources*

With limestone dominating the solid geology of Anguilla, underground aquifers have historically provided the main water resource. However, there is evidence of local contamination due to soakaways, formerly the standard method of sewage disposal in Anguilla, and a desalination plant at Crocus Bay on the west coast now provides a potable supply.

In common with the rest of the lower-lying land in The Valley, the airport overlies a groundwater aquifer, which was formerly used for the piped potable water supply. However, due to contamination of the aquifer from the numerous domestic soakaways in the area, potable water is now obtained from the desalination plant. There is now, therefore, the potential for the use of groundwater for agriculture but this resource is not currently utilised. It is hoped that, with future improvements in sewerage systems and waste-water treatment, water quality in the aquifer will improve.

Run-off water from the airport runway and car parks passes to soakaway but the area is prone to flooding during storm conditions. The car parking areas have suffered inundation and runway run-off is thought to have contributed to past flooding in the Stacia Valley area, to the west of the airport. It is recognised that a new drainage system for the hard surfaces with sufficient flood storage capacity is necessary.

5.2.3 *Land-use Policy*

A strategic 20-year National Land Use Plan was published by Anguilla's Physical Planning Unit in 1995. The Plan identified the deficiencies of the current airport at Wallblake and noted the need for expansion of facilities. Options to be considered as advised in the Plan included runway extensions to allow operation by A TR 42 aircraft without payload restrictions, extension to 4,806 feet (1465m) to accommodate ATR 72 aircraft under all conditions and to evaluate alternative locations for an airport. The sites suggested were at Brimegin, Corito or further to the south at Lockrum.

Land to the east and to the north-west of the airport was proposed for medium density housing. The Plan noted that any expansion in the areas of existing development to the west of the airport and in the main centre of The Valley would be limited by water resources, in particular until such time as effective sewage disposal methods are universally available. The land to the south-east of the airport, between the power station and the waste disposal site at Corito, is zoned for further industrial development.

Other land-use proposals in the Plan identified as being of high priority were the further development of tourism facilities in specified locations, the conservation of areas of high biodiversity, and to minimise losses of agricultural land.

There is currently a proposal for the development of a golf course on the land to the east of the airport covering The Forest and Forest Bottom, together with a marina formed from excavation on the coast at Forest Bay and a hotel development to the north in Conkpool Bay. Such proposals have yet to be submitted as formal planning applications and the details of the golf course design would depend on the adopted runway option at Wallblake.

5.2.4 Agriculture

Apart from the use of small allotment gardens, there is no arable agriculture undertaken in the vicinity of the airport. However, the land to the east in Forest Bottom is noted by Anguilla's Department of Agriculture as being of good quality for arable farming. Indeed, the land now occupied by the airport, being part of the level central plain that supports a significant proportion of the population, forms part of the main area in Anguilla for relatively good "red" soils.

The land to the east of the airport was extensively cultivated in the past with crops such as maize, pigeon peas, cotton and sweet potato and in the 1980s the valley floor was mechanically cleared of scrub vegetation. The remains of field boundaries and sisal plantations are still evident in places on the ground while the old boundaries are clearly discernible on aerial photographs (see Drawing CK3660/09.011008, Appendix C).

No arable farming is currently practised in Forest Bottom though the land presumably retains its potential for cultivation. At present, the grassland that has colonised the former arable land on the valley floor is lightly grazed by small herds of goats.

5.2.5 Flora and Fauna

The National Trust for Anguilla hold no records of any flora or fauna of special ecological importance in the area around the airport, nor in the land to the east, known as The Forest where the vegetation is characterised by low scrub rather than tall trees.

In Forest Bottom, patches of *Acacia* and sea grape (*Coccoloba uvifera*) scrub have developed on the valley floor, in some areas extending from the original field boundaries. There are also the remains of sisal plantations. The grasslands of the valley floor have a low diversity of flowering plants, consistent with the recent use as arable farmland and the recolonisation by a relatively low number of dominant grass species.

On both sides of the broad valley, rocky limestone slopes support a dense growth of shrubs forming a typical community that extends over the majority of the island where the intensity of land use is low. It is a community comprising native and introduced species that has remained following the past removal of the original tree cover for timber and fuel over the majority of the island. Characteristic species include sweet briar (*Acacia tortuosa*), bilbush (*Phyllanthus epiphyllanthus*), Christmas bush (*Comocladia dodonaea*), chinkwood (*Bouyeria succulenta*) and sages (*Lantana* and *Croton* sp.).

Some taller trees are present at the base of the slope, white cedar, loblolly and tamarind and a grassy track runs along the northern edge at the break of slope between the valley side and the flatter land of the valley floor.

The open grasslands and scrub edges provide good general habitat for a number of common bird and insect species. Bird species include bananquit, black-faced grassquit, grey kingbird, pearly-eyed thrasher, ground dove, quail dove and turtle dove while swallows hunt over the open grasslands.

5.26 Archaeology

There are a number of sites throughout Anguilla with remains of early Amerindian settlements. While there is evidence of human presence on the island from 2000 BC, the radiometric dating of bone remains or other artefacts indicate the presence of permanently settled farming communities from around 400 AD with a peak occupation by Amerindian cultures between 1200 and 1400 AD. Artefacts include ceramics, carved shells, stone beads, stone and coral tools.

Most of the recorded sites lie close to the coast though there are a few inland sites. The site known as Forest North is one of three inland sites and is situated to the east of the existing runway at the airport. The site includes a cave on the north side of the valley, Airport Cave (see Drawing CK3660/09.011008, Appendix C). Another cave is present, Tanglewood Cave, approximately one Km to the east. Both have yielded human remains and artefacts suggestive of ceremonial activities.

The Forest North site was first identified by the Anguilla Archaeological and Historical Society in 1984 and is one of 13 sites in Anguilla with substantial evidence of permanent habitation. It has been the subject of a recent study, which looked at a number of archaeological sites throughout Anguilla (Crock 1996, 2000). The valley has been sampled by a series of test pits, 23 in a series of transects in 1993 and a further 12 pits in 1998.

The distribution of artefacts within the pits and on the surface suggest that the site was located in the shallow valley, Forest Bottom, and now bisected by the unmade public road from Forest Bay. It covered some 5 ha, though some of the evidence has been disturbed by both historic cultivation and the more recent land clearance and arable agriculture in the valley. Clearance activities are thought to have been responsible for the artefact-rich deposits at the surface in some locations, particularly along the edges of the valley floor.

Artefacts found during the archaeological investigations include numerous ceramic remains, stone axes, shell beads, coral and shell tools. There are also faunal remains, in particular the skeletal remains of fish, though the slightly acidic soils of the valley have rendered these remains in poor condition.

The Forest North site is one of 6 sites in Anguilla associated with areas of deeper fertile ("red") soils and the remains found at the site suggest a main period of continuous occupation from 900 to around 1500 AD.

During a site visit with archaeologists from the Anguilla National Trust (February 2001), pottery fragments were found on the surface, particularly in the east of the site.

5.2.7 Air Quality

Air quality around the airport is influenced by the periodic movement of aircraft and the associated but light vehicle movements along the access and perimeter roads. In addition, the island's electricity generating plant on the southern edge of the runway is a point source of aerial emissions from the oil-fired generators.

Local air quality is an issue of concern to some local residents who report hydrocarbon and particulate contamination from aerial fallout into domestic water collection and storage systems.

5.2.8 The Noise Environment

While aircraft movements produce the most noticeable noise events, the infrequent and sporadic nature of the current levels of activity by relatively small aircraft do not provide a significant adverse noise climate. There are also relatively low levels of background noise, more continuous in nature, from the regular traffic movements on the surrounding roads. The electricity generating plant provides a continuous point source of noise emissions from the generators and their exhaust discharges.

5.2.9 Aircraft Noise

The issue of aircraft noise was considered in the Comparative Airport Study and information on the likely impacts was given in the report issued in June 2000.

Noise "footprints" were generated using the Federal Aviation Administration's Integrated Noise Model (INM), version 6.0, to show the exposure to a single event level of 90 dB.

With respect to the development options at Wallblake, the potential impacts of the A TR 42 and A TR 72 aircraft were investigated, using the modelled data for the British Aerospace HS748, a directly comparable aircraft for which the characteristics are contained in the INM database. Noise footprints of this aircraft type are shown in Drawing CK3660/09.011005 within Appendix C, for arriving and departing aircraft, assuming a direct approach and take-off path. The noise characteristics of both the A TR 42 and 72 are essentially the same as shown in the drawing.

On the very rare occasions when westerly winds favour an approach and take off in a westerly direction, impacts would be indicated by a 180 degree rotation of the footprint shown in Drawing CK3660/09.011005, Appendix C with a shift in the take off plot to the east to correspond with the increase in runway length.

The slightly wider footprint of the take off emissions would, on the rare occasions of easterly winds, affect ~ few more properties to the north and south of the zone normally under the flight-path of approaching aircraft. The small additional area would affect some properties in George Hill and North Hill Village. With the low number of aircraft movements and the rare occasions when the direction of approach and take off would be reversed, such additional effects are unlikely to cause disturbance.

5.3 Development Options

The options for improvement require land-take at the eastern end, of the airport but differ principally in the extent of the runway extension to the east. The options are:

- Option 1: An extension at the eastern end of the runway by 252m (including a 150m Starter Strip)
- Option 2: As Option 1 but with re-profiling of the western end of the runway.
- Option 3: An extension at the eastern end of the runway by 852m (including a 150m Starter Strip)

All three options would require the eastern extensions to be constructed on embankment to counteract the effect of the descending slope, and Option 2 would require the reprofiling of the runway at the western end to minimise adverse gradients and improve the threshold. The impacts of the options are considered below in general terms in relation to the environmental receptors or issues concerned. Where it is possible to reduce the impacts of the proposed options, some mitigation opportunities are considered.

5.3.1 Landform, Land-use and Visual Implications

All three runway options would introduce a new landform into the valley, Forest Bottom, to the east of the existing runway. The new landform would be visible from a number of properties to the north and north-east of the airport and from the vantage point along the unmade road north from Forest Bay.

The extent of land-take varies, naturally, between options and also with the gradient required for the stability of the embankments. There will be a minimum gradient determined by the nature of the fill material, the construction method and the safety implications of steep embankments in relation to runway use. The slackening of gradients to approximate to those more typical of the local landforms, thereby reducing the visual impact of the new structure, may be desirable but would increase the total land-take required for each option. Planting, or allowing the colonisation of native, low shrub species on the embankments would also assist in integrating the new landform into the local landscape. Taller trees could be introduced at the base of the lateral embankments, subject to safety considerations.

5.3.2 Water Resources

The extension of the runway, the introduction of larger aircraft and an increase in aircraft movements provide the potential for an increase in water pollution, both from fall-out from engine exhausts, and from surface run-off from the runway during storm events. The latter could result in sporadic episodes where surface drainage is contaminated by suspended solids, heavy metals, hydrocarbons and related compounds from tyre wear, fuels, lubricants and hydraulic fluids. Depending on the filtration characteristics of the substrate and the chemical and biological processes of pollutant oxidation, precipitation, absorption and adsorption, there is potential for, over the longer term, pollution of the groundwater resources.

All options to extend the runways however, offer the opportunity to improve upon the existing drainage regime at the airport, both with respect to flood control and pollution interception. The collection of surface run-off from runway, dispersal areas and car parks should be undertaken with following, in-line treatment by standard sump or underground tank interceptors for silt and oil where there is a risk that underground water might otherwise be polluted by accidental spills or the gradual accumulation of pollutants on the hard surfaces.

Lateral swales along the runway could be used to receive water from the runway but further consideration is needed as to whether these should be sealed ditches leading to further storage lagoons, or true infiltration structures. Given the failure of existing infiltration run-off and the possibility of groundwater contamination, sealed systems should be considered further. Storage of run-off in sealed ditches, balancing lagoons or ponds will prevent seepage into underground water supplies. A storage system sized to an appropriate storm return period will both ameliorate the flood risk and treat the pollution load.

Naturally vegetated ponds have an additional capacity for pollution treatment by oxidation in the root zone of reeds and by uptake of heavy metals in root and stem tissue. Such ponds also have advantages for wildlife and visual amenity. Access to such ponds is required for the emergency treatment of any pollution episode and for routine maintenance when contaminated silt and excess plant material will need to be removed. Given the appropriate scale and design details of the pond and the upstream interceptor systems, such maintenance is likely to be needed every 15-20 years. Care will need to be taken to avoid increasing the likelihood of bird strikes at the airport.

Occasional water quality monitoring is desirable to determine the risks of pollution to the aquifer from water discharged from the balancing ponds and to assist in determining the maintenance regime for the pond. With the number of aircraft movements anticipated in the mid-term, water pollution is not expected to be a significant issue given the installation of an up-to-date drainage system. It is expected that any future development regarding fuel stores and re-fuelling facilities would be accompanied by up-to-date pollution-prevention and spill containment systems.

Water retained in storage systems may find use in landscape irrigation. Water quality should be analysed and monitored with respect to hydrocarbon contamination and heavy metal content before any use in agricultural irrigation.

5.3.3 Land-use Policy

With the need for an improvement in the airport facilities in Anguilla clearly identified in the 20-year National Land Use Plan, there is no direct conflict between the runway extension options and land-use policy.

There are, however, identified trade-offs between some impacts such as the loss of arable land, loss of some adjacent properties, increase in temporary noise nuisance to local settlement areas, and the gains to transport capacity and local employment that will arise from the improvements.

Runway extensions to the east, with the resulting noise characteristics that will arise in the future, will be a consideration in the future development of the land in the area of The Forest, particularly in relation to the proposal for medium-density housing. Residential developments under the take off path at the eastern end of the runway would not be recommended.

New policies will be needed to address the issue of safety and noise nuisance to properties by the western end of the runway, particularly if, in the future, larger aircraft are, on the rare occasions when westerly winds are prevalent, to take off to the west. Resettlement issues are considered in Section 6. Where land to the west of the airport is vacated by resettlement elsewhere, there is scope for the use of the land for agriculture, either in the form of small allotments or for larger scale production. Any use of run-off water from the airport for agricultural use should be subject to a water quality analysis to ensure that potential toxins such as heavy metals or organophosphates are not present to pose any risk to food quality.

5.3.4 Agriculture

The extension of the runway to the east extends across the northern section of the valley, Forest Bottom. This will result in the loss of present grazing land on the valley floor. Given the small number of grazing stock, the light grazing regime and the extensive area of grassland that will remain to the south east unaffected by the runway improvement options, this is considered to be a minor impact.

There is also the loss of the agricultural potential of the soils for arable cultivation. Approximately 15% of the former arable land of Forest Bottom between the existing eastern airport perimeter and the unmade road from Forest Bay will be taken for options 1 and 2. The loss of land would increase slightly if the flow balancing and water treatment lagoon were to be constructed in the valley, which offers the most logical location for such a facility.

Option 3 extends into the northern slope of the valley side with its rocky limestone outcrops and scrub vegetation. Option 3 therefore affects little additional land with arable potential over and above the losses incurred by options 1 and 2.

While all of the runway extensions would result in some loss of land with potential agricultural use, there is considerable scope for the re-cultivation of abandoned farmland or lightly used land with agricultural potential at this site and elsewhere in Antigua. In this context, the impact of the proposed runway extension on the agricultural sector seems slight.

5.3.5 Flora and Fauna

The land-take required for options 1 and 2 comprises former arable farmland, now down to species-poor pasture grassland with some remaining field boundaries and developing patches of scrub. The north-eastern edge of the extended runway would result in some loss of the dense shrub habitat at the base of the valley slope and the transitional edge habitats along the track and between the open grasslands and scrub formations.

Option 3, in addition to the above effects, will result in further habitat loss in the area of dense scrub and limestone outcrop on the northern valley slope. Almost one third of this scrub habitat area on the north valley slope may be lost to Option 3 though with the incursions by properties to the north and west, the extent of this habitat as evident on aerial photographs (see Drawing CK3660/09.011008, Appendix C) is difficult to measure accurately.

Given the extensive area of old field and dense scrub habitats, particularly along the southern slope of the valley, that would remain after construction of options 1 and 2, the overall ecological impact arising is unlikely to be significant. There is scope for positive habitat management and landscape planting around the perimeter of the airport, which could compensate for the minor extent of habitat loss. In particular, native shrub species could be re-introduced onto the runway embankments and native trees where appropriate at the base of the embankment slopes.

For Option 3, with a much greater incursion into the apparently undisturbed dense scrub habitat, the impacts at a local level will be of greater significance to wildlife. The development represents a component of the gradual attrition of wildlife habitats that generally accompanies economic expansion. However, given the extent of this habitat type in Anguilla, the level of impact on regional (island) criteria is unlikely to be damaging to the biodiversity of Anguilla, given appropriate initiatives elsewhere on the island to conserve such habitats for their wildlife, landscape and amenity value. It should, nevertheless, be noted that while no evidence is available for any rare or unusual species present on the site, no detailed studies appear to have been undertaken.

5.3.6 Archaeology

With options 1 and 2 resulting in land take from the valley floor of Forest Bottom and from the northern slope of the valley side, there will be a relatively minor impact on the Forest North archaeological site. The effects include the construction of the runway extension over part of the formerly occupied valley floor with its artefact deposits and other stratigraphic evidence relating to Amerindian culture.

Option 3 appears to increase the effects caused by options 1 and 2. In particular, it will necessitate the closure of Airport Cave (see Drawing CK3660/09.011008, Appendix C).

Construction should be preceded by archaeological studies of the land to be lost including a complete excavation of Airport cave and high-density sampling of the area of Forest Bottom to be affected by construction. Time and resources for this work should be included in the project specification. While it is thought that no more caves are present in the northern slope of the valley, archaeologists from the Anguilla National Trust should be notified of the works programme and allowed a watching brief during vegetation clearance on the valley slopes and all other site clearance works that involve excavation of the ground surface. A contingency should be introduced into the construction contract so that, in the event of finds during construction, reasonable facilities in terms of time and resources can be made available to allow the temporary protection of sites and the completion of archaeological works.

5.3.7 Air Quality

Generally, discernible adverse effects on local air quality are registered only at major international airports with a high frequency of aircraft movements. Anecdotal reports of aerial pollution incidents at Wallblake require further study to determine the source. Where aircraft are implicated it is likely that such incidences will decrease with the modernisation of aircraft fleets.

With an increase in air movements and the use of larger aircraft there is the potential for a slight increase in emissions. Key emissions that, at high levels, would be of concern are nitrogen oxides, hydrocarbons and fine particulates (PM₁₀). However, the addition of a low number of ATR flights will have no perceptible effect on the air quality regime at the airport. It is expected that any future development regarding fuel stores and re-fuelling facilities would be accompanied by up-to-date vapour containment and odour control systems.

Resettlement of residences situated in the low-level flight path of aircraft would naturally mitigate the effects of any effects of aerial fall-out or poorer air quality in the future. Improvements in the supply and domestic storage of piped water will avoid the risk of contamination by aerial fall-out of supplies otherwise collected locally by roof catchments or stored in open tanks.

5.3.8 The Noise Environment

There will be noise implications associated with construction in relation to the transport of fill and other construction materials and the construction activities at the airport. Impacts of transport activity will depend primarily on the source of fill for the runway embankments. Noise nuisance from transport vehicles should be minimised by ensuring all vehicles are properly silenced and by avoiding any night-time movements in residential areas. There are relatively few properties that will be directly affected by construction work on the runway site. Night-time working should, however, be avoided to prevent nuisance to the properties to the north of the runway that overlook the site. Every opportunity should be taken to develop temporary haul roads within the airport perimeter to avoid the use of public roads.

5.3.9 Contingent Impacts

The provision of construction fill for the runway extension may have significant local impacts at the site of extraction. An assessment of environmental impact for sources outside Antigua is beyond the scope of this document.

On Antigua, the quarry at Brimegin which supplies limestone aggregate and building blocks, is situated in an area of extensive shrubland, probably the largest remaining area of undisturbed habitat of this type. The Brimegin area is one of only three sites in Antigua noted for its biodiversity of native species though relatively little recent ecological research in the area appears to have been undertaken and it is unlikely that all species have been catalogued. The area between the quarry and the west coast is one of only two sites remaining on the island with a community of native tall trees, the other being the small valley at Katouche Bay, the latter already being affected by property development. Over the long term, extraction at the Brimegin quarry may lead to unacceptable loss of land and wildlife habitat in the area. The provision of fill from this site for the Wallblake airport extension requires an assessment of resources

to be undertaken so as to avoid any incursion into the area to the west of the existing quarry .

The proposed golf-course and marina development to the east of the airport (see Drawing CK3660/09.011007, Appendix C) has the potential to provide fill from the extraction required to create the new marina. This project will have its own environmental consequences which should be subject to a full Environmental Impact Assessment. The supply from this project would obviate the need for increased extraction at the Brimegin quarry .

