KPMG

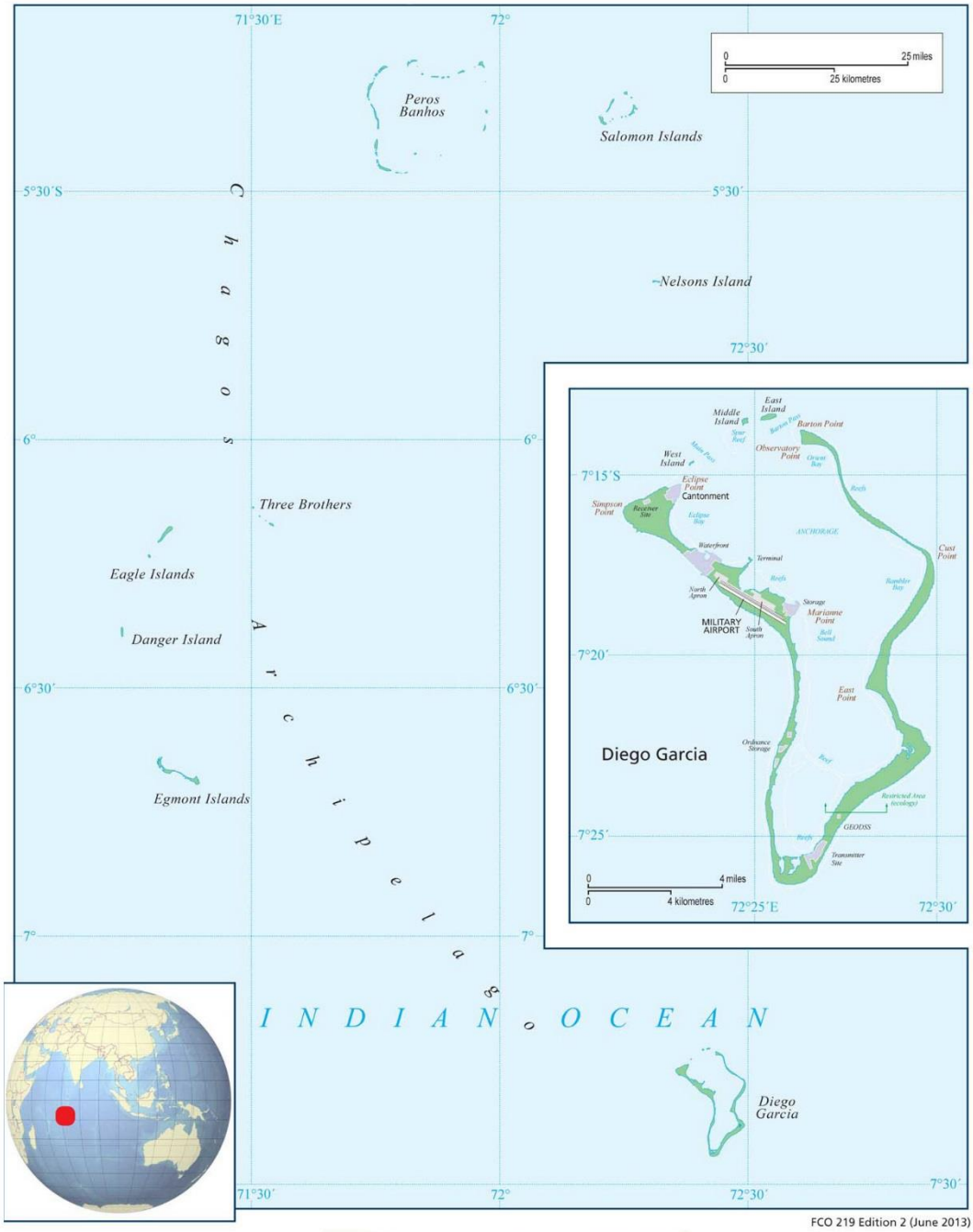
cutting through complexity

Feasibility study for the resettlement of the British Indian Ocean Territory

Volume I

31st January 2015

British Indian Ocean Territory



FCO 219 Edition 2 (June 2013)

Currency Equivalents

Currency Unit = Sterling Pound (£)

Exchange Rates (1 October 2014)

£ 1 = US$ 1.6203

£ 1 = € 1.2866

Source: Bank of England

Fiscal Year

1st April – 31st March

Abbreviations and Acronyms

APCC	Asian and Pacific Coconut Community
BIOT	British Indian Ocean Territory
BIOTA	BIOT Administration
BMFC	British/Mauritius Fisheries Commission
BSFC	British/Seychelles Fisheries Commission
CB	Capacity Building
CCT	Chagos Conservation Trust
CDA	Coconut Development Authority (Sri Lanka)
CPI	Consumer Price Index
DFID	Department for International Development
EC	European Commission
ECCB	East Caribbean Central Bank
EDF	European Development Fund
EEZ	Economic Exclusion Zone
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EPPZ	Environment Protection and Preservation Zone
EU	European Union
FAO	Food and Agriculture Organisation
FCMZ	Fisheries Conservation and Management Zone
FCNO	Filtered Coconut Oil
FCO	Foreign and Commonwealth Office
FIRR	Financial Internal Rate of Return
FPO	Fisheries Protection Officer
FPV	Fisheries Protection Vessel
GDP	Gross Domestic Product

GRT	Gross Register Tonnage
GST	Goods and Services Tax
HR	Human Resources
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICCPR	International Covenant on Civil and Political Rights
IOTC	Indian Ocean Tuna Commission
IPCC	International Panel on Climate Change
IUU	Illegal, Unreported and Unregulated
KPI	Key Performance Indicator
MCS	Monitoring, Control and Surveillance
MDG	Millennium Development Goal
M&E	Monitoring & Evaluation
MIS	Management Information System
MPA	Marine Protected Area
MRAG	Marine Resources Assessment Group Limited
MSC	Marine Stewardship Certificate
MWR	Morale, Welfare and Recreation
NGO	Non-Governmental Organisation
NM	Nautical Mile
NSFDG	US Naval Support Facility Diego Garcia
NTA/NTZ	No Take Area/No Take Zone
O&M	Operations and Maintenance
OT	Overseas Territory
OTD	Overseas Territories Department
OTEP	Overseas Territories Environment Programme
PIDG	Private Infrastructure Development Group
PIO	Pitcairn Island Office
PM	Pacific Marlin

RIB	Rigid-hulled Inflatable Boat
RICS	Royal Institution of Chartered Surveyors
RM	Royal Marines
ROPO	Royal Overseas Police Officer
SFPO	Senior Fisheries Protection Officer
SIDS	Small Island Developing States
SWOT	Strengths, Weaknesses, Opportunities and Threats
TCI	Turks and Caicos Islands
TdC	Tristan da Cunha
TEFU	Treaty on the Functioning of the European Union
TOR	Terms of Reference
UK	United Kingdom
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
USAF	United States Air Force
VAT	Value Added Tax
WHO	World Health Organisation
WTO	World Tourism Organisation
WTTC	World Travel and Tourism Council

Contents

Executive Summary

Introduction

In March 2014, the British Indian Ocean Territory (BIOT) Administration commissioned KPMG to carry out a feasibility study for the resettlement of BIOT. The feasibility study was undertaken over a ten-month period between April 2014 and January 2015. It was conducted by a multi-disciplinary team, tasked with preparing a 'neutral' analysis of different options for the resettlement of BIOT.

For each option, the feasibility study considers the following:

- The likely cost to the UK Government of establishing and maintaining a settlement over periods of five, ten and twenty years;
- Whether such a settlement could be self-sustaining and, if so, within what time period and under what conditions; and
- The associated risks, environmental implications and full costs of mitigation, in the event that resettlement takes place.

This report collates the work of the study, and provides a detailed description of the overall approach and methodology followed, as well as the findings. The findings depend on many assumptions, as outlined in the report.

Study approach and methodology

The study analyses the different resettlement options using a range of different variables including: legal, political, environmental, social and economic factors, and estimations of the total cost of the resettlement options. The views from a range of stakeholders were sought, including the Chagossian community, through a series of open consultations.

The work was carried out through three main phases:

- **Consultation** and data gathering, consulting with the Chagossians and gathering relevant data on the numerous factors affecting resettlement;
- **Analysis** to determine the prospects for an economically self-sustaining community on BIOT, weighing the likely economic opportunities against the expected financial costs and environmental risks; and
- **Reporting**, setting out an analysis of the resettlement options, with consideration of the environmental risks and costing of each option. This phase included a draft report made available on 27 November 2014 and this report made available on 31 January 2015.

Key activities and resettlement options

The study team undertook field research in BIOT, visiting Diego Garcia and 13 of the outer islands, including two which are considered in detail as part of the resettlement option analysis, Ile du Coin and Boddam. The purpose of the visit was to gather relevant data on selected islands within BIOT, to develop a framework for assessing the viability of each island for resettlement. We quickly narrowed down the resettlement locations to Diego Garcia, which is included in all three resettlement options, and the two outer islands, which were the only outer islands to have been inhabited on a significant scale in recent history. Environmental analysis confirmed the greater suitability of Diego Garcia than the two outer islands from a resettlement perspective. Existing infrastructure on Diego Garcia is a major practical and economic advantage provided that access can be agreed.

Consultations with the Chagossian community took place in Mauritius, the Seychelles, Manchester, Crawley, and London. The aim of these activities was to inform the Chagossian community of the study and consultation process, and to gather their views on this process and resettlement in general.

An environmental questionnaire was developed to seek views from stakeholders on the various environmental issues linked to resettlement. These included members of the Chagos Conservation Trust (CCT) and other individuals with technical/environmental knowledge, particularly on BIOT or resettlement. The questionnaire focused broadly on: the carrying capacity of individual islands; the potential impact of resettlement on the environment; the impact of the environment on resettlement; and environmental monitoring requirements.

In light of these activities, and the team's wider background research, the team have focused their analysis on three resettlement options:

- Option 1: **Large-scale resettlement** (population 1,500) with economic activities such as public sector employment, employment on the US Naval Support Facility, tourism and fisheries. This sort of development would require infrastructure on Diego Garcia and the outer islands.
- Option 2: **Medium-scale resettlement** (population 500) with livelihood options that could be supported in a number of ways such as public sector employment, engagement on the US Naval Support Facility, artisanal fishing and monitoring the MPA.
- Option 3: **Pilot, small-scale resettlement**, (population 150, serving as a middle ground between permanent resettlement and the status quo) with incremental growth over time, and limited infrastructure on Diego Garcia.

These options are neither exhaustive (other options are possible), nor mutually exclusive, in that a resettlement process which started off at a pilot scale could move on to medium or larger scale resettlement depending on the level of success and the demand from the community to move in larger numbers. The costs might be reduced below Option 3 by adopting lower standards of infrastructure and service provision than assumed in this study, or by having an even smaller initial population.

The provisional candidate island options considered in the feasibility assessment of island options are Diego Garcia and, as examples of outer islands, Ile du Coin (Peros Banhos atoll) and Boddam (Salomon atoll), a view supported by responses to the environmental questionnaire. In the event of resettlement, these 3 islands are selected as ones that would be most practical. However, subsequent resettlement on some other BIOT islands is not precluded.

Legal and political analysis (Section 4)

The review has found that there are no fundamental legal obstacles that would prevent a resettlement of BIOT to go ahead. The legal and constitutional framework will, however, require significant amendment in order to facilitate a resettlement and this will require a comprehensive consultation process with the Chagossians and other interested parties. The following areas would be considered a priority in advance of and during the initial stages of any resettlement:

Constitutional

- A decision as to whether any new constitution, interim or permanent, for BIOT would be based solely upon Her Majesty's prerogative powers or on a United Kingdom statute based primarily on the level of oversight the UK Parliament may require.
- The possibility of putting an interim constitutional framework in place until the first phases of resettlement have been successful. The consultative process for this would ideally be as inclusive and fair as possible.
- Amendment of the existing constitutional framework and immigration ordinances and the British Indian Ocean Territory (Immigration) Order 2004 to allow Chagossians to resettle and live on

designated areas of BIOT. In the longer term, issues relating to nationality would also be important.

- The European Convention of Human Rights including the right to individual petition in addition to the International Convention on Civil and Political Rights might be extended to BIOT.

Governance

- Whether to establish the position of Governor or maintain the existing position of Commissioner as well as what direct powers the position will have and where the post will be based.
- A temporary consultative body for Chagossians and other interested parties, perhaps based on a conference of representatives, until a more permanent consultative structure can be agreed and established by constitution or local Ordinance.

Administration

- A resident civil service system to assist in facilitating the resettlement including provision of basic medical, police and other vital services. Courts may also be required to function on occasions. Possibly a resident Law Officer given the amount of legal amendments required during the initial phases of any resettlement.
- The Commissioner's/Governor's authority to raise revenues through a local Ordinance in addition to a consolidated fund in order to finance resettlement activities.

Environmental analysis (Section 5)

The continued physical existence of the islands of the Chagos Archipelago, which constitute BIOT, depends on the health of its underlying coral reefs, upon which the islands have formed. Diminished reef health, coupled with unfavourable shoreline changes, whatever the causes, has a direct bearing on any human populations inhabiting BIOT.

Whether or not future reef growth will keep pace with sea level rise is very important for resettlement decisions and prospects. Estimates of coral reef growth are in the range of 0.6 to 7.9 mm/yr, averaging 3.5 mm/yr. Sea level rise measurements for different atolls in Chagos indicate an increase of 3.2 mm/yr – 6 mm/yr, (from differing techniques). For projecting future rates global estimates are most relevant. Projected global average changes are 6.5 mm/yr (2013-2050) rising to 7.4 mm/yr (2013-2100), according to the Intergovernmental Panel on Climate Change (IPCC). Whether growth will be sufficient to combat sea level rise, coastal erosion and flooding of BIOT islands over the coming decades is a cause for concern. Many factors influence reef health, and therefore growth, making reef growth projections uncertain. The available reef growth estimates are not recent, and growth may reduce as ocean acidification and other reef disturbances increase.

While eastern Diego Garcia is a possible resettlement area, it was designated an internationally important wetland area by the BIOT Government in 2001, and contains an Important Bird Area (IBA) in the north. Nevertheless, environmental factors imply that Diego Garcia would be the most suitable/least risky location for resettlement. This island/atoll is relatively large, and already has critical infrastructures currently for use by the US Naval Support Facility. The following considerations will also be relevant to decisions on resettlement:

- Diego Garcia lies outside the Chagos No-Take MPA. The MPA, and outer islands within it, are of greater global significance than Diego Garcia.
- Diego Garcia already has an airport and port (though any use of such facilities is subject to agreement with and approval of the US government).
- Outer islands are remote, demanding environments, where all infrastructure and facilities would need to be established in the event of resettlement or tourism. Construction of a port and/or airport would be invasive and cause major environmental damage to the coral reefs, fish and other marine life.

- Development impacts on one or more outer atolls would also extend to the Chagos No-Take MPA, potentially threatening its ecological integrity and diminishing its utility as a global reference site for environmental monitoring and in other ways. Zoning of the MPA (to demarcate which islands may and may not be inhabited, or fished) may help alleviate the impacts somewhat.
- Any form of development in Chagos has the potential to impact the MPA. A key differential between Ile du Coin and Boddam (or the other islands) compared to Diego Garcia is simply that the former two islands bear less of the impact of recent human habitation and start off from a less degraded state.

Carrying capacity estimates for different island and resettlement options are complex and carry many assumptions and uncertainties. For example, self-sufficiency and heavy reliance on local fish increases the environmental burden ('ecological footprint') on Chagos' resource and reefs, lowering carrying capacities. In contrast, importing fish/resources reduces the environmental burden on Chagos – increasing carrying capacities.

Potential environmental impacts from the different resettlement options are summarised below, although some of these could be ameliorated through mitigation measures.

Option 1 (likely to involve both Diego Garcia and outer islands, such as Ile du Coin or Boddam)	Option 2 and 3 (involving Diego Garcia)
■ Very substantial construction impacts from a port or airport, if built on the outer islands; ■ Massive environmental impacts from construction (e.g. roads), infrastructures (e.g. power generation) and facilities; ■ Moderate impacts from houses, other buildings (e.g. tourist resorts) and facilities; ■ High/moderate impacts from sewage, solid waste and sedimentation; ■ Potentially heavy impact from fishing, diving and snorkelling; ■ Non-sustainable use of coral and sand as building materials; ■ Serious potential threat to the integrity of Chagos No-Take MPA, as noted, including reduced fish production, reef health and utility as a global reference site	■ Some impacts from construction (e.g. roads), infrastructures (e.g. power generation) and facilities (e.g. housing, other buildings) on Diego Garcia; ■ Threats to the Ramsar (wetland) site on eastern Diego Garcia and an important bird area at Barton Point; ■ Some disturbance from sewage, solid waste and sedimentation; ■ Potential additional impact on fish community if 'resettlement' and 'recreational' fishing both allowed. Improvement if existing 'recreational' fishing reduced or discontinued and catch limits imposed on 'resettlement' fishing; ■ Non-sustainable use of coral or sand as building materials.

The only way to fully understand the impact of resettlement on the reefs and resources of BIOT is to monitor environmental parameters. An Environmental Impact Assessment (EIA) should begin before the construction of any proposed infrastructure and/or human activities. EIA enables comparison of how well predicted impacts from resettlement match actual impacts determined from monitoring, and identifies the need for action to mitigate emerging problems.

Prior to any resettlement all stakeholders would be advised to consider and agree:

- Limits of acceptable change for the various parameters;
- Penalties, and
- Who will bear the costs of dealing with the problem, if thresholds are crossed?

Infrastructure analysis (Section 6)

In considering the infrastructure requirements of any future resettled population, the study has taken into account what is practical to determine indicative cost estimates. The provision of housing and public services available in other British Overseas Territories was examined, and a range of norms in the region and in other Small Island Developing States. Consideration of the need for infrastructure has taken into account the following core principles:

- Do minimum additional harm to the environment;
- Focus on environmental protection and sustainability;
- Take into account economic and financial affordability, value for money, and sustainability; and
- Respond to reasonable needs with feasible options.

Several key infrastructure needs have been considered. The study has explored: design, cost and contracting issues; transport and island access; shelter, governance, and law and order facilities; as well as energy, fuel, and the need for infrastructure to support the provision of other basic services.

Finding suitable cost comparators for the Feasibility Study has been particularly challenging. Contractors providing extremely robust and high standard engineering services to the US Navy incur high costs. These are the upper limit for estimation, but whether savings can be made is a key issue. Small family businesses on, for instance, Mauritius, build houses for a fraction of these costs. The issue for this study has been to find a suitable methodology and set of benchmarks, taking into account the expectations of potential re-settlers and reasonable comparators. Comparisons can be identified from other Overseas Territories, but the figures provided also reflect the paucity of existing supply chains which could push up costs considerably in the context of BIOT.

Expansion from 150-500 to a larger population (up to 1,500) would involve a more complex and varied set of infrastructure provisions, probably with more private sector participation. Expansion to other islands for various economic activities (e.g. fishing, nature tourism) could be considered after specific and realistic project proposals were developed on a case-by-case basis based on lessons learned from the initial expansion phase.

Economic and financial analysis (Sections 7 and 8)

The economic and financial analysis in Section 7 includes an assessment of potential livelihood and employment prospects (assuming 50% of the population would be economically active) in key sectors for each option. It quantifies the associated training costs (assuming 50% of the employed work force would require training). Incomes are estimated in aggregate. The study has looked at livelihood options for any resettled community. The main employment opportunities would be in the public sector (operation and maintenance of community infrastructure) and in the US naval facility. There are income opportunities in artisanal fishing and environmental activities related to fishing. There is potential for the development of high-end tourism and eco-tourism, with scope for employment in hotels, water sports, and as tourist guides on the islands. There is also scope for the development of small coconut plots for subsistence consumption and use, plus potential supply of by-products to the Naval Support Facility, tourism developments and the construction sector. The following table presents illustrative estimates of employment and associated training costs for the 3 main resettlement options based on assumptions outlined in Section 7.

Component	Unit	Option 1	Option 2	Option 3
Population				
■ Population	nos.	1,500	500	150
■ Labour Force	nos.	750	250	75
Indicative Employment and Training Requirements				
Public Sector				
■ Employment	nos.	263	175	53
■ Training Costs	£ million	1.97	1.31	0.39
US Naval Facility				
■ Employment	nos.	263	63	15
■ Training Costs	£ million	1.97	0.47	0.11
Artisanal Fishing				
■ Training Costs	£ million	0.42	0.35	0.28
Tourism				
■ Employment	nos.	76		
■ Training Costs	£ million	0.57		
Other Employment				
■ Employment	nos.	30	10	3
■ Training Costs	£ million	0.23	0.08	0.02
Total				
■ **Employment**	**nos.**	**631**	**248**	**71**
■ **Training Costs**	**£ million**	**5.15**	**2.21**	**0.81**

The issue of financial sustainability was considered for each option over a 20 year period after the completion of construction. The indicative annual deficit for each option remains substantial throughout the period with only limited progress towards self-sufficiency. The indicative annual subsidy per head in year 10 would range from: (i) Option 1: £17,300 per head (with the costs associated with the airport and breakwater/harbour) and £8,600 per head (without the costs associated with the airport and breakwater/harbour); to (ii) Option 2: £18,600 per head; and (iii) Option 3: £44,100 per head. These are all in 2014 constant prices.

Component	Financial Flows in £Million per year (Years 3 – 20)						
	3	4	5	6	7	10	20
Option 1							
Total – Revenue	0.09	0.21	0.33	0.44	0.93	1.86	4.00
Total – Expenditure	0.00	7.14	11.66	16.17	22.97	27.87	27.86
Exp. Without Airport and Harbour	0.00	4.52	6.41	8.30	12.47	14.75	14.74
Deficit	0.09	(6.93)	(11.33)	(15.73)	(22.04)	(26.01)	(23.86)
Without Airport and Harbour	0.09	(4.30)	(6.08)	(7.86)	(11.54)	(12.89)	(10.74)
Option 2							
Total – Revenue	0.15	0.23	0.29	0.32	0.76	0.81	1.22
Total – Expenditure	3.69	5.28	8.84	9.99	10.51	10.51	10.50
Deficit	(3.54)	(5.05)	(8.53)	(9.61)	(9.24)	(9.18)	(8.46)
Option 3							
Total – Revenue	0.15	0.23	0.29	0.32	0.76	0.81	1.22
Total – Expenditure	3.16	6.36	7.29	7.43	7.43	7.43	7.42
Deficit	(3.01)	(6.14)	(7.00)	(7.10)	(6.67)	(6.61)	(6.20)

The main next steps for consideration of resettlement would involve the following:

- Establish how many Chagossians want to resettle and on what basis.
- Conduct further studies and investigations:
  - **Human Resources Study** of Chagossians proposing to resettle.
  - **Training Programme** based on the results of the Human Resources Study and commitments by Chagossians wishing to resettle.
  - **Site investigations, engineering studies, final designs and costs** – based on selected island(s). These investigations should also focus on cost minimisation and value for money.
  - **Implementation and Action Plan** – including procedures for appropriate consultation with Chagossians and other stakeholders.
  - **Risk Management Study and Plan** to address all relevant risks and uncertainties; and propose mitigation measures to reduce their impact.
  - **Funding Study** to identify sources of funding to support potential resettlement.
- Prepare appropriate Constitution and management structure for potential resettlement.
- Investigate potential opportunities for access to facilities of US Naval Facility.
- Investigate potential opportunities to provide services to US Naval Facility.
- Investigate and promote interest of private sector in opportunities to support resettlement.
- Investigate and address other related issues e.g. (i) land ownership; (ii) accommodation ownership, mortgages and repayment; (iii) remittances; (iv) entitlement to pensions; (v) access to loans; etc.

Indicative cost estimates for each resettlement option are assessed (in Section 8) in terms of the capital investment and the annual operations and maintenance costs, plus periodic capital replacement and/or refurbishment. The economic and financial analysis also considers the potential economic development opportunities that resettlement might bring. A summary of the indicative cost estimates for each of the resettlement options is shown below. These indicative estimates are subject to extremely large uncertainties. They represent a judgment taking into account many factors that could affect the final costs. These include very significant uncertainties inherent in the physical terrain, the environmental protection design implication costs, the contracting scenarios, and the risk

appetite for any contractor newcomers on BIOT. Whilst the table below and the other related tables in this report have not given indicative ranges of possible outcomes because of those uncertainties, in the report and annexes we give examples of the wide range of possible costs that have been identified during the period of data research and review.

	Option 1 (Over 6 years)	Option 2 (Over 4 Years)	Option 3 (Over 3 Years)
Indicative total capital cost estimates	£423.3 million	£111.6 million	£65.4 million
Indicative capital costs, without airport and breakwater/harbour (Option 1 only)	£190.2 million	£111.6 million	£65.4 million
Capital costs per head of population Total capital costs Capital costs without airport and breakwater/harbour (Option 1 only)	£282,000/head £127,000/head	£223,000/head	£436,000/head
Indicative annual O&M costs Total per year Total, without airport and breakwater/harbour (Option 1 only)	£21.5 million/year £9 million/year	£6.3 million/year	£4.7 million/year
Indicative capital replacement and refurbishment costs (after 10 years) Total Total, without airport and breakwater/harbour (Option 1 only)	£37 million £16 million	£9.4 million	£5.5 million

In Section 8, we also identify a potential variant of Option 3 which involves lower overall costs through reducing the initial numbers of resettlers and the associated infrastructure. This involves capital costs of £32.4 million and operating subsidies of £5.0 million per year, based on a resettlement population of 50 people. A population of 50 is however arguably below reasonable and dynamically sustainable levels and will likely require significantly more support from BIOT than a larger more diverse cohort.

1 Introduction and Background

1.1 The British Indian Ocean Territory

1.1.1 History and geography

The British Indian Ocean Territory (BIOT) lies approximately 1,770 km east of Mahé (the main island of the Seychelles)[1]. The territory, an archipelago of 58 islands, covers some 640,000 square km of ocean. The islands have a land area of only 60 square km and 698 km of coastline. Diego Garcia, the largest and most southerly atoll and island, is 44 square km. The terrain is flat and low and most areas do not exceed two metres in elevation.

The uninhabited Chagos islands were first discovered by the Portuguese in the 16th century. The French assumed sovereignty in the late 18th century and began to exploit them for copra, originally employing slave labour. By then, the Indian Ocean and its African, Arabian and Indian coasts had become a centre of rivalry between the Dutch, French and British East India companies for dominance over the spice trade and over the routes to India and the Far East. France, which had already colonised Réunion in the middle of the seventeenth century, claimed Mauritius in 1775, having sent its first settlers there in 1772; it subsequently took possession of the Seychelles group and the islands of the Chagos Archipelago[2].

During the Napoleonic wars Britain captured Mauritius and Réunion from the French. Under the treaty of Paris in 1814, Britain restored Réunion to France, and France ceded to Britain Mauritius and its dependencies, which comprised Seychelles and various other islands, including the Chagos Archipelago. All these dependencies continued to be administered from Mauritius until 1903, when the Seychelles group was detached to form a separate Crown Colony. The Chagos islands continued to be administered as a dependency of Mauritius until they were detached to become the British Indian Ocean Territory in November 1965. In return Britain paid a grant of £3 million to Mauritius.

A US Naval Support Facility was constructed from 1971 – 1973. The agreement for use of the Islands for this purpose was granted from 1966 – 2016 with the option of a further 20 year extension.

1.1.2 The Chagossians

The former workers/inhabitants were removed from the islands between 1967 and 1973 to make way for the building of the Naval Support Facility. After the British Indian Ocean Territory had been created, the UK government gave Mauritius an undertaking to cede the Territory to Mauritius when it was no longer required for defence purposes. However, since the 1980s, successive Mauritian governments have asserted a sovereignty claim to the islands, arguing that they were detached illegally. The UK government rejects this claim. Mauritius is currently pursuing arbitration through the UN Convention on the Law of the Sea (UNCLOS) over the UK's right to establish a 'no take' Marine Protected Area (MPA) around BIOT in 2010. Following the removal of the former inhabitants, the Territory has no permanent inhabitants and members of the UK and US armed forces, officials and contractors in the Territory are temporary occupants without any right of permanent abode.

Since 1978 there have been several legal cases brought against the UK government for the right of abode and compensation to the former inhabitants. In 1982 the UK government paid £4 million to the Chagossians. In October 2008 the Law Lords upheld the 2004 British Indian Ocean Territory (Constitution) Order, made by prerogative Order in Council, as valid. This means that no person has the right of abode in BIOT or the right to enter the territory unless authorised.

1.1.3 Previous resettlement research

In 2000 the UK government commissioned an independent feasibility study[3] to look at resettlement on the outer islands. That feasibility study comprised the following phases:

- **Phase 1** was tasked with making an initial assessment of the feasibility of resettlement based upon the natural resources on the two outer atolls of Peros Banhos and Salomon.
- **Phase 2A** of the study, which took place in 2001, involved establishing equipment to generate long term information on local climatic conditions and tides, and their influence on the freshwater lenses on two of the islands within these two atolls.
- **Phase 2B**, which started in November 2001, was completed in July 2002. It involved assessments of groundwater resources, soils, fisheries resources, and the marine and terrestrial environment.

This study concluded that resettlement was not feasible. While the report expressed the view that that short-term habitation for limited numbers on a subsistence basis would in theory be possible, it also emphasised that any long-term resettlement would be precarious and costly. The outer islands, which have been uninhabited for forty years, are isolated, low-lying and lack all basic facilities and infrastructure. The study noted that the cost of providing infrastructure and public services could become very costly for the UK taxpayer. However, the study has been questioned by some on grounds of professional standards and independence.

A subsequent, separate and different, feasibility study was undertaken[4]. This report was also queried as it did not adequately consider the impacts of resettlement on the environment, or of flooding or freshwater depletion. Also, the locations and costs for the airport and tourist facility have been challenged[5].

Aims and overview of this study

In March 2014, the British Indian Ocean Territory (BIOT) Administration commissioned KPMG to carry out a new feasibility study for the resettlement of BIOT. The Terms of Reference are attached in Appendix 1. In preparing this study we have drawn on the professional expertise and writings of a wide range of external specialists, as reflected in the annexes and bibliography. The views of such external specialists, based on their professional expertise and the information which was made available to them, are accordingly reflected in this report. The feasibility study was undertaken over a ten-month period between April 2014 and January 2015. A 'neutral' analysis of different options for the resettlement of BIOT was commissioned. The study presents the most feasible options but these are not exhaustive, nor does it recommend preferred options. This will be for the UK government to consider based on a wide range of factors.

The main options were identified during the course of the study in consultation with stakeholders. For each option, the feasibility study considers the following:

- The likely cost to the UK Government of establishing and maintaining a settlement over periods of five, ten and twenty years;
- Whether such a settlement could be economically self-sustaining and, if so, within what time period and under what conditions; and
- The associated environmental risks and implications and estimated costs of environmental mitigation, in the event that resettlement takes place.

1.2 Structure of this report

This final report presents the work completed, and is divided into the following Sections:

- Section two provides an overview of the overall **approach and methodology** followed;
- Section three summarises the **key activities** and sets out the final list of resettlement options which the study considers;
- Sections four (legal), five (environmental), six (infrastructure) and seven (economic) **analyse the feasibility of resettlement**, looking at the key issues to be addressed against each of the different elements in the study's analytical framework; and
- Section eight provides a **summary comparison** of the different resettlement options.

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[1] Sheppard & BIOT Administration FCO, 2011.

[2] Although the latter were not commercially important, they had strategic value because of their position astride the trade routes.

[3] Posford Haskonig, 2002.

[4] Howell & Chagos Refugees Group, 2008 Returning Home: A Proposal for the resettlement of the Chagos Islands. UK Chagos Support Association.

[5] Turner et al. 2008.

2 Study Approach and Methodology

2.1 Guiding principles

2.1.1 A 'neutral' analysis

The study has sought to obtain as much information as possible about the background to the potential resettlement of the BIOT. This includes the earlier feasibility studies, related peer reviews, independent studies on resettlement of BIOT and the documentation gathered as part of the initial stakeholder consultations that took place in 2013. This has enabled us to establish a clear picture of the context in which the study has taken place. We have, however, adopted a "neutral" approach, starting afresh when analysing the expected costs and opportunities of each resettlement option without being steered by the conclusions of others.

2.1.2 Open consultation

The process of consultation by KPMG which began in 2014 has continued throughout the study, consisting of structured consultation events, both in the UK, Mauritius and the Seychelles with multiple meetings. These have been important as a means to supplement the findings of the team's desk research and interviews, and help develop the resettlement options.

2.1.3 Presenting findings in a clear and accessible way

This report is the final output of this feasibility study and sets out an economic and financial analysis of each resettlement option, along with environmental and social analysis, to reflect the likely implications for BIOT over the short, medium and long term. This report addresses the range of issues and is supported by clearly defined estimates of capital costs, operating and maintenance costs, and potential revenue streams for the BIOT.

2.2 Key phases of activity

Inception Phase: Scoping. A detailed review of the background information and formulation of the study plan was concluded.

Phase I: Consultation and data gathering. Once the inception phase was completed, the team began the main phase of the study, the aim of which was to consult with the Chagossians and to gather relevant data on the population, as well as on the carrying capacity and resources of the islands themselves through a visit to the Territory. Consultations with scientists and other specialists familiar with BIOT and other UK Overseas Territories have also been important. This has involved meetings, discussions and, in the case of environmental consultations, the administering of a questionnaire.

Steps had already been taken to survey the Chagossians, and to establish a clearer picture of the numbers who wish to return. The Howell Report of 2008 is one such source, and we undertook a desk-based review of relevant materials and consultation papers before the fieldwork which involved consultation events and the use of structured questionnaires to survey the Chagossians resident in the UK, Seychelles and Mauritius.

The aim of this Phase was to understand, in more in-depth terms:

- How many people want to return and under what circumstances;
- The specific nature and likely timing of this return (either permanent or temporary);
- The age and economic profile of those who would consider resettling; and

- Lifestyle expectations, based on current living standards in the Chagossians' respective locations.

Phase II: analysis. Having gathered relevant data through desk research and consultations, the team reconfirmed, cross-checked information and undertook a detailed analysis of the prospects for an economically self-sustaining community on BIOT, weighing the likely socio-economic opportunities against the expected financial costs and environmental risks. We carried out an assessment of opportunities for:

- Gainful employment (e.g., in agriculture, fishing, handicrafts, etc.);
- Tourism (possibly requiring private sector involvement) in fields such as eco-tourism, the development of a small exclusive resort (cf. Maldives), cruise-ship visits, research and scientific visits;
- BIOT government employment;
- Other income generation opportunities; and
- The possibility of remittances and/or contributions from other sources (both public and private).

Alongside this we calculated the likely financial costs of resettlement and environmental implications, covering:

- Access facilities;
- Island transport;
- Housing;
- Schools and clinics;
- Administration buildings;
- Power generation;
- Telecommunications; and
- Water, sanitation and waste facilities.

Besides the capital costs of the above items, the team has also considered the question of operating costs, payment for services, as well as administration (e.g. any need for an expatriate doctor, teacher, etc.).

Phase III: production of the study report. The result of this work is presented in this report, and sets out an analysis of the resettlement options, as well as consideration of environmental risks. This reflects the likely financial implications over the short, medium and long term, and is supported by indicative estimates of:

- Capital costs, including likely contingent liabilities;
- Annual operating and maintenance costs, including Chagossians employed in the public sector;
- Revenue and income from the following: payments for utility services; levies on tourists and visitors; import duties and taxes; land sales and fees; rents; other income (e.g. stamps, coins, internet registration, etc.);
- Environmental and financial implications of the resettlement options and transport needs, including the costs of upholding BIOT ordinances and international legislation, environmental monitoring and also measures needed to combat sea level rise and coastal erosion plus estimated costs; and
- Analysis of results over 20 years for each option

3 Key Activities and Resettlement Options

3.1 Field visit to the British Indian Ocean Territory

The study was undertaken by a multidisciplinary group of experts with infrastructure, economics, legal, environmental, resettlement, and project management skills. Several team members visited BIOT, including Diego Garcia and outer islands considered for potential initial resettlement, Ile du Coin and Ile Boddam (amongst a total of 13 outer islands). The purpose of the visit was to gather relevant data on selected islands within BIOT, and to seek input from UK and US representatives on Diego Garcia on the factors to be considered during any resettlement process.

A framework was developed for assessing the viability of each island for resettlement. This framework takes into account a range of environmental and physical parameters such as, for example, ease of access, proneness to flooding, agricultural potential and the likely challenges to infrastructure development. It has subsequently been refined and supplemented by other data sources, including the earlier feasibility studies, in order to triangulate findings and to identify any significant changes that have taken place on the islands over recent years.

The field visit observations and key data for 14 Chagos Archipelago Islands visited (13 outer islands and Diego Garcia) are summarised in Annex 3.1. The information includes important physical and environmental factors that will influence resettlement prospects. Key points are highlighted below. More comprehensive assessments of resettlement on Diego Garcia and two of the outer islands, based on these and other environmental factors, are shown in Sections 5 and 8. Whilst preferred island selection has been primarily driven by environmental & sustainability considerations, Annex 3.1 summarises a wide array of data and site observations that were taken into consideration when finalising choices. These factors included reef structure, ease of access, patterns of prevailing and seasonal winds, evidence that inundation occurred (e.g. accumulation of plastic debris), pattern of inland mangroves/vegetation, past occupation and overall island size and shoreline height and profile variability

All the islands are low-lying and most are classic coral cays (keys). Islands are situated on the rim of atolls, and there are no protected lagoonal islands. Consequently, most land is no more than a few hundred metres from a seaward-facing shore. Maximum elevations are generally around 2-3 m above high tide[1]. Key criteria for resettlement include:

- **Distances between islands**. Distance, whether from Diego Garcia or an outside point of 'origin', will influence transport times, costs and logistics in the event of resettlement[2].
- **Surface area, height and protection**. Island area influences the extent and type of resettlement options that can be accommodated. The previously inhabited island of Ile du Coin is approximately 130 hectares, while Boddam is slightly smaller, at 108 hectares, but they are not the largest outer islands[3].
- **Maximum island length and orientation**. These features influence an island's potential suitability for a commercial and passenger airstrip. BIOT islands visited with a length of approximately $\geq$ 2 nautical miles, include three outer islands[4] and Diego Garcia. This minimum length is a commonly accepted threshold for commercial passenger aircraft (See Section 6.2.2).
- **Former habitation of BIOT islands**. Only Diego Garcia is currently inhabited. Islands previously populated by Chagossians included Ile du Coin and Boddam; some other islands were also inhabited, temporarily[5], Past inhabitation of an island provides some indication of its potential for sustaining human population, although changes, for example in climate and technology, need to be considered.

- **Access to islands by sea and level of protection**. In the event of re-settlement, all such islands would need jetties/wharfs. Approach and ease of access for a small craft ranged from relatively easy (including Boddam[6]) to difficult or extremely difficult (including Ile du Coin[7]). Also important is the extent to which atoll rims are enclosed by islands and reef flats with good protection being found on Diego Garcia and Boddam[8].
- **Vegetation cover and inland access**. Islands visited are typically fringed with *Scaevola*, coconut trees, shrubs and various hardwoods, extending variable distances inland. Some islands have relatively dense vegetation, impeding access inland (including Boddam[9]) while others have less dense vegetation (including Ile du Coin[10]), sometimes as a result of past clearing.
- **Rainwater and groundwater**. In Diego Garcia, rainfall and aquifers meet freshwater needs of the current population. This groundwater, coupled with appropriate treatment and with additional rainwater harvesting from building roof run-off is a significant resource. Groundwater supplies and/or freshwater were evident on the islands visited. Depths varied according to distance inland, rock porosity and tidal cycles: values often ranged from 0.5 metres to 1.5-2 metres.
- **Soil and agriculture potential**. The level of organic matter and extent/depth of top soil provides an indication of agriculture potential. This ranged from 5 – 10 cm on some islands[11] (limited soil quality) to >30 cm on others (e.g. Ile du Coin[12]: richer soils). In some cases (e.g. Ile du Coin[13]) a clear link was evident between soil quality and potential for agriculture.
- **Inundation risk and overtopping by seawater**. This actual or potential hazard is highly relevant to agriculture as well as habitation and construction in general. Our analysis suggests that for some islands[14], the risk appears relatively low, while for others the risk is substantial (e.g. Ile du Coin, Diego Garcia – in certain areas[15]).
- **Ecology, wildlife and conservation significance**. On the islands visited, rats were observed on most[16]. Seabird life was nevertheless prolific on these islands[17]. The mangroves found on BIOT[18] are the most southerly in the Indian Ocean, and as such have significance.
- **Disturbances and impacts**. Only a few of the islands visited had evidence of historic construction, including Diego Garcia. Accumulation of solid waste and beach debris, in very high concentrations, was common however.