ENVIRONMENTAL ISSUE	ENVIRONMENTAL IMPACT		MITIGATION
<p>A summary of the comparative environmental effects of the runway extension options is given in Table 5.1 below.</p> <p>Landform and land-use</p>	<p>Landscape change. Loss of alternative land-use potential (e.g. agriculture). Property loss.</p> <p>Moderate to High imDact.</p>	<p>No additional property affected to east. Land of poor agricultural potential. Land to west subject to occasional noise blight.</p> <p>As for options I and 2</p>	<p>Grading and planting to integrate new embankment into landscape. Re-location and resettlement of affected properties</p>
<p>Water Resources</p>	<p>Potential for pollution of groundwater during construction and operation.</p> <p>Minor impact</p>	<p>Similar impacts with little difference in scale</p> <p>As for oDtions I and 2</p>	<p>Efficient collection, storage with and pollution control of run-off water. Re-use in landscape irrigation or amenitY Donds.</p>
<p>Land-use policies</p>	<p>No conflict with existing policies though proposals for medium density housing to the east of the runway should be reviewed.</p> <p>Minor imDact</p>	<p>As for options I and 2 with implications for land-use policies to west under new noise regimes.</p>	<p>Review of future land use policy to east of runway extension and existing land-use re: resettlement issues to the west. Agricultural potential on vacated land.</p>
<p>Agriculture</p>	<p>Loss of grazing land with arable potential. Approx. 5 ha of land-take.</p> <p>Minor to moderate impact</p>	<p>No significant additional losses of land with agricultural potential</p> <p>As for options I and 2</p>	<p>Many areas under-utiled in Anguilla. Effective agricultural development elsewhere would compensate for loss. Potential use if land to the west gained from resettlement</p>
<p>Flora and Fauna</p>	<p>Losses of grassland and scrub-edge habitats at the base of the valley slopes.</p> <p>Minor impact</p>	<p>Greater losses of dense scrub habitat on valley slopes</p> <p>Moderate impact</p>	<p>Peripheral areas around the runway planted with native woody species. Reinforcement of national conservation initiatives.</p>
<p>Archaeology</p>	<p>Loss of part of Forest North archaeological</p>	<p>As for options I and 2 but with loss of</p>	<p>Pre-construction excavation within cave</p>

ENVIRONMENTAL ISSUE	ENVIRONMENTAL IMPACT		MITIGATION
	<i>Options 1 and 2</i>	<i>Option 3</i>	
	site. Moderate impact	Airport Cave. Moderate to high impact	and valley floor with preservation of any finds. Watching brief during site clearance/construction.
Air Quality	Potential for increase in aircraft emissions but unlikely to be perceptible Minor impact	As for options 1 and 2	Re-settlement would reduce the number of receptor households
Noise Regime	Construction noise, transport of fill. Transient increases in noise levels in relation to the frequency of new aircraft movements. Moderate imoact.	Similar to options 1 and 2 over a longer work site. Noise regime changes when western take-offs occur	A void night-time construction activity. Re-settlement would reduce the number of receptor households, noise insulation, prohibition of night flights.
Table 5.4 Summary of Comparative Environmental Impacts of Runway Options	Similar to options 1 and 2	Similar to options 1 and 2	Similar to options 1 and 2
* Impacts are judged to be Minor change from the existing situation.	to be Severe (large-scale impact or loss of resources)	to be Moderate, or appropriate mitigation	to be Moderate, or appropriate mitigation

5.4 Environmental Summary

The environmental appraisal has considered the key issues associated with runway development options at Wallblake airport. The issues of note include those related to land-take as they affect landscape, ecology, agriculture and, in particular, archaeology. For the last issue, archaeological studies prior to construction will be necessary with a watching brief during construction. With appropriate mitigation, the impacts arising in relation to the above issues are regarded as acceptable. Option 3 has a greater impact on the local flora and fauna than options 1 and 2. Though option 3 is unlikely to have any significant overall effect on Anguilla's biodiversity, the project puts into focus the issue of gradual attrition and fragmentation of habitat on the island and the need for solid wildlife conservation initiatives in Anguilla.

The project offers an opportunity to improve on the existing infrastructure for the control of and treatment of run-off water.

Community issues form the predominant impact group pertaining to loss of property and exposure to noise.

There will be changes to the noise environment arising from the development of any of the options. Noise issues represent one of the most significant community impacts. Resettlement is the most appropriate form of mitigation for severely affected households in the take off path with noise insulation provided as necessary elsewhere. Control of flight times will prevent night-time nuisance. Construction noise may be mitigated by the application of suitable standards to construction vehicles and plant, and control over access and time of working.

Apart from impacts on ecology, there is relatively little difference in the impacts between the options.

Contingent impacts will arise from the supply and transport of fill, depending on the source of supply. New roads may also arise as part of the development though these will probably be influenced primarily by future land use proposals in the area to the east of the airport. These issues should be subject to both strategic and site specific environmental assessments.

5.5 References

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6.0 LAND COSTS, RESETTLEMENT, PLANNING AND LEGAL ISSUES

6.1 Development Options for Wallblake Airport

The development options considered for Wallblake Airport are described in Section 4 and are principally as follows:

Option 1 - An extension of the eastern end of the runway by 252m (including a 150m Starter Strip)

Option 2 - As option 1 but with re-profiling of the western end of the runway.

Option 3 - An extension of the eastern end of the runway by 852m (including a 150m Starter Strip).

6.2 Costing of Wallblake Airport Development Options

6.2.1 Land Acquisition Costs

The implementation of any of the options would affect approximately 52 parcels of land (see Appendix C, Drawing CK3661109.011006). The Crown owns only one of these parcels of land while the others are all privately owned. There are 37 parcels to the north and 15 to the south of the runway. The majority of those to the south would be affected only in part, however, the Government may choose to acquire entire parcels of land in an effort to discourage the continuation of dense residential development in close proximity to the airport in the long term.

It is assumed that all properties directly affected by the proposed airport expansion would have to be purchased on the open market or compulsorily acquired by the Government. In either case the market price of land would be a main guiding factor.

A comprehensive list of the properties affected is appended in Appendix F. This list of properties includes all those lands needed to carry out the options including those likely to be affected by the transition slopes. The heights of buildings within the transition slopes would need to be controlled to ensure compliance with the UK CAA document 'CAP 168 - Licensing of Aerodromes' (CAP 168). At this stage, it has been assumed that all properties in or in close proximity to the edge of the runway strip will be required for acquisition. Where appropriate, the occupants of buildings have been identified for relocation. With respect to properties directly affected, as identified in Appendix F, these fall within the runway strip.

The costs of land acquisition have been calculated on the basis of records held by the Land and Survey Department supplemented with information from persons knowledgeable about the real estate industry in Anguilla. Information furnished on the expectations for land compensation revealed a range from US\$50,000 per acre based on the Lands and Survey Department information base to US\$225,000 per acre as estimated by Miss Bernice Lake, owner of one of the largest parcels of land to be affected.

On the basis of discussions with a wide range of people it is believed that, in general, the costs of land acquisition would likely fall between £35,000 (ie US\$50,000) and £50,000 (ie US\$70,000) per acre depending on the specific characteristics of the individual plot of land.

Every effort would be made to purchase the lands through the process of negotiated agreements rather than compulsory acquisition. The latter would be a longer process involving the law courts. In some cases, owners may opt to do land exchanges rather than receive compensation. Under such circumstances, if the Government does not have access to land in the Valley area, the same monies allocated for compensation would be used by the Government to purchase land on the open market in order to facilitate the land exchange.

Costing for acquisition purposes is estimated as follows:

- Current value of land in this area would range, in general, from £35,000 to £50,000 per acre.
- Assuming that the parcels of land to the north and south of the runway would be acquired in their entirety and not only the sections directly affected by the expansion of the runway, then approximately 33 acres of land would need to be acquired from existing landowners by the Government in order to implement options 1 or 2 as described above. An additional 10 acres, approximately, would have to be acquired to undertake Option 3. Given the location of the land required to undertake Option 3 (along the runway approach path from the east) it would be shrewd in planning terms to acquire this land in any case.
- There is an additional 4.6 acres of land located between the eastern boundary of the land identified for Option 3 and the existing public access road to the east. This area is also in the approach path of the runway from the east. Although not required to accommodate the physical expansion of the runway it will be required to safeguard the airfield's airspace.
- In order to implement the options, the costs of acquiring the affected land parcels would range from approximately £1,155,000 to £2,400,000 as shown in Table 6.1. The average costs have been used in Table 4.3, the Matrix of Options.

Development Option	No. of Parcels	Amount of Land (approx. acres)	Cost at £35,000 per acre	Cost at £50,000 per acre	Average Cost £
Option 1	51	33	1,155,000	1,650,000	1,400,000
Option 2	51	33	1,155,000	1,650,000	1,400,000
Option 3	52	481	1,850,000 ^z	2,400,000	2,125,000

Table 6.1: Land Acquisition Costs

¹ This estimate includes the 4.6 acres to the east of the proposed runway extension

² The additional plot of land is owned by Bernice Lake. Its value has been calculated at the higher rate of £50,000 per acre.

6.2.2 Re-housing Costs

There are approximately 18 buildings (homes and businesses) which would be affected by the project. Under the acquisition procedures the government would need to replace these facilities in such a way that the occupants of the premises are no worse off than under their current circumstances. In keeping with sound planning practice, every effort should be made to relocate persons within 1km of their current location in keeping with sound planning practice.

There are 14 residential buildings, one school and three residential/commercial buildings which would have to be replaced in order to carry out the airport expansion. The school would need to vacate its rental accommodation and find an alternative property in a suitable location. The government is not obliged to provide this new accommodation. However, they may assist in the process. The property owners, however, would need to be appropriately compensated for the affected land and building.

The average size of the properties to the north and the south of the runway is 1,186 and 1,347sq. ft. respectively. Current construction cost is on average £45 (ie US\$65) per sq. ft. Therefore, the re-housing of these residential and commercial activities would cost approximately £1,200,000.

A large property has recently been constructed to the east of the existing unmade public road, east of the airport. This would require re-provision if option 3 was progressed, and a conservative preliminary cost of £200,000 has been allowed for this.

Costing for home replacement is summarised in Table 6.2:

Current location	No. of buildings	Average size of building	Total floor area to be replaced	Approximate cost of replacement
North of runway	12	1,186 sq. ft.	14,235 sq. ft.	£640,000
South of runway	6	1,347 sq. ft.	8,082 sq. ft.	£360,000
East of runway	1	N/A	N/A	£200,000
Total				£1,200,000

Table 6.2: Estimated Re-housing Costs

6.2.3 Resettlement Costs

The final cost of land to be purchased by the Government to facilitate land exchanges will depend on the level of infrastructure and services to the land, the location of the land and the amount being purchased for resettlement. As discussed earlier, the value of land on the open market could range between £35,000 and £50,000 per acre.

The monies required for compensation have already been discussed. The costs take account of either direct compensation or the purchase of land by the Government on the open market in order to facilitate land exchanges. It should be noted that a number of property owners affected also own other parcels of land to which they are willing to be relocated. Direct compensation is therefore relevant in those cases.

The government owns very little land in the Valley area that is suitable for residential development. There is, however, approximately 4-5 acres of Government owned land in the Rock Form area and this would be suitable for the negotiation of land exchanges.

Additionally, the Government may need to give consideration to providing assistance with moving costs. Assuming a current rate of £140 (ie US\$200) per movement, it is estimated that approximately £840 per household should be set aside to assist the 18 affected households with this process. A total of £15,000 should therefore be allocated for use in re-settlement.

6.2.4 Resettlement Issues

The Project Manager of the Airport Expansion Project has reported that to date all parties to the north of the airport are willing to be relocated. The remaining issues related to resettlement are as follows:

- There is very limited land owned by the Government of Antigua. Therefore, in order to re-house the households in the vicinity of the airport the government would have to purchase vacant land on the open market to accommodate the new facilities for the dislocated households. These lands would be privately owned, individual serviced parcels of land for the most part and not large tracts that would then need to be subdivided and serviced. This has implications for the negotiated purchase price. It is noteworthy that there is an adequate supply of vacant land available in the Valley area for relocation for residential purposes.
- It is necessary to finalise at an early stage how many households would wish the Government to provide replacement homes and how many would prefer to be compensated and build their own homes. This would allow home replacement to commence as soon as possible.
- The Government will need to set a start-up date to implement the airport expansion that would allow for new facilities to be completed for the dislocated households prior to this date. This would affect those who have chosen to have the government provide replacement houses.
- There are three commercial activities currently operating from residences to be affected by the airport expansion. Two of these, a small neighbourhood bar and a small lumber yard, can be re-accommodated as mixed commercial/residential activities. It is hoped that the owner of the lumber shop can be re-sited to a lot very near to the airport as desired. The bar can be re-sited within the context of a new residential area as appropriate from a land use planning perspective. However, the third commercial activity is an auto repair shop which is considered unsuitable in a residential area. The planning authorities are unlikely to re-house this activity along with the owner's new residence. Suitable accommodation could

be found in the commercial/light industrial area along Farrington Road or the industrial area in Corito where the Government has access to some lands. The costs of separating this business from the owner's home are difficult to assess at this stage but would have to be fully considered.

6.2.5 Planning Issues

The planning issues are wide ranging and may be summarised as follows:

- The effect which the airport will have on the school building to the south would provide the Government with an opportunity to assist the island's only private primary school in finding suitable accommodation that will allow for expansion. The school currently rents the building from a private citizen but the Government has identified an extensive area in Pope Hill which could accommodate the present and future needs of the school. The Pope Hill area has been zoned in the National Physical Development Plan for educational purposes.
- Nuisance factors relates to the airport, such as noise, fumes and vibrations, may lead to planning blight of areas adjacent to the airport.
- There is a need to ensure that the proposed development respects the archaeological site to the immediate east of the airport expansion area.
- Access to the island's only land fill as well as to the Delta and Shell companies storage tank areas would need to be maintained with the proposed road closure due to airport expansion. An alternative route has been suggested involving the construction of a new road along the northern edge of the expanded airport runway. The road would be extended eastward to create a new route linking it with an existing public road which runs north-south and offers access to the Corito area (see appendix C, Drawing CK3660/09.011001).
- There is a major development proposed to the immediate east of the airport involving possibly some 300 acres to be used for the construction of an inland marina, hotel, residential villas and an IS-hole golf course. This development has implications for the final design of drainage facilities to service the runway expansion to the east. There are implications, also, for the upgrading of the public road to the east of the runway that is proposed to be used to accommodate heavy duty vehicles accessing the Delta and Shell bulk storage areas and the island's only landfill at Corito (see also Section 4.2.6 and Drawing CK3660/09.011007, Appendix C).

6.2.6 Legal and Institutional Issues

No significant legal or institutional issues have been identified for the implementation of this project. It is anticipated that all the relevant procedures have been adequately covered under the Land Acquisition Ordinance Cap 273, 1959.

6.3 The Impact of the Optional Developments on Anguilla Tourism Strategy

6.3.1 Tourism is the main economic activity in Anguilla, accounting for more than half of the total employment opportunities. The basic underlying philosophy of Anguilla's tourism strategy can be summed up in the following statement that is contained in the Draft Tourism Policy (18 September, 2000) that is currently being circulated for comment:

Fundamental to government tourism policy has been the recognition that inappropriate and uncontrolled tourism development can produce adverse economic, environmental and social effects, and that because of its small geographic size and limited work force Anguilla cannot support or benefit from mass tourism.

Based on this, Anguilla has fashioned and marketed a product that it defines as "low volume, high yield". Simply put, fewer visitors paying high prices for a high quality vacation.

This policy is not only expressed at the political level, but is supported by many groups across the island. In the interviews undertaken for the social impact assessment (Section 9, Comparative Airport Study, WS Atkins International Limited, June 2000) respondents were convinced that they did not want mass tourism. They felt that while the island could not support a fully international airport, improvements at Wallblake would increase safety and facilitate an increase in the level of visitors consistent with the type of tourism being marketed for the island.

The relationship between tourism in Anguilla and the development of Wallblake Airport has been extensively presented in Section 4 of the Comparative Airport Study. To summarise the main points:

- In 1998 Wallblake Airport handled 89,460 air passengers of which 64.7% were visitors.
- There was a significant increase in the number of air passengers at Wallblake between 1985 and 1989, coinciding with the airport redevelopment and a direct scheduled service from San Juan by American Eagle.
- The majority of tourists visiting Anguilla are from the United States of America.
- The average annual occupancy rate for hotels in Anguilla is below the Caribbean average rate.
- Various studies have identified a number of factors that are believed to constrain the growth of tourism in Anguilla. These are limitations in the availability of labour; in the supply of development sites; local capital and access to the island by air.
- American Eagle provides the main air transportation to tourists to the island.

The development options proposed for the Wallblake Airport are as follows:

Option 1 - An extension of the eastern end of the runway by 252 m (including a 150m Starter Strip).

Option 2 – As Option I, but with re-profiling of the western end of the runway.

Option 3 - An extension of the eastern end of the runway by 852m (including a 150m Starter Strip).

All three options offer viable technical solutions to the constraints imposed by the existing airport, which include:

- The fact that the runway is too short to allow the 42 seat ATR 42 aircraft operated by American Eagle to operate to and from San Juan at maximum payload on all conditions.
- The current runway cannot support the larger A TR 72 aircraft that are being deployed to the San Juan hub by American Eagle to serve their Caribbean destinations.

The proposed improvements to the runway therefore ensure that that the A TR 72 can carry maximum passenger payloads (66 seats) under most conditions, thereby avoiding the restrictions on seat availability that exist at present. At the same time the options do not support the introduction of large jets or substantially increased traffic that would signal the advent of mass tourism. The optional developments are therefore consistent with the currently stated tourism policy, and should have a net positive impact on the future development of tourism on Anguilla.

7.0 FINANCE AND FUNDING

7.1 Introduction

The development options considered for Wallblake Airport are described in Section 4 and are principally as follows:

- Option 1: An extension of the eastern end of the runway by 252m (including a 150m Starter Strip)
- Option 2: As Option 1 but with re-profiling of the western end of the runway
- Option 3: An extension of the eastern end of the runway by 852m (including a 150m Starter Strip).

This section of the report examines the funding options for the above development options. In particular, it:

- discusses the various forms of finance and sources of funding;
- considers the availability of funding from regional and international development institutions;
- identifies the different private sources of funding and involvement and gives examples;
 - and finally, assesses the options, estimating total debt service together with the likely terms and conditions of each, and the associated risks and scope for transfer. A preferred option is recommended.

Global airport expansion has been a theme of the latter nineties and, if air traffic forecasts (4% per annum passenger growth) are correct, is set for many years to come. Along with the expansion there have been various funding methods applied. A popular route has been privatisation. For large airport companies, an initial public offering (IPO) has been considered to be the optimal way of raising finance, enabling the company to issue new shares when new project funding is required. For smaller airports, governments (both central and local) have sold stakes (not always controlling stakes) to companies which have access to raising money on the financial markets. For example, the Italian State holding company, 00, sold 51 % of Aeroporti di Roma to a consortium which is funding a US\$2.9 billion staged expansion through to 2005. In Australia, Adelaide Airport Ltd raised US\$240 million in December 2000 for a new terminal through issuing a medium-term bond paying a floating rate of interest 1.96 percentage points above the bank bill rate. Brisbane Airport Corporation did something similar earlier that year.

Privatisation brings the added value of a more efficiently run asset. Public sector staff managing airports are usually good operationally but lack a business approach and commercial skills. This point differentiates the advantage that privatisation holds over a build-own-transfer (BOT) arrangement. It ensures that the pressure is kept on the whole organisation and not just the asset expansion.

The BOT arrangement has its own advantages over conventional project finance as the airport owner does not have to concern itself with fund-raising. The contractor organises this leaving the owner to pay back a given amount of money over a given period of time. The complexities of how the contractor has financed the project, is not

the owner's concern unless, of course, the contractor goes bankrupt before the project is built.

PFI (Private Finance Initiative) or PPP (Public-Private Partnership) or DBFO (Design, Build, Finance and Operate) mean pretty well the same thing and are ways of getting the best of both privatisation and a BOT. In the long run, the asset usually returns to the State but for 25 or more years is managed by the private sector. In such deals, the emphasis is on the service and not the provision of a certain facility. German contractor Hochtief has a partnership arrangement with the Greek Government with respect to the building and running of the new Athens airport and the new Inverness (Scotland) terminal is a PFI deal.

There is the conventional project finance route. This was adopted in the case of the Beef Island airport expansion in the British Virgin Islands close to Anguilla. The Beef Island project attracted aid and soft loans from the European Union. In Anguilla's case, there are strong arguments for aid and soft loan support. The airport does provide a lifeline to the community in cases of emergencies, it offers a public service which normally could not be supported economically and it creates the opportunity for expansion of its main industry, tourism. It is possible for aid and soft loans to be configured into PFI or BOT funded mechanisms (Inverness, for example, received Objective One funding from the European Union Regional Fund).