Hence, the provisional candidate island options considered in the evaluation of island options (See Sections 5.3 & 8.1) are Diego Garcia and, as exemplars of outer islands, Ile du Coin (Peros Banhos atoll) and Boddam (Salomon atoll), a view supported by the environmental questionnaire. For example, respondents noted the suitability of Diego Garcia over Ile du Coin and Boddam. In the main, respondents did not consider other islands suitable for re-settlement, especially as historically they had not supported permanent communities.

Several Chagossians have expressed views that all BIOT islands should be potentially open for resettlement. However, for logistical and financial reasons, this would be unrealistic. In the event of resettlement, the 3 islands noted are seen as ones that might initially be most suitable, mainly for practical reasons. However, resettlement on some other BIOT islands in the future is not necessarily precluded. Ile Pierre and Eagle, both of significant area (> 150 ha), and possibly other islands, might also be options in the event of any subsequent phase of resettlement, although relatively little is known about Ile Pierre. As noted in other parts of this report, many other factors also influence island suitability and prospects for any initial and subsequent resettlement.

3.2 Consultations and survey results

3.2.1 Consultations

Consultations were completed with the Chagossian community in Mauritius, Seychelles, Manchester, Crawley, and London. The purpose of this was to inform the Chagossian community of the study and consultation process, and to gather their views on this process and resettlement in general. Chagossians were also invited to submit formal papers or provide comments via email to the study team.

A community focus group guide was developed to facilitate conversation between the study team and the Chagossian community. It was designed to capture information on the Chagossians' expectations of what resettlement would involve, issues that matter the most to the community, and what life was like for the older generation when they lived in BIOT. The community focus group guide was successful in facilitation of the process of collecting information during the consultations.

Table 3.1: Key messages from consultation with the Chagossian community

Theme	Key messages
General	■ Attendees at all consultations expressed a preference for returning to BIOT permanently. It was clear that temporary visits to BIOT is not an acceptable option for the Chagossians. ■ A modern standard of living, (with differing views about the basis on which this would be determined). ■ Strong preference towards Diego Garcia being a part of the resettlement options. Chagossians would want the right to access all islands in BIOT.
Political/Legal	■ Village councils established as a means of Governance. ■ Rules and regulations around fishing would be acceptable.
Environmental	■ Environmental consciousness was apparently high. ■ Members of the group would be willing to play an active part in maintaining the environment of BIOT, including employment as environmental monitors. ■ Green technology, especially regarding energy generation, is of interest.
Social	■ Access to infrastructure currently on Diego Garcia or equivalent. ■ Access to school education, with access to universities in the UK. It was suggested that there should be university scholarships for Chagossians. ■ Basic public health services with a clinic, hospital, and pharmacy. ■ The community would be willing to provide paid labour for maintenance of BIOT.
Economic/Livelihoods	■ Wide range of employment skills ranging from unskilled and skilled technicians to professional. ■ Strong desire to be trained to develop skills that may be useful on BIOT if resettlement were to occur. ■ Strong interest in fishing for subsistence and as an income generating activity. Fish processing would provide opportunities for employment ■ Coconut use for both subsistence and for generating income. ■ Access to a state pension scheme. Concerns about access to an equivalent to the UK State Pension Credit. ■ Agreement that BIOT should be open to high-end tourism and eco-tourism.

Chagossians consistently brought up two issues in all meetings, but which are outside the scope of the study, namely:

- Clarity on who has the right to British citizenship – this is a priority concern of the Chagossians;
- The right to permanent residence in BIOT if resettlement were to go ahead. There was a concern that a narrow definition of who is eligible to resettle would prevent some family members from resettling.

Preliminary conclusions.

The consultations with the Chagossian community were successful in providing insights into what the Chagossians would expect of resettlement and how the Chagossians themselves can help ensure that any resettlement would be sustainable in the long run. The information gathered from the consultations helped the team to develop illustrative resettlement options for the purpose of analysis, gauge what the environmental effect of resettlement would be and how to mitigate this, and formulate livelihood options for potential settlers.

Those with high levels of expectations expressed that they would like to have facilities comparable to that on Diego Garcia currently, with additional, UK standard education and health facilities. Information on what infrastructure and facilities they expected helped inform the resettlement options. Some Chagossians expressed strong views that they would not accept anything but a 'modern' standard of living comparable to that of the average UK citizen. However, this was subsequently challenged in discussions held in Mauritius. The standards of living and infrastructure expected are worth further exploration, since affordability will ultimately influence any decision on whether to proceed with resettlement.

Many Chagossians are environmentally conscious and understand the risks resettlement would have to the environment. The community were keen that strict environmental monitoring takes place and expressed a desire to be trained to help carry out this monitoring. They understand the risks of overfishing and proposed that green technology be a part of resettlement, such as in energy generation.

The wide range of employment skills present in the Chagossian community has allowed the team to identify major livelihood options for a resettled community. A combination of vocational skills together with high level administrative and public service skills is important for the sustainability of a resettled community on BIOT. Tourism also has the potential to open up a variety of employment opportunities.

3.2.2 Environmental questionnaire survey

An environmental questionnaire was developed to seek views from identified stakeholders on the various environmental issues linked to resettlement[19]. Stakeholders included all members of CCT[20], and other stakeholders with technical environmental knowledge, particularly on Chagos and/or environmental issues related to resettlement[21]. The questions contained within the tool (Annex 3.2) relate to:

- The carrying capacity of individual islands;
- The potential impact of resettlement on the environment;
- The impact of the environment on resettlement; and
- Environmental monitoring requirements, should a decision to resettle be taken.

Further results of stakeholder views, including results of quantitative analyses, are summarised in Annex 3.3 Summary data on the background of respondents (anonymised), and which stakeholder group they represent, are also given in Annex 3.3.

Table 3.2: Key messages from the environmental questionnaire

Theme	Key messages
Resettlement option by island	Respondents were asked which islands they would consider to be most suitable for resettlement given each of the resettlement options. Diego Garcia is clearly thought to be the most suitable Island for resettlement with respondents believing that a modern lifestyle, a pilot resettlement, or a scientific research station being the most suitable options for the island.
Research station	Respondents were asked to consider whether a research station in BIOT would be an effective means of assessing environmental aspects of resettlement. 29 people said yes while only five said no. Examples were given of research stations in Aldabra, Seychelles, Laccadives, and Galapagos which could be used as models for a research station in BIOT. A large majority of respondents believed that there could be employment opportunities for Chagossians on the research station.
Impact of resettlement on the environment	Respondents were asked to assess the overall resilience/robustness of the islands and their reefs to resettlement impacts. Diego Garcia was thought to be the most resilient island to environmental disturbances likely to result from both subsistence and modern lifestyle resettlement. Most respondents believed that Ile du Coin and Boddam are both fragile and unsuited to resettlement. All other islands were deemed 'fragile'.
Impact of environment on resettlement	Respondents were asked how resilient/robust they thought different islands would be to absorb and recover from natural environment disturbances. Most respondents thought that the islands were fragile and vulnerable to natural events such as sea level rise and coastal erosion. While Diego Garcia was seen as having some capacity to absorb damaging impacts, given its larger land area, it was nonetheless thought to be vulnerable and only protectable through significant investment in shoreline protection.
Carrying capacity	Respondents were asked what they thought were the carrying capacities of the islands. For the modern lifestyle option Diego Garcia was assumed to have the largest carrying capacity, with the mean of the responses being 1,427 with a maximum of 5,000. The mean assumed carrying capacity of Ile du Coin and Ile Boddam were both below 100. For the subsistence option Diego Garcia was also assumed to have the largest carrying capacity, with the mean of the responses being 363 with a maximum of 3,000. The mean assumed subsistence carrying capacity of Ile du Coin and Boddam were again both below 100.
Environmental monitoring	A large majority of respondents thought that all listed types of environmental monitoring were necessary. Whether respondents thought Chagossians could be trained to carry out the environmental monitoring varied with each type of monitoring tool but the general consensus was that Chagossians could be trained to carry out environmental monitoring in some capacity.

3.3 Overview of resettlement options

The feasibility study inception report presented three potential options. These have been revisited in light of the team's field research and consultations. The subsequent research, in particular, has indicated that:

- Consultation has not given a clear indication of the likely level of demand for resettlement, with widely differing indications of the likely demand for resettlement;
- Conflicting views exist concerning the suggestion that expectations for infrastructure standards and access to basic service are high – akin to UK/other mainland standards; and
- Diego Garcia remains a preferred location.

In light of this, the analysis in the remainder of this report will be focused on the following three options:

- **Option 1: Large-scale resettlement (with a population of approximately 1,500 in the first instance)**. This assumes a substantial settlement, with economic opportunities built around activities such as tourism and/or commercial fisheries. This form of resettlement would require infrastructure development on both Diego Garcia and the outer islands of the archipelago, in order to provide adequate support services for the returning population. Any resettlement on the outer islands would probably require zoning of the No-Take MPA, with repopulation of only one or a few islands, to help contain development pressures to a small part of the archipelago.
- **Option 2: Medium-scale resettlement (with a population of 500)**. This scenario envisages a medium-sized population of resettlers, whose livelihoods could be supported in a number of ways: for example, the management of the Marine Protected Area, activities such as artisanal fishing, or employment on the US Naval Support Facility on Diego Garcia.
- **Option 3: Pilot, small-scale resettlement, with incremental growth over time (initial population of 150)**. This scenario serves as a middle ground between permanent substantial resettlement and the status quo. It would require some limited investment in infrastructure and facilities, likely on Diego Garcia, in order to enable interested Chagossians to return to BIOT on a pilot basis, allowing for incremental growth over time if the pilot is shown to be successful.

These options are neither mutually exclusive nor exhaustive. For example they can be seen as representing a progression from a pilot community (option 3), with over time the development of larger communities (options 2 and 1). Option 1 could be developed without any outer island settlement (though in practice there would be limits on the size of the population of Diego Garcia imposed by economic and environmental constraints). In theory an option could be developed which was based only on outer island settlement but this has been discounted on environmental and practical grounds (See Section 5).

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[1] Except for islands having a raised reef and with cliffs about 6 m above high tide. Seismic activity (upthrust) likely contributes to this.

[2] Direct distances are most relevant for air travel, while distances via 'waypoints' relate to sea travel and are longer.

[3] Eagle and Pierre are larger than 150 hectares.

[4] Sudest, Eagle, Pierre.

[5] For example Sudest (abandoned), Eagle (abandoned) and Diamant (former leper colony).

[6] Also Sudest, Takamaka, Fouquet.

[7] Also Eagle, Middle Brother, Nelson.

[8] The least protected islands visited are Eagle and Middle Brother (Great Chagos Bank) and the most protected – besides Diego Garcia – are Takamaka, Fouquet and Boddam (Salomon atoll).

[9] Also Sudest, Diamant, Moresby.

[10] Also Eagle Yeye.

[11] E.g. Sudest, Sipaille.

[12] Also Pierre, Takamata, Fouquet.

[13] Also Sudest.

[14] E.g. Sipaille, Middle Brother, Pierre, Yeye, Nelson.

[15] Also Moresby Sudest, Eagle.

[16] Except on Middle Brother and Nelson.

[17] Especially Nelson.

[18] Eagle and Middle Brother.

[19] 51 responses were received, although respondents did not always answer every question.

[20] The former Special Scientific Group (SSG – no longer an entity).

[21] 145 people were sent the questionnaire, and responses were received from 51, more than one third of the total. (Respondents did not always answer every question).

4 Legal and Political Analysis

4.1 Introduction and overview

4.1.1 Aims and objectives of this analysis

This Section outlines the legal implications of a return of Chagossians to the BIOT. The current legal framework for BIOT is designed for islands uninhabited apart from those working on the US Naval Support Facility on Diego Garcia. The legal framework for BIOT is therefore quite different to that for any of the inhabited British Overseas Territories.

There are no insurmountable legal obstacles that would prevent a resettlement on BIOT. It will, however, be necessary to prioritise the legal provisions which require immediate change and identify those which can be put in place in the longer term. This Section highlights the main legal areas which might require attention should resettlement go ahead. Consultation with the Chagossians as well as other interested stakeholders should take place in respect of specific proposed legal changes.

This Section includes a comparative analysis with the legal frameworks governing other British Overseas Territories, and in particular those territories inhabited by a relatively small number of people[1] which are likely to be most similar to BIOT.

4.1.2 Legal background

BIOT is one of 14 territories under British Sovereignty now known as the British Overseas Territories. All of these territories are part of '*Her Majesty's dominions*' as territories which belong to the Crown and are also British possessions. The territories are constitutionally separate both from each other and from the United Kingdom, which is defined in the Interpretation Act 1978 as Great Britain and Northern Ireland. Nevertheless each of the territories is constitutionally linked with the United Kingdom as the sovereign power. Each inhabited territory has its own government and legislature. Laws can also be made for the Overseas Territories by United Kingdom Act of Parliament or by Order in Council made by Her Majesty on the advice of the United Kingdom Government.

4.1.3 The constitutional and legal framework of BIOT

Each British Overseas Territory has its own written constitution which has been approved by Her Majesty as an Order in Council by and with the advice of the Privy Council, upon the recommendation of United Kingdom Government. These Orders are based either upon the common law prerogative power of Her Majesty or, and sometimes in addition to, a statutory power. In only two cases (BIOT and Gibraltar) are the constitutions contained in Orders in Council made exclusively by virtue of the Royal prerogative. The British Indian Ocean Territory (Constitution) Order 2004 is the current constitutional framework in place for BIOT.

The BIOT constitution set out in the Order referred to above provides the legal framework for the governance of BIOT. It establishes the office of the Commissioner who exercises executive power on behalf of Her Majesty for BIOT. The Commissioner may make laws for the peace, order and good government of the Territory. The constitution makes allowance for the continued functioning of courts on the islands as in existence before the constitution and makes certain directions for their future functioning. Importantly, Article 9 of the constitution is clear that the main purpose of BIOT is for defence and that there is no right of abode for anyone on the territory:

1. Whereas the Territory was constituted and is set aside to be available for the defence purposes of the Government of the United Kingdom and the Government of the United States of America, no person has the right of abode in the Territory.
2. Accordingly, no person is entitled to enter or be present in the Territory except as authorised by or under this Order or any other law for the time being in force in the Territory.

In addition to the constitution there is also statute law in force in BIOT comprising of Ordinances made by the Commissioner, and statutory instruments made under them, in addition to Orders in Council and Acts of the United Kingdom Parliament which have been extended to the Territory. Sections 3 to 5 of the Courts Ordinance 1983 are important to note as they allow for the incorporation of English statutes, common law and rules of equity in BIOT law insofar as they are applicable and appropriate to local circumstances. The present constitutional and governance framework for BIOT is not designed for a territory with a permanent population.

The position of Commissioner of BIOT is filled by a senior official in the Foreign and Commonwealth Office (FCO), who is assisted by an Administrator, both of whom are based in London within the FCO. The Commanding Officer of the Royal Navy/Marine contingent based on Diego Garcia acts as the Commissioner's Representative within the Territory.

In 1966, by Exchange of Notes between the US and United Kingdom governments, a treaty was made defining use of the territory, and Diego Garcia in particular, by the two governments for defence purposes with the presumption being that the islands would have no permanent population. The treaty is for an initial period of 50 years, until 2016 when it renews automatically unless either Government gives notice to terminate between December 2014 and December 2016. Any resettlement will therefore require review of the details contained in the treaty.

BIOT is noted for its exceptional marine environment. In 2010 the United Kingdom government proclaimed a Marine Protected Area from the outer limit of the territorial sea (three nautical miles) to approximately 200 nautical miles surrounding the islands (See Section 4.4.1 for details). In addition, many other domestic legal restrictions are in place to protect the terrestrial environment and the coral reefs and inshore waters of BIOT. These legal protections have again been designed for a territory with no permanent population, although some pre-date the removal of the original islanders (e.g. The Green Turtles Protection Regulations 1968). Any resettlement will therefore require amendment to the environmental protection framework to allow for a settled population whilst also protecting the environment.

4.1.4 Adapting the legal framework to facilitate resettlement

Given the current legal framework for BIOT as outlined above it is clear that considerable amendment will be required to facilitate a sustainable resettlement of Chagossians. This Section will focus on the following areas identified as being a high priority:

- The constitutional and governance framework;
- Treaty arrangements between the US and the UK for the use of BIOT; and
- Environmental protection laws and conventions.

4.2 Constitutional and governance framework

The current constitutional and governance framework for BIOT is designed for a territory used solely for defence purposes. If BIOT is resettled there are several areas of governance that will require immediate attention. The right of Chagossians to return and live on BIOT needs to be set out both in the constitution and related immigration ordinances and the British Indian Ocean Territory (Immigration) Order 2004. The status of Her Majesty's executive representative, either as Commissioner or Governor, as well as his powers and functions need to be dealt with, as does the establishment of a representative body for Chagossians to advise and support the executive. The system for passing local laws and the establishment of a resident judicial system need to be

reviewed. Other areas that require attention include the civil service, police and fundamental human rights protection.

4.2.1 Amending the constitution

Ascension, the British Antarctic Territory, the Falklands Islands, Pitcairn, South Georgia and the South Sandwich Islands, and Tristan da Cunha have their constitutional frameworks based upon the British Settlements Acts 1887 and 1945. BIOT was acquired by Britain by cession from France and therefore the British Settlements Acts cannot be used as the basis for any constitutional change to BIOT under the Acts' own definition. Other Overseas Territories that the British Settlement Acts do not apply to are St. Helena, Cayman Islands, Montserrat, the Turks and Caicos Islands, the Virgin Islands, Anguilla, Bermuda and Cyprus, all of which have the statutory legal basis for their constitutional frameworks based upon separate acts of the United Kingdom Parliament. As previously mentioned, BIOT and Gibraltar have their constitutions contained in Orders in Council made exclusively by virtue of the Royal prerogative. Any change therefore to BIOT's constitutional framework can be made either solely under the Royal prerogative or on the basis of a United Kingdom Parliamentary statute.

The issue of whether any new constitution for BIOT is based solely upon Her Majesty's prerogative powers or on a United Kingdom statute raises a number of issues. The former basis is subject to judicial review on grounds of irrationality and procedural impropriety as has been shown in previous legal cases relating to BIOT. It is also the case that a constitutional order made under statutory powers is likewise subject to judicial review, at least insofar as to determine whether it is within the powers granted by the parent Act. The most important potential difference is the possibility for the UK Parliament to make statutory provision for oversight of Constitutional Orders made under legislation. In the past Parliament has hesitated to do more than require Orders to be laid before Parliament after being made and others, such as the Saint Helena Act 1833, the Anguilla Act 1980 and the Cyprus Act 1960, do not even have this requirement. Orders made only on the basis of the Royal Prerogative are not required to be laid before Parliament. However it has been noted:

Since 2002 political arrangements have operated whereby most constitution Orders have been sent in draft by the Foreign and Commonwealth Office to the House of Commons Foreign Affairs Committee where possible at least 28 sitting days before they were submitted to Her Majesty in Council. This procedure was not followed in the case of the British Indian Ocean Territory Constitution Order 2004.[2]

Given the need for flexibility in the event of any resettlement it may be considered prudent to allow for less direct Parliamentary oversight over new constitutional arrangements, at least until a permanent constitution has been agreed with the caveat that all interested parties are properly consulted. Under the present arrangements for passing a constitution by Order in Council the actual procedure is relatively straightforward. The new constitution is recommended to Her Majesty by the United Kingdom Government with the Order formally made by Her Majesty based on the advice of the Privy Council.

4.2.2 Amending the constitution: the consultative process

It should be highlighted that the practice in recent years has been to reach political consensus with the representatives of the territory concerned as to any constitutional changes. Almost all recent constitutional review negotiations have taken place on the basis of proposals emanating from the territories themselves. The importance of such consultation with Chagossians on the constitutional reform process is clearly established. Given the environmental significance of BIOT it would seem prudent to also consult with environmental stakeholders.