7.2 Institutional Funding

7.2.1 Background

There are four principal organisations which have provided institutional funding to airport developments in the Caribbean, namely:

- The European Development Fund (EDF) •
The European Investment Bank (Em)
- The Caribbean Development Bank (CDB) •
The Inter-American Development Bank.

World Bank only offers support to low and middle income countries and usually on a government, and not project, level. Anguilla is not included in the bank's member country list. Therefore, this source of finance is not available for the project.

With respect to Anguilla's economic state, it has to be said that it is not a poor island. Its GDP at factor cost in 1999 is preliminarily estimated at £58 million by the Eastern Caribbean Central Bank. Across a population said to be around 12,000 (9,660 at the 1992 census), this gives a GDP per head of just under £5,000. For this reason, Anguilla will not be an obvious target for large sums of aid funds. However, there are economic and social benefits associated with the airport development particularly regarding its public service responsibilities.

Export credits agencies also provide project finance. The experience of airports and terms of the Export Credit and Guarantee Department (ECGD) is also discussed.

7.2.2 European Development Fund

The EDF is the principal aid agency of the European Commission to the developing world. It has been and is active in the Caribbean and it is one of the funders of the Beef Island Airport expansion project.

Aid from the EDF is usually accompanied by a loan from the EIB (see below). It prefers to avoid co-financing a project. Instead it would fund a discrete package of the project. In Beef Island, the EDF and EIB financed the terminal. In the case of Anguilla, they could fund the ground preparation for the airport expansion.

With respect to Anguilla, there are currently no funds available to support the airport expansion. This is because the next 5-year allocation of funds has yet to be discussed and agreed by the representatives of the four Member States (namely, Denmark, France, the Netherlands and Britain) which have overseas country territories (OCTs).

7.2.3 European Investment Bank

The EIB is the development bank of the European Union. It is a non-profit making organisation and its principal task is to fund infrastructure investment within the EU. It, however, also operates in more than 120 countries in the world directed by the external co-operation and development policies of the EU. African, Caribbean and Pacific countries which have established a special relationship with the EU are the largest group. EIB funding goes to support investments in all key infrastructure sectors of economy such as telecommunication, water, power and transport (airports, roads, rail, and seaports).

Past Deals

The Table 7.1 shows the EIB's deals regarding the airport project finance in the past.

Country	Description	Amount (EUR million)
Germany	Extension of Dusseldorf airport	32.9
	Expansion and modernisation of Nuremberg airport	5.1
Greece	Construction of Sparta international airport (Athens Improvement)	60.5
Spain	extension of Madrid Barajas airport	48.8
France	airport (La Reunion Modernisation and enlargement of passenger	7.6
Latvia	terminal at Riga international airport	10.0
Mauritius	Expansion and modernisation of Sir Seewoosagur I	18.0
	international airport	Ramgoolam
Rwanda	Modernisation of international ai	
Beef Island	Extension of airport	11.0

Source: EIB

Table 7.1: Summary of Loans to Airport Projects by EIB

Policy

When the Bank lends for government services or public enterprises, these are normally revenue generating (e.g. civil aviation) and are required to operate within commercially oriented policies. General loan policies are listed in Table 7.2.

<u>Loan Guidelines</u>	
<u>Term</u>	Medium to long term (up to 20 years, occasionally more)
<u>Grace Period</u>	Typically 2 years on an 8-year loan, perhaps 5 years on a 20-year loan
<u>Currencies</u>	Borrower's choice e.g. USD, EURO
<u>Repayment</u>	Equal 6-monthly instalments
<u>Interest Rate</u>	Finest market rates
<u>Security</u>	Government guarantees considered
<u>Amount Limits</u>	Up to 50% of project costs
<u>Fees</u>	Generally, no processing, commitment and other fees are charged

Source: EIB

Table 7.2: Lending Conditions of EIB

EIB funding is not tied to purchases of goods nor equipment from specific suppliers or countries. Bidding procedures are required on a *best for the project* approach and are mainly on the basis of open tendering or consultation.

7.2.4 Caribbean Development Bank

The CDB was established in October, 1969 for the purpose of contributing to the harmonious economic growth and development of the member countries in the Caribbean and promoting economic co-operation and integration among them. CDB contributes to the financing of public sector and private sector projects related directly to economic development in its borrowing member countries. Its sponsors are Germany, Italy, Canada, China and the UK.

Past Deals

CDB is one of the banks involved in the Beef Island airport development project in the British Virgin Islands. CDB is funding US\$17.7 million, a third of the US\$53 million project. It is covering the civil works costs on the runway. The loan is over 15 years with 3 years grace period. The interest rate is variable and close to commercial levels. Currently it stands at 6.8% per annum and is secured by government guarantee.

Policy

CDB gives priority to infrastructure and services which support productive enterprises and social and community development.

Antigua is classified as a Group 2 country together with Barbuda and British Virgin Islands. The Table 7.3 shows the policy guidelines for public borrowers in the Group 2 countries.

<u>Loan.Guidiines.</u>	
<u>Term</u>	Up to 25 years including grace period
<u>Grace Period</u>	Maximum 5 years
<u>Currencies Interest</u>	Availability from CDB
<u>Rate Securi</u>	6.68% per annum
<u>Amount Limits</u>	Government guarantees considered
<u>Commitment Fees</u>	Up to 70% of project costs, occasionally up to 80%
Source: CDB	1% per annum on the undisbursed portion of a loan

Table 7.3: CDB Lending Conditions for Group 2 Countries

All design, build and supervision services and all materials, consumables and plant/equipment have to be sourced either from the bank's sponsoring countries (namely, Gennany, Italy, Canada, China and Britain) or its Caribbean members.

7.2.5 *Inter-American Development Bank*

The Inter-American Development Bank, the oldest and largest regional multilateral development institution, was established in December of 1959 to help accelerate economic and social development in Latin America and the Caribbean.

Past Deals

Cheddi Jagan International Airport (CJIA)- Approved

The objective was to raise the standards of air transport operation, safety procedures and affiliated services to internationally acceptable levels. This required a thorough review of the statutory, regulatory and institutional framework of the sector, significantly investments, and private sector participation in operating air transport facilities and services. Project conditions are given in Table 7.4.

<u>..J»fojeCt.SUIDIDa...</u>	
<u>Borrower</u>	The Government of the Co-o perative Republic of Guyana
<u>Total Project Amount</u>	US\$31.5 million
<u>Sources of Funding</u>	Inter-American Development Bank (US\$30 million) The Guyana Government (US\$1.5 million)
<u>Amortisation Period Grace</u>	40 years
<u>Period Disbursement Period</u>	10 years
<u>Interest Rate</u>	4 years
<u>Inspection & Supervision</u>	1 % during g grace period; 2% thereafter
<u>Credit Fee</u>	1%
Source: Inter-American Bank	0.5%

Table 7.4: Lending Conditions for Cheddi Jagan International Airport

Airport Reform and Improvement Program in Jamaica – Approved

Approved in September, 1995, the programme was to improve the efficiency, quality and sustainability of airport transportation services available to the tourism industry and other export sectors of the economy in order to sustain the export drive. The programme included three components:

- i. Civil works at the Norman Manley International Airport including rehabilitation of the airside infrastructure;
- ii. A communication system to upgrade and rehabilitate national air traffic control equipment, navigational aids and associated facilities; and
- iii. Regulatory and institutional activities to establish the technical and economic regulatory framework before transferring the airports to the private sectors.

Project Summary	
Executive Agency	Airports Authority of Jamaica Ltd.
Total Project Amount	US\$46.8 million
Sources of Funding	Inter-American Development Bank (US\$26.5 million) Multilateral Investment Fund (US\$0.6 million) Local Sources ru\$19.7 million

Source: Inter-American Bank

Table 7.5: Lending Structure for Airport Development in Jamaica

Belize Airport Authority 1999 – Proposed

The project aims to modernise the Civil Aviation Sector. It includes 1) the concession of Phillip Goldson International Airport and possibly San Pedro Airport to a qualified private sector strategic investor and airport operator; 2) the strengthening of the Civil Aviation Department as a qualified, independent and autonomous technical regulator; and 3) the separation of air traffic control from the aviation department.

Project Summary	
Executive Agency	Belize Airport Authority
Total Project Amount	US\$1.15 million
Sources of Funding	Multilateral Investment-Fund (US\$0.8 million) Local Counterpart ru\$0.35 million

Source: Inter-American Bank

Table 7.6: Proposed Lending Structure for Belize Airport Authority

Four International Airports in Dominican Republic 1999 – Proposed

The project entails the rehabilitation, upgrading, modernisation and operation of four international airports in the Dominican Republic, which are Las Americas, Gregorio Luperon, Maria Montez and Arroyo Barril. The project was awarded to Aerodom through an international bidding process. The concession has been structured as a 20years Build-Operate- Transfer agreement.

<u>Project Summa</u>	
<u>Sponsors</u>	Operadora de Aeropuertos del Caribe, S.A. Ogden Central & South America, Inc Vancouver Airport Services <u>Impregilo SpA</u>
<u>Total Project Amount</u>	<u>Up to US\$417 million</u>
<u>Financial Plan</u>	A-Loan: US\$65 million (phase I) B-Loan: "US\$70 million (phase I

Source: Inter-American Bank

Table 7.7: Proposed Lending Structure for Dominican Republic Airports

Policy

The Bank may extend financing for:

- institutional strengthening;
- rationalisation, maintenance, rehabilitation, remodelling or expansion of existing airports and their aerial navigation and safety systems;
- construction and/or expansion of aerial navigation and safety systems; and
- construction of new airports and their aerial navigation and safety systems, with preference for local traffic.

Proposed projects should preferably form part of short, medium or long-term investment plans for financing the transportation sector or its sub-sectors as well as being integrated with the socio-economic planning at the national level. They should have the capacity to provide a speedy and efficient transportation service that makes it possible to link up the different areas each member country and helps to facilitate foreign trade.

7.2.6 Export Credit Guarantee Department

ECGD is the UK's official export credit agency. It is a separate Government Department reporting to the Secretary of State for Trade and Industry. ECGD has over 80 years' experience of working closely with exporters, project sponsors, banks and buyers to help UK exporters compete effectively in overseas markets. It arranges finance facilities and credit insurance for contracts ranging from around £20,000 up to hundreds of millions of pounds. ECGD also provides overseas investment insurance for UK-based companies investing overseas.

ECGD has not been involved in airport projects in the Americas and Caribbean. Also its view is that the Anguilla market is small and ECGD's existing capacity for cover is modest. It would not be able to consider this project. From Table 7.8, it can be seen that the minimum level of potential ECGD support for them to consider has to be worth at least £20 million in project financing terms. However, this is far more than the existing cover-availability on the market.

<u>Loan Guidelines</u>	
<u>Term</u>	Up to 14 years, maximum average loan life is 7.25 years
<u>Grace Period</u>	Maximum 2 years
<u>Currencies</u>	Availability from CDB
<u>Interest Rate</u>	6.48%
<u>Risk Sharing</u>	Risk be allocated to the parties best suited to manage and influence
<u>Amount Fees</u>	Minimum £20 million
Source: ECGD	No application and processing fee

Table 7.8: Conditions of ECGD Lending

Financing is linked to the provision of equipment and machinery from UK suppliers only.

Other countries offer similar schemes such as SACE in Italy and Hermes in Germany.

7.3 Private Sector Involvement

7.3.1 Introduction

Private sector involvement in airport development has been substantial over the past 10 years and appears to be growing. Below provides examples of DBFO/PFI schemes and indicates the level of interest in being involved in the Anguilla project following discussions with the four interest groups, namely contractors, operators, banks and airlines.

7.3.2 Contractors

Below are discussed the experiences of four leading international contractors in the airport business - Heery, Colas, Interbeton and Hochtief.

Heery International

Part of Balfour Beatty, Heery International is a full-service architecture, interior design, engineering, construction management and program management firm with over 1,000 employees located in offices throughout the United States and Europe.

The company has been involved in airport projects. Below is described two examples of their recent airport projects which were conventional project financed.

Tampa International Airport: In 1996, Hillborough County Aviation Authority retained Heery to provide design services for the renovation of the transfer level (level 3) of Tampa International Airport.

Edinburgh Airport: Heery was responsible for construction management of the expansion and redevelopment of Edinburgh Airport in partnership with British Airport Authority (BAA), the largest single airport operator in the world. Since 1995 Heery has provided design and construction management services for the £60m Edinburgh Airport Major Development. The objective of the development is to increase significantly the annual capacity of the

airport, while simultaneously producing a concept for future development, which addresses a planning horizon of 2010. To date, the completed phases have increased capacity from 2,500,000 to 6,500,000 per year, and boast a new combined domestic and international departures lounge, expanded retail, and baggage handling and screening.

Heery has shown only a small degree of interest in the Antigua's airport extension and purely from as conventional contractor. It would not consider any finance schemes based on our initial enquires.

Colas

Colas is one of France's leading companies involved in the building, lighting and maintenance of roads (and related sectors). It is part of the International Colas Group, the biggest road construction company in the world. The Colas Group has a turnover of 6.5 Euro billion in 2000 with 53,000 staff.

With respect to airports, Colas has been involving in projects in Asia, Central American, Caribbean and across over Europe. An example of small airport development is Biggin Hill in the UK.

Biggin Hill: Biggin Hill is a busy private airport situated on the A233 four miles south of Bromley in Kent. The business is a mixture of private, pleasure and official flights using relatively small craft. An average of 50 aircraft movements a day, makes it similar to traffic levels in Antigua in A T M terms. Over the years, the condition of the main runway had deteriorated and it now required major rehabilitation, while the western taxiway needed to be realigned and extended.

The company is interested in forming joint ventures with governments. Colas has shown their interest in the Antigua project with an intention of DBFO.

Interbeton

Interbeton is part of Hollandsche Beton Groep nv. HBG is a European construction group which undertakes projects worldwide, covering in all aspects of construction. The head office is located in Rijswijk, the Netherlands. The company was founded in 1902 and its shares are listed on the AEX Stock Exchange in Amsterdam. HBG employs about 20,000 people. The Group expects to achieve a turnover in excess of Euro 5 billion in 2000.

The company is involved in the construction of a new airport in Zimbabwe, Harare International Airport that is a design, build and finance (BOT) project.

Harare International Airport: Interbeton/Edmund Nuttall/ ABB as a consortium signed the contract of this project for building and civil works in January 1996 but it took till November 1997 for all the loan agreements were signed. They arranged funding through ING Barings and NCM (the Netherlands), Berliner Bank and ECGD (UK) and KfW and Hennes (Germany). The loans are backed by sovereign guarantees.

The project comprises the design and construction of a complete new 36,000m² terminal building which contains departure and arrival halls, tax-free shops, business and VIP lounges, offices, restaurants, three air bridges, parking space for both aircraft and cars. Special features to this airport building are the fully glazed airbridges and the fair faced concrete beam H:\Jobs\CK3660\Draft Report

patterned ceilings in the departure and arrivals hall. The most distinctive feature of the design is the 40m high control tower, modelled after the ancient tower at Great Zimbabwe, dating back to the 13th century. The facade of the building also offers a typically African design.

Bequia Island Airport: Interbeton also has projects in the Caribbean Sea, for example, the airport in Bequia Island. This was a completely Greenfield project which cost US\$20 million. Funding came all from the European Community.

The company is interested in the Anguilla project and would be prepared to consider a DBFO. It could team up with specialists such as Schiphol Airport, which owns the airport in Amsterdam. Their expected return on investment would be at least 10% subject to situations and risks. They would require a guarantee from the government covering at least 50% of the costs. In addition, they would like to see only a small equity participation by government in the project so that the operating company has more freedom and flexibility to act and make decisions.

Hochtief AirPort GmbH

Established in 1875, Hochtief is Germany's largest construction company. With on-going projects amounting to 8.42 billion Euro in 1999, the organisation is also one of Europe's leading players in the construction industry.

Athens International Airport, 1996-2001: For the first time, the company is not only assuming the responsibility for planning, building and financing an airport, but for operating it as well. Moreover, the new airport is the first example anywhere in Europe of a public-private partnership. Once the airport is finished in 2001, Hochtief will operate it jointly with their partners and the Greek government for 25 years. For this purpose the airport corporation Athens' International Airport S.A. (AIA) was founded. After the operator concession runs out the airport becomes the property of the Republic of Greece.

Regarding the planned building costs amounting to approximately £ 1 billion, Hochtief has concluded what is known as a GMP agreement. GMP stands for guaranteed maximum price: the company is committed to keep within the price set down for the project. If costs fall below this amount, the Greek government and Hochtief will split the savings according to previously agreed procedures.

Warsaw International Airport, 1990-1992: Warsaw needed new passenger and cargo buildings, but PPL, the state-owned airport operator, could only finance a third of the cost. In a triangular agreement a bank paid Hochtief the remaining two-thirds of the cost against future airport revenue.

The company has shown an interest in the Anguilla project and would consider providing finance. According to their Western Europe experience, the required return on equity would be 15-20%. It is likely that the company will lead a consortium including other construction companies. It requires less than 49% shareholding if the consortium has management control on the airport. If not, it requires more than 50% equity holding.

7.3.3 Operators

It was the norm that airports were owned and operated by the State (either central government or local authorities). In the late eighties and nineties there was a trend to privatise airports. One of the first was the privatisation of the British Airports Authority (BAA) in the mid-eighties. BAA has since been involved in buying and operating other airports (eg Edinburgh and Southampton).

In some cases, investor consortia have purchased stakes in airports and then have appointed existing airport operators to manage these interests. For example, Manchester Airport plc, which is owned by Manchester City Council and 9 other local authorities, manages Adelaide Airport on behalf of the consortium which bought it.

There has been interest shown in owning/running airports by companies which run other modes of transport. National Express and FirstGroup were good examples of these up to recently when they sold their airport interests. Manchester Airport bought East Midlands and Bournemouth airports from National Express and a joint venture comprising the Australian bank, Macquarie, and a Spanish rail company, Cintra Concesiones de Infraestructuras de Transporte, bought Bristol International Airport from FirstGroup and Bristol City Council.

As indicated above, contractors are now diversifying into airport ownership and management. Hochtief has an equal stake in a joint venture with Aer Rianta, the Irish (currently state-owned but about to be privatised) airports operator. The JV, called Airport Partners, owns 36% of Hamburg and 50% of Dusseldorf airports. Aer Rianta also has a stake in Birmingham airport and earns advisor fees from Sofia and Bahrain airports.

In general, none of the operators whom we approached were interested in the Anguilla project. Some, like Manchester Airport, cannot invest outside the UK. For others, the geographical location is not part of their core market area (eg for Aer Rianta, it is the USA). But also the size of the business and the fact that it will have to operate with a subsidy for a considerable time in the foreseeable future were *turn offi* for them. Aer Rianta, for instance, are only interested in projects which will yield them a potential net income of US\$~ million per annum.

The Highlands & Islands Airports Ltd (HIAL) is experienced in running airports of the size of Anguilla. This is discussed below.

The Highlands & Islands Airports Ltd

Pertaining to the Scottish Executive, RIAL operates ten airports throughout the western and northern isles of Scotland and the north. Eight of the ten airports are licensed for Public Use. Barra and Campbell are licensed for Ordinary Use where approach procedures are private and have very low passenger numbers (as does Tiree). Inverness and Sumburgh (on Shetland) by contrast have relatively high numbers of passengers compared to Anguilla. It is the other five airports that are of interest in the Anguilla case as they either have similar passenger movements (actually slightly less for Benbecula, Islay and Wick) or the numbers which Anguilla aspires to over the next 10-15 years (at Kirkwall and Stornoway).

All RIA's airports operate with a subsidy. Table 7.9 gives the size of the subsidy by airport and by passenger and aircraft movement. This compares to a subsidy in 2000 of around £500,000 (*VS\$800k*) in Anguilla, £10.25 per passenger (assuming passenger numbers equally half that of passenger movements) or £30.28 per aircraft movement.

Airport	Subsidy (£'OOOs)	Subsidy/passenger (£)	Subsidy/ATM (£)
Barra	340	49.57	271.57
Benbecula	1,138	33.05	308.48
CamDbelltowo	589	70.60	280.61
Inverness	3,423	9.86	124.29
Islav	494	23.87	204.72
Kirkwall	1,040	11.55	88.91
Stornoway	1,921	21.67	248.32
Sumbur2h	1,705	7.51	115.46
Tiree	497	96.34	523.16
Wick	1,124	34.50	202.12
Total! A veral!e	12,271	14.25	157.92

Source: Highlands & Islands Airports Ltd. Annual Report, 1999-00

Table 7.9: HIA Airport Subsidies, 1999-00

Islay is very much like Anguilla. With 20,697 passengers and 2,413 aircraft movements it is a remote island holiday destination. Benbecula used to be a military airport and its main business is still related to the military. Many of its 34,433 passengers come to make use of its rocket ranges on South Vist as a test site. Wick with 32,580 passengers, is also a business destination accounting for 85-90% of passengers.