In other British Overseas Territories recent constitutional change has taken place either after referenda, by resolution of the locally-elected body or by more informal local consultation. Given the challenges in carrying out effective consultation where the Chagossian population is so spread out, it may be appropriate to consider a temporary constitutional framework to replace the existing one during the initial stages of any resettlement and at a later stage, when Chagossians living on BIOT have had the opportunity to gauge the needs of life on the islands, to adopt a more permanent constitution. Such an interim constitution could contain the basic provisions necessary to legally allow resettlement on BIOT and also to facilitate a temporary governance framework which would support the development of a permanent constitution. If the decision is taken to develop a temporary constitutional framework it will require consideration as to whether an open consultative process is required, perhaps through a representative conference, or whether in the interests of expediency only the bare minimal changes to the current framework are made with the understanding that a comprehensive consultative process will take place subsequently. It is suggested that a roadmap for this process could be set out in a policy paper to be discussed with Chagossian representatives rather than the details specifically being included in any interim constitutional framework.

4.2.3 Towards a new constitution and legal framework

Nationality and right of abode

On 10 June 2004, Her Majesty by Order in Council enacted the Constitution Order and a separate Immigration Order. As mentioned previously, these Orders specifically exclude any person from having a right of abode in the territory or from entering the territory without a permit issued by the Commissioner's representative.

The issue of Chagossian nationality and subsequent right of abode is complicated as since the 1970s Chagossians have been excluded from the territory and have been dispersed, mainly in Mauritius, Seychelles and the UK. Under the British Overseas Territories Act 2002 all British Overseas Territories citizens as of 21 May 2002 were granted British citizenship. By the same Act a person born after that date becomes a British citizen if, at the time of birth, his or her father or mother is either a British citizen or settled in the territory. Section 6 of the 2002 Act made special provision for Chagossians by conferring British citizenship and/or British Overseas Territories citizenship on persons connected by descent with the British Indian Ocean Territory with the conditions being that the person was:

- Born on or after 26 April 1969 and before 1 January 1983;
- Born to a woman who at the time was a citizen of the United Kingdom and Colonies by virtue of her birth in the British Indian Ocean Territory; and
- Immediately before 21 May 2002 was neither a British citizen nor a British Overseas Territories citizen.

Under Part II of the British Nationality Act 1981 Overseas Territories citizenship may be acquired by birth or adoption in a territory, by registration or naturalisation in a territory, or by descent from a British Overseas Territories citizen. Under Section 43 of the same Act the functions of the Secretary of State are delegated to territory Governors.

If resettlement goes ahead some Chagossians would not be eligible for British Overseas Territory citizenship based on the above legal framework. One example would be a child born to a Chagossian who themselves was not born on BIOT, which is quite common.

While it would be possible to allow for resettlement of Chagossians by granting of a temporary permit to reside in BIOT by the Commissioner's Representative, and this may be a viable short term option, the issue of Chagossians having Overseas Territory citizenship and right of abode is one that will require immediate attention should resettlement go ahead. The issue of citizenship is an emotive one for all Chagossians.

In some territories a status commonly known as 'belonger status' has been established whereby, under the constitution or local legislation, persons are given the right of abode in a territory. This status and its definition vary from territory to territory but it can be said to apply to two groups of people, those considered indigenous to the territories and those who have been granted the status, usually longer term residents, through means established under local legislation. It is common that 'belongers' have preferential rights with regards to employment, property rights and participation in local government such as the right to vote and right to hold public office. In any future constitution for BIOT this status could be used as a potential option to resolve issues surrounding the right of abode.

In some territories the right to protection against arbitrary deprivation of the right of abode in the territory and/or ' belonger' status in the territory is included in the constitution. Given BIOT's unique circumstances this would also have to be considered an option in any changed constitution.

It should be stressed that Chagossians may have rights by virtue of their citizenship or residence in the United Kingdom or elsewhere. How these rights would be affected, if at all, by resettlement is not within the scope of this study.

Land rights

The Acquisition of Land for Public Purposes (Repeal) Ordinance 1983 repealed earlier Ordinances and declared that all the land in BIOT is Crown Land. One issue with resettlement will be dealing with perceptions of land rights over land formerly used by Chagossian families even though the land previously was owned by the various plantation owners. One of the powers a Governor has under a territory constitution is power to dispose of Crown Land. Under Article 14 of the BIOT Constitution the Commissioner is delegated authority to dispose of land on behalf of Her Majesty. In the short-term, any resettlement will require development of a process to allocate use of land by the BIOT government to returning Chagossians.

Governor or commissioner

Under the existing Constitutional framework Her Majesty is represented in BIOT by a Commissioner who in practice is based in the FCO in the UK. In all British Overseas Territories which are inhabited by permanent populations, rather than by scientific or military outposts, Her Majesty is represented by a Governor. It should be noted that the office of Governor of Pitcairn is in practice held by the British High Commissioner to New Zealand and is therefore resident in New Zealand. The Governor of Ascension and Tristan da Cunha is resident in and also Governor of Saint Helena. It would seem likely that in the event of resettlement a Governor would, at least in the longer term, be appointed but not necessarily resident in BIOT. One option would be to follow the Pitcairn example and give the role to the British High Commissioner in neighbouring Maldives or Mauritius, depending upon agreement from all relevant parties.

In terms of definition of the role of Governor, Schedule 1 to the Interpretation Act 1978 is most concise:

'Governor', in relation to any British possession, includes the officer for the time being administering the government of that possession.

This definition is broad enough to include the role of Commissioner as it currently exists for BIOT and in this Section references to the powers of a Governor should be read as the same as those of a Commissioner . In essence, the Governor is the head of government of a territory. The Governor of any overseas territory is appointed by Her Majesty, and in almost all cases the appointment is made by Royal Commission on advice of Her Majesty's United Kingdom Ministers. Regardless of whether a Governor is appointed or whether the current position of Commissioner continues it is likely that senior civil servants will be required to take responsibility for managing the resettlement process based both in the UK and also in BIOT.

Box 4.1 Other Overseas Territory Case Studies

In **Pitcairn** an island Council is constituted by the constitution with members of the Island Council elected to office in free and fair elections held at regular intervals. In practice the Council has twelve members, seven of whom are elected including the Mayor, Deputy Mayor and five Councillors, all with voting rights. The other five members are the Governor, Deputy Governor, a Commissioner who liaises between the Council and the Governor and a Governor's Representative all of whom are non-voting ex-officio members of the Council. The elected members of the Council and the Deputy Mayor all serve two-year terms. The Mayor is elected for three years and can serve a maximum of two consecutive terms at a time. Subject to the orders and instructions of the Governor the island Council may make, amend or revoke regulations for the good administration of the island, the maintenance of peace, order and public safety and the social and economic betterment of the islanders. The same Ordinance also lists a wide area of governance areas that the Council can issue regulations on, including public health, traffic, public works, etc. It is important to note that the Governor can alter, vary or revoke any regulations made by the Island Council. The Mayor, as President of the Council, acts as Chief Executive Officer for the islands on behalf of the Governor. The position of Island Secretary and Government Treasurer are also established by this Ordinance.

Ascension Island's Council consists of the Governor, seven elected members, three ex-officio members including the Administrator, Attorney-General and Director of Resources with none of the three having a vote. Under the same Ordinance, the Governor shall consult the Council in the formulation of policy in relation to the exercise of all functions conferred upon him in relation to or in respect of Ascension and acts in accordance with the advice given to him by the Council. However the Governor is not obliged to consult the Council in a variety of situations including where acting within his express discretion and upon instruction from the Secretary of State, and importantly the Governor is not subject to judicial review in relation to a decision not to consult with the Island Council. In Ascension, a Finance Committee is established and the Governor has the authority to establish other committees under the same ordinance.

Local council

While the role and authority of the Governor is explained below, in the less populated Overseas Territories some form of local council, cabinet or executive body – elected or appointed – is established by constitution to, at the very least, advice the Governor and in some cases to exercise limited executive and legislative functions. Limits on the powers of these local bodies may be set out in implementing legislation rather than in the Constitution itself, presumably to allow for greater flexibility.

The issue of what kind of representative body is to be established for Chagossians needs to be discussed with any resettling population. It may be more realistic for a temporary consultative body to be put in place until a more permanent structure can be agreed and established by constitution or local Ordinance. The process for selecting the members of such a consultative body, temporary or permanent, will not be simple given the unique context of BIOT. It is suggested that such a body will, initially, have to include representatives of the Chagossian community from as many areas where they are settled as is feasible. In the future, once it is considered realistic to establish a permanent council, the question as to how to include the views of Chagossians living outside of BIOT, but with an expressed interest in resettling, will also have to be considered.

Role and authority of the Governor

The Governor's authority is limited to that conferred on him or her by the Crown, with whom executive authority rests, and by Acts of Parliament or other laws. The constitution of a territory is where the specific powers and duties of a Governor are set out. The Governor, in the exercise of those functions, is subject to judicial review in the Overseas Territory and in the UK.

In most territories the Governor exercises the role of executive authority in the territory on behalf of Her Majesty. In smaller territories where there is no elected legislative body, the Governor also fulfils the role of the legislature in the territory. Regardless of what powers may be delegated to any local council or other executive body, in all Overseas Territories the Governor retains specific special responsibilities. These responsibilities invariably include emergency powers, external affairs, internal security, defence and the public service.

Executive functions. The constitution should specify which functions the Governor must exercise on instructions from Her Majesty or the Secretary of State, or after consultation, recommendation or approval from any local elected Cabinet or Executive Council as well as functions which can be exercised without reference to any local person or body.

Currently the BIOT Commissioner has authority to dispose of Crown land, to constitute public offices and the power of pardon. These are also common amongst other British Overseas Territories. Even in Overseas Territories with elected governments, certain areas are reserved for the Governor including external affairs, defence, internal security and the appointment and removal of public officers. In other territories areas such as finance, administration of justice and shipping are also reserved for the Governor. In some of the larger territories a Ministerial system of government exists with the constitutions setting out what powers can be delegated by the Governor to Ministers. Similarly, in territories with elected legislative bodies the Governors have a constitutional power to dissolve that body, usually on the advice of the Premier or Chief Minister. Given the size of any potential resettlement it is not likely, at least in the short and medium term, for a ministerial system or an elected legislature to be appropriate in the case of BIOT.

Legislative functions

In Overseas Territories with no elected legislative body, as BIOT is currently, the Governor is constituted as the legislature by the Constitution and must act within the scope laid out in the constitution. Under BIOT's current constitution the Commissioner is given power to make laws for the peace, order and good government of the territory. For Ascension and Tristan da Cunha, the Governor has this legislative power but must first consult the Island Council in each case. The situation is similar in Pitcairn, however the Governor there also has the power to make laws without consulting the Island Council when instructed to do so by a Secretary of State. In some other territories with an elected legislature, the Governor has a limited right of passing legislation based on prescribed procedures. Aside from this, a Governor's main role in territories with elected legislatures is that of giving assent to legislation passed. Given the scale of the resettlement options for BIOT, it would appear that the models from Pitcairn and Ascension and Tristan da Cunha are most relevant, where the Governor has legislative power but must usually consult with an island council.

Except in Gibraltar, the constitutions of all British Overseas Territories contain a provision for Her Majesty, through a Secretary of State, to disallow any law enacted by legislature in those territories and this power is usually unlimited in scope. While this power is rarely exercised there is no reason to suggest it is not a power which should be included in any new BIOT Constitution.

As noted earlier Sections 3 to 5 of the Courts Ordinance 1983 allow for the incorporation of English statutes, common law and rules of equity in BIOT law in so far as they are applicable and appropriate to local circumstances. The provisions of this Ordinance would allow the legal framework of BIOT to evolve on a gradual basis without leaving any potential major legislative gaps.

Emergency powers

In all Overseas Territories the Governor has considerable special powers in the event of an emergency which includes the power to declare an emergency and issue emergency regulations with the force of law during the period of emergency. These provisions should be included in any new constitutional arrangement for BIOT. In the Cayman Islands, the Virgin Islands and Montserrat, the legal basis for these powers is in the Constitution while in other Overseas Territories it is set out in Orders in Council or local legislation.

Public service. A major role for any Governor is responsibility for the Public Service. The Governor essentially has the authority over the Public Service and is responsible for the good government of the territory. Given that only a limited Public Service exists for BIOT, considerable discussion will have to go into planning to ensure that the Public Service is adequate to provide for the needs of a resettled population as well as cost-effective. Any new Constitution for BIOT will have to set out the Governor's main responsibilities vis-à-vis the Public Service and will likely require further local laws to define the details of the Governor's responsibilities.

All Overseas Territory constitutions give the Governors the power to constitute offices for the territory and also to make appointments to a variety of offices. This would in some cases include the appointment of the Premier or Chief Minister, other Ministers and judicial and public service appointments. The constitutions specify how such decisions and appointments are to be made including the level of consultation required with the local representative body. Article 7 of the BIOT Constitution grants the Commissioner these powers which could be used during any resettlement process without requiring constitutional change.

External affairs

In every Overseas Territory the Governor retains responsibility for external affairs. Ultimately these responsibilities are in the control of the Secretary of State as the territories have no international legal personality separate from the United Kingdom. In the less inhabited territories including Pitcairn and Ascension and Tristan da Cunha no reference is made to external affairs in the territory constitution and it is therefore presumed that responsibility remains with the Governor. In the St Helena constitution the Governor has the discretion to assign limited responsibilities for external affairs to either a member of the Executive Council or Legislative Council, and is obliged to consult, but not obliged to follow the advice of, the Executive Council on matters relating to external affairs.

Defence, customs and policing

Constitutional responsibility for defence, public order, security and emergency powers are always the responsibility of the Governor of an Overseas Territory, and in some special circumstances are the responsibility of the commanding officer of any military post. In the less inhabited territories this is not always described in detail as the presumption is that such responsibilities belong to the Governor.

In the Falkland Islands constitution the Governor must consult the Commander of the British Forces before taking any decision relating to defence or internal security and must act in accordance with the Commander's requests. The Armed Forces Act 2006 extends to the British Overseas Territories and in general UK forces present in an Overseas Territory are subject to that territory's law, however the United Kingdom Forces (Jurisdiction of Colonial Courts) Order 1965 as amended does withdraw jurisdiction from civil courts in several of the territories for certain offences.

In most Overseas Territories and certainly in the lesser-populated territories the Governor exercises executive responsibility for internal security and policing and may act against the advice of any local executive or council. Currently in BIOT the Commissioner appoints Police Officers (formerly known as 'peace officers'), drawn from members of the UK military contingent stationed on Diego Garcia, under his powers in the Courts Ordinance 1983. Frequently the same individuals are also immigration and customs officers for the Territory, appointed under the BIOT (Immigration) Order 2004 and the Imports and Exports Control Ordinance 2009 respectively. For the present, there is no reason why this arrangement cannot continue in place. In more substantially inhabited territories there is usually a separate and independent police force acting independently from that of the UK military. The Pitcairn model is similar to the present multi-functional BIOT arrangement with one Police Officer appointed by the Governor, who also functions in practice as an immigration and border officer. In Pitcairn the Police Force is not established as a separate entity and the Police Officer is appointed as other local government officers are under the Local Government Ordinance 2014. In St. Helena, Ascension and Tristan da Cunha an independent Police Force is established with Headquarters in St. Helena. The Police Force is responsible for policing, fire and rescue, immigration and prisons. They are also assigned to carry out their duties on Ascension and Tristan da Cunha. This latter model would be costly to replicate in BIOT and it is suggested that the simpler, and current BIOT/Pitcairn type model is the optimum short and medium term solution for BIOT.

Acting Governor and the Office of Deputy Governor

It is common for Overseas Territories' constitutions to provide for the appointment of an acting Governor during a temporary absence or incapacity of the Governor. There is also a possibility to create a permanent office of Deputy Governor which is a distinct office in addition to or as an alternative to an Acting Governor position. In any event, the constitution should include provision for circumstances where the Governor is absent or incapacitated which can include appointing the Deputy Governor or someone else as acting Governor with specific authorities granted under the appointment.

In some territories the office of Deputy Governor exists, appointed by the Governor with approval of a Secretary of State, directly by Her Majesty on approval or by instructions given through a Secretary of State. The Deputy Governor in some cases must be a 'belonger' of the territory. The powers of the Deputy Governor are usually specified in the constitution. Although few of the lesser inhabited territories have this position, it is still a possibility for a resettled BIOT in the longer term.

Judiciary

Under Courts Ordinance 1983 a Magistrates' Court and a Supreme Court, acting as a superior court of first instance, are established for BIOT with Magistrates and Judges appointed by the Commissioner. The Supreme Court is made up of a Chief Justice and may sit in the United Kingdom if, in the opinion of the Chief Justice, it is in the interests of justice to do so. The Officer in charge of the Royal Naval/Marine contingent on Diego Garcia is in practice appointed as a local magistrate and a

non-resident Senior Magistrate is also in place. There is a Court of Appeal and as is the case for all Overseas Territories there is a right of final appeal to the Judicial Committee of the Privy Council. It would seem therefore that a resettled BIOT would not require any immediate changes to the judicial architecture in place, however provision will need to be made to have the courts sit as and when needed. If regulatory change is needed it can be made directly under the Royal prerogative through Orders in Council or, if appropriate through local Ordinance.

One issue which could need attention is the jurisdiction of the various courts, and in particular if a fundamental rights Section is introduced to the constitution it would be normal to specify a right of appeal to the Supreme Court of the Territory and then to the Privy Council in cases seeking enforcement of fundamental rights provisions. In practice, as with other less populated territories such as St Helena, Ascension and Tristan da Cunha and Pitcairn where there are no resident legally qualified magistrates, these courts would rarely sit and would be required to visit the islands as and when needed.

No Governor has any judicial function in the Overseas Territories except in some circumstances to make judicial appointments. The current Commissioner of BIOT is given no powers under the constitution to make such appointments however under the Courts Ordinance 1983 he is responsible for all judicial appointments. In some territories a Judicial Services Commission fulfils this role but it seems unlikely that it would be required in BIOT, at least in the short and medium term, given the likely small caseload.

Law officers

Every British Overseas Territory government has a Law Officer as principal legal advisor usually also filling in the role of Attorney General. In the less populated territories such as Pitcairn, and BIOT, the Law Officer is not resident. Currently in BIOT there is a Principal Legal Adviser and General Counsel, who are resident in the UK, appointed by the Commissioner. The Principal Legal Adviser is also responsible for all prosecutions under the law. It is likely given the amount of legal reform required for BIOT in the event of a resettlement that a resident Law Officer could be considered, at least in the short-term. In territories where the post exists the Attorney General is an ex officio member of the local executive body and legislature and this could be considered an option for any Island Council established for BIOT. If so, the role would need to be outlined in any new constitution or governance Ordinance for BIOT. In Pitcairn and St Helena, Ascension and Tristan da Cunha the constitutions set out that the Governor appoints the Attorney General upon the approval of the Secretary of State. In both constitutions it is specified that the Attorney General, or those acting under his authority, act independently in the exercise of their functions from the Governor or any other authority or person in the territory, and in other territories acts independently in his prosecution functions only.

Civil service and public finance

In most territories the public service is usually defined in the constitution along with areas such as policing and prison services with all such personnel being Officers under the authority of the Governor. In some cases this power is exercisable by the Governor independently, or else upon the instruction from a Secretary of State. It is also open for the Governor to be advised on appointments and dismissals by a local advisory body. In more substantially populated territories the constitution creates a Public Service Commission to advise the Governor, however this may not be appropriate for BIOT in the short and medium term. It would be common for General Orders to be issued by a Governor on the local government regulating the public service and setting out conditions of service. In both Pitcairn and St. Helena, Ascension and Tristan da Cunha the constitutions require the Governor to approve a Code of Management for the public service.

Each overseas territory has its own public funds, rules for raising and spending revenue, and audit arrangements. Territories can benefit from funding assistance from the United Kingdom although they are generally expected to be self-sufficient. Territories can also benefit from access to EU and other development funding and loans. In the less populated territories responsibility for public finance

belongs to the Governor as part of his executive role. However the power to raise revenue requires the authority of a legislative act. It is also common for a consolidated fund to be established under the constitution with local legislation outlining how the fund is to be managed. It is suggested that an immediate priority given any resettlement will be to establish the Governor's authority to raise revenues through a local Ordinance and in addition to establish a consolidated fund in order to finance resettlement activities. It is modern practice that all such funds would be subject to an independent audit. In Pitcairn and Ascension and Tristan da Cunha provision is included in their constitutions for an independent audit to be carried out with the Governor required to make appropriate arrangements for an audit, and it is suggested that the same could be considered for any change to BIOT's constitution.

Human rights

In the United Kingdom government's 1999 white paper entitled, 'Partnership for Progress and Prosperity: Britain and the Overseas Territories' it is stated:

Our objective is that those territories which choose to remain British should abide by the same basic standards of human rights, openness and good government that British people expect of their Government. This means that Overseas Territory legislation should comply with the same international obligations to which Britain is subject, such as the European Convention on Human Rights and the UN International Covenant on Civil and Political Rights.

As BIOT has had no permanent population it has been the position until now that no international human rights treaties which the UK has ratified were considered applicable in BIOT by the UK government.

The Human Rights Act 1998 does not extend to any of the territories and it has therefore been the practice that human rights protection is instead provided for in each Overseas Territory's law either through Orders in Council or local legislation. In cases where new constitutions for the territories have been drafted since the White Paper in 1999, the United Kingdom government has insisted on inclusion of a fundamental rights chapter with both the European Convention on Human Rights and the UN International Covenant on Civil and Political Rights (ICCPR) given effect. In some territories the fundamental rights chapter goes even further than the UK Human Rights Act 1998 and these two conventions. In all territories the rights and the precise wording used have been agreed after extensive consultations with the local population in order to ensure provisions reflect the wishes of the inhabitants and are also appropriate for each territory's unique circumstances. One example is that there is no right to a trial by jury in Pitcairn's constitution due to the small population (approximately sixty-seven) which would make it impracticable. In all territories with a fundamental rights chapter in the constitution there is an automatic right of any person to apply to the territory Supreme Court (or local equivalent) for enforcement of their rights with the court usually having jurisdiction to award damages.

In some territories an independent Human Rights Commission or Ombudsman or Complaints Commissioner is established under the constitution with the jurisdiction to investigate allegations of human rights abuses by public officers. In Pitcairn and St Helena, Ascension and Tristan da Cunha a Complaints Commissioner's office is established with the Commissioner appointed by the Governor 'from time to time', allowing the flexibility to appoint a Commissioner as and when needed.

The European Convention on Human Rights including the right to individual petition to the European Court of Human Rights has been extended to all territories apart from Pitcairn, British Antarctic Territory and BIOT. Protocols No.1 and No. 13 to the Convention have also been extended to most territories but not BIOT. Other conventions which have been extended to some territories include the International Convention on Civil and Political Rights, International Covenant on Economic, Social and Cultural Rights, UN Convention Against Torture, UN Convention on the Elimination of all forms of Racial Discrimination, UN Convention on the Rights of the Child and the UN Convention on the Elimination of Discrimination against Women, as well as others. It is the position of the UK

government only to extend these conventions to territories that are permanently settled and with the capacity to fulfil the obligations which extending them incur.

Should a resettlement go ahead, it is suggested that a priority should be the consideration of what short and longer-term human rights framework for BIOT is desirable and where capacity building support would be required. It is likely the extension of the European Convention of Human Rights, including the right to individual petition, in addition to the International Convention on Civil and Political Rights would have the highest priority. This would ensure that over a period of time a basic human rights framework is in place which meets the basic obligations the UK has accepted. It would, however, require UK government support to ensure that the requisite implementation and reporting mechanisms are in place relatively early. The other international human rights conventions mentioned above should be considered for extension to BIOT as and when the capacity to fulfil their obligations is in place.

European Union

Although BIOT and most Overseas Territories are not part of the European Union they have the status of 'overseas countries and territories' for the purposes of Part Four of the Treaty on the Functioning of the EU and are listed as such in Annex II to that treaty. Under a European Council Decision valid from January 1 2014 until the end of 2020, BIOT forms part of an association of overseas countries and territories with the European Union ('Overseas Association Decision'). Although not third countries, the Overseas Countries and Territories (OCTs) do not form part of the single market and must comply with the obligations imposed on third countries in respect of trade, particularly rules of origin, health and plant health standards and safeguard measures. The Overseas Association Decision moves the relationship between the Union and the OCTs to a reciprocal partnership to support the OCTs' sustainable development. The EU Decision establishes an association of the OCTs with the Union (the 'association'), which constitutes a partnership, based on Article 198 of the Treaty on the Functioning of the European Union, to support the OCTs' sustainable development as well as to promote the values and standards of the Union in the wider world.

Importantly A rticle 43 of the EU Decision removes all customs duties for any products imported from the OCTs into the European Union, and Article 44 ensures that no quantitative restrictions apply on goods imported from OCTs. Under Article 45 the OCTs can impose customs duties and/or quantitative restrictions on products imported from the EU. Under Part 4 of the same Decision OCTs are able to apply for European Development funds and technical assistance for their sustainable development as well as for humanitarian or emergency purposes. A total of €364.5 million is allocated for these purposes[3] until the end of 2020 with a further € 100 million available for loans through the European Investment Bank (EIB), although it would be likely to take several years for a new community to access funds.

4.3 Treaty arrangements between the US and the UK

The British Indian Ocean Territory (Constitution) Order 2004 sets out:

9(1) Whereas the Territory was constituted and is set aside to be available for the defence purposes of the Government of the United Kingdom and the Government of the United States of America, no person has the right of abode in the Territory.

Under the Exchange of Notes between the US government and the United Kingdom, dated 30 December 1966 and subsequently amended by several additional Exchanges of Notes:

- The islands shall be available to meet the needs of both governments for defence purposes;
- Before either government proceeds to construct or install any substantial construction in the Territory they will seek the other's approval;

- Article 4 of the Supplement dated February 1976 restricts access to Diego Garcia to government officials and military personnel, and, subject to immigration rules, civilian contractors. For all other persons 'consultation' between the UK and US governments is required. Article 13 contains a prohibition on commercial fishing, oil or mineral exploitation on Diego Garcia and in the sea and sea-bed over which the UK has sovereignty;
- The Treaty is for an initial period of 50 years, until 2016 when it renews automatically unless either Government gives notice to terminate between December 2014 and December 2016.

The substance of any changes required to the Treaty between the US and UK governments for the use of BIOT, including Diego Garcia, is not within the scope of this study as it necessarily involves agreement between the two governments.

4.4 Environmental protection laws and conventions

The United Kingdom Government White Paper from 2012 on the British Overseas Territories stresses the importance given by the government to the protection of the environment in the Overseas Territories. The White Paper gives BIOT as a Case Study:

The islands, reef systems, biodiversity and waters of BIOT are among the richest on the planet, containing about half of all the reefs of this ocean which remain in good condition. Established on 1 April 2010, the Marine Protected Area – where commercial fishing is prohibited – is the largest such marine reserve in the world.

On 26 September 2001, the BIOT Environment Charter was signed by the UK Government. The Charter sets out the government's vision for protecting the environment of BIOT. Although the BIOT constitution expressly states that the islands are to be used for defence purposes, it is accepted that the islands have a special environment that requires protection. Any resettlement of BIOT will have to take into account the need to balance sustainable resettlement with adequate protection for the environment.

One general comment to make is that in BIOT there is currently no planning and development legislation in place and therefore no legal requirement to undertake Environmental Impact Assessments (EIAs) before permitting major development proposals. A resettled BIOT would also require a strategic development planning process to identify respective areas for building and conservation and prevent uncontrolled development from spreading across the most valuable landscapes, coastlines and habitats.

4.4.1 Marine protection and fisheries

On the 1 April 2010 the Commissioner for BIOT, on behalf of Her Majesty and acting through the Secretary of State, issued a Proclamation establishing a Marine Protected Area (MPA) within the Environment (Protection and Preservation) Zone that had been proclaimed on September 17 2003. In 2010 the United Kingdom Government declared a Marine Protected Area of c.640, 000 sq. km within the Environment (Protection and Preservation) Zone of the Territory[4]. The Proclamation states that legislation and regulations detailing how the MPA will affect fishing and other activities within the MPA will be passed at a later stage. To date, due to ongoing litigation, no MPA ordinance has been made.

The Fisheries (Conservation and Management) Ordinance 2007 and related Statutory Instrument from 2007 regulate all fishing activities for BIOT until such time as implementing legislation for the MPA is passed.

Under Section 7 of the 2007 Ordinance, fishing is prohibited in the mentioned waters without a license from the Director of Fisheries. Licenses used to be issued for both pelagic and inshore fishing until the last one expired on 1 November 2010. Section 7 of the Ordinance allows for

some limited fishing for those legally present on the territory with the main condition being that the fish is for personal consumption within 3 days. These provisions would allow any returning Chagossians to undertake limited fishing for personal consumption but would not allow basic artisanal fishing. In the event of resettlement it would be a priority to engage with the Chagossians to agree on whether to amend this legislation. It should be noted that under Section 11 (2) of the Ordinance the Director of Fisheries can impose different requirements for issuance of licenses to fishing boats. It is possible therefore that some limited permits could be given to Chagossians to carry out artisanal fishing until such time as more substantive changes to the legislation could be agreed. The existing Statutory Instrument from 2007 implementing the Ordinance, which was drafted to cover the then existing commercial fishery, sets out quite stringent criteria for fishing boats to apply for a license including insurance, various certificates and safety equipment. These would be difficult for resettled artisanal fishing to comply with. It is therefore likely that the Statutory Instrument, at the very least, would require amendment to allow the issuance of licenses in these cases.

The United Kingdom has also proclaimed a 200-mile BIOT Fisheries Conservation and Management Zone (FCMZ) on October 1, 1991, and a BIOT Environment Protection and Preservation Zone (EPPZ) on September 17, 2003, with geographical coordinates notified to the UN Secretariat under UNCLOS Article 75(2). The FCMZ has been implemented by the various Fisheries Ordinances, the current of which has been considered above. No domestic legislation has been issued to enforce or regulate the EPPZ, so this would not have any direct impact on a resettled population.

4.4.2 Nature reserve and wildlife protection

In addition to the MPA, there are other legal protections in place to protect and preserve the wildlife on BIOT *(British Indian Ocean Territory, the Protection and Preservation of Wildlife Ordinance, 1970; The Strict Nature Reserve Regulations, 1998; Statutory Instrument No. 4 of 1998)*. Under this legislation the islands (and their territorial waters) specified in the Schedule are declared to be Strict Nature Reserves. Unless permission is granted no person can enter, traverse, camp in or reside, engage in hunting or fishing or conduct any other activity including agriculture in the areas specified.

The islands specified are: In the Great Chagos Bank (a) Three Brothers and Resurgent Island (b) Danger Island (c) Cow Island and (d) Nelson Island; and in the Peros Banhos Atoll, all the islands to the east of a line drawn between the easternmost point of land on Moresby Island and the easternmost point of land on Fouquet Island. Any resettlement to these islands would therefore require either amendment to this legislation or the granting of permits to those returning.

4.4.3 Diego Garcia Lagoon

The Diego Garcia lagoon (including the military port and anchorages), part of the territorial sea and the eastern land of the atoll is designated as a wetland of international importance under the 1971 Ramsar Convention (ratified by the UK with effect from 5 May 1976 and extended to the BIOT on 8 September 1998). The application of the Convention to Diego Garcia excludes 'the area set aside for military uses as a US naval support facility'. Under Article 3 of the Convention the United Kingdom commits to formulating and implementing planning so as to promote the conservation of the wetlands, and as far as possible the wise use of wetlands in their territory. The use of this area for a resettled population is therefore possible but with the commitment to ensure that damage to the environment is limited. Currently, recreational and sport fishing are listed as one of the uses of this designated area.

4.4.4 International treaties

BIOT is also subject to further levels of internationally binding legal protection with regards to the environment. Those Conventions are listed in Annex 4.1 and will need to be taken into account in any new governance framework for BIOT.

4.5 Conclusions and implications for resettlement

There are no fundamental legal obstacles that would prevent a resettlement of BIOT. The legal and constitutional framework will however require significant amendment in order to facilitate a resettlement and this is likely to involve a comprehensive consultation process with the Chagossians and other interested parties.

It is suggested that the following areas would be considered a priority in advance of and during the initial stages of any resettlement:

Constitutional and Rights

- Whether any new constitution, interim or permanent, for BIOT would be based solely upon Her Majesty's prerogative powers or on a United Kingdom statute, taking into account what level of oversight by the UK Parliament is considered appropriate.
- An interim constitutional framework until the first phases of resettlement have been completed and assessed, should be considered. The consultative process for this, which would ideally be as inclusive and fair as possible needs also to be dealt with.
- Immediate amendment of the constitutional framework and immigration ordinances and the British Indian Ocean Territory (Immigration) Order 2004 to allow Chagossians to resettle and live on designated areas of BIOT. In the longer term issues relating to nationality would also be important.
- Enshrining basic rights contained in the European Convention of Human Rights including the right to individual petition in addition to the International Convention on Civil and Political Rights in any revised constitutional framework for BIOT could be considered. The UK government could ensure the requisite support is in place to ensure that implementation and reporting requirements for these mechanisms are in place quickly.

Governance

- The position of Governor or maintenance of the existing position of Commissioner as well as deciding what direct powers the position will have and where the title holder will be based.
- A temporary consultative body for Chagossians and other interested parties, perhaps based on a conference of representatives, until a more permanent consultative structure can be agreed and established by constitution or local Ordinance.

Administrative

- A process to allocate use of land to returning Chagossians.
- A resident Law Officer could be considered given the amount of legal amendments required during the initial phases of any resettlement.
- The Commissioner's/Governor's authority to raise revenues through a local Ordinance in addition to a consolidated fund in order to finance resettlement activities and ongoing public services.
- A resident public service structure to assist in facilitating the resettlement including provision of basic medical, police and other vital services. Courts may be required to function on occasions.
- A procedure for accessing European Development Funds for BIOT as early as possible.

- Amendment of The Fisheries (Conservation and Management) Ordinance 2007 and related Statutory Instrument from 2007 to allow for at least artisanal fishing for a resettling population.

The process of installing a new constitutional and governance framework for BIOT will necessarily take time and will depend on the pace of any resettlement and the needs of the returning populace balanced with consideration for environmental concerns and the importance of BIOT for defence purposes. The following issues could be dealt with in the medium to long term:

- If not agreed initially, a permanent constitution. This could include a system of local governance where the powers of the Governor and local council are set out, as well as the relationship between one and the other.
- A new constitution could include a fundamental rights chapter based on consultations with the local population in order to ensure provisions take account of the wishes of the inhabitants and are also appropriate for the territory's unique circumstances. Other international human rights conventions mentioned previously could be considered for eventual extension to BIOT as and when the capacity to fulfil their obligations are in place.
- An Ombudsman or Complaints Commissioner could be established, albeit with the option to appoint someone only when needed, with the jurisdiction to investigate allegations of human rights abuses by public officers.
- A resident judicial system may eventually be considered although it is more likely that only a local resident Magistrate would be needed along with occasional sittings of other courts. If a fundamental rights Section is introduced to the constitution it would be normal to specify a right of appeal to the Privy Council in cases seeking enforcement of fundamental rights provisions.
- Any provisional arrangements for establishment of a civil service could be made permanent and included in local Ordinances.
- The regulations detailing how the MPA will affect fishing and other activities within the MPA will vary depending on where resettlement goes ahead.

- Amendment of The Fisheries (Conservation and Management) Ordinance 2007 and related Statutory Instrument from 2007 regulating all fishing activities for BIOT to reflect the new situation again balancing the needs of the local population with environmental and defence concerns.

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[1] Such as Pitcairn, St. Helena, Ascension and Tristan da Cunha.

[2] British Overseas Territories Law, Ian Hendry and Susan Dixon, March 2011.

[3] Source: EU Website.

[4] The area covered by the zone is defined in the following way:

'The said environmental zone has as its inner boundary the outer limits of the territorial sea of the Territory and as its seaward boundary a line drawn so that each point on it is two hundred nautical miles from the nearest point on the low-water line on the coast of the Territory or other baseline from which the territorial sea of the Territory is measured or, where this line is less than two hundred nautical miles from the baseline and unless another line is declared by Proclamation, the medial line. The median line is a line every point on which is equidistant from the nearest point on the baseline of the Territory and the nearest point on the baseline from which the territorial sea of the Republic of the Maldives is measured.'

5 Environmental Analysis

5.1 Introduction

The continued physical existence of the islands of the Chagos Archipelago, which constitute BIOT, depends on the health of its underlying coral reefs, upon which the islands have formed. Diminished reef health, coupled with unfavourable shoreline changes has a direct bearing for any human populations inhabiting BIOT. On Diego Garcia, increased coastal vulnerability (both man-made and natural) has led to the need for costly artificial shoreline defence – currently exceeding US$10 million per year[1].

In addition to climatic impacts including sea level rise, BIOT islands are vulnerable to episodic events. While the region seldom experiences cyclonic strength winds, severe storms sometimes occur, especially in Diego Garcia[2]. With respect to tectonic movements, a tremor in the 1800s destroyed an island in Peros Banhos, resulting in loss of productive Copra plantation. There has been suggestion of a tsunami wave in the lagoon at Diego Garcia in 1983, while in Salomon atoll no tectonic activity has been observed. However, data are limited. Impacts of the 2004 tsunami were low on all BIOT islands, but were generally compounded by erosion impacts[3]. Overall, BIOT has been described as one of the most intense locations of oceanic seismicity, albeit at generally low levels[4]. These sorts of disturbances potentially have significant bearing on any future resettlement and infrastructure requirements (see Section 6.3).

This high level of interdependence regarding BIOT's coral islands, and the risks and benefits associated with alternative re-settlement options, calls for multi-disciplinary analysis. Integrated thinking, combining socio-political, economic, legal and environmental perspectives, is therefore an overarching thread in this report.

Environmental risks associated with potential re-settlement of BIOT encapsulate two different concepts:

- **Risks to resettlement from the environment** (e.g. from coral mortality, beach erosion, climate change impacts, overtopping of islands or seawater ingress into soils) – resulting from natural factors and/or human activities; and
- **Risks to the environment from resettlement** (e.g. decline in coral health or biodiversity from construction/dredging, or over-fishing).

5.2 Assessment of key environmental issues

5.2.1 Coral reef health

The Chagos islands are accumulations of sand and gravel originating from eroded coral and rubble (and coralline algae). Active coral reef growth (accretion) provides the raw materials[5]; normally erosion is balanced by accretion. However, if accretion rates fall, due to stress on coral reefs, island robustness can diminish. This increases vulnerability to seawater breaching and has many other undesirable consequences. Maintained reef health is therefore critical for island longevity and the prospects of any resettled population in Chagos. In the very long term, the islands could become inhabitable or even become submerged.

Human-related factors reducing coral cover (directly or indirectly) and undermining reef health, and thus their normal ability to accrete, include the following:

- **Elevated nutrient levels**: for example, from sewage, leading to algal blooms, low oxygen and other undesirable knock-on effects (e.g. fish decline).

- **Inappropriate coastal development**: for example, dredging, infilling and siting of infrastructure in areas that harm key natural processes. These can alter reef dynamics and lead to unwanted erosion and/or sedimentation being particularly harmful to reefs.
- **Coral bleaching:** this is caused by stress, in particular warming. The severe 1998 El Niño Southern Oscillation event leading to seawater warming and reef mortality in Chagos (to 10-15 metres depth on northern atolls, and to above 40-metre depth in Diego Garcia).
- **Coral diseases:** these are currently at the low end of the global spectrum in Chagos, but possibly increasing and new diseases (e.g. 'white syndrome') may be emerging and responsible for some mortality of large table *Acropora* corals observed in 2014.
- **Increased ocean acidification:** following uptake of atmospheric CO2 in the oceans, there has been reduced calcification of calcifying organisms such as reef-building corals – a problem that is increasing globally.

Resettlement should seek to minimise physical, chemical and biological interference to coral reefs and the island/sea interface – for example by jetties, clearance of coastal vegetation or accumulation of contaminants. This will help ensure maintenance of reef health, sediment production and island resilience[6].