Stomoway is another former Ministry of Defence airfield. Its 88,637 passengers are mainly for business generated by oil exploration. Kirkwall is a remote island community where air transport plays an important lifeline. The airport also serves tourists and the business sector among the 90,043 passengers that it received in the last financial year. RIAL seeks funding by conventional methods. The £2.5 million terminal building investment in Kirkwall is to be funded by a bank loan. However, soon after its ownership was transferred ITom being a subsidiary of the Civil Aviation Authority to the Scottish Office in 1995, it was obligated to use the PFI route to build a new terminal for Inverness. At the time, the conventional method of loan finance would have meant a piecemeal development. The main characteristics of the PFI were:

- £9 million project
- 25 year operating life with the option to extend to 30 should demand requirements necessitate significant investment in the period between 20 and 25 years 350,000 passenger
- floor (ie minimum annual fee should actual passenger numbers fall below 350,000) stepped impact on annual fee should passenger numbers rise quickly
- a capped inflation rate placed on the annual fee
-

In May 1999, the new terminal came into effect and HIAL is delighted with the outcome. The service provided by the PFI consortium, Inverness Airport Terminal Ltd. is perceived to be "excellent".

Canmore (a dealmaker) and Chestertons covering the facilities management own the consortium. Lloyds Bank (the Scottish banks had difficulties in deciding the credit risk of RIAL) provided funding.

However, HIAL is critical about the hidden cost of PFI. The process involved long and tiresome negotiations. These were necessary to agree on the performance measures, service levels and methods of auditing. Yet it proved to be expensive in terms of professional fees (£1.1 million) and management time. HIAL's view is that £9 million is too small a project to support the upfront costs of establishing the PFI.

To be fair to PFI, the Inverness deal happened at a time when PFI was in its infancy. Now there are standard structures and procedures in place for professionals, especially lawyers, to facilitate the process faster and in a more cost-effective (probably £1.1 million) and less cumbersome manner. The reason why it takes longer than more conventional ways of raising finance is that there are numerous service levels to define and agree upon.

7.3.4 Banks

Citibank has been involved in airport project finance, for examples, Jamaica Airport, Haiti Airport and other airports in the Caribbean. The bank was unwilling to disclose its terms at this stage.

Bank of Nova Scotia was involved in financing the Beef Island Airport. It supplied 6% (US\$3.2 million) of the total project costs as a medium term loan (5 years) with no grace period. Interest rates were at commercial levels on a variable basis and currently are around 7.5-8% per annum.

Like the others, Deutsche Bank has been financing airport projects (eg Berlin's Schoenefeld airport where it is supporting the Flughafen Berlin-Brandenburg International consortium). Based on their experience, the mix of finance is usually 40% equity and 60% debt. In the case of the involvement of big operators with good track records, the commercial bank debts are likely to be converted into bond issue. Generally, if the borrowers are public sectors, the standard annual interest rate is 6.13% or 1.5-2% above LIBO.

A number of commercial banks providing project finance were contacted but they showed little interest stating that the project was too small.

7.3.5 Airlines

Airlines have been known to fund airport developments, particularly in the USA. These are usually connected with the development of terminals for their exclusive use.

The main user of the airport is American Eagle which is owned by AMR Corporation which also owns American Airlines one of the largest airlines in the world. The other principal user is LIA T which is a Caribbean owned airline and has limited financial resources. However, in Anguilla's case, we do not think that such funding is appropriate as most of the capital cost is in the runway.

7.4 Funding Options

7.4.1 Options

The relatively inexpensive Option 1 with a base cost of around US\$1 0.5m is probably too small to attract a PPP. The project finance and BOT routes are likely to be the only options. The revenues could support supplier credits of up to US\$7.5m (assuming a 12% per annum interest charge over 10 years) or a loan of US\$10.5m from the Caribbean Development Bank.

Consequently for the purposes of examining the funding options we have assumed a project capital and pre-operating expenditure of US\$35 million and for the project to take two years to complete. This equates approximately to runway development Option 3. Placing this in context of a GDP at market prices of around US\$100 million, this project is clearly a significant capital outlay for the island.

In our opinion, there are three funding options worth considering, namely:

- conventional project finance
- a BOT scheme
- a Public-Private Partnership.

We do not think that privatisation of the airport is feasible at this time as the airport is not profitable even if the revenue from Passenger Departure Tax is taken into consideration.

For the purpose of discussing funding options and calculating debt service requirements, we have assumed the Option 3 development, namely the 852m extension costing US\$35 million including terminal upgrade, parking apron, airfield lighting and bulk fuel installation.

Underlying all the funding options is the basic requirement of covenanting resources to secure the loans. These could be taken out on the land and buildings.

7.4.2 Conventional Private Finance

The expansion of Beef Island Airport in the British Virgin Islands (BVI) is an excellent example. In 1998 173,000 passengers entered the BVI through Beef Island airport. A similar number departed via this route making the annual passenger movements about 350,000 (nearly four times higher than those in Anguilla). With hourly peaks of as much as 150 passengers, the terminal building was operating beyond its capacity of 100 passengers per hour.

Aircraft parking also was a problem during peak times. Careful marshalling of aircraft was required. The runway was of similar length to Anguilla (1115m long) and therefore restricted the payload of the ATR 42 aircraft operated by the main airline company, American Eagle. As in the case of Anguilla, seats had to be left unused.

The development described as Phase 1, has been divided into two separate but associated phases, namely:

- Phase IA - a new passenger terminal and cargo building capable of handling a peak of 430 passenger per hour, landside roads, car park and infrastructure and a new aircraft parking apron;
- Phase IB - runway extension of 300m, upgrading of graded strip, new control tower and operations block.

The construction valued at US\$53 million was divided into several contracts related to particular types of work and geographical location. The project finance was structured as detailed in Table 7.10 below.

Source	Funding US\$m	% of Project Cost	Conditions
EDF	4.6	8.7%	grant
Em	5.0	9.0%	12-year loan, 3 years grace period, 3% pa interest rate
CDB	17.7	33.4%	15-year loan, 3 years grace period, variable rate slightly lower than commercial (6.8% pa)
Bank of Nova Scotia	4.5	8.5%	5-year loan, no grace period, variable commercial rate of interest (c. 7.5-8% pa)
BVI Social Security Board	3.2	6.0%	10 year loan, no grace period, variable commercial rate of interest (c. 7.5-8% pa)
BVI Government Source: The Development planning Unit, Government of the British Virgin Islands	18.0	34.0%	

Table 7.10: Project Funding of Beef Island Airport

Using this model for the Wallblake airport extension, the funding structure becomes as shown in Table 7.11 for an investment of US\$35 million (including capitalised interest over the construction period).

Source	Funding US\$m	% of Project Cost	Conditions
EDF	3.1	8.7%	grant
Em	3.2	9.0%	12-year loan, 3 years grace period, 3% pa interest rate
CDB	11.7	33.4%	15-year loan, 3 years grace period, variable rate slightly lower than commercial (6.8% pa)
Bank of Nova Scotia	3.0	8.5%	5-year loan, no grace period, variable commercial rate of interest (c. 7.5-8% pa)
Local Loan	2.1	6.0%	10 year loan, no grace period, variable commercial rate of interest (c. 7.5-8% pa)
Anguillan Government	11.9	34.0%	-

Table 7.11: Project Funding of Wallblake Airport

Table 7.12 shows the debt servicing of such a structure. Bankers apply conservative estimates of the revenue forecast to evaluate loan requests (we have taken 95% of the central case). For the project to be acceptable to bankers, revenues at least should cover the debt service. They would also look for government guarantees. In this case, the table demonstrates that even if all the revenues were set aside to pay for the funding, and that the departure tax were to be doubled to US\$20 per non-resident.

they would be insufficient to cover the debt schedule until around the year 2013. The Anguillan Government would have to fund more like 56% of the project, not take the Local and Nova Scotia loans and reduce the CDB loan to say US\$8.9 million to have a debt service schedule which does not exceed cumulative projected revenues. (It is important to note that the government will also have to subsidise the airport to cover the annual operating costs).

Just using EU money, the government would still have to invest about US\$15 million against US\$15 million from the EIB and a US\$5 million EDF grant, to ensure that the debt is serviced by cumulative projected revenues. Another alternative is to have a long-term loan from the Inter-American Bank. Although a grant would not be available the grace period could be longer (say 7 years) and interest less (1% pa during the grace period and 2% thereafter. Around US\$26 million could be borrowed on these terms with US\$9 million coming from the Anguillan Government. The Anguillan Government would also have to meet all the operating costs of the airport until around 2018 when some revenues could begin to offset against these costs.

As well as being virtually dependent on securing soft loans and grants, the other disadvantages with this option relate to risk. Still remaining with the Anguillan Government are the risks that:

- passenger forecasts will not rise as fast as predicted
- other revenues will be as high as predicted
- all the revenues are collected (a current problem)
- American Eagle and LIA T will continue to fly to Anguilla or that other airlines can be encourage to fly to Anguilla.

There are contract risks too. Although the contractors can be penalised for delay in construction and overspend, the airport will lose income, as the additional passengers who would have come in the larger aircraft will not come. American Eagle also loses efficiency if delays occur. Furthermore, there is no incentive for the contractor to bring in the project under-budget and in a faster time.

The principal problem with this type of funding is that the current and forecast revenues are too low to support the debt servicing.

Table 7.12: Debt S fP F' Schedul

Source	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>DrilWdown</i>																	
EDF	3.1																
EIB	3.2																
CDB		11.7															
B ofNS		3.0															
Local loan		2.1															
Equity	11.9																
<i>Payback of/oans (assl/mes payment on / January of new year)</i>																	
EIB					0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36				
COB						0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
S ofNS			0.60	0.60	0.60	0.60	0.60										
Local loan			0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21					
<i>Balance of Loal/</i>																	
EIB			3.20	3.20	2.84	2.49	2.13	1.78	1.42	1.07	0.71	0.36					
CDS			11.70	11.70	11.70	10.73	9.75	8.78	7.80	6.83	5.85	4.88	3.90	2.93	1.95	0.98	
S of NS			2.40	1.80	1.20	0.60											
Local loan			1.89	1.68	1.47	1.26	1.05	0.84	0.63	0.42	0.21						
<i>Paymellt of illterest</i>																	
EIB		3.0%	0.096	0.096	0.085	0.075	0.06	0.053	0.043	0.032	0.021	0.011					
CDS		6.8%	0.796	0.796	0.796	0.729	0.663	0.597	0.530	0.44	0.398	0.332	0.265	0.199	0.133	0.066	
B of NS		7.5%	0.180	0.135	0.090	0.045											
Local loan		7.5%	0.142	0.126	0.110	0.095	0.079	0.063	0.047	0.032	0.016						
<i>Tota/ payback</i>																	
			0.8/0	0.810	1.166	2.14/	2.14/	1.54/	1.541	1.541	1.541	1.541	1.331	0.975	0.975	0.975	0.975
<i>Total Interest</i>																	
			1.2/3	1.153	1.081	0.943	0.806	0.7/3	0.620	0.528	0.435	0.342	0.265	0.199	0.133	0.066	0.000
Total Debt Service			2.023	1.963	2.247	3.084	2.946	2.254	2.161	2.068	1.975	1.883	1.596	1.174	1.108	1.041	0.975
Revenue Forecast			1.125	1.191	1.274	1.345	1.421	1.501	1.586	1.675	1.762	1.852	1.948	2.049	2.154	2.234	2.316
95% of Forecast			1.069	1.131	1.210	1.278	1.350	1.426	1.507	1.591	1.674	1.759	1.851	1.947	2.046	2.122	2.201
Cumulative Revenue Source; WS Atkins estimates less Debt			-0.955	-1.786	-2.822	-4.628	-6.225	-7.052	-7.707	-8.184	-8.485	-8.608	-8.354	-7.581	-6.642	-5.561	-4.336

7.4.3 Build-Own- Transfer

This scheme suffers from the same problems as the project-financing route in so far as the revenue forecasts are too low to cover the financing. In its favour is the probability that the capital expenditure will be lower as the expansion will be in the hands of one contractor who can be motivated to keep all costs to a minimum. Also project supervision will be easier through the one contractor. Even if we assume that this accounts for a £2 million saving, the project still need considerable government investment in the project. One mix where cumulative revenues remain positive is the following structure:

		US\$m
. EDF	-	3.1
. EIB	-	3.2
• CDB	-	8.8

Fundamentally, if the government wishes a solution where by its initial investment is relatively small (say, US\$10 million or less), BOT is not suitable. Typically, BOT is to use private sector finance to fund infrastructure projects where the government finances are constrained and where payment for the project can be met from revenues from the project.

The risk of achieving the revenue forecasts remains with the government but the contractor does have an incentive to bring the project in ahead of time.

7.4.4 Public-Private Partnership

The advantages of this approach are that:

- the funding is spread across a much longer period;
- the private sector participates in the revenue risk aspects of the project;
- it is the private sectors' loss for debts not paid;
- the private sector assumes the initial capital cost and all the operational (including maintenance) cost risks across this period;
- the private sector is motivated to complete the capital works ahead of time as it does not start to receive service payments until then

For such a partnership to succeed there has to be scope for the private sector to operate the airport more efficiently. At present, labour costs account for 80% of operational costs excluding maintenance and capital costs. Experience of HIAL demonstrates that numbers can be reduced through multi-skilling. For example, typically at the smaller airports RIAL's fire fighters would carry out the routine maintenance, provide flight information, undertake meteorological observations and undertake bag handling for which RIAL receives a fee from the airlines. It is difficult to compare exactly manning levels between airports because of outsourcing and regional regulations but (subject to a more detailed review) Wallblake does appear to be overstaffed by 40-50%.

On this basis, we have evaluated the potential for private sector involvement using the following assumptions:

- Total capital cost of project - US\$33 million (same saving as with the BOT route) • the private sector sets up a special-purpose vehicle company (SPV) to run the airport for 25 years plus two years of construction;
- US\$100k annual management cost to the SPV;
- the Anguillan Government injects US\$10 million and the balance being funded from the EDF (US\$5m), EIB (US\$10m) and CDB (US\$8m);
- the SPV is able to gain the same terms and conditions of grants and loans from the EDF, EIB and CDB as for the project financing route;
 - service level payments of US\$15 per passenger movement for the first five years dropping to US\$12 for next five years, then US\$6 for next five and finally US\$1 thereafter;
- the SPV funds negative cashflows;
- the SPV can make 15% overall efficiency savings (equivalent to 30% reduction in manpower costs);
- the SPV aims to achieve around 17% annual real rate of return over the life of the project;
- the period is for at least 25 years of operational life;
- professional fees to Anguillan Government to set up the PPP is US\$~ million;
- the SPV
- additional capital investments (eg refurbishment of the runway) over this period which would normally be included in a PPP, are outside this agreement for comparison purposes.

7.4.5 Evaluation of the Options

Table 7.13 evaluates the three funding options and in the case of Option 3, the Project Finance option, three alternative funding structures; namely:

- a) having the same structure as Beef Island,
- b) having a structure where the debt service can be met from revenues, and
- c) having only EU and Anguillan Government funding (soft loan option).

The table shows for each option the Net Present Value of the additional cost to the government of funding and operating this project over 25 years. It nets out the subsidy that the government will have to pay if it decided to do nothing (except to increase the departure tax to US\$20 for non-residents and US\$10 for residents). The net cashflows have been discounted at 5% and adjusted for 2% pa inflation. Revenue is based on 95% of the *central case* in the feasibility study. The table also indicates the maximum government funding requirement net of the "do nothing" subsidy and the year when this peaks.

The soft loan option costs less than the other options and requires the Government to inject US\$15 million as an initial investment (43% of the capital costs).

Table 7.13: Evaluation of Funding Options

Option	NPV@7.1% (US\$m)	Funding	Govt. Initial Investment (US\$m)	Govt. Funding Requirement (US\$m)
1a Project Finance - Beef Island	US\$ 27.5	EDF - US\$ 3.1 EIB - US\$ 3.2 CDB - US\$ 11.7 BNS - US\$ 3.0 Local- US\$ 2.1	US\$ 11.9	US\$ 39.9 Peak Year: 2017
1 b Project Finance - Revenue cover	US\$ 28.5	EDF - US\$ 3.1 EIB - US\$ 3.2 CDB - US\$ 7.7	US\$ 21.0	US\$ 36.4 Peak Year: 2017
1c Project Finance - Soft loan	US\$ 23.5	EDF - US\$ 5 EIB - US\$ 15 CDB- US\$ 0	US\$ 15.0	US\$ 33.2 Peak Year: 2013
2 BOT	US\$ 26.4	EDF - US\$ 3.1 EIB - US\$ 3.2 CDB - US\$ 8.9	US\$ 17.8	US\$ 35.1 Peak Year: 2017
3 PPP	US\$ 23.7	EDF- US\$ 5 EIB- US\$ 15 CDB- US\$ 8.9	US\$ 10.0	US\$ 35.0 Peak Year: 2017

Source: WS Atkins estimates

The PPP option, however, is a close second to the soft loan. It is more attractive because the operating and revenue risks are transferred to the private sector partner (although the partner will insist on a minimum level of passenger movements each year being part of the contract). Although costing more, it requires only a modest US\$10 million of initial government investment. The annual payments across the full period of the concession reduce considerably.

In all these options the importance of obtaining grants and soft loans is paramount. There will be limitations on the available funds from European Community sources and these will take probably two years to put in place. The Inter-American Bank and the Caribbean Development Bank seem to be the more likely sources of such finance. Given the poor financial return on the project but reasonable economic return, these institutions may be more willing to lend as part of a PPP arrangement, in order to ensure efficiency savings. They would insist that the PPP consortium is financial sound and appropriate covenants are established (e.g. government backed guarantees) before proceeding.

Table 7.14 details the costs to the government of the five options.

The PPP option would be even more favourable if the airport expansion were to be linked to the hotel/golf course/marina development at Conch Bay. This US\$195 million project dwarfs the airport extension and fundamentally becomes more feasible if the airport were to receive larger planes. Potential investors could be the principal up-market vacation club companies such as the Marriott or Hilton chains. However, our understanding is that the owners of the Conch Bay project is against development of the airport as this would encourage greater traffic and Conch Bay is on the flight path.