5.2.2 Resettlement and environmental sustainability

Overall, the environment in BIOT is well preserved although coral cover and health is declining in some areas (Annex 5.1). Most inhabited coral reef areas of the Indian Ocean are degraded. The choice of resettlement option (Section 3.4), the number of returning Chagossians, and their activities will strongly influence future environmental conditions. Initially resettlement would obviously increase the population but over the long term population is highly uncertain. Population growth would add to environmental pressures and resource use, as well as to infrastructure and operational costs. Voluntary departure, evacuation following breaching by the sea, or even natural population decline would ease environmental pressures. There would also be economic implications of a fall in population, as a result of a reduced requirement for infrastructures and other resettlement facilities. Many of these require a substantial financial outlay.

Population levels and environmental pressures over the 20-year time span addressed in this study may not be indicative of long-term trends. Impacts often build progressively following population growth, as seen across the Indian Ocean. If environmental sustainability[7] and the MPA's integrity are to be assured, a cap may be needed on the total number of BIOT islands (and perhaps atolls) available for resettlement. Otherwise, progressive 'island creep' and unsustainable development following resettlement could happen[8]. This might be achievable by zoning of the MPA, whereby resettlement is permitted on one or a few of the offshore islands. With vigorous coastal management, environmental pressures might be contained within these areas. But in other parts of the MPA, development would not be permitted. Issues surrounding sustainability are addressed further in Sections 5.2.4 and 5.2.5.

The importance of translating aspirational environmental aims into ameliorative management actions will be critical. Understanding environmental risks, as well as anticipated socioeconomic gains, is part of this. Many factors will determine whether BIOT reefs remain in relatively good condition (with or without resettlement), or degrade to the poor or heavily impacted state that now characterises most inhabited coral reef areas of the Indian Ocean. Achieving effective management in BIOT, in contrast to heavily damaged areas, is challenging and is addressed in several parts of the report (e.g. Sections 5.26-5.28). However, collateral environmental damage from major infrastructure is probably unavoidable. For example, a new jetty or airport would involve substantial lagoon disturbance. In most planned airports built on coral islands, attempts are made to raise the ground approximately one metre. The source for the hundreds of thousands of cubic metres of rock infill required would be critical, with environmental consequences for the recipient Island and encircling reefs.

5.2.3 Sea level rise, coastal erosion and overtopping

Sea level is rising and needs to be considered in strategic long term planning of resettlement. Sea-level rise measured globally over the last century (1901-2010) has been on average around 1.7 mm/yr, with some indication of increasing rates of rise[9][10], e.g. satellite altimetry now gives a value of 3.2 mm/yr for 1993-2014. Projected global average changes are 6.5 mm/yr (2013-2050) and rising to 7.4 mm/yr (2013-2100) as reported by the Intergovernmental Panel on Climate Change (IPCC). Thus the rise projected over the next 37 years (24 cm) is approximately equivalent to the observed rise over the last century.

For Diego Garcia, tidal gauge data (2003-2014) indicate a sea level rise of approximately 5-6 mm/yr, while other estimates suggest about 3 mm/yr[11], but with much variability in the data. Sea level rises for different atolls in Chagos (1993-2014) have been measured from radar altimetry, with an increase of 3.8 mm/yr (Diego Garcia) and 3.2 mm/yr (Peros Banhos and Salomon)[12]. These are current rates, and for future years it is probably safest to adopt projections based on the IPCC global estimates above. Sea level rise for Diego Garcia was recently projected[13] to be in the range of 1.2 to 5.3 mm/yr (up to 65 cm 2010-2090, i.e. up to 7.6 mm/yr, if the upper limit is augmented to account for accelerated drawdown of ice sheets). Additional details of sea level rise and related environmental issues are available[14].

Whether coral growth will be sufficient to combat sea level rise, coastal erosion and flooding of BIOT islands over the coming decades is a cause for concern, particularly under conditions of increasing ocean acidity. Available coral reef accretion data from elsewhere indicate a range of 0.60-7.89 mm/yr, averaging 3.54 mm/yr. Although these figures carry uncertainties[15], particularly regarding their applicability to Chagos and implications for resettlement, they do indicate grounds for concern.

Shorelines of BIOT islands are dynamic[16], which is highly relevant to the physical security of islands and resettlement prospects. Where coastal erosion[17] leads to the loss of elevated land rims at island margins, it can lead to increased likelihood of overtopping by seawater; this has occurred in a number of places in Diego Garcia[18]. Whether problems have increased, especially on the outer islands, remains uncertain[19]. Natural processes, human alteration of coastlines (e.g. infilling for development infrastructures on Diego Garcia) and climate/regional scale impact all influence erosion and overtopping[20].

Whatever the causes, erosion and overtopping could become more problematic[21]. The extent to which the islands will remain robust against these and other disturbances is unclear[22]. The extent and the likelihood of flooding events would not only affect living arrangements but also threaten to contaminate the freshwater supplies and damage agriculture. Concerns about the vulnerability of the islands are also evident in the questionnaire responses described in Section 3. In view of the vulnerability and uncertainty about the future of BIOT islands and resettlement prospects (especially on the outer islands), strict building regulations are important (and should include provision for a fixed coastal buffer (setback) and the strict protection of strandline vegetation). The provision for artificial shore defences (coastal armouring)[23] on any islands resettled, plus an evacuation plan, would also be worth considering.

As part of the Maldivian government's evacuation plan in the face of sea level rise, land has been purchased in countries such as Australia for its citizens. In a densely-populated island in the north of the Maldives, 60% of residents have volunteered to evacuate over the next 15 years[24] [25]. Similarly, the President of Kiribati endorsed a plan in 2012 to buy nearly 6,000 acres on Fiji's main island as insurance for Kiribati's entire population of 103,000. Some villages have already moved[26].

As an overarching statement, it is evident that climate and environment are certainly a major constraint, but not necessarily a complete impediment to resettlement. However, having to evacuate BIOT in the event of sea level rise, coastal erosion and related impacts may be necessary, although this is unlikely within the time scales (up to 20 years) addressed in this feasibility study.

5.2.4 Environmental carrying capacity of potential resettlement locations

The population size supportable on the potential island options depends on many issues, including those addressed throughout Section 5, and in particular:

- **The resettlement option(s)** adopted along with human activities; and
- **The degree to which fish and other natural resources** (e.g. sand/coral for building) **are extracted from the islands:** imports reduce the local ecological footprint and increase carrying capacity, while self-sufficiency has the opposite effect.

Carrying capacity on any island is not fixed, but variable and highly complex[27]. The islands have never supported more than about 1,300 non-military people at any time[28]. The full effects of a resettled population and infrastructure can only be determined by monitoring. However, acceptable thresholds for selected environmental monitoring parameters (i.e. to identify if/when a problem has emerged) have yet to be determined and agreed[29]. Related to these issues, many environmental and logistic problems can be overcome with sufficient technical and financial resources (as witnessed by artificial shore defences on Diego Garcia, protecting the Naval Support Facility, and costing many millions of US dollars). Similarly, solid and other waste is a big issue; most in Diego Garcia is incinerated or held for off-island recycling, but toxic waste is removed at a high cost.

Recognising these and other uncertainties, possible carrying capacity estimates for the three islands considered for resettlement in this study are summarised in the table below. Several thousand probably could be supported in Diego Garcia with all food and facilities flown or shipped in, with resupply every few days (the approach adopted in the Naval Support Facility). For the outer islands, the estimated 50 individuals is within the average carrying capacity figures given by respondents to the environmental questionnaire (Section 3.2.2) for basic/subsistence (65-79 individuals) and modern lifestyle (60-63 individuals). These figures are also close to the low level of human presence (40 individuals) known to result in reduced fish size, calcifying substrates, and coral diversity in a predictable manner (but with impact diminishing with distance across an atoll)[30]. The higher figures in carrying capacity estimates reflect the fact that a moderate level of environmental injury would be inevitable. Many respondents thought that islands have a larger capacity to carry a modern lifestyle (where goods are imported on a significant scale) than subsistence (where resources are taken mainly from the land and sea locally), certainly as regards Diego Garcia[31]. This may partly reflect the fact that subsistence lifestyle would likely call for greater self-sufficiency than modern lifestyle. As noted, this increases the local ecological footprint, and hence lower carrying capacity might be expected.

Table 5.1: Estimated carrying capacity (maximum population supportable)[32] and previous population densities for Diego Garcia, Ile du Coin and Boddam

Island	Estimated Carrying Capacity (based mainly on environmental issues)	Estimated previous population sizes (Various reports)	Estimated carrying capacity (numbers of people) from environmental questionnaire[33]			
	Total Population	**Total Population**	**Basic/subsistence lifestyle**		**Modern lifestyle**	
	Range	Range	Max.	Avg.	Max.	Avg.
Diego Garcia	1,000-2,000	200-619	3,000	363	5,000	1,427
Ile du Coin	50-250	60-346	200	65	400	60
Boddam	50-250	89-219	200	79	300	63

*Less than half of the 51 respondents provided data for this question A.11.) (Based on a dataset with 51 responses): Source Study Survey 2014

Estimates of the carrying capacity of the three islands identified for possible resettlement are vital when deciding the size of any possible resettlement and any restrictions that might be placed on any expansion of resettlement. Though the numbers of people that would resettle if given the opportunity are uncertain, environmental factors strongly suggest that the islands have a capacity threshold which needs to be taken into account when deciding on the scale and type of resettlement.

5.2.5 Acceptable levels of fishing

Importance of No-Take Areas (NTAs)

In the event of resettlement, it is unlikely that fishing areas used by Chagossians would be limited to only the island(s) resettled. Fishing across an entire atoll, evenly, would not be expected either. However, without safeguards, unrestricted fishing could easily reduce fish populations around certain BIOT islands or in particular areas. Maximum fishery benefits are likely to arise from well-distributed optimally sized reserves, or No-Take Areas (NTAs), whereby fishing is permitted in some areas, but not in others. Hence, NTAs and zoning (especially if resettlement included the outer atolls, which lie within the Chagos MPA) are an important and integral component of fishery considerations, for all groups of marine resources below. These measures are also considered in other parts of Section 5, as well as in Section 8.

Reef fish and sea cucumbers

Levels of fishing for reef fish (and other groups) that can be supported in Chagos depend primarily on resource abundance (biomass) levels; targeted reef fish biomass is extremely high, especially on the outer atolls. Estimated abundances per unit area[34] are summarized below for the three atolls identified as resettlement options:

- Peros Banhos: more than 7,000 kg/ha;
- Salomon: 3,000 kg/ha; and
- Diego Garcia: 1,250 kg/ha (lower because of higher fishing levels and lower stocks).

Appropriate fishing levels depend on the environmental and socio-economic objective. For example, if the objective is to maintain ecosystem processes sufficiently just in order to generate key seafood species, then moderate fishing might be appropriate. Work in the Indian Ocean suggests a guide is to keep fishing at a level such that biomass remains at ≤300-500 kg/ha[35], although the ecosystem, being less complete may become less resilient. However, if the goal is to maintain higher trophic level and large species in the population, then very little or no fishing is preferable[36] [37].

Hence, sustainable or appropriate fishing can be considered from various perspectives. While fishing zones will have some impact on biomass, one (potentially efficient) approach to sustainable fishing is to reduce natural reef fish biomass levels to a little more half. A related issue then requiring consideration is to determine over how much of the reef extent such fishing would be needed, in order to feed people, and over how much of the reef extent would such alteration be environmentally acceptable.

The recreational fishery around Diego Garcia, whose estimated sustainable yield was considered to be 4-5 t/ km^2/ yr (i.e. 40-50 kg/ha/yr) declined under relatively light fishing. Some recent assessments consider that the fishing level 0.1 t/km^2/yr[38] (i.e. 1 kg/ha/yr) for the comparable commercial inshore fishery might also be applicable to Diego Garcia's recreational fishery. Given its recent population decline, the sustainable reef fishery potential from Diego Garcia waters will be certainly be much less than the present recreational fish take, which is around 48 t/yr[39]. However, reviews[40] of coral reef fisheries highlight the large regional variability in sustainable limits and the difficulty of estimating this for a particular location.

Estimated potential/sustainable yields for commercial bank-reef fisheries are available for inshore waters of BIOT, by area and depth, for various sectors. These include Peros Banhos and Salomon, but not Diego Garcia. Values range from 0.1 t/km²/yr to 1.375 t/km²/yr (i.e. 1-1.4 kg/ha/yr). A conservative estimate of 0.1 t/km²/yr (i.e. 1 kg/ha/yr) may be considered appropriate for BIOT.

Potential/sustainable fishery yields discussed above are broad metrics for mixed species. Individual species may be more or less vulnerable. A fishing 'vulnerability' score is available for most species[41] and will be valuable in the event of resettlement and for more precise determination of catch quotas. Although desirable, these are seldom straightforward. If they are set, on-going monitoring would be critical, to determine if or when thresholds are crossed, so that fishing effort can be eased. Otherwise, fish population decline would be likely or inevitable.

Sea cucumbers should probably be targeted only very lightly, or preferably not at all[42], in view of their proneness to unsustainable harvesting in Chagos[43] and elsewhere and also because of their major role in maintaining coral reef and ecosystem health[44].

Reef sharks

Shark abundance has also declined in Chagos. Present depletion rates are on account of illegal unregulated unreported (IUU) take. Acceptable take for a 'sustainable' shark fishery is essentially zero, unless numbers increase substantially from present depletion rates, which is likely to take 20+ years, given shark behaviour and fecundity.

Tuna and pelagic fish

Determining safe or sustainable capture levels of tuna for Chagos is problematic, especially given their migratory nature, recent declines in catch per effort and marked variation in BIOT catches (e.g. 685t in 2006-07 and 32,051t in 1993-04)[45]. Until populations are known to be stable in Chagos waters, no tuna fishing may be the only precautionary, long-term or sustainable option for all or most areas. Issues surrounding sustainability, conservation and exploitation partnerships are highly complex.

A recent review highlights the potential regional benefits of the Chagos No-Take MPA on tuna populations, and on by-catch, particularly for sharks[46]. The review notes that the closure of Chagos/BIOT to all commercial fishing will eliminate by-catch and help to reduce elasmobranch by-catch in the western Indian Ocean as a whole by providing a temporal and spatial haven. However, there is no single solution for the tuna fishery. Discussion is still needed as to whether the value of Chagos as the only significant MPA for these species in the Indian Ocean is something that could or should be sacrificed for resettlement. There are powerful arguments on both sides[47].

It will be important to consider many governance aspects and issues in the event of resettlement. For example, the only fishing currently permitted in Chagos without license is for personal consumption within three days[48]. To the Food and Agriculture Organisation and others, this technically does not constitute 'subsistence' fishing, which has a specific meaning[49] – as does artisanal fishing[50]. A balance would clearly need to be struck between perceived appropriateness of a particular fishing activity and risk of over-fishing. This would be particularly important for immediate-needs fishing ('fish for food'), and particularly for any exploitation for economic purposes ('fish for finance').

As noted, Diego Garcia lies outside the MPA, and hence is not subject to the same fishery restrictions and other issues that apply to the outer atolls. From a fisheries perspective, combined with many other environmental, technical and socio-economic factors, this would make Diego Garcia the most realistic island option for resettlement. Given recent fishing history on this island, however, fishery regulations would need to be substantially strengthened, perhaps by including one or more small No-Take Reserves, to facilitate replenishment of fish populations[51].

Fishing has the potential to be a vital food and income source for any resettled population. But the risk involved in any level of fishing activities is that the fish stock will diminish with adverse consequences to both fish populations and reefs in BIOT. Strict monitoring tools will be required to ensure a sustainable level of fishing judged against present stock sizes.

Concluding remarks

The acceptable or appropriate level of fishing (for the various species groups) depends on the objective, and there are many trade-offs. Any resettlement that hopes to be even partly self-sufficient through fish will have an impact on the fish and reef community – which is seldom confined to the particular island(s) inhabited. Arguably, the geographic footprint resulting from fishing levels set, coupled with areas not fished, should not be excessive. However, as noted in 5.2.6, this critically depends on 'levels of acceptable change' set for various environmental parameters, including species groups, prior to monitoring. In the absence of set thresholds, a future decline in abundance of a species group/parameter that is significantly greater than the magnitude of natural fluctuations could be considered 'unacceptable', and should trigger the need for attention or management.

In the event of resettlement, a strong case can be made for zoning, in respect of choice of island options and fishing/no fishing (through No-Take Areas – NTAs) within a particular atoll. It would be deleterious both to the environment and most likely to coral reef fisheries to fish all areas equally. This would be especially important if resettlement locations include the outer islands (under Option 1), which lie within the Chagos MPA. The body of literature on NTAs as a fisheries management tool is well advanced[52] and their benefits for fishing communities have led to a level of proliferation in many small island settings. A detailed fishery zoning plan is outside the scope of this feasibility study. Nevertheless certain principles should be established early, including the need to identify critically important vulnerable areas for each of BIOT's atolls. In particular in spawning areas/aggregations and nursery areas fishing should not be permitted. Scientists and conservation organizations have recommended that networks of no-take areas should generally cover 20-30% of all marine habitats. Because of BIOT's unique setting and status, probably at least 50% of reefs and other habitats should be NTAs. Areas where fishing would be permitted should be similarly identified. As noted, while any resettlement would probably be limited to particular islands, fishing would very likely be more extensive, which could easily lead to unsustainability of fish populations around some islands. Hence, NTAs and permissible fishing areas would need to be determined for atolls[53], not just any resettled islands within an atoll.

There will also be need for separate consideration about what proportion of the BIOT Archipelago as a whole could remain set aside for strict biodiversity conservation as no-take (with only limited fisheries benefits; See also Section 5.2.2).

5.2.6 Monitoring, environmental impact assessment (EIA) and contingent liabilities

Anticipated environmental consequences of alternative resettlement options, from construction, operations and Chagossian activities, are outlined in Sections 5.4 and 8.3. However, full effects cannot be known in advance, especially as details of possible infrastructures, potential future livelihoods of Chagossian and other activities are as yet generic rather than specific.

The only way to fully understand impacts is to monitor environmental parameters over time: before ('baseline' data), during and after resettlement. This forms part of EIA, which should begin before construction of any proposed (significant) infrastructure and/or human activities. EIA and monitoring enables comparison of how well predicted impacts match actual impacts determined from monitoring. This is necessary for determining the extent of compliance with BIOT ordnances and international agreements, following any development of the island(s) needed for returning Chagossians. EIA and monitoring costs are considered in Annex 5.3 and Section 7.

A broad suite of physical, chemical and biological environmental parameters – including fish populations – should be monitored as part of future EIAs, to determine environmental effects of resettlement infrastructures, operations and human activities (Annex 5.2). The majority of questionnaire responses agreed with this list of monitoring parameters. Prior to any resettlement, it will be critical for FCO/stakeholders to consider and agree: a) limits of acceptable change for the various parameters, b) penalties for transgressions (causing the problem), and c) who will be bear the costs of dealing with the problem, if thresholds are crossed. It would also be important to establish baseline data.

EIA and monitoring are vital tools for monitoring and mitigating impacts on the environmental health and integrity of ecosystems, islands, atolls and the entire Chagos Archipelago. Without such measures, environmental deterioration is highly likely or inevitable, whichever re-settlement option is chosen. BIOT's unique international value, and flow of benefits that currently extend far beyond the Chagos Archipelago's 200 nm Environment Protection and Preservation Zone (EPPZ), could be affected in the event of resettlement. In the event of resettlement of the offshore islands (Option 1), zoning of the MPA to confine impacts to particular islands/atolls would likely be a beneficial measure. However, some and possibly significant environmental impact would be inevitable. Monitoring can determine the nature, magnitude and extent of impacts but not what level of damage is acceptable.

Standard works on the EIA process and practice are available[54] and should be consulted and applied in the event of resettlement (See also Annex 5.2, sub-section – Notes on environmental monitoring and costs. EIAs can help determine likely environmental effects of construction, infrastructures, operations and human activities progress. Options should be developed for mitigation – or even cessation of construction, for example of infrastructures, if environmental damage becomes unacceptable. While many costs for EIAs are embedded in monitoring costs (Annex 5.3; See also Section 7), mitigation costs are unlikely to be known in detail until the EIA has been done. Hence these could potentially be a significant additional downstream cost, which can only be determined as a separate exercise later[55]. Risk mitigation is addressed further in Section 6, while Annex 5.4 provides comprehensive guidance on the following, based on experiences in the Maldives:

- Mitigation of construction, operation and human/tourism activities.
- Method of energy generation.
- Method of energy conservation.
- Method of water production.
- Method of water conservation.
- Method of sewage treatment and disposal.
- Method of solid waste collection and disposal.
- Conservation of flora and fauna.

By active participation in aspects of environmental monitoring and conservation, settlers could make a positive environmental contribution. This would not completely offset environmental damage created by construction, infrastructures and activities, but it is nevertheless an important benefit.

Contingent liabilities[56] include environmental mitigation and legal liabilities. Potential contingent liabilities may include:

- Weather related: (i) flooding and over-topping - resulting in potential loss of life, damage to infrastructure, property, assets, agriculture and lifestyle; (ii) failure of sea defences; (iii) natural disasters, requiring partial or complete evacuation (e.g. tsunami); etc.

- Environmental: (i) damage to reefs by accident and/or activities of "re-settlers" and other visitors; (ii) over-fishing; (iii) illegally fishing; (iv) infringement of the MPA's regulations (v) environmental legal costs;

These could arise where thresholds of environmental parameters (such as maximum fish catch levels or waste disposal/containment limits) are exceeded, as a result of environmental impacts from resettlement. They could also arise where the thresholds have been set inappropriately because the environmental relationships have been misunderstood or relationships have changed because of global trends, for instance through climate change. As noted, the thresholds will need to be determined by UK government in advance of resettlement, but should be kept under review in the light of environmental trends and concerns and in the context of BIOT ordinances and regulations. Environmental monitoring is critical for tracking these trends and to provide early-warning of any pending problems. Detecting infringements early will help trigger timely action on environmental management and mitigation, and reduce the eventual remediation and liability costs. Legal hearings and associated costs might also be incurred from environmental disputes associated with resettlement[57]. Financial assessment of contingent liabilities is not possible without more detailed design of the resettlement plans. Given that future population demographic and absolute size is so uncertain, it would be appropriate to undertake more detailed assessment as part of any design and implementation processes.

5.2.7 Environmental lessons from the Maldives and other regions

The Maldives, Marshall Islands and other low-lying coral island states face many challenges that will likely confront BIOT if resettled. Prior to the onset of tourism in the early 1970s, environmental pressures from development in the Maldives would have been relatively modest. Within 20 years, a range of practical problems (e.g. sand and coral mining), environmental and other issues emerged[58]. Particularly significant was the need for an artificial breakwater in the capital, Malé[59], and the many impacts when islands of Seenu atoll were interlinked. Since 2000, additional problems in the Maldives have included inundation from the 2004 tsunami as well as a swell event and wave overtopping in 2008. These incidents, against a backdrop of global climate change, highlight the vulnerability of these islands and the importance of healthy coral reefs and appropriate infrastructure[60]. Many lessons learned in those atolls will undoubtedly have application to BIOT in the event of resettlement (Annex 5.5). Although tourism impacts from early developments are undeniable[61], newer resorts in the Maldives can be seen as far less damaging. As noted in Section 5.4.2, such examples might provide the basis for 'best practice' in the Chagos.

5.2.8 Offsetting environmental damages from resettlement

Construction, infrastructures and operations, along with Chagossian activities, would inevitably put variable pressure on the environment. 'Monetary' and 'environmental' compensation (the latter through e.g. 'habitat equivalency analyses' and environmental restoration projects) are mechanisms commonly used for addressing ecosystem damage arising from development. This may have application in BIOT in the event of resettlement.

Given Chagossian current engagement with restoration in plantation areas of Diego Garcia, capacity is already building with respect to conservation activities involving restoration. These or similar activities might be appropriate as part of any future environmental compensation in the event of resettlement[62]. Restoration is seen as a potentially valuable environmental offset, involving very substantial input from members of any resettled community. Related to restoration work, Chagossians should be able to play an active role in determining the risk of new invasive species, and also in the removal, policing and monitoring of invasive species, plus scientific support for this. Invasive species are listed as one of the key stressors affecting BIOT in the Interim Conservation Management Plan, with species such as the black rat continuing to cause ecological damage across much of the Territory. Problems from invasive ('hitch-hiker) species could rise as a result of an increase in the import of goods. (Arguably, therefore, the need for assessment and management of invasive species would probably be lower in the absence of resettlement).

Details of any system to help offset collateral damage from development would need to be determined and agreed by the BIOT Administration and Chagossians if resettlement occurs. Plantation restoration (or even hardwood restoration over former plantation) can never be compensation for either that particular ecosystem or some other ecosystem, such as coral reefs. Through habitat equivalency analysis, an injured or lost ecosystem in one area is 'compensated' for by restoration of (ideally) the same ecosystem through a project in a (preferably) nearby area. Environmental compensation is never considered an adequate alternative to avoiding reef damage in the first place. In the case of reefs, there is no completely adequate way of compensating for reef damage (other than some artificial reef development, which could be undesirable in Chagos). The best approach is always impact avoidance wherever and whenever possible – as the highest priority. Environmental compensation is desirable when this is not possible, but certainly is not as an equivalent alternative, particularly in the case of highly invasive projects, such as an airport or port for one of the offshore coral islands.

5.2.9 Decision-making and governance in the event of resettlement

Future governance of BIOT, including ownership issues and local decision-making, will need careful consideration in the event of resettlement, as would associated costs of their establishment and operation. Comprehensive determination of governance details and associated costings, if resettlement occurs, fall beyond the scope of this feasibility study. As noted, the environment will be

affected by, and should also influence many aspects of governance. BIOT laws and MPA ordnances will serve as a broad *'top-down'* framework for management decisions; for example the number of islands that may be developed and overarching fishing regulations. Complementary *'bottom-up'* regulatory bodies and decision-making by Chagossians would also be necessary; for example for provision of local planning laws, building regulations. More detailed discussion of governance issues is contained in Section 4.

5.3 Evaluation of potential resettlement locations

Environmental considerations are critical for comparative evaluation of island options and resettlement options. As noted, the island options most appropriate for any initial resettlement include Diego Garcia, Ile du Coin and Boddam[63]. Environmental assessment of these island options is summarised below; the environmental criteria used, together with the level of certainty/uncertainty, are shown in Annex 5.6.

It is important to note that the ranking scores used are *relative* ranking scores. They do not distinguish between large or small differences in absolute/quantitative values for a particular environmental factor. For some factors, rankings represent clear-cut differences, while for others differences may be only marginal. Several of the rankings are tentative at present. Nevertheless, for many key environmental factors (e.g. sustainable aquifer yield, carrying capacity, scientific importance for research and monitoring, international significance), differences between islands are clearly discernible. Whilst acknowledging variability in the quality of data, and without weighting key factors, conclusions of the analysis are considered to be reasonably robust. As shown in table 5.2 below, Diego Garcia is the favoured island for resettlement – on environmental (and economic) grounds, in comparison with Ile du Coin and Boddam – selected as exemplars of islands in the outer atolls.

Table 5.2: Ranking of 3 Islands for Resettlement Potential against environmental factors (1 = most suitable/least risky, 3 = least suitable/most risky).

Environmental Factor	Diego Garcia	Ile du Coin	Boddam
Rainfall	3	1=	1=
Sustainable Aquifer Yield	1	2=	2=
Soil Quality and Agro-Forestry Potential	1	2=	2=
Coral reef fish abundance	1=	1=	3
Food from local or external sources	1	2=	2=
Building materials from local or external sources	1	2=	2=
Previous human population size & est. current carrying capacity	1	2	3
Naturalness	1	2=	2=
Scientific importance for research and monitoring	1	2=	2=
International significance	1	2=	2=
Sea level and coastal intrusion	3	1=	1=
Size of island	1	2=	2=
Approach and ease of access	1=	3	1=
Ecotourism value of fishing and coral reefs for diving	3	1=	1=
Ecotourism value of islands for land and inshore recreation	1	2=	2=

Source: Study assessment.

5.3.1 Carrying capacity, life support systems (self-sufficiency)

Rainfall

Atolls/islands with higher annual rainfall allows for greater direct use of freshwater and/or aquifer recharge than for islands/atolls with lower annual rainfall. Hence, according to this factor,

atolls/islands with more rainfall would be more favourable for resettlement than those with less rainfall. However, the utility of ranking by rainfall is unclear. Droughts can happen anywhere and Diego Garcia is the only island with viable longer-term water reserves. Sustainable aquifer yield (below) is probably a more important ranking factor than rainfall.

Sustainable aquifer yield

Islands having a larger freshwater 'lens' (aquifer volume) are likely to support a given resident population size more readily than islands having a smaller lens; the size of a freshwater lense(s) increases non-linearly with island size. Hence, in the absence of desalination, islands with larger aquifer yields will be more favourable options for resettlement than islands with smaller yields. Even on Diego Garcia including the Naval Support Facility, freshwater needs can be met using natural sources (rainfall and aquifers).

Soil quality and agro-forestry potential

Islands with rich soils will have greater potential for agro-forestry or agriculture (locally grown crops etc.) than islands with poorer soil quality, thus reducing reliance on external sources and associated costs. However, as noted elsewhere, local resource-use can impose a high ecological footprint (e.g. extra water demand from irrigation[64]). Soil quality on Ile du Coin and Boddam is unusually rich in organic matter[65], while on Diego Garcia it is variable but also good[66]. The extent and nature of previous agriculture provides a relative indication of its relative viability on different islands in the event of resettlement. Islands with extensive/diverse agriculture formerly would be more favourable options for resettlement. Under previous resettlement copra production from coconuts was the main agricultural activity and mainstay of the economy. The extent of former coconut operations was greatest in Diego Garcia and least in Ile du Coin.

Coral reef fish abundance

Since fishing would have previously been atoll-wide (rather than island-specific), coral fish abundance on different atolls provides a relative index of this resource's capacity to support Chagossians. For virgin stocks (i.e. with no fishing), atolls with higher coral fish abundance are likely to have greater capacity to support a given resident island population than atolls associated with lower abundances. Hence, those with abundant resources would offer a more favourable resettlement option than atolls having lower coral fish abundance. Both total fish biomass and targeted fish biomass (groupers, snapper, and emperors) are highest for Peros Banhos, intermediate for Salomon and lowest Diego Garcia[67]. However, this is an inverse of current fishing pressure, and so it is likely that the situation could reverse within a year of any re-settlement. If the extent of accessible fishing area is taken into account, a more important consideration than fish density per unit area, this is greater for Diego Garcia and Peros Banhos (Ile du Coin) than Salomon atoll (Boddam). As noted in Section 5.2.5, over-harvesting is likely without adequate safeguards in place, including no-take areas, and ongoing monitoring. Also, impact on fish population size is reported, even at relatively light or modest levels of recreational fishing as on Diego Garcia. Because of past non-sustainable exploitation of sea cucumbers, and their known importance is maintaining reef health, these animals should probably not be used a ranking factor – or exploited in the future.

Food from local or external sources

Food obtained from external sources reduces the ecological footprint on Chagos – whichever island(s) may be resettled. Largely due to transport and logistics issues, the cost of importing food is likely to be lower for islands closest to Diego Garcia than for more distant islands assuming the Naval Facility remains operational. However, this factor could be less relevant if an airport or port (both highly invasive environmentally) were built on an island in an outer atoll. Sacrificing one or more northern islands for port or airport development is not advocated, as the feasibility study is a neutral one. But it remains an option, albeit one that would carry major environmental impacts.

Building materials from local or external sources

Rocks, sand and cement, in particular, obtained from outside Chagos, places less burden on its coral reefs and associated environments than if these resources were extracted in Chagos. The cost of importing building materials is likely to be lower for islands which are closer to Diego Garcia. However, this factor could be less relevant if an airport or port (both highly invasive environmentally) were built on an island in an outer atoll.

Previous human population size and estimated current carrying capacity

Previous population size on different islands provides an approximation of relative carrying capacities. Islands or atolls with higher Chagossian populations formerly (highest in Diego Garcia and lowest in Boddam) might be expected to support higher populations in the future. Estimated current carrying capacity determined by this study and the environmental questionnaire (Section 4) for these islands confirmed this ranking. Based on past population size, or estimated current carrying capacity, islands able to sustain larger populations would be more favourable options for resettlement than islands supporting lower populations. However, past or present population size does not necessarily reflect concern for the environment or its stewardship, local resource consumption and sustainability or former quality of life (Section 5.2.4).

5.3.2 Other natural assets and environmental significance

These environmental factors consider the ecological and wider international significance of Chagos. The logic is that islands or atolls having these attributes should be less favourable for resettlement than islands/atolls lacking them. For many of these factors – including ecological importance[68], biogeographic importance[69] and extent of ecological knowledge[70] – understanding is insufficiently advanced for their current use in comparative evaluation of different island options. Nevertheless, in the event of resettlement they should be examined further.

Naturalness

Naturalness reflects the extent to which an area has been protected from, or has not been subject to, human-induced change. Such areas are relatively undisturbed and have higher conservation value than more impacted areas, and include here the outer islands of Ile du Coin and Boddam. According to this factor, these islands would be less favourable options for resettlement than Diego Garcia, which is more disturbed[71],[72].

Scientific importance for research and monitoring

The scientific importance of a region, for example for research and monitoring, is also an important consideration. In Chagos, more research has been done in the outer atolls than in Diego Garcia. This makes islands, such as Ile du Coin and Boddam, more important for science, research and monitoring than Diego Garcia, especially for use as an international 'reference' or control site – which is a globally recognised value of the archipelago. Hence, according to this criterion, Ile du Coin and Boddam would be less favoured island options for resettlement than Diego Garcia[73].

International significance

This factor includes issues such as whether the area is or has the potential to be an internationally recognised or special protected area. Such areas should be a lower priority for resettlement than areas lacking such significance. Eastern Diego Garcia is a Ramsar Site[74] (for internationally important wetlands) and this island also harbours one of BIOT's ten IUCN Important Bird Areas (IBAs). The IUCN Category 1 No-Take Marine Protected Area (MPA), created in 2010[75], encompasses all the outer atolls and islands of BIOT – hence Ile du Coin and Boddam, but not Diego Garcia. All of Chagos is of outstanding international significance, and the archipelago is a priority site highlighted by 'marine biodiversity hotspots' analysis and the WWF Global 2000 priority Ecoregions[76] There is also a commitment by UK government to manage the Chagos Archipelago 'as if it were a World Heritage Site'. Additionally, the large No-Take MPA, encompassing the outer islands but not Diego Garcia, provides a further layer of protection. This helps to underpin the Chagos Protected Area as a global reference site for a wide range of scientific ecological, oceanographic and climatic studies, as well as its continued benefits to humans into the future. According to this criterion, therefore, Ile du Coin and Boddam would be less favourable sites than Diego Garcia for resettlement.

5.3.3 Impacts of environment on resettlement – climate change and other factors (atoll robustness)

Sea level rise and coastal intrusion

Atolls or islands with the greatest rates of sea level rise in the recent past may be more vulnerable in the future than atolls/islands with lower rates. These would probably be less favourable options for resettlement than atolls and islands associated with lower rates. Future rates of sea level rise clearly matter for resettlement risks and prospects. However, projected future rates for different atolls or islands in Chagos cannot be reliably distinguished, and determination is problematic even for large ocean areas. Given this uncertainty and that the differences in sea level are marginal, relative sea level rise may be of less environmental significance

than factors such as island elevation and land area – to protect against gradual recession of the coastline and one-off flooding events (see below). Many other factors, including coral reef health, present and future reef accretion rates[77], erosion rates and storminess[78], create further complexity and uncertainty. This limits their inclusion in comparative evaluation of different island options. The relatively likelihood of overtopping and saline intrusion into aquifers is also difficult to determine at present, although issues related to these impacts are considered further below.

Size of island

Qualitatively, islands having greater height and area might be expected to be more substantial and robust than smaller ones against sea level rise and other physical environmental disturbances. Hence, these islands would be more favourable resettlement options than smaller ones – aside from greater space available for development. The total and potentially habitable area of Diego Garcia is much larger than Ile du Coin or Boddam, and its maximum height (more than 5 metres) and breadth are also greater[79]. However, average values can be misleading. Diego Garcia also has extensive tracts of low-lying shore, close to sea level, and overtopping occurs. These and other factors, such as beach width and rock/coral porosity (which are variable), is highly complex. Many uncertainties remain, and full details are not known for all islands. Hence the comparative evaluations according to size of islands are tentative[80].

Approach and ease of access

Navigational hazards (coral heads etc.), exposure to wind and waves, jetty needs are among the natural environmental features influencing the safety of approach to shore and ease of access to BIOT islands. Some of these vary seasonally, i.e. according to the monsoons. Islands with relatively easy approaches will be better options for resettlement, from practical and economic standpoints, than those that are more hazardous.

5.3.4 Potential of natural resources for economic activities

Ecotourism value of fishing and coral reefs for diving

Pelagic/game/recreational fish are potentially important resources for economic activities (e.g. tourism). However, detailed data on abundances for different atolls are not available although, as noted, targeted fish biomass (groupers, snapper, emperors) are highest for Peros Banhos, intermediate for Salomon and lowest Diego Garcia[81]. The ecotourism value of coral reefs for diving may have even greater potential to generate economic revenue than resource extraction. Islands/atolls with the most attractive and least disturbed coral reefs (or terrestrial habitats) will have greater appeal to tourists than islands/atolls having more impacted reefs. However, reefs can easily become degraded by coastal development pressures[82], and by damage from heavy diving[83].

Ecotourism value of islands for land and inshore recreation

In contrast to the marine environment, the terrestrial environment of Diego Garcia would probably have greater recreational and conservation attraction than Ile du Coin or Boddam. This reflects the extensive vegetation and important wildlife, including large populations of green and hawksbill turtles and birds on Diego Garcia[84]. As noted, the only Ramsar Site in Chagos is on eastern Diego Garcia. This island also harbours an Important Bird Area (IBA).

5.4 Summary environmental comparison of resettlement options

This section examines the three different *re-settlement (development) options*, with respect to anticipated environmental impacts from construction, infrastructures, their operations and also human activities, following any return to BIOT islands by Chagossians. These impacts are also summarized in Section 8.2. A summary evaluation of resettlement locations (*island options*) is shown in Section 8.1. This is based on detailed comparative environmental evaluations of Diego Garcia, and Ile du Coin and Boddam – as exemplars of outer islands in different atolls that might be selected for any initial resettlement (Section 5.3). The detailed and summary evaluations of islands were determined using relative ranking scores (1 = most suitable or least risky island option; 3 = least suitable/most risky island option).

For any resettlement option, ongoing environmental monitoring is essential for determining the severity of projected impacts and effects of any remediation intended to alleviate these[85]. As noted in section 5.8, environmental monitoring should be an integrated component of any resettlement plan before, during and after any actual resettlement. Despite the impacts of a very large resettlement on Diego Garcia, the outer islands would be of some value as 'reference' sites for monitoring effects of resettlement in Diego Garcia. Undeveloped outer islands would be even more important for this purpose in the event of resettlement of Boddam or Ile du Coin.

In the event of resettlement of the outer islands, it would be also necessary to scale up routine MPA monitoring (e.g. during research cruises aboard the BIOT Patrol Vessel), to determine if impacts extend beyond any resettled islands and compromise MPA integrity. This would likely increase overall environmental monitoring costs (Annex 5.3; Section 7), as well as the costs of ongoing routine research assessing the status of the Chagos MPA.

5.4.1 Option 3 (small-scale resettlement) and option 2 (medium-scale resettlement)

Anticipated environmental effects of construction and infrastructures for these resettlement options are summarised in Table 8.2[86]. Impacts are inevitable, but overall are projected to be substantially less in Diego Garcia than from resettlements on the outer islands. As noted, an airport and port – both highly invasive, environmentally – already exist (only) on Diego Garcia, although use of US military infrastructure cannot be assumed. Lower anticipated overall impact on this atoll/island is consistent with the relative robustness of Diego Garcia to resettlement impacts, in comparison with Ile du Coin and Boddam (and probably also other offshore islands), in the questionnaire survey (Section 4)[87]. Particularly significant is that Diego Garcia does not lie within the Chagos No-Take MPA. Hence a limited resettlement on Diego Garcia is potentially achievable with no appreciable increase in impact on the environment beyond what has already been made by the Naval Support Facility (but see also the caveats and assumptions in Section 5.2). However, as noted, a Ramsar site encompasses the eastern side of the island. This part of Diego Garcia is a potential resettlement area. Siting of construction, infrastructure and facilities should avoid loss or injury of habitats and important wildlife in the most sensitive areas[88]. In addition to the established IBA in Chagos (Barton Point), another has been proposed, in view of significant populations of Red Footed Boobies in eastern Diego Garcia from the Plantation Gate to Barton Point, plus East, Middle and West Island. On the main island, construction should be avoided in and around these areas.