000005	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<i>111 - Bee/Island</i>																	
Capital Cost	11.900																
debt service			2.023	1.963	2.247	3.084	2.946	2.254	2.161	2.068	1.975	1.883	1.596	1.174	1.108	1.041	0.975
operating deficit			0.527	0.506	0.470	0.442	0.409	0.372	0.330	0.284	0.237	0.186	0.129	0.065	-0.003	-0.049	-0.100
Total Annual Cost	11.900	0.000	2.550	2.469	2.717	3.526	3.355	2.625	2.491	2.353	2.212	2.069	1.724	1.239	1.105	0.992	0.875
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-11.900	0.000	-2.209	-2.131	-2.387	-3.202	-3.038	-2.317	-2.190	-2.062	-1.930	-1.799	-1.467	-0.995	-0.871	-0.755	-0.634
Cumulative net cost	-11.900	-11.900	-14.109	-16.241	-18.627	-21.830	-24.868	-27.185	-29.376	-31.438	-33.368	-35.167	-36.634	-37.629	-38.500	-39.256	-39.890
<i>1b - Project Finance</i>																	
Capital Cost	21.000																
debt service			0.620	0.620	0.964	1.552	1.498	1.443	1.389	1.335	1.280	1.226	1.172	0.773	0.729	0.685	0.642
subsidy			0.527	0.506	0.470	0.442	0.409	0.372	0.330	0.284	0.237	0.186	0.129	0.065	-0.003	-0.049	-0.100
Total Annual Cost	21.000		1.146	1.126	1.434	1.994	1.906	1.815	1.719	1.619	1.517	1.412	1.300	0.838	0.726	0.636	0.542
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-21.000		-0.806	-0.788	-1.105	-1.670	-1.590	-1.507	-1.418	-1.329	-1.235	-1.142	-1.043	-0.594	-0.492	-0.399	-0.301
Cumulative net cost	-21.000	-21.000	-21.806	-22.594	-23.698	-25.369	-26.958	-28.465	-29.883	-31.212	-32.448	-33.590	-34.633	-35.227	-35.719	-36.118	-36.419
<i>1c - Soft Loan</i>																	
Capital Cost	5.000	10.000															
debt service			0.450	0.450	2.067	2.017	1.967	1.917	1.867	1.817	1.767	1.717	1.667				
subsidy			0.527	0.506	0.470	0.442	0.409	0.372	0.330	0.284	0.237	0.186	0.129	0.065	-0.003	-0.049	-0.100
Total Annual Cost	5.000	10.000	0.977	0.956	2.536	2.459	2.375	2.288	2.197	2.101	2.003	1.903	1.795	0.065	-0.003	-0.049	-0.100
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-5.000	-10.000	-0.636	-0.619	-2.207	-2.135	-2.059	-1.980	-1.896	-1.811	-1.722	-1.633	-1.538	0.179	0.237	0.286	0.341
Cumulative net cost	-5.000	-15.000	-15.636	-16.255	-18.461	-20.596	-22.655	-24.636	-26.531	-28.342	-30.064	-31.697	-33.234	-33.056	-32.819	-32.533	-32.192
<i>2 - BOT</i>																	
Capital Cost	17.800																
debt service			0.701	0.701	1.046	1.727	1.666	1.604	1.543	1.482	1.421	1.360	1.299	0.893	0.843	0.792	0.742
subsidy			0.527	0.506	0.470	0.442	0.409	0.372	0.330	0.284	0.237	0.186	0.129	0.065	-0.003	-0.049	-0.100
Total Annual Cost	17.800		1.228	1.207	1.516	2.169	2.074	1.976	1.873	1.767	1.658	1.546	1.428	0.958	0.840	0.743	0.642
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-17.800	0.000	-0.887	-0.870	-1.186	-1.845	-1.758	-1.668	-1.573	-1.476	-1.376	-1.276	-1.170	-0.714	-0.606	-0.506	-0.401
Cumulative net cost	-17.800	-17.800	-18.687	-19.557	-20.743	-22.588	-24.346	-26.014	-27.587	-29.063	-30.439	-31.715	-32.885	-33.600	-34.206	-34.712	-35.112
<i>3 - PPP</i>																	
Capital Cost	5.000	5.000															
PPP costs	0.500																
Subsidy			1.657	1.779	1.921	2.051	2.187	1.874	2.004	2.137	2.289	2.432	1.297	1.381	1.475	1.560	1.650
Total Annual Cost	5.500	5.000	1.657	1.779	1.921	2.051	2.187	1.874	2.004	2.137	2.289	2.432	1.297	1.381	1.475	1.560	1.650
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-5.500	-5.000	-1.316	-1.442	-1.591	-1.728	-1.870	-1.566	-1.703	-1.847	-2.007	-2.162	-1.040	-1.137	-1.241	-1.323	-1.408
Cumulative net cost	-5.500	-10.500	-11.816	-13.258	-14.849	-16.577	-18.447	-20.013	-21.716	-23.563	-25.570	-27.732	-28.772	-29.909	-31.149	-32.472	-33.881

Financing Options 1 and 2

The ability of the project to gain commercial funding for Technical Options 1 and 2 is limited by the expected revenue in the early years. Table 7.15 assumes that borrowing is sought from a local source and the Bank of Nova Scotia. The former would provide a 10-year period to pay-back the loan with no grace period while the redemption of the latter loan is over 5 years. Interest is set at 7.5% per annum for both.

Owing to the fact that income from the runway extension will rise gradually, the most the project will be able to borrow under these circumstances is US\$5 million, equally split between the two lenders. This applies to both options. The resulting cashflows are given in Table 7.15. The cost of both options peak in 2012, at US\$15 million for Option 1 and US\$21 million for Option 2.

Table 7.15: Cost to Government of Technical Options 1 and 2 (US\$ millions, current prices)

Options	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
-																	
<i>OptiDft 1</i>																	
Capital Cost	8.100																I
debt service			1.069	1.013	0.956	0.900	0.844	0.325	0.306	0.288	0.269	0.250	0.000	0.000	0.000	0.000	0.000
operating deficit			0.527	0.506	0.470	0.442	0.409	0.372	0.330	0.284	0.237	0.186	0.129	0.065	-0.003	-0.049	-0.100
Total Annual Cost	8.100		1.595	1.519	1.426	1.342	1.252	0.697	0.636	0.572	0.505	0.436	0.129	0.065	-0.003	-0.049	-0.100
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-8.100		-1.255	-1.181	-1.096	-1.018	-0.936	-0.389	-0.335	-0.282	-0.224	-0.166	0.129	0.179	0.237	0.286	0.341
Cumulative net cost	-8.100	-8.100	-9.355	-10.536	-11.632	-12.651	-13.586	-13.975	-14.311	-14.592	-14.816	-14.982	-14.853	-14.675	-14.438	-14.152	-13.811
<i>OptiDft 2</i>																	
Capital Cost	14.300																
debt service			1.069	1.013	0.956	0.900	0.844	0.325	0.306	0.288	0.269	0.250	0.000	0.000	0.000	0.000	0.000
operating deficit			0.527	0.506	0.470	0.442	0.409	0.372	0.330	0.284	0.237	0.186	0.129	0.065	-0.003	-0.049	-0.100
Total Annual Cost	14.300		1.595	1.519	1.426	1.342	1.252	0.697	0.636	0.572	0.505	0.436	0.129	0.065	-0.003	-0.049	-0.100
Less "do nothing cost" subsidy			-0.341	-0.338	-0.330	-0.323	-0.317	-0.308	-0.301	-0.290	-0.282	-0.270	-0.257	-0.244	-0.234	-0.237	-0.242
Net Cost	-14.300		-1.255	-1.181	-1.096	-1.018	-0.936	-0.389	-0.335	-0.282	-0.224	-0.166	0.129	0.179	0.237	0.286	0.341
Cumulative net cost	-14.300	-14.300	-15.555	-16.736	-17.832	-18.851	-19.786	-20.175	-20.511	-20.792	-21.016	-21.182	-21.053	-20.875	-20.638	-20.352	-20.011

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

It is concluded that:

Finance. The higher cost options could not be financed without a package of soft loans and grants as well as considerable investment by the Government of Anguilla. The principle problem is that the current and forecast traffic revenues are too low. These are unlikely to generate enough funds to support both the debt servicing and the airport operating costs until post 2018.

Resettlement Costs. The minimum resettlement and land acquisition costs are estimated to be £2.36m. The costs for the maximum development option would be £3.76m. This is largely attributable to the extra land take required for safeguarding.

Legal and Institutional Issues. No significant legal or institutional issues have been identified for the implementation of this project. It is anticipated that all the relevant procedures have been adequately covered under the Land Acquisition Ordinance Cap 273, 1959.

Tourism. The optional developments are consistent with the currently stated tourism policy, and should have a net positive impact on the future development of tourism on Anguilla.

Environmental. There are no likely significant impacts that cannot be mitigated successfully by careful design.

Archaeological. There will be a relatively minor impact on the Forest North archaeological site. In the case of maximum development, it will be necessary to close Airport Cave.

Aircraft Operations. The minimum cost option allows operations of the A TR 72 at the eastern end of the runway. However, on the few occasions where take offs are to the west, the A TR 72 will, depending on the weather of the day, suffer a weight penalty equal to approximately 36 passengers.

Project Costs. The total project costs are estimated to be minimally £7.15m with the maximum recommended proposal estimated at £28.26m.

Project Feasibility. The maximum option provides the best solution for the long term development of air traffic and hence tourism in Anguilla. However the current and medium term forecast traffic is unlikely to be able to support anything other than the minimum cost option.

8.2 Recommendations

It is recommended that:

- a. The development of Wallblake Airport is undertaken on a phased basis.

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- b. The minimum cost option, as designed, is considered as the first phase and undertaken as soon as is practicable.
- c. Land should be reserved against the requirement for the future development of the airport and, where practical, purchased on a gradual basis.

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APPENDIX A
TERMS OF REFERENCE

Section 3

TERMS OF REFERENCE FOR AN OPTIONS and FUNDING STUDY

I. Background Information

1.1 Wallblake Airport is the only airfield serving the island of Anguilla. It has a paved runway 1,097 metres long and 30.5 metres wide with terminal approach via taxiways and apron. The western runway threshold is displaced by 183 metres. The airport has a terminal building and control tower which were built in 1988, limited firefighting equipment, airport approach aids, navigational *aids* and night landing facilities.

1.2 The airport serves regular routes to and from a number of Caribbean destinations. All passengers travelling to Anguilla from outside the Caribbean must connect at international airports on nearby islands. Many passengers from North America transfer at San Juan - Puerto Rico and others at St Maarten.

1.3 Currently, American Eagle operates the 44 seater ATR 42 from San Juan. Using the existing runway in dry weather the plane operates with a 4 seat payload penalty, and in wet conditions its payload is reduced to only 28 passengers. The Company's long term plan is to phase out these aircraft in its Caribbean operations. Its plans in this regard are well advanced with only very few destinations remaining to which the aircraft is operated, Anguilla being one of them. Executives of the Company have informed the Anguilla Government that all ATR 42's will be phased out within the next two to six years.

1.4 American Eagle is replacing its ATR 42's with the larger 66 seat ATR 72. This aircraft requires a significantly longer runway than the present Wallblake Airport runway. It requires a runway length of 1,402 metres on runway 10 for take off towards the east with a full payload provided there are no obstacles in the clearance surfaces. 2073 metres on runway 28 for take off towards the west would be required taking account of the obstacles at the western end of the runway.

1.5 The Government of Anguilla (GgA) has been considering the construction of a new airport at Brimigin on the north side of the island since the early eighties. Several studies have been undertaken since then on both the feasibility of building a new airport or extending the runway and improving the facilities at Wallblake.

1.6 In October 1999 HMG commissioned a comparative airport study for Anguilla. The study undertook the following tasks:

- (a) A review of all existing data and reports on options for Anguilla's airport development and updated the technical, financial and economic data contained in them
- (b) An investigation of the extent to which the existing airport facilities imposed a constraint on tourism, air cargo and other national development objectives
- (c) An assessment of realistic projections for future passenger and cargo traffic flows for (the next five years) and whether existing facilities were likely to impose any

CO ns t rai n ts

(d) An appraisal of the two airport development strategies in relation to projected increase in demand, economic cost, safety, pollution and compatibility with national planning objectives and made recommendations for the future development.

1.7 The study concluded, inter alia, that the island of Anguilla would require a longer runway to meet its future requirements and that the *only* economic and feasible solution would be to extend and expand the facilities at Wallblake.

1.8 The GoA have reviewed the comparative airport study conclusions and determined that the existing airport at Wallblake should be expanded to meet the future requirements of Anguilla. The design aircraft for determining the extent of runway expansion should be the A TR 72. Other facilities to support this 66 seat aircraft will need to be determined and consideration will need to be given to operational and safety requirements as part of this development scheme. The development should be achieved at minimal cost.

2. ReQuirements of the Consultancy

2.1 A consultancy is now required to produce various *options* for the extension of the airport runway and expansion of terminal and other essential facilities for the Government of Anguilla to consider along with options for funding such work. This *work* should build upon the work carried out in the comparative Study. The consultant's terms of reference for this are as follows:

- (i) Review all existing data and literature on options for Anguilla's Wallblake airport development, and form a matrix of options commencing with the minimum safe option for lengthening the runway at the eastern end, regarding/reprofiling to the west, plus any variance on the length of runway extension. The review should include any associated work that this extension may involve.
- (ii) Include in the matrix sub sections for preferences of ICAO and UKCAA, GoA on required facilities (terminal extension, apron extension, taxiway extension, update to lighting, fire services, navigation aids, and produce a reasonably accurate cost estimate for each option and addition, setting out the legal requirements or institutional recommendation for each option. When: appropriate, all costs estimates should include ongoing recurrent costs implications as well as initial capital costs.
- (iii) Identification of the effect of each option on the wider tourism strategy, environmental and archaeological impact and any resettlement issues involved.

3. Methodology

3.1 A consultancy is now required to advise on the detail of a minimum cost development programme for Wallblake Airport and suggest methods of funding this development. The previous comparative airport study is to be reviewed and the operational requirements and constructional costs are to be refined. The design of the runway extensions is to be refined as necessary, with greater detail, to give more robust costings.

3.2 Associated with this longer runway the surrounding infrastructure is also to be reviewed in terms of capacities and safety requirements. This includes taxiway, apron, terminals and equipment, vehicle parking and road diversion.

3.3 The need and costs of providing aviation fuel at the airport are to be established together with the means of its transportation. The analysis should include an examination of the feasibility of establishing refuelling facilities immediately well ahead of the commencement of construction of the runway extension project.

3.4 Safety requirements are to be measured against international standards and recommendations made concerning both the administrative and operational imperatives.

3.5 Both social and environmental/archaeological impact assessments of the proposed development will need to be carried out focusing the work already completed in the Comparative Study.

3.6 In this context resettlement issues will be reported upon together with environmental and archaeological factors

3.7 In the context of the safety assessment the need for and the cost of navigational aids, sited on or near the airport will be reviewed and adequacy of the existing airfield ground lighting will be assessed.

3.8 The increase in the demand for electricity as a result of the airport extension and development project should be assessed and the resulting need for additional standby electricity power should be examined.

3.9 The Consultants shall evaluate appropriate forms of financing and sources of funding. This shall include consideration of the availability of institutional funding from regional or international development agencies and banks as well as considering the potential for participation by private investors and likely levels of interest in the project. Estimates of total debt service should be provided for each funding package, including feasible variations in the timing and terms of repayment. The Consultants shall advise on appropriate options for procurement that may include but not be limited to 'Design and Build' and 'Build-Operate-Transfer' schemes commenting on relative costs feasibility and scope for risk transfer and shall make a clear recommendation regarding the preferred option. The Consultants shall also outline the key stages of procurement for each option, providing a detailed description and schedule for the recommended approach. The analysis of all funding options which provide a firm financial plan should include full estimates of any

costs which are likely to fall to GoA as part of the overall funding package.

3.10 The consultant will assist the GoA in determining the optimum course of development both in terms of constructional phasing and finance acquisition.

3.11 Fire, crash and rescue equipment and organisation will be reviewed and recommendations made.

3.12 Cost estimates for items listed above should include any recurrent cost implications, in line with 2.1 (ii) above.

4. Duration of Consultancy

4.1 It is proposed that the overall duration of the consultancy will be nine weeks commencing on the 3 January 2001. Visits to Anguilla are anticipated to be required for the review of the physical development options and for re-examination of the cost estimates as well as for the social impact re-assessment and the presentation to GoA of the options, construction phasing and funding possibilities that will be required in the final stages of the consultancy.

5. Reporting

5.1 The consultant will be required to produce the following reports:

(a) A draft final report following the revaluation and costing exercise and also the funding options referred to in section 2 and 3 above, in 3 copies to the GoA and 3 copies to DFID. The draft final report should be produced within 3 weeks of the end of the study.

(b) A final report which will include comments from GoA and DFID subsequent to the end of study discussions in Anguilla with the GoA.

6. Locally Provided Support Facilities

6.1 The Ministry of Finance and Economic Development and the Ministry of Infrastructure, Communications and Utilities (MICU) will be jointly responsible for liaison with the consultant. The first point of contact for formal communication between the consultant and GoA will be the Project Manager appointed by the Government.

6.2 The Project Manager will ensure the provision of all documents, data, reports, statistics, information and maps at the disposal of the Government which the consultant may require for the purposes of the technical assistance: The majority of all this data base is already available in the form of the comparative study report and supporting documents.

6.3 As much notice as possible should be given by the consultant to the Project Manager

when making arrangements to use the above services and *facilities*.

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APPENDIX B

BASIS OF DESIGN AND COSTINGS

APPENDIX B: BASIS OF DESIGN AND COSTINGS

RUNWAY DESIGN

Requirement

The primary objective of the project is the enhancement of Wallblake Airport such that ATR 72s can be operated from it. To this end, the runway pavement must be of sufficient strength to support these aircraft and the runway alignment must be suitable.

The airport must comply with the requirements of the UK Civil Aviation Authority (CAA). To this end, all components of the airfield must comply with the CAA produced document titled 'CAP 168: Licensing of Aerodromes' (CAP 168). This document provides design criteria covering gradients, obstructions, taxiway widths, runway widths, runway strip widths, safety distances etc. The majority of the criteria specified are dependant on the 'Aerodrome Reference Code' (ARC) and this, in turn, is based primarily on the runway length, maximum size aircraft wing span and maximum size aircraft main gear wheel span

Pavement design

The pavement has been designed using the LEDF AA software design package. A range of sub grade support conditions were assumed and, following assessment of the trial pit logs, a conservative sub grade CBR of 6% was selected. A flexible pavement type, similar to the existing runway, was selected. The BAe 146 aircraft has similar characteristics to the A TR 72, and was used as the design aircraft. The pavement was designed to accommodate four BAe 146 aircraft every day for a 30 year period. An unbound base course was selected, to better utilise available local materials.

The pavement construction produced is as follows:

Wearing course:	125mm
Base course: CABC:	100mm
Total construction:	350mm
	575mm

The proposed pavement construction design was checked using the process described in 'A guide to airfield pavement design and evaluation' produced by the Property Services Agency. This confirmed the suitability of the pavement cross section.

Runway Strip

It is a requirement of CAP 168 that all runways are surrounded by a graded area known as a runway strip. The width of this strip is dependant on the ARC.

The extensions have been designed as ARC 2C and 3C visual approach runways in accordance with CAP 168 (Table 3.1). Consequently, runway strips extending 40m and 75m respectively either side of the runway centre line and 60m beyond the thresholds must be provided (Section 4). At the ends of the starter strip, CAP 168

(Section 4.2.2) specifies that the runway strip must extend by a minimum of largest aircraft wing overhang plus 7.5m or 20% of wingspan, whichever is the greater. The ATR 72 has a wingspan of 27.05m and a wheel track of 4.1m. Runway strip extension beyond the starter strip must, therefore, be no less than $(27.05 - 4.1)/2 + 7.5 = 18.975\text{m}$. Similarly for BAe 146-300, extension must be no less than $(26.34 - 4.72)/2 + 7.5 = 18.310\text{m}$. Therefore, the extension should be set at 20.00m.

CONSTRUCTION COSTS

Source of costs

Estimated material unit costs were obtained from the following three sources:

- Estimates received from local suppliers in February 2001
- Actual costs used in British Virgin Islands in 2000
- Estimates of costs received from local suppliers in 1999.

The above costs were assessed and 'best-estimates' of likely costs were calculated. These costs are summarised below in Table B 1 :

Material	Unit	Price. £
Site clearance	mZ	0.80
Runway grooving	mZ	9.30
Wearing course	120mm x mZ	28.00
Base course	100mm x m2	18.00
Imported bulk fill	m3	15.00
Compact bulk fill	mJ	5.00
Imported CABC	mJ	25.00
Compact CABC	mJ	5.00
Cut to spoil	mJ	4.10

Table B1: Assumed material unit costs

Clearly, large variations in the above costs could potentially lead to considerable inaccuracies in the option cost estimates.

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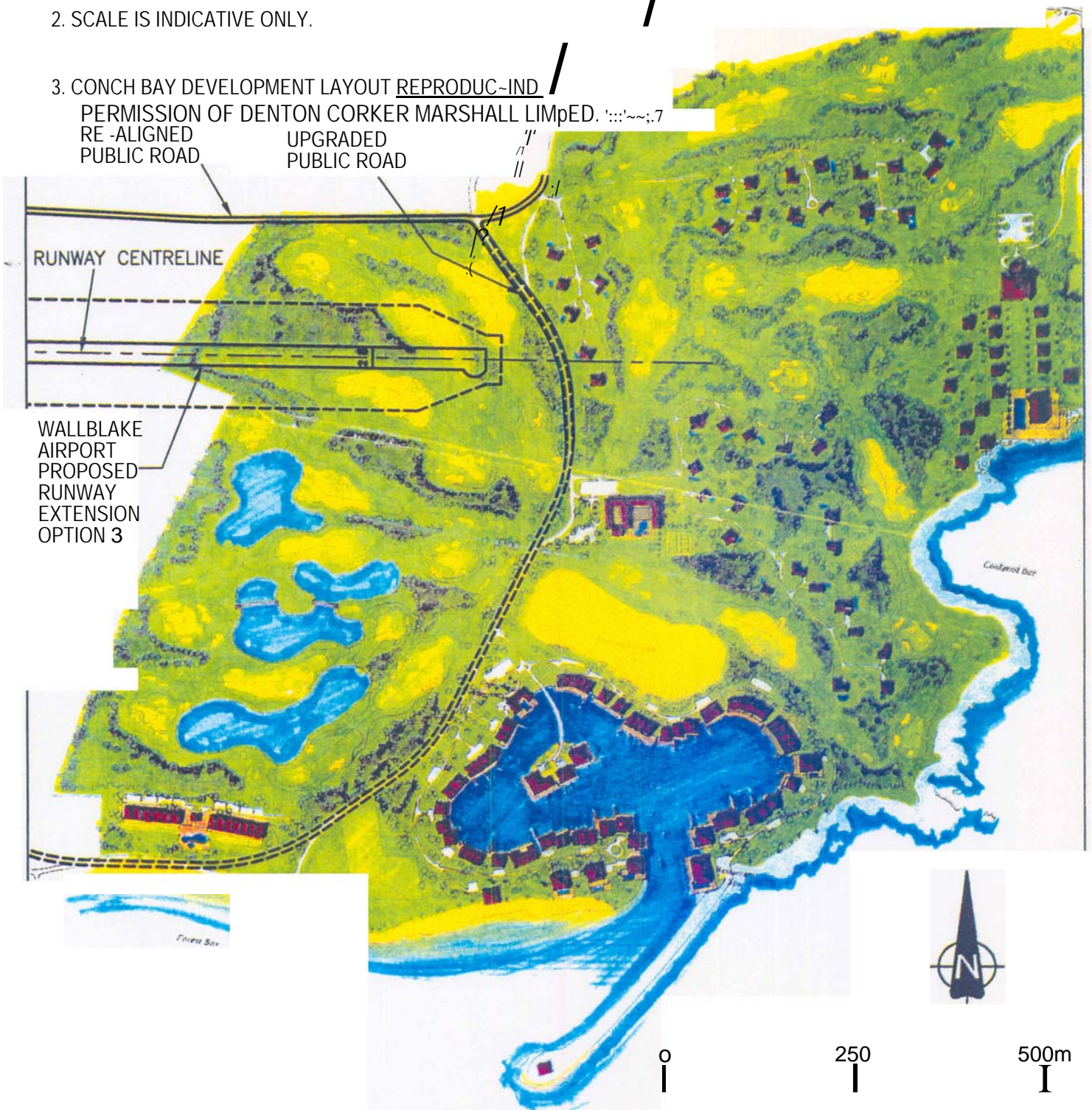
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APPENDIX C

DRAWINGS

NOTES /

- 1. PROPOSED PUBLIC ROAD ALIGNMENTS ARE INDICATIVE ONLY. /
- 2. SCALE IS INDICATIVE ONLY. /
- 3. CONCH BAY DEVELOPMENT LAYOUT REPRODUCED BY PERMISSION OF DENTON CORKER MARSHALL LIMITED. /



WS Atkins Consultants Limited
 Consulting Engineers,
 Woodcote Grove,
 Ashley Road, Epsom, Surrey, England, KT185BW

9) I Project
ANGUILLA AIRPORT STUDY

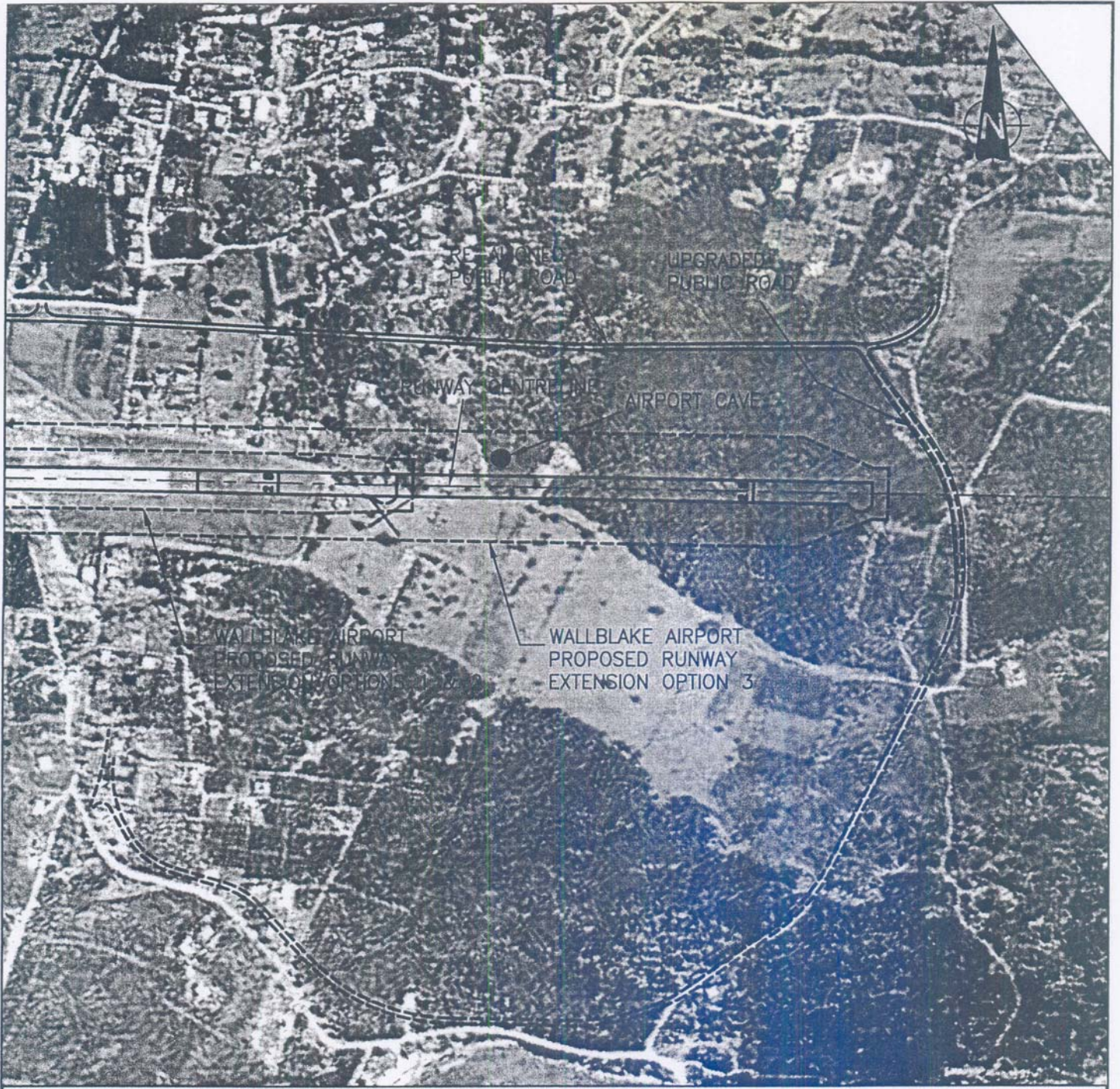
Fax (01372) 740055
 Tel. (01372) 728140

**IMPACT OF WALLBLAKE AIRPORT
 OPTION 3 ON CONCH BAY DEVELOPMENT**

INFORMATION		0			
Code	Purpose of issue	Rev	Date	Auth	Rev
FILENAME: J:\CK3660\OUT\007.DWG					

Description

By	Date	Chk	Review	Auth	Date	SH	Date	SH	Date	SH	Date
							03.04.01		03.04.01		20 Apr 01
Scale					Drawing Number						
1:7500					CK3660/09.01/007						



NOTES

- 1. PROPOSED PUBLIC ROAD ALIGNMENTS ARE INDICATIVE ONLY.
- 2. SCALE IS INDICATIVE ONLY.



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 Woodcote Grove,
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@ Project

ANGUILLA AIRPORT STUDY

**WALLBLAKE AIRPORT
 ARCHAEOLOGICAL SURVEY**

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Date	03.04.01	Date	03.04.01	Date	20 Apr 01	Date

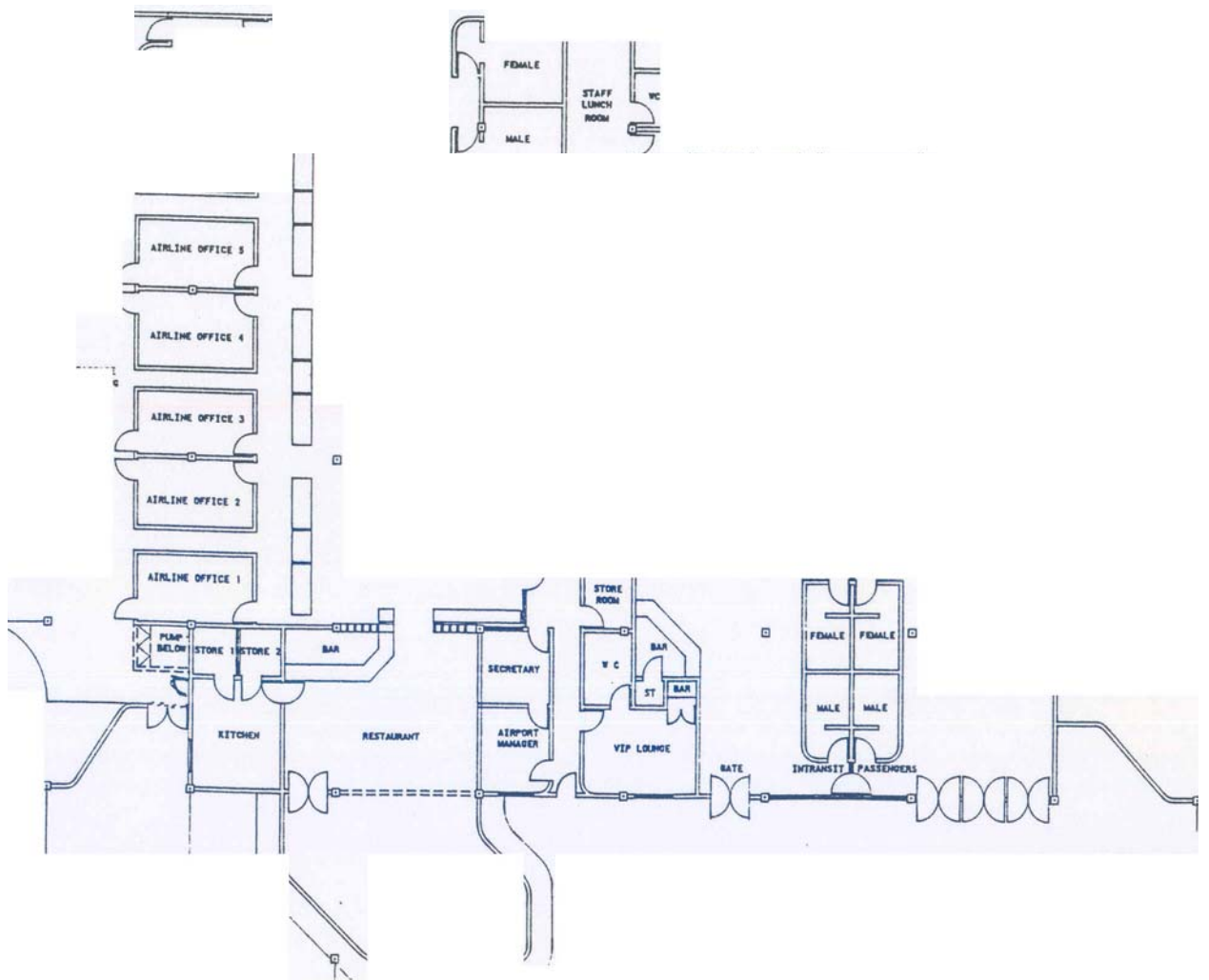
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Extension to Wallblake Airport Runway
Options and Funding Study Anguilla

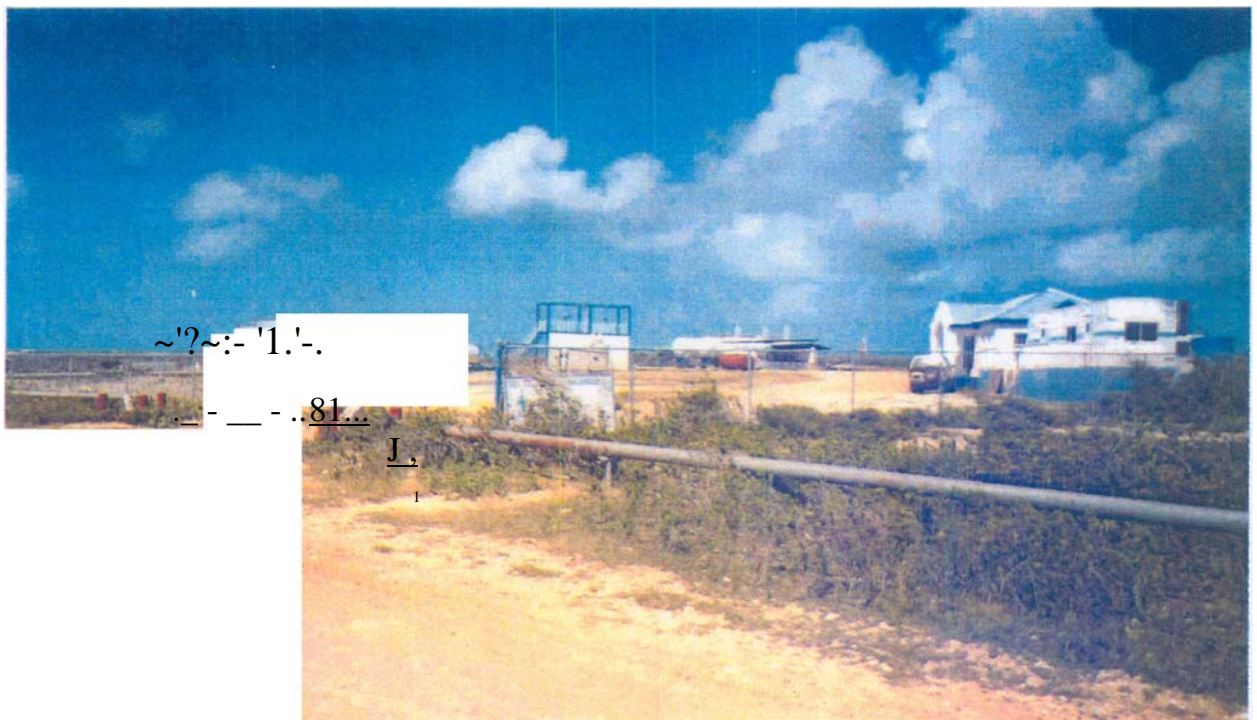
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APPENDIX D

PHOTOGRAPHS



Photograph 1: Oil off-loading area



Photograph 2: Delta Petroleum Anguilla Ltd fuel compound and Shell fuel pipeline

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Photograph 3: Power Station fuel pipeline and ShellIDelta access road



Photograph 4: Existing Terminal Building



Photograph 5: Terminal check-in desks



Photograph 6: Baggage handling area

-EXIT



Photograph 7: Departure lounge viewed from south end



Photograph 8: Departure lounge viewed from north end



Photograph 9: Departure Tax and Immigration control desk



Photograph 10: Immigration Control, arrivals area

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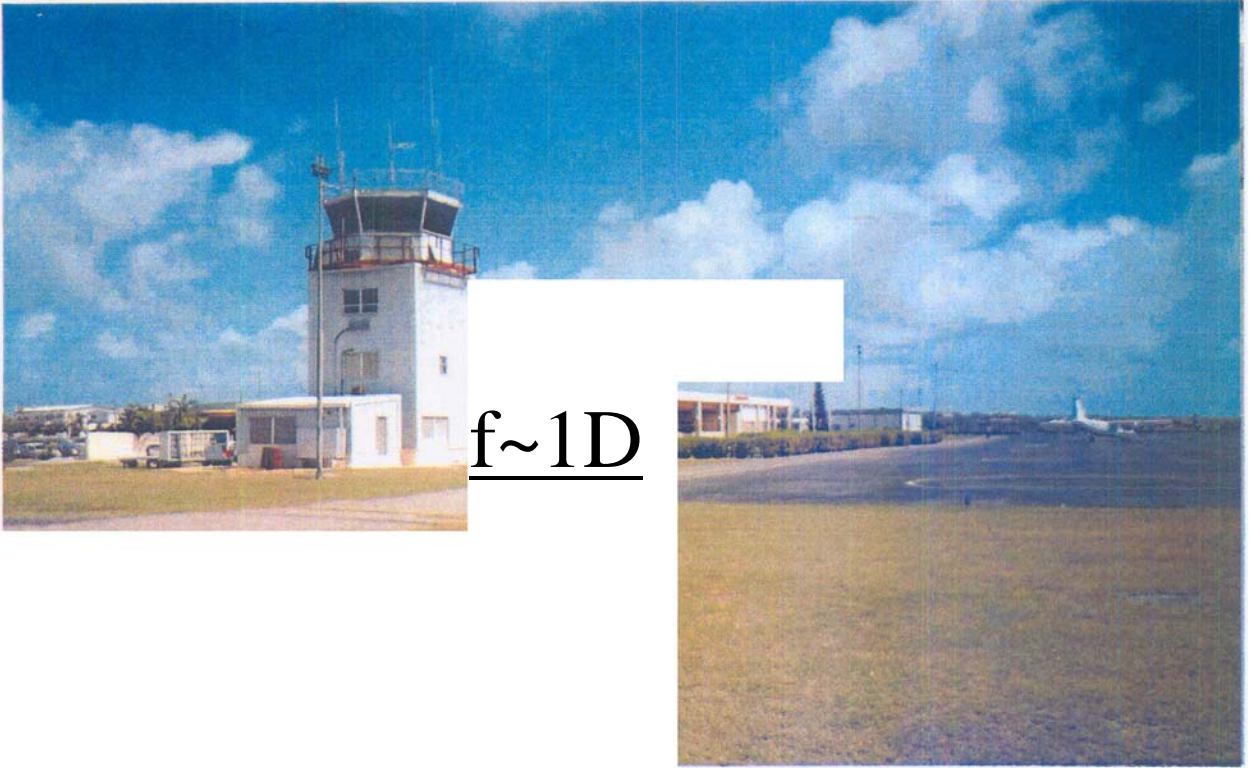
Photograph 11: Arrivals baggage unloading area



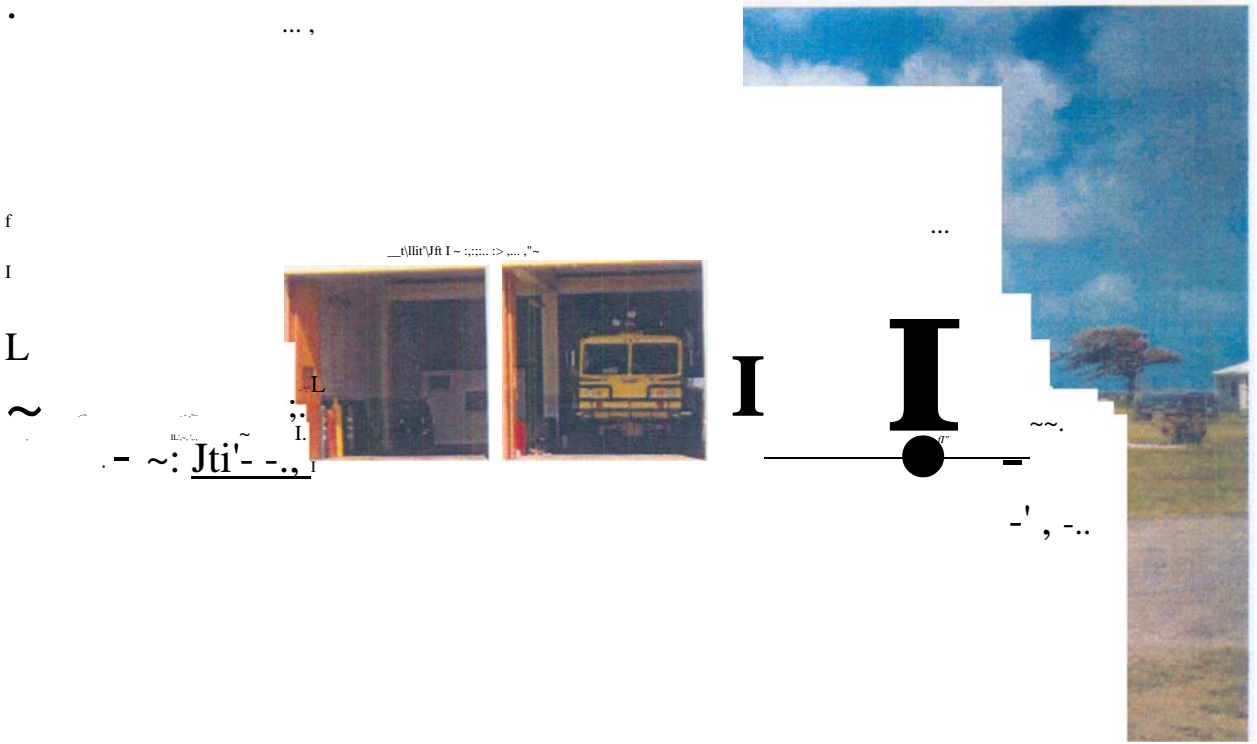
Photograph 12: Arrivals baggage reclaim area and Customs Control Area



Photograph 13: Existing Apron



Photograph 14: Air Traffic Control Tower



Photograph 15: Airport Rescue and Fire Fighting Facility



-Photograph 16: Airport Maintenance Facility

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APPENDIX E
CAP 168 REFERENCES

Table 8.2 Minimum Usable Amounts of Extinguishing Agents

Aerodrome Category	Foam meeting performance Level A			Foam meeting performance Level B			Complementary Agents (kg/t)	
	Water (litres)	Foam Concentrate (litres) *	Discharge Rate Foam solution (litres/minute)	Water (litres)	Foam Concentrate (litres) * ,	Discharge Rate Foam solution (litres/minute)	Dry Powder or Halogenated hydrocarbon	or CO2
Special	See Appendix 8H							
1								
2								
3	Required to use foam meeting level B			1 200	72*	900	135	270
4	3600	216*	2600	2400	144*	1800	135	270
5	8100	486*	4500	5400	324*	3000	180	360
6	11800	708*	6000	7900	474*	4000	225	450
7	18200	1 092*	7900	12 100	726*	5300	225	450
8	27 300	1638*	10800	18200	1092*	7200	450	900
9	36 400	2 184*	13 500	24 300	1 458*	9000	450	900
Notes to table 8.2:	48 200	2892*	16600	32 300	1 938*	11200	450	900

These quantities are based on the use of foam concentrates designed for use at 6% solution strength. licensees are advised of the availability of foam concentrates which may be used at other solution strengths. For example, 3% concentrates are 'stronger' than 6% concentrates. In certain instances operational advantages may be offered by using 3% concentrates.

t The complementary agent may be selected according to the requirements of paragraph 8.1.

Other than at Category Special, 1, 2, and 3 aerodromes, where hand line branch pipes and nozzles alone may be used, the discharge rates for foam shall be met using only the RFF vehicle monitors.

A 200% reserve supply of foam concentrate, and a 100% reserve supply of complementary agents shall be maintained at the aerodrome for prompt replenishment of vehicles/equipment. Where a major delay in the replenishment of exhausted extinguishing agents is anticipated, the quantity of reserve supplies should be increased.

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APPENDIX F

LAND ACQUISITION ISSUES

AIRPORT IMPROVEMENT PROJECT

PARCELS AFFECTED Proprietor	North of Runway		Sq.ft. Of	House Assessment Value US\$	Replacement House Value US\$	Land US\$	Total Value	Development Option 3	Development Value for Option 3								
	Block & Parcel	Approx. Area Option ilacre								House							
											Option ilacre	House	House Value	Land	Total	Development	Development
											Value	Value	Value	Value for Option 3	Value for Option 3		
Bernice Lake	78913B 100 (Part of)	4	3,601	\$ 254,000.00	\$ 234,065.00	\$ 160,000.00	\$ 648,065.00	9.82	\$ 392,800.00								
Guilford Gumbs	78913B 89 (Part of)	3.37			\$	\$ 14,800.00	\$ 14,800.00										
Frances T. Gumbs	78913B 88)	0.33			\$	\$ 13,200.00	\$ 13,200.00										
leopold Woods	78913B 86	0.40			\$	\$ 16,000.00	\$ 16,000.00										
Cyril N. Harris	78913B 85 (part 01)	0.50			\$	\$ 20,000.00	\$ 20,000.00										
Christopher I Gumbs Crown	78913B84 78913B 116)	0.90 0.37				\$ 36,000.00 N/A	\$ 36,000.00										
Joseph Allen Gumbs	78913B (part of)	0.19			\$	\$ 7,600.00	\$ 7,600.00										
Poland M. Arrindell	78913B 90	0.20	1,236	\$ 56,000.00	\$ 80,340.00	\$ 8,000.00	\$ 144,340.00										
Jacob I. Richardson	78913B 91	0.40			\$	\$ 16,000.00	\$ 16,000.00										
Walkins Hodge	78913B 83	1.00			\$	\$ 40,000.00	\$ 40,000.00										
James lewis lake	78913B 199	0.50			\$	\$ 20,000.00	\$ 20,000.00										
Carmen Violellake	78913B 198	0.70		\$ 60,000.00	\$	\$ 28,000.00	\$ 88,000.00										
Mena Elvina lake	78913B 81	0.90			\$	\$ 36,000.00	\$ 36,000.00										
Violet Richardson	78913B82		671	\$ 14,000.00	\$ 43,615.00	\$	\$ 57,615.00										
James B. Gumbs	78913882		1,147	\$ 50,000.00	\$ 74,555.00	\$	\$ 124,555.00										
James E Gumbs'	78913B82	1.25		\$ 53,500.00	\$	\$ 50,000.00	\$ 103,500.00										
Jasmine W. Smith	78913B 213)	0.25	1,006	\$ 33,800.00	\$ 65,390.00	\$ 10,000.00	\$ 109,190.00										
Joyce M. Gumbs	78913B 216	0.80			\$	\$ 32,000.00	\$ 32,000.00										
Christopher I Gumbs	78913B 108)	1.74			\$	\$ 69,600.00	\$ 69,600.00										
Yvehe Proctor	78913B 138	1.00	945	\$ 24,000.00	\$ 61,425.00	\$ 40,000.00	\$ 125,425.00										
Gwendolyn Gumbs				\$ 2,000.00		\$	\$ 2,000.00										
Beryl Proctor				\$ 27,000.00		\$	\$ 27,000.00										
Vesla F Gumbs	78913B 137	0.25	841	\$ 54,000.00	\$ 54,665.00	\$ 10,000.00	\$ 118,665.00										
James E. Gumbs	78813B 41	0.40	735	\$ 36,000.00	\$ 47,775.00	\$ 16,000.00	\$ 99,775.00										
James E. Gumbs			855	\$ 25,000.00	\$ 55,575.00	\$	\$ 80,575.00										
Carlos E. Gumbs	78813B 60 (part of)	0.09			\$	\$ 3,600.00	\$ 3,600.00										
Chrislopher I Gumbs	78813B 65 (part of)	0.38	930	\$ 51,000.00	\$ 60,450.00	\$ 15,200.00	\$ 126,650.00										
Calvin W. ake	78813B 38 (part of)	0.20	1,736	\$ 58,700.00	\$ 112,840.00	\$ 8,000.00	\$ 179,540.00										
Ruth Janel Alias	38713B 71	0.10			\$	\$ 4,000.00	\$ 4,000.00										
Alston R Gumbs	38713B 23 (part of)	0.09			\$	\$ 3,600.00	\$ 3,600.00										
Roderick A N Gumbs	38713B 24 (part 01)	0.20			\$	\$ 8,000.00	\$ 8,000.00										
Heather V James	38713B 25 (part of)	0.17			\$	\$ 6,800.00	\$ 6,800.00										
Hilda lake	38713B 88 (part of)	0.27			\$	\$ 10,800.00	\$ 10,800.00										
Giles Faulkner	38713B 27 (part of)	0.30			\$	\$ 12,000.00	\$ 12,000.00										
Franklyn R Richardson	38713B 28	0.30		\$ 10,000.00	\$	\$ 12,000.00	\$ 22,000.00										
Albert A R lake	38713B 98	0.90	532	\$	\$ 34,580.00	\$ 36,000.00	\$ 70,580.00										
Mole.s																	
House Assessment Value refers to a total capital value		2.45		\$ 809,000.00	\$ 925,275.00	\$ 763,200.00	\$ 2,497,475.00	9.82	\$ 1,965,000.00								

AIRPORT IMPROVEMENT PROJECT

PARCELS AFFECTED	South 01 runway (75 01 from center line)										
Proprietor	Block & Parcel	Approx. Area	Total Area	Sqft. of	House	Replacement	Arteced	PARCEL	Total	Total	\$ 50,000.00 Value per acre
		Arteced		Building	Assessment Value	House Value	land Value	Value	Value A	Value B	
					US	US	US	US			
F rands Gumbs	78813B 51		0.6	1634 S	54,888.06 S	106,210.00		S 30,000.00	S 54,888.06	S 84,888.06	
Clara Gumbs	38813B 2		0.2					S 10,000.00	S 10,000.00	S 10,000.00	
Conrad Bradley	3881383 (pari of)	0.15	0.4	854 S	28,700.00 \$	55,510.00 \$	7,500.00 \$	20,000.00 \$	36,200.00 \$	48,700.00 \$	
Keith Brooks	38813B 4 (pari of)	0.15	0.80	1152.00 \$	38,700.00 \$	74,880.00 \$	7,500.00 \$	40,000.00 \$	46,200.00 \$	78,700.00 \$	
William H Rogers	3881385 (pari 01)	0.22	1.00	280.00 S	9,400.00 S	18,200.00 \$	11,000.00	S 50,000.00	S 20,400.00	S 59,400.00	
Clara Gumbs	38813B 6 (pari 01)	0.23	0.80				11,500.00	S 40,000.00	S 11,500.00	S 40,000.00	
Iena Lloyd Choisil	3881387 (pari 01)	0.10	0.80				S 5,000.00	S 40,000.00	S 5,000.00	S 40,000.00	
Shiey B. Maynard	38813B 91 (pari of)	0.25	2.25	2050.00 \$	68,800.00 S	133,250.00 \$	12,500.00	S 112,500.00	S 81,300.00	S 181,300.00	
Phyllis C. Richardson	38813B 92 (pari 00)	0.36	2.18	2112.00 S	70,900.00 S	137,280.00 \$	18,000.00	S 109,000.00	S 88,900.00	S 179,900.00	
Robin Hicklin Richardson	387138 49(parl 01)	0.08	0.3				S 4,000.00	S 15,000.00	S 4,000.00	S 15,000.00	
Elihu Richardson (per rep)	38713B 51 (pari 01)	0.39	0.45				S 19,500.00	S 22,500.00	S 19,500.00	S 22,500.00	
Hilda lake	38713B 59 (pari 01)	0.22	0.6				S 11,000.00	S 30,000.00	S 11,000.00	S 30,000.00	
Giles Faulkner	38713B 61 (pari of)	0.24	0.6				S 12,000.00	S 30,000.00	S 12,000.00	S 30,000.00	
John Calvin Hodge	38713B 62 (pari 01)	0.26	0.7				S 13,000.00	S 35,000.00	S 13,000.00	S 35,000.00	
Rulh Janel Alias	387138 50 (pari of)	0.09	0.3				S 4,500.00	S 15,000.00	S 4,500.00	S 15,000.00	
Notes 1) House Assessment Value refers to a notional capital value 2) Arteced land Value refers only to the portion of land directly affected by the airport expansion 3) Total Value A IS the total when the House Assessment Value & the Arteced Land Value are added 4) Total Value B IS the total when the House Assessment Value & Parcel Value are added											
TOTAL		2.74	11.38	S	139,700.00 S	525,330.00	137,000.00 \$	569,000.00 S	353,500.00 S	785,500.00 S	

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GOVERNMENT OF ANGUILLA / DFID

EXTENSION TO W ALLBLAKE AIRPORT RUNWAY

OPTIONS AND FUNDING STUDY: ANGUILLA

CONTRACT NUMBER: CNTR 00 1995

AMENDMENTS TO DRAFT

FINAL REPORT

JUNE 2001

1.0 INTRODUCTION

The draft final report for this project was issued on 24 April 2001. The report was discussed on 03 May 2001 at a meeting between the Government Review Committee and Jamie Jamieson of WS Atkins International Ltd. During the meeting, WS Atkins offered to provide clarification of certain issues raised in the draft final report. This document seeks to provide this clarification.

2.0 CLARIFICATION

The following points are offered as clarification of the draft final report:

2.1 Wind data

Attachment A to this document contains proposed Sections 3.5 and 3.6 clarifying the issue of prevailing winds etc at Wallblake Airport.

2.2 Obstacles to the west of the airport

Attachment A contains proposed Section 3.7 clarifying the status of obstacles to the west of the airport.

2.3 Comparison with previous study

Attachment B contains proposed Section 4.2.7. This section compares the runway extension options proposed in the current report with those of the June 2000 study.

2.4 Land costs, resettlement, planning and legal issues

Attachment C contains a revised Section 6 titled Land Costs, Resettlement, Planning and Legal Issues. Additionally, it includes the revised Land and Building Acquisition Cost tables for Options 1. and 2 and Option 3. The original versions of these tables were contained within Appendix F of the draft [mal report.

2.5 Matrix of options

Table 4.3 of the draft final report indicates the costs associated with each of the proposed options. This table has been updated and is included in Attachment D.

2.6 Maximum development heights

Drawing CK3660/09.01101O is included in Attachment E. This drawing shows contour lines illustrating indicative maximum heights of development in the vicinity of the airport.

3.0 CONCLUSION

This document is offered for discussion in conjunction with the draft final report at the meeting to be held in Anguilla on Wednesday 06 June at 1400 hours. This meeting will be attended by representatives of the Government of Anguilla, the Department for International Development and WS Atkins International Ltd.

Extension to Wallblake Airport Runway
Options and Funding Study: Anguilla

DFID Contract No. 001995
Amd N° 1 to Draft Report

ATTACHMENT A

Insert after Section 3.4:

3.5 Wind Data

It is understood that the prevailing wind direction in Anguilla is such that take offs towards the west are infrequent. In this context, it should be pointed out that the aircraft performance calculations used in this section and in Section 4 are carried out assuming "no wind" conditions. Headwinds (ie those winds which have a component in the opposite direction to the aircrafts' take off run) improve payload carrying capability by offering reductions in take off distance requirements. In addition, aircraft are allowed to take off with tail wind components. This increases take off distance required, but can in some circumstance (such as at Anguilla, where westerly take offs are obstacle limited) provide better payload capability when accepting the tail wind condition taking off towards the east.

Aircraft can accept tail wind components of up to 10-15 knots, depending on individual flight manual instructions. Therefore, the number of occasions when westerly take offs are necessary at Anguilla will not be proportionate to the actual wind statistical data (for example, 5% westerly winds, 70% easterly winds, 25% light and variable), because for some of the westerly winds (with components of less than 10-15 knots down the runway), take offs towards the east will be permitted and may offer better payload capability.

Further, strong westerly winds exceeding 10-15 knots component, although necessitating take offs towards the west, will provide better payloads than the "no wind" case assumed in the aircraft performance calculations and used in the derivations of runway lengths.

3.6 Temperature

The temperature that has been used in the aircraft performance calculations is 32°C, being the accepted reference temperature for Wallblake Airport. Lower temperatures improve aircraft performance, and enable increases in payload to be utilised.

3.7 Obstacles

Wallblakes runway has a collection of obstacles located at the western end of the runway on the rising ground of George Hill. These comprise power lines, buildings and finally the terrain itself.

It would be possible to remove the power lines, which are the limiting obstacle for westerly take offs at the present time. This would provide an extra 400 pounds of take off weight for an A TR 72 on westerly take offs, equivalent to reducing the take off requirements by approximately 35m (100 feet). This would cost in the order of £50,000. Further obstacle relief on this runway would require the removal of buildings and terrain, which would be expensive.

The source of this information is American Eagles Flight Safety Department.

Extension to Wallblake Airport Runway
Options and Funding Study: Anguilla

DFID Contract No. 00 1995
Amd N° 1 to Draft Report

ATTACHMENT B

Insert after Section 4.2.6:

4.2.7 Previous Study Comparison

The previous study ('Comparative Airport Study: Anguilla' dated June 2000) suggested as one option an eastern extension to the runway of 450m plus a further paved area of 60m for the runway strip requirement, plus a paved length of 90m representing the necessary Runway End Safety Area (RESA), the latter two distances providing a "starter strip" for take offs towards the west. This would give a total runway length of $450\text{m} + 60\text{m} + 90\text{m} + 1097\text{m} = 1697$ metres.

This report proposes, as Option 3, an increase of 552m (as opposed to 450m), giving the maximum ARC 2 runway length of 1799m plus a starter strip of 150m. The additional paved runway extension of 102m (552m - 450m) would provide additional flexibility in aircraft handling, with increased payload capabilities at an increased cost in the order of £750,000.

It is considered that this additional runway length would be worth providing because of the extra flexibility it would provide for future operations. Incorporation of this extra length would be most cost effectively achieved, were it to be included in the initial runway extension programme.

Extension to Wallblake Airport Runway Options
and Funding Study: Anguilla

DFID Contract No. 00 1995
Amd N° 1 to Draft Report

ATTACHMENT C

6.0 LAND COSTS, RESETTLEMENT, PLANNING AND LEGAL ISSUES

6.1 Development Options for Wallblake Airport

The development options considered for Wallblake Airport are described in Section 4 and are principally as follows:

Option 1 - An extension of the eastern end of the runway by 252m (including a 150m Starter Strip) Option 2 - As option 1 but with re-profiling of the western end of the runway. Option 3 - An extension of the eastern end of the runway by 852m (including a 150m Starter Strip).

6.2 Costing of Wallblake Airport Development Options

6.2.1 Land Acquisition Costs

The implementation of options 1 or 2 would affect some 26 parcels of land while the implementation of Option 3 would affect approximately 53 parcels of land (see Appendix C, Drawing CK3661109.011006). In the case of options 1 or 2, the parcels that would be affected are all located to the north of the existing runway. With regards to Option 3, of the 53 parcels likely to be affected, there are 37 parcels to the north, 1 (one) to the east and 15 to the south of the runway. The Crown owns only one of these parcels of land while the others are all privately owned. The majority of those to the south would be affected only in part, however, the Government may choose to acquire entire parcels of land in an effort to discourage the continuation of dense residential development in close proximity to the airport in the long term. To this end, 'whole plot' areas have been assumed for areas to the south of the runway. There is also one building housing a school, among the properties listed to the south of the runway, which would be affected by the airport expansion proposals because of its overall height regardless of the option selected.

It is assumed that all properties directly affected by the proposed airport expansion would have to be purchased on the open market or compulsorily acquired by the Government. In either case the market price of land would be the main guiding factor.

A comprehensive list of the properties affected is included in Appendix F. This list of properties includes all those lands needed to carry out the options including those likely to be affected by the transition slopes. The heights of buildings within the transition slopes would need to be controlled to ensure compliance with the UK CAA document 'CAP 168 - Licensing of Aerodromes' (CAP 168). At this stage, it has been assumed that:

- all properties in or in close proximity to the edge of the runway strip will be required for acquisition
- a clearance or buffer zone of approximately 20m is required outside the runway strip
- most of the residential buildings in the area are approximately 10ft high and would not be affected by the transition slopes if outside the 20m buffer zone
- the building housing the school is in excess of 20ft and would need to be relocated.

Where appropriate, the occupants of buildings have been identified for relocation. With respect to properties directly affected, as identified in Appendix F, these fall within the runway strip.

The costs of land acquisition have been calculated on the basis of records held by the Land and Survey Department supplemented with information from persons knowledgeable about the real estate industry in Anguilla. Information furnished on the expectations for land compensation revealed a range from £35,000 (US\$50,000) per acre based on the Lands and Survey Department information base to £155,000 (US\$225,000) per acre as estimated by Miss Bernice Lake.

On the basis of discussions with a wide range of people it is believed that, in general, the costs of land acquisition would likely fall between £35,000 and £50,000 per acre depending on the specific characteristics of the individual plot of land.

Every effort should be made to purchase the lands through the process of negotiated agreements rather than compulsory acquisition. The latter would be a longer process involving the law courts. In some cases, owners may opt for land exchanges rather than receive compensation. Under such circumstances, if the Government does not have access to land in the Valley area, the same monies allocated for compensation would be used by the Government to purchase land on the open market in order to facilitate the land exchange.

Costing for acquisition purposes is estimated as follows:

- Current value of land in this area would range, in general, from £35,000 to £50,000 per acre.
- In reviewing the engineering drawings in relation to the plot boundaries (see Appendix C, Drawing CK3661/09.01/006), rough estimates of the areas of land to be affected by the expansion options suggest that approximately 46 acres of land would need to be acquired from existing landowners by the Government in order to implement Option 3 as described above. If either of options 1 or 2 were implemented, however, the amount of land to be acquired would be approximately 10 acres.
- In order to implement the options, the costs of acquiring the affected land parcels would range from approximately £350,000 to £2,300,000 as shown in Table 6.1. The average costs have been used in Table 4.3, the Matrix of Options.

Development Option	No. of Parcels	Amount of Land (approx. acres)	Cost at £35,000 per acre	Cost at £50,000 per acre	Average Cost £
Option 1	26	10	350,000	500,000	425,000
Option 2	26	10	350,000	500,000	425,000
Option 3	53	46J	1,835,000	2,300,000	2,067,500

Table 6.1: Land Acquisition .Costs

J This estimate includes approximately 15 acres to the east of the existing runway.

2 The additional plot of land to the east of the runway is or was formerly owned by Miss Bernice Lake. Its value has been calculated at the higher rate of £50,000 per acre.

The cost of land acquisition is largely dependent on governmental policy regarding the purchase of partial plots of land or the complete purchase of plots. Additionally, it will be effected by whether the Government undertakes deals with individual plot owners or makes a blanket proposal. For these reasons, the costs can only be considered indicative.

6.2.2 Re-housing Costs

The implementation of options I or 2 would both affect the same 10 buildings, 9 to the north and the school to the south of the runway. Under the acquisition procedures the government would need to replace these facilities in such a way that the occupants of the premises are no worse off than under their current circumstances. In keeping with sound planning practice, every effort should be made to relocate persons within 1 km of their current location.

In the case of Option 3, there are approximately 19 buildings (homes and businesses) which would be affected by the project. There are 15 residential buildings, one school and three residential/commercial buildings which would have to be replaced in order to carry out the airport expansion. The school would need to vacate its rental accommodation and find an alternative property in a suitable location. The government is not obliged to provide this new accommodation. However, they may assist in the process. The property owners, however, would need to be appropriately compensated for the affected land and building.

A large property has recently been constructed to the east of the existing unmade public road, east of the airport. This would require re-provision if Option 3 was progressed, and a conservative preliminary cost of £200,000 has been allowed for this.

Current construction cost is on average £45 (ie US\$65) per sq. ft. Based on this, the cost of re-housing would be in the range £428,000 to £1,200,000 depending on which option is implemented.

Estimated costs for building replacement are summarised in Table 6.2 below.

Options 1 and 2

Current location	NU of buildings	Average size of building	Total floor area to be replaced	Approximate cost of replacement
North of runway	09	877 sq. ft.	7,892 sq. ft	£355,140
South of runway	01	1,634 sq. ft.	1,634 sq. ft.	£73,530
Total				£428,670

Option 3

Current location	NUof buildings	Average size of building	Total floor area to be replaced	Approximate cost of replacement
North of runway	12	1,186 sq. ft.	14,235 sq. ft	£640,000
South of runway	6	1,347 sq. ft.	8,082 sq. ft.	£360,000
East of runway	1	N/A	N/A	£200,000
Total				£1,200,000

Table 6.2: Estimated Re-housing Costs

6.2.3 Resettlement Costs

The final cost of land to be purchased by the Government to facilitate land exchanges will depend on the level of infrastructure and services to the land, the location of the land and the amount being purchased for resettlement. As discussed earlier, the value of land on the open market could range between £35,000 and £50,000 per acre.

The monies required for compensation have already been discussed. The costs take account of either direct compensation or the purchase of land by the Government on the open market in order to facilitate land exchanges. It should be noted that a number of property owners affected also own other parcels of land to which they are willing to be relocated. Direct compensation is therefore relevant in these cases.

The government owns very little land in the Valley area suitable for residential development. There is, however, approximately 4-5 acres of Government owned land in the Rock Form area and this would be suitable for the negotiation of land exchanges.

Additionally, the Government may need to give consideration to providing assistance with moving costs. Assuming a current rate of £140 (ie US\$200) per movement, it is estimated that approximately £840 per household should be set aside to assist the affected households with this process. A total of £8,000 for options 1 and 2 and £15,000 for Option 3 should therefore be allocated for use in re-settlement.

6.2.4 Resettlement Issues

The Project Manager of the Airport Expansion Project has reported that to date all parties to the north of the airport are willing to be relocated. The remaining issues related to resettlement are as follows:

- There is very limited land owned by the Government of Anguilla. Therefore, in order to re-house the households in the vicinity of the airport the government would have to purchase vacant land on the open market to accommodate the new facilities for the dislocated households. These lands would be privately owned, individual serviced parcels of land for the most part and not large tracts that would then need to be subdivided and serviced. This has implications for the negotiated

purchase price. It is noteworthy that there is an adequate supply of vacant land available in the Valley area for relocation for residential purposes.

- It is necessary to finalise at an early stage how many households would wish the Government to provide replacement homes and how many would prefer to be compensated and build their own homes. This would allow home replacement to commence as soon as possible.
- The Government will need to set a start-up date to implement the airport expansion that would allow for new facilities to be completed for the dislocated households prior to this date. This would affect those who have chosen to have the government provide replacement houses.
- There are three commercial activities currently operating from residences to be affected by the airport expansion. Two of these, a small neighbourhood bar and a small lumber yard, can be re-accommodated as mixed commercial/residential activities. It is hoped that the owner of the lumber shop can be re-sited to a lot very near to the airport as desired. The bar can be re-sited within the context of a new residential area as appropriate from a land use planning perspective. However, the third commercial activity is an auto repair shop which is considered unsuitable in a residential area. The planning authorities are unlikely to re-house this activity along with the owner's new residence. Suitable accommodation could be found in the commercial/light industrial area along Farrington Road or the industrial area in Corito where the Government has access to some lands. The costs of separating this business from the owner's home are difficult to assess at this stage but would have to be fully considered.

6.2.5 Planning Issues

The planning issues are wide ranging and may be summarised as follows:

- The effect which the airport will have on the school building to the south would provide the Government with an opportunity to assist the island's only private primary school in finding suitable accommodation that will allow for expansion. The school currently rents the building from a private citizen but the Government has identified an extensive area in Pope Hill which could accommodate the present and future needs of the school. The Pope Hill area has been zoned in the National Physical Development Plan for educational purposes.
- Nuisance factors related to the airport, such as noise, fumes and vibrations, may lead to planning blight of areas adjacent to the airport.
- There is a need to ensure that the proposed development respects the archaeological site to the immediate east of the airport expansion area.
- Access to the island's only land fill as well as to the Delta and Shell companies storage tank areas would need to be maintained with the proposed road closure due to airport expansion. An alternative route has been suggested involving the construction of a new road along the northern edge of the expanded airport runway. The road would be extended eastward to create a new route linking it

with an existing public road which runs north-south and offers access to the Corito area (see appendix C, Drawing CK3660/09.011001).

- . There is a major development proposed to the immediate east of the airport involving possibly some 300 acres to be used for the construction of an inland marina, hotel, residential villas and an 18-hole golf course. This development has implications for the final design of drainage facilities to service the runway expansion to the east. There are implications, also, for the upgrading of the public road to the east of the runway that is proposed to be used to accommodate heavy duty vehicles accessing the Delta and Shell bulk storage areas and the island's only landfill at Corito (see also Section 4.2.6 and Drawing CK3660/09.011007, Appendix C).

6.2.6 Legal and Institutional Issues

No significant legal or institutional issues have been identified for the implementation of this project. It is anticipated that all the relevant procedures have been adequately covered under the Land Acquisition Ordinance Cap 273, 1959.

6.3 The Impact of the Optional Developments on Anguilla Tourism Strategy

6.3.1 Tourism is the main economic activity in Anguilla, accounting for more than half of the total employment opportunities. The basic underlying philosophy of Anguilla's tourism strategy can be summed up in the following statement that is contained in the Draft Tourism Policy (dated 18 September 2000) that is currently being circulated for comment:

Fundamental to government tourism policy has been the recognition that inappropriate and uncontrolled tourism development can produce adverse economic, environmental and social effects, and that because of its small geographic size and limited work force Anguilla cannot support or benefit from mass tourism.

Based on this, Anguilla has fashioned and marketed a product that it defines as "low volume, high yield". Simply put, fewer visitors paying high prices for a high quality vacation.

This policy is not only expressed at the political level, but is supported by many groups across the island. In the interviews undertaken for the social impact assessment (Section 9, Comparative Airport Study, WS Atkins International Limited, June 2000) respondents were convinced that they did not want mass tourism. They felt that while the island could not support a fully international airport, improvements at Wallblake would increase safety and facilitate an increase in the level of visitors consistent with the type of tourism being marketed for the island.

The relationship between tourism in Anguilla and the development of Wallblake Airport has been extensively presented in Section 4 of the Comparative Airport Study. To summarise the main points:

- . In 1998 Wallblake Airport handled 89,460 air passengers of which 64.7% were visitors.

- . There was a significant increase in the number of air passengers at Wallblake between 1985 and 1989, coinciding with the airport redevelopment and a direct scheduled service from San Juan by American Eagle.
- . The majority of tourists visiting Anguilla are from the United States of America.
- . The average annual occupancy rate for hotels in Anguilla is below the Caribbean average rate.
- Various studies have identified a number of factors that are believed to constrain the growth of tourism in Anguilla. These are limitations in the availability of labour; in the supply of development sites; local capital and access to the island by air.

- . American Eagle currently provides the main air transportation to tourists to the island.

The development options proposed for the Wallblake Airport are as follows:

Option 1 - An extension of the eastern end of the runway by 252 m (including a 150m Starter Strip).

Option 2 - As Option 1, but with re-profiling of the western end of the runway.

Option 3 - An extension of the eastern end of the runway by 852m (including a 150m Starter Strip).

All three options offer viable technical solutions to the constraints imposed by the existing airport, which include:

- . The fact that the runway is too short to allow the 42 seat A TR 42 aircraft operated by American Eagle to operate to and from San Juan at maximum payload in all conditions.
- . The current runway cannot support the larger A TR 72 aircraft that are being deployed to the San Juan hub by American Eagle to serve their Caribbean destinations.

The proposed improvements to the runway therefore ensure that that the A TR 72 can carry maximum passenger payloads (66 seats) under most conditions, thereby avoiding the restrictions on seat availability that exist at present. At the same time the options do not support the introduction of large jets or substantially increased traffic that would signal the advent of mass tourism. The optional developments are therefore consistent with the currently stated tourism policy, and should have a net positive impact on the future development of tourism on Anguilla.

APPENDIX F: EXTENSION TO WALLBLAKE AIRPORT RUNWAY – OPTIONS 1 & 2

LAND AND BUILDING ACQUISITION COSTS

PARCELS AFFECTED: North of Runway					
Proprietor	Block & Parcel	Approx. Area acre	Sq.ft. Of Building	House Assessment Value US	Replacement House Value US
Crown	78913B 116)	0.37			
Joseph Allen Gumbs	78913B (part of)	0.19			
Poland M Arrindell	78913B 90	0.20	1,236	\$56,000	\$80,340
Jacob L Richardson	78913B 91	0.40			
Watkins Hodge	78913B 83	1.00			
James Lewis Lake	78913B 199 (part of)	0.25			
Carmen Violet Lake	78913B 198 (part of)	0.35		\$60,000	
Mena Elvina Lake	78913B 81	0.90			
Violet Richardson	78913B82		671	\$14,000	\$43,615
James B Gumbs	78913B82		1,147	\$50,000	\$74,555
James E Gumbs	78913B82	1.25		\$53,500	
Yvette Proctor	78913B 138	1.00	945	\$24,000	\$61,425
Gwendolyn Gumbs				\$2,000	
Beryl Proctor				\$27,000	
Vesta F Gumbs	78913B 137	0.25	841	\$54,000	\$54,665
James E Gumbs	78813B 41	0.40	735	\$36,000	\$47,775
James E Gumbs			855	\$25,000	\$55,575
Christopher I Gumbs	78813B 65 (part of)	0.38	930	\$51,000	\$60,450
Ruth Janet Alias	78713B 71	0.10			
Alston R Gumbs	78713B 23 (part of)	0.09			
Roderick A N Gumbs	78713B 24 (part of)	0.20			
Heattier V James	78713B 25 (part of)	0.17			
Hilda Lake	78713B 88 (part of)	0.27			
Giles Faulkner	78713B 27 (part of)	0.30			
Franklyn R Richardson	78713B 28	0.30		\$10,000	
Albert AR Lake	78713B 98	0.90	532		\$34,580
	Total:	9.27	7,892	\$462,500	\$512,980

PARCELS AFFECTED: South of Runway					
Proprietor	Block & Parcel	Approx. Area acre	Sq.ft. Of Building	House Assessment Value US	Replacement House Value US
Francis Gumbs	78813B 51	0.6	1,634	\$54,888	\$106,210
	Total:	0.6	1,634	\$54,888	\$106,210

Notes

House Assessment Value refers to a notional capital value
 Replacement House Value is based on a construction cost of US\$65 per sq ft

APPENDIX F: EXTENSION TO WALLBLAKE AIRPORT RUNWAY – OPTION 3

LAND AND BUILDING ACQUISITION COSTS

PARCELS AFFECTED: North of Runway

Proprietor	Block & Parcel	Approx. Area acre	Sq.ft. Of Building	House Assessment Value US	Replacement House Value US
George Kentish	789138 100 (part of)	4.00	3,601	5254,000	5234,065
Guilford Gumbs	789138 89 (part of)	0.37			
Frances T Gumbs	78913888	0.33			
Leopold Woods	789138 86	0.40			
Cyril N Harris	789138 85 (part of)	0.50			
Christopher I Gumbs	78913884	0.90			
Crown	789138116	0.37			
Joseph Allen Gumbs	789138 (part of)	0.19			
Poland M Arrindell	78913890	0.20	1,236	\$56,000	580,340
Jacob L Richardson	789138 91	0.40			
Walkins Hodge	789138 53	1.00			
James Lewis Lake	789138199	0.50			
Carmen Violet Lake	789138198	0.70		\$60,000	
Mena Elvina Lake	78913881	0.90			
Violet Richardson	78913882		671	\$14,000	\$43,615
James E Gumbs	78913882		1,147	\$50,000	\$74,555
James E Gumbs	78913882	1.25		\$53,500	
Jasmine W Smith	789138213	0.25	1,006	533,800	\$65,390
Joyce M Gumbs	789138216	0.80			
Christopher I Gumbs	789138 108	1.74			
Yvette Proctor	789138138	1.00	945	524,000	\$61,425
Gwendolyn Gumbs				\$2,000	
Seryl Proctor				\$27,000	
Vesta F Gumbs	789138 137	0.25	841	\$54,000	\$54,665
James E Gumbs	78813841	0.40	735	\$36,000	\$47,775
James E Gumbs			855	\$25,000	\$55,575
Carlos E Gumbs	788138 60 (part of)	0.09			
Christopher I Gumbs	78813865 (part of)	0.38	930	551,000	\$60,450
Calvin W Lake	788138 38 (part of)	0.20	1,736	\$58,700	\$112,840
Ruth Janet Alias	787138 71	0.10			
Alston R Gumbs	787138 23 (part of)	0.09			
Roderick AN Gumbs	787138 24 (part of)	0.20			
Heather V James	787138 25 (part of)	0.17			
Hilda Lake	78713888 (part of)	0.27			
Giles Faulkner	78713827 (part of)	0.30			
Franklyn R Richardson	78713828	0.30		510,000	
Albert AR Lake	7871389B	0.90	532		534,580
Total:		19.45	14,235	\$809,000	\$925,275

PARCELS AFFECTED: East of Runway

Proprietor	Block & Parcel	Approx. Area acre	Sq.ft.Of Building	House Assessment Value US	Replacement House Value US
George Kentish	789138 100 (part of)	15.00			
Total:		15.00			

Note

The land to the east of the runway is valued at the higher cost of US\$70,000 per acre

PARCELS AFFECTED: South of runway

Proprietor	Block & Parcel	Approx. Area acre	Total Area acre	Sq.ft.of Building	House Assessment Value US	Replacement House Value US
Francis Gumbs	788138 51		0.60	1,634	\$54,888	\$106,210
Clara Gumbs	3881382		0.20			
Conrad Bradley	3881383 (part of)	0.15	0.40	854	\$28,700	\$55,510
Keith Brooks	3881384 (part of)	0.15	0.80	1,152	\$38,700	\$74,880
William H Rogers	3881385 (part of)	0.22	1.00	280	\$9,400	\$18,200
Clara Gumbs	388138 6 (part of)	0.23	0.80			
Lena Lloyd Choisit	3881387 (part of)	0.10	0.80			
Shirley 8 Maynard	38813891 (part of)	0.25	2.25	2,050	\$68,800	\$133,250
Phyllis C Richardson	388138 92 (part of)	0.36	2.18	2,112	570,900	\$137,280
Robin Hicklin Richardson	38713849 (part of)	0.08	0.30			
Elihu Richardson (per rep)	38713851 (part of)	0.39	0.45			
Hilda Lake	38713859 (part of)	0.22	0.60			
Giles Faulkner	38713861 (part of)	0.24	0.60			
John Calvin Hodge	387138 62 (part of)	0.26	0.70			
Ruth Janet Alias	387138 50 (part of)	0.09	0.30			
Total:		2.74	11.38	6448	\$139,700	\$525,330

Notes

House Assessment Value refers to a notional capital value

Replacement House Value is based on a construction cost of US\$65 per sq n

Extension to Wallblake Airport Runway Options
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ATTACHMENT D

	Runway Onllon 1				Runway Onllon 2				Runway Oollon 3			
	'Discounted' fill	'Bought' fill	'Discounted' fill	'Bought' fill	'Discounted' fill	'Bought' fill	'Discounted' fill	'Boughr fill	'Discounted' fill	'Bought' fill	'Discounted' fill	'Boughr fill
Runway construction												
(including drainage)	£1,726,000	£3,130,700	£1,726,000	£3,130,700	£3,187,600	£6,267,600	£3,187,600	£6,267,600	£11,081,300	£14,161,300	£11,081,300	£14,161,300
Airfield lighting	£60,856	£60,856	£60,856	£60,856	£134,671	£134,671	£134,671	£134,671	£143,316	£143,316	£143,316	£143,316
Laud acquisition	£425,000	£425,000	£425,000	£425,000	£425,000	£425,000	£425,000	£425,000	£2,067,500	£2,067,500	£2,067,500	£2,067,500
Re-housing cosu	£428,670	£428,670	£428,670	£428,670	£429,670	£428,670	£428,670	£428,670	£1,200,000	£1,200,000	£1,200,000	£1,200,000
Resettlement cosU	£8,000	£8,000	£8,000	£8,000	£8,000	£8,000	£8,000	£8,000	£1 5,000	£1 5,000	£15,000	£15,000
Road diversion	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000	£1,000,000
Terminal	Opt 2	Opt 2	Opt 3	Opt 3	Opt 2	Opt 2	Opt 3	Opt 3	Opt 2	Opt 2	Opt 3	Opt 3
	£1 50,000	£150,000	£1,110,000	£1,110,000	£150,000	£1 50,000	£1,110,000	£1,110,000	£1 50,000	£150,000	£1,110,000	£1,110,000
Bulk Fuel Installation	No provision	No provision	Provided	Provided	No provision	No provision	Provided	Provided	No provision	No provision	Provided	Provided
	£0	£0	£1,410,000	£1,410,000	£0	£0	£1,410,000	£1,410,000	£0	£0	£1,410,000	£1,410,000
Apron	No provision	No provision	50% addition	50% addition	No provision	No provision	50% addition	50% addition	No provision	No provision	50% addition	50% addition
	£0	£0	£250,000	£250,000	£0	£0	£250,000	£250,000	£0	£0	£250,000	£250,000
Air Traffic Control Tower	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Rescue & Fire Fighting Service	£100,000	£1 00,000	£100,000	£1 00,000	£100,000	£100,000	£100,000	£100,000	£1 00,000	£1 00,000	£100,000	£100,000
Maintenance Facility	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
Professional fees	£389,853	£530,323	£651,853	£792,323	£543,394	£851,394	£805,394	£1,113,394	£1,575,712	£1,883,712	£1,837,712	£2,145,712
Contingency	£857,676	£1,166,710	£1,434,076	£1,743,110	£1,195,467	£1,873,067	£1,771,867	£2,449,467	£3,466,566	£4,144,166	£4,042,966	£4,720,566
Total cosU	£5 146 054	£7,000 258	£8604454	£10,458658	£7 172 802	£11 238 402	£10631 202	£14 696 802	£20 799 393	£24,864,993	£24 257 793	£28,323 393

Summary of oplons

Runway Option 1: Increase runway length to east by 102m (total runway length of 1199m) plus starter strip of 150m (TORA to west of 134901, TORA 10 east of 1 199m).

Runway Option 2: Increase runway length to east by 102m (total runway length of 1 199m) plus starter strip of 150m (TORA to west of 134901, TORA to east of 119901). Raise west end of runway by approximately 5m. Runway Option 3: Increase runway length to east by 702m (total runway leghth of 179901) plus starter strip of 150m (TORA to west of 1949m, TORA to east of 179901).

Terminal Option 1: 'Do nothing' option (cost: 0).

Terminal Option 2: Optimisation of existing Terminal building (approximate cost: £150,000).

Terminal Option 3: Construction of new Arrivals Terminal. Existing Terminal to solely handle departing passengers (approximate cost: £1,110,000).

Notes

1. 'Discounted' fill assumes that up to 280,000m³ of suitable fill will be made available to the airport by the developers of the proposed golf course/marina complex to the east of the airport.

2. 'Bought' fill assumes that all fill is bought at market rates.

3. Professional fees assumed to be 10% of all other cosU.

4. Contingency assumed to be 20% of all other cosu, including professional fees.

Table 4.3: Wallblake Airport Development - Matrix of Options

Extension to Wallblake Airport Runway
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ATTACHMENT E

**Extension to Wallblake Airport Runway
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Note: Drawing CK3660/09.01/010 issued separately