In order to retain the ecological integrity of a resettled island, quotas should be determined and set on permissible maximum areas of each island, its coral reefs, vegetation and other habitats that may be a) removed and b) degraded by construction and infrastructures. Establishing a provisional threshold may be appropriate, but figures will need to vary according to habitat type.

Non-sustainable use of coral and sand for building creates major impacts on reefs. For any significant infrastructures, imported materials will help alleviate problems, but of course this is costly. Similarly, caution is needed to ensure that timber for construction or other purposes is harvested sustainably.

Impacts arising from a range of operations and human activities are inevitable in the event of resettlement under options 2 or 3 (in Diego Garcia); several can be reduced if mitigation measures are adopted (Table 8.3). New impacts would naturally add to pressures from operation of the Naval Support Facility and other existing human activities.

As noted, environmental effects of construction and operation of resettlement are inevitable, but can be ameliorated to a greater or less extent. Annex 5.4 presents a schema for environmental criteria used in evaluation of proposals for the development or redevelopment of tourist resorts in Maldives. Many of the impacts and mitigation measures are potentially applicable to the proposed resettlement option in Diego Garcia (and particularly to Ile du Coin and Boddam, as described below).

5.4.2 Option 1 (large-scale resettlement)

In general, completely undeveloped remote islands are demanding environments, requiring significant infrastructure and facilities to make them 'habitable'. These inevitably carry extremely high environmental as well as financial costs. This is consistent with the relative fragility of Ile du Coin and Boddam to resettlement impacts, in comparison with Diego Garcia, determined from the environmental questionnaire survey (Section 3.2.2).

Projected environmental effects of construction and infrastructures for this resettlement option are summarised in Table 8.2. Overall, impacts are likely to be far more substantial than for the resettlement options 2 or 3 (in Diego Garcia alone). Resettlement of the outer islands would likely require an airport, port or both. Construction and operation of this infrastructure would be extremely invasive environmentally. Airports built on coral islands, as noted, typically require substantial quantities of rock and rubble to raise the base level by around one metre. How this might be done differently from other islands, to at least minimise impacts, would require very careful consideration. The island and its coral reefs would be adversely impacted, and a wide-range of secondary impacts (e.g. from shipping, pollution) would also be expected. Particular concern arises because Ile du Coin and Boddam (plus all other BIOT islands except Diego Garcia) lie within the Chagos No-Take MPA are part of the Big Ocean network, although it is noted that the latter includes many large MPAs that allow human use, including fishing. The Chagos No-Take MPA encompasses exceptional conservation values that benefit BIOT and other countries. Large-scale resettlement could easily erode these values unless impacts are carefully contained. The declaration of the MPA was originally made without prejudice to possible resettlement, in full acknowledgement that such resettlement might require the revisiting of the regulatory regimes. It would be critical to develop appropriate regulatory regimes to minimise impacts and reduce likelihood of ongoing expansion of impacts over time, adopting as many of the current MPA ordnances and BIOT regulations as practicable. Any form of development in Chagos has the potential to impact the MPA. A major differential between Ile du Coin and Boddam (or the other islands) compared to Diego Garcia is that the former two islands bear less of the impact of recent human habitation and start off from a less degraded state.

As noted, the potential exists for the MPA to be zoned (e.g. to potentially allow for resettlement, and fishing, but only in certain areas). Thus, the MPA is not necessarily immutable. Should resettlement happen, environmental monitoring would be critical in addition to zoning, to determine whether consequential impacts cross acceptable thresholds of change; and, if so, what would be the consequences?

Construction of roads would also incur greater impact than in Diego Garcia, in view of their complete absence on the outer islands and need for extensive vegetation clearance. Impacts from construction of other facilities (housing, other buildings, etc.) would be broadly as for 'modern' resettlement option in Diego Garcia (Table 8.2).

Many of the impacts expected from operations and human activities in Ile du Coin or Boddam, if resettled (Table 8.3), are similar to those likely for a Diego Garcia resettlement. However, in the event of tourism developing on the outer islands, impacts from diving and snorkelling, boating, fishing and other tourism activities could become increasingly prevalent and harmful unless carefully controlled. Anchor damage and fishing above safe levels are particular concerns should resettlement proceed, not only in the outer islands but in Diego Garcia also. Annex 5.4 addresses these and other potential concerns (e.g. conservation of flora and fauna) further, based on experiences in the Maldives. This also examines environmental issues relevant to infrastructure and facilities appropriate for Ile du Coin and Boddam, including methods of energy generation and conservation; water production and conservation; sewage treatment and disposal; and solid waste collection and disposal.

Although not directly related to resettlement, it is noted that carefully managed use of live-aboard vessels, to allow remote adventure diving across the archipelago, would create relatively little impact on the no-take MPA. Clearly this would avoid the need for shore accommodation and supporting infrastructures including a port and/or airport, which are environmentally invasive. However, live-aboard accommodation does not constitute resettlement *per se* and would not be an acceptable option to Chagossians.

Zoning of the MPA, as indicated, is one potential mechanism for allowing resettlement in selected outer islands. The following points are particularly relevant:

- UK Government/BIOTA and CCT and partners have recognised that the MPA would have to change if resettlement were to happen.
- Some contend that it is not really justifiable to claim that taking a part out from this MPA (e.g. through resettlement on one or more outer islands) is somehow to destroy its purpose and integrity, and note that the current MPA already has a large 'hole' around Diego Garcia, the largest atoll.
- It is not clear that a smaller 'hole' around another (outer) atoll, or indeed part of such an atoll, should have highly adverse effects.

These positions are understandable. However, several other perspectives may also be relevant here, which may be summarized as follows:

- Many conservation scientists would have preferred Diego Garcia to have been included in the MPA. The exclusion of this atoll/island from the MPA, apparently due to political and strategic (rather than conservation) reasons, does not necessarily make the decision acceptable environmentally.
- As noted, the ecological footprint in Diego Garcia has been reduced appreciably by importing food and other critical resources and other measures, not all of which may be possible in the event of resettlement on outer islands.
- While zoning should help contain the spread of impacts beyond islands/atolls on which resettlement might be permitted, this comes with no guarantees. A port and/or airport, housing and other infrastructure are very invasive environmentally. These are a likely requirement, given that (much less invasive) ship-based accommodation is not considered an acceptable resettlement option.
- Many or most populated coastal areas of the western Indian Ocean – whether 'protected' or unprotected – are environmentally degraded and/or experience substantially reduced reef fish catches.

- Even Australia's Great Barrier Reef, a zoned multiple-use MPA and often regarded a flagship MPA, is now suffering serious environmental problems. However, threats are not due to settlements within the MPA, but are due to very large-scale issues of continental agricultural run-off and decisions to dredge massive shipping lanes across the reefs and continental shelf, such that sediments flow freely across the reefs.

5.5 Indicative cost estimates of environmental impact assessment and future annual environmental monitoring and evaluation

Requirements for EIA and related environmental monitoring are outlined in Section 5.2.6. The estimated capital costs are US$2.3 million, while estimated annual monitoring costs are between US$2.0 million and US$2.2 million. Further details (which apply to all three resettlement options), are given in Annex 5.3. Estimated costs shown do not include figures for aerial surveys, as estimates cannot be obtained at the present time. Similarly, possible or likely mitigation requirement/costs, if one or more islands are developed, cannot yet be determined. Details will only emerge once the EIA process is well underway.

5.6 Conclusion and key policy implications

A summary environmental comparison of different resettlement options is outlined later in Section 8 of this report. These are separated into indicative (or anticipated) construction and infrastructure effects (Table 8.2) and operations and activities effects (Table 8.3). Environmental comparisons are provisional, pending comprehensive specifications of design and construction requirements for facilities needed in the event of resettlement. Environmental impacts would increase, progressively, depending on the resettlement option.

From examination of environmental issues, a number of key policy implications have emerged with much significance to resettlement decisions. These include the following:

- Consideration of whether any early phase of resettlement would include the **outer islands**, all of which lie within the No-Take MPA. If so, zoning would help limit impacts from construction, infrastructure, fishing and other Chagossian activities to only certain islands. However, even with zoning, impacts from major infrastructure (e.g. a port and/or airport) on outer islands would likely be very significant and harmful to the MPA.
- **Fishing** and other resource use by Chagossians would be a step towards self-sufficiency, and a potential livelihood option for generating income. However, even relatively light or modest fishing can be harmful to fish populations and coral reef health. Importing food, as currently happens on Diego Garcia, helps impose a lower 'ecological footprint' on Chagos.
- **Climate change** and sea level rise are undeniable and major issues, but not necessarily a complete impediment to resettlement. However, having to evacuate BIOT in the event of sea level rise, coastal erosion and related impacts cannot be precluded.
- A **monitoring programme** and EIA are needed so that anticipated impacts from resettlement and climate change impacts (e.g. erosion) can be determined. However, levels of acceptable change (thresholds), and the consequences of any transgressions need to be determined in advance of resettlement.
- The overall **protection strategy** for BIOT reefs needs considering. Two ends of a spectrum are: allowing the reefs to be fished in a managed and zoned approach, accepting that they become a less complete system, with areas of reduced fish and less resilient reefs; or to retain all outer atoll reefs in their current status as a beacon for reef health in the Indian Ocean, but with extremely limited possibilities for any fishing.

[1] A US investment of over $30 million during 2014/15 to protect the shoreline from gradual erosion. (Written Ministerial Statement from FCO, 6th March 2014).

[2] Sheppard & Seaward, 1999.

[3] Spalding, 2005.

[4] Sheppard & Seaward, 1999.

[5] Overtopping (and associated flooding) allows a fresh layer of sediment to be added to island surfaces, thereby increasing land levels (Kench et al., 2006). According to CCT, however, this is not necessarily the case. Storms will do this, but overtopping commonly happens in several areas now on many calm high spring tides as well, that permeate the land without pushing any more sand onto it.

[6] Environmental consequences of no resettlement could also be relevant. Without shoreline armouring, some uninhabited BIOT islands could experience increased flooding, erosion or disappearance over the coming decades. There is a cost to prevent this, which, even if considered appropriate for only a few 'high-priority' islands, should arguably be netted off any costs of coastal defences budgeted for re-settlement. However, this would be a policy for consideration by UK government.

[7] 'Sustainability' is a misleading concept. In many parts of the Indian Ocean resource abundance diminished long ago. If it persists in this condition, it might be considered 'sustainable' – but only because the initial baseline was so poor. For these situations, 'persistence' is probably a better term. In Chagos, environmental health is good overall, i.e. the benchmark is set high; measured departures from this following any resettlement, by environmental monitoring, will serve as a gauge of sustainability.

[8] This is an expected environmental outcome, not a position or judgement on whether or not resettlement should proceed. Additionally, if resettlement occurs, it would probably be very difficult in practice to prevent inhabitation of additional islands in the future, if islands became over-populated and/or sustainability became compromised following initial resettlement. Population expansion across islands and atolls would inevitably add to progressive environmental pressures in BIOT and likely compromise the integrity of the MPA.

[9] IPCC Climate Change 2013: The Physical Science Basis.

[10] A recent paper indicates no evidence of acceleration in rise of global mean sea level in the twentieth century (Gregory et al., 2013). However, P. Woodworth (2014) notes that there is always acceleration in sea level, from year to year and decade to decade, just as there is in the weather.

[11] Woodworth, 2014.

[12] See Dunne, 2014.

[13] Forbes et al. 2013 (based on IPCC, 2007, projections).

[14] See, e.g., Sheppard, 2002, 2012; Chagos News No. 45. 2014; Dunne, 2014; Woodworth, 2014.

[15] Uncertainties about reef accretion may be summarised as 1) these are (pre-1999), not recent estimates, and rates may become lower as ocean acidification and other reef disturbances increase; 2) the data are not from Chagos, and 3) reef accretion rates for Chagos have not yet (Oct.2014) been measured.

[16] A study of shoreline changes in Diego Garcia between 1963 and 2013 has recently concluded (Purkis, 2015). Some of the key findings, all relevant to BIOT island stability and resettlement, are as follows: (1) Diego Garcia's coast, like all atoll islands, is naturally dynamic and will likely become more so in the future, increased by human modification of shorelines and sea-level rise; (2) Land area shows virtually no net change, while 12% of the shoreline has accreted and 15% receded/eroded; (3) Quarrying the reef flat in the 1970s from Simpson Point south, for spoil used for the airfield's runway, is an area of marked erosion; the excavated reef grooves may have led to doubling or tripling of the wave energy; (4) The shoreline around East Point area, a former settlement and potential resettlement location, has undergone complex changes. Coastal retreat has occurred on the eastern (seaward) shoreline, and both retreat and extension on western (lagoon side) shoreline. East Point is not one of the 7 coastal areas of most land loss identified, but is nevertheless a coastal area of 'notable erosion'; (5) Greatest erosion on Diego Garcia has occurred in an area containing the highest density of infrastructure; coastal areas in which *Scaevola* vegetation has been purposely removed have also undergone pronounced erosion.

[17] Changing shorelines, changing island shapes, growth of some islands and diminution of others are evidence of the dynamic nature of islands and changes in erosion.

[18] See Sheppard, 2002, 2012; Dunne, 2014; Purkis, 2015. Problems of erosion have occurred in a number of places – in addition to western parts, where construction of artificial defences is on-going, to counteract erosion and protect military facilities. For example, on the eastern arm of Diego Garcia, erosion has broken through to the century old track in many places; shoreline flooding is evident in several parts of Diego Garcia. While changes in erosion and accretion of white sand on any island occur seasonally, and over longer time scales, erosion of dark, organically enriched soils is of greater concern. This commonly supports mature hardwoods and palm trees. Migration of wooded 'brown soil 'to beach sand reflects long-term meaningful change and is quantified in the recent study of Purkis (2015), based on analysis of remote sensing images for 2 years (1963 and 2013) over a 50-yr period.

[19] As noted, marked shoreline changes in Diego Garcia are evident from the study by S. Purkis (2015), but on this island virtually no net increase in erosion is evident.

[20] See Purkis, 2015.

[21] Erosion and overtopping could increase from sea level rise and other 'external' events. For example, Dunne (2014) reports there is no evidence that extreme values (the highest tides) are increasing at a faster rate than mean sea level. However, this author shows that highest tides are indeed increasing but at the same rate, not at a faster rate, than mean sea level is rising. CCT stresses that sea level rise is evident from the data and, as such, needs to be recognised for the threat it represents to the Chagos. As noted in the report, erosion and overtopping can also result from reduced reef health, and interplay of many other factors; for example, island profiles influence overtopping risk more than average island heights. Section 5.3 considers the relative robustness of different islands and resettlement options to climatic impacts, erosion and other shore disturbances.

[22] Global change has many perspectives to consider. While the Pacific Islands of Kiribati have evacuation plan, a recent review (Webb & Kench, 2010) of 27 Pacific Islands over a 20 to 61-yr period when sea level rise 2 mm indicated: 43% remained stable, 43% increased in area and 14% decreased in area. On the other hand, there is good evidence coral reef health is in general decline, weakening their capacity to absorb the escalating impacts.

[23] Such 'hard engineering' may not be an optimal solution for islands such as BIOT. Arguably, if inundation becomes a recurrent problem in the future, then resettlement should cease and consideration should be given to evacuating the island(s). On the other hand, it is wiser to earmark costs for shore defence, even if this later proves to be unnecessary, than not to include costs but later to find increasing impact on resettlement from coastal erosion and overtopping.

[24] BBC news report 2004.

[25] However, the region's sea level history carries uncertainties and perspectives vary (e.g. Kench et al., 2004, 2005; Singh et al., 2001; Mörner & Tioley, 2005).

[26] Keyes, 2012.

[27] Variability is due to changes in natural processes; the precautionary principle therefore advocates a conservative estimate for carrying capacity; however, as noted, populations could expand and the number of islands colonised potentially increase – as capping of number of inhabited islands may be difficult to implement unless the MPA is zoned.

[28] CCT information.

[29] As noted elsewhere, as an interim measure a significant/unexpected change from ambient environmental conditions should trigger management concern and possible remedial action.

[30] Houk & Musberger, 2013.

[31] On Diego Garcia, estimated carry capacity is higher than for the outer islands, not only because the island is bigger, but also because the island already has major infrastructures, such as an airport and port (whose availability would have to be determined). Major infrastructures would be needed on the outer islands and leave a larger ecological footprint than any resettled population.

[32]'Unit of environmental damage per person', or cost per person, would be a metric of greater resolution and utility than just absolute numbers of people, but cannot yet be determined. Even carrying capacity figures shown are very provisional and carry much uncertainty for the reasons explained in Section 5.

[33] The higher carrying capacity figures given by respondents to the environmental questionnaire for modern lifestyle, in comparison with subsistence life style, may partly reflect greater reliance on imported food and other resources for a modern lifestyle. As noted, importing resources for use in BIOT imposes a lower ecological footprint (locally), but the financial costs are likely to be high.

[34] Figures from Graham et al. 2013.

[35] See also McLanahan et al, 2011.

[36] It is worth noting that overfished fisheries can take 60-80 y to recover; Chagos reef fish populations may only now be nearing recovery from previously BIOT colonization (T. McLanahan, in review/press). CCT (2014) suggests that under fairly heavy fishing, there would be a bonanza for 2-4 years, then increasing degradation similar to that suffered on most other reefs in the Indian Ocean. CCT maintains that the best role for Chagos reefs for the benefit of the region generally is to ensure that fish biomass remains high as at present and not to semi-collapse it, which is what happens if it is viewed as a food larder. It is government that decides what the purpose of Chagos reefs is to be: to become a greatly diminished food larder, or to remain as it is now as a beacon for reef health in the Ocean.

[37] N. Graham also notes '.., very little fishing can deplete the biomass of large upper trophic level species, and thus alter the foodweb. These groups only appear to be protected in large remote unfished locations such as northern Chagos. But you can fish a reef a fair bit harder and still maintain most processes – it just becomes a less complete system.'

[38] 0.1 t/km2 = 100 kg/km2 = 1 kg/ha.

[39] Dunne et al. 2014.

[40] Dunne et al. 2014.

[41] See 'Fishbase'.

[42] A sustainable catch limit is not possible to calculate. Sea cucumber densities in Chagos are increasing again in that numerous small individuals are now evident in many shallow areas. No 'sustainable catch' limit is even possible given that gleaning often removes all from the areas being fished.

[43] Spalding, 2006; Price et al., 2010.

[44] Price et al., 2010.

[45] Dunne et al. 2014.

[46] Koldewey et al. 2010.

[47] Koldewey et al. 2010; Dunne et al. 2014.

[48] R. Dunne believes that BIOT Ordnance No. 5 (2007), allowing fishing for only 3 days, may be overly restrictive; 'artisanal' or 'subsistence' fishing as defined by FAO (See separate footnotes) is not permitted in Chagos. He feels that any increase in inshore fishing (by resident Chagossians), through changes in the law, could be partly offset by stopping all recreational fishing, and limiting fishing to subsistence, licensed and sustainable fishing by Chagossians on the east of DG. For example, according to Mr Dunne, fishing in the 3 nautical mile territorial sea surrounding Diego Garcia has the potential to yield about 26 tonnes per year (the present pelagic recreational fish catch). Fishing to support a resettled population could be offset by the cessation of the recreational fishery. A catch of this size would provide approximately 255 people with their total protein intake (based upon the consumption of tuna in the Maldives – ~100 kg per year per person [the highest fish consumption per capita in the world, where nearly all protein is derived from tuna]). Recreation involving fishing could perhaps be replaced by other tourist/leisure activities (Chagossian-US arrangement) for N personnel as noted above. Mr Dunne also considers that limited pelagic fishing should not be problematic. However, these views are not necessarily a consensus of opinion of CCT, Dunne et al. (2014) also suggest that or the pelagic fishery, similar concepts of sustainable yields (as used for reef fisheries) are not applicable because of the migratory nature of the fish.

[49] A fishery where the fish caught are shared and consumed directly by the families and kin of the fishers rather than being bought by intermediaries and sold at the next larger market. Pure subsistence fisheries are rare as part of the products are often sold or exchanged for other goods or services.

[50] Typically traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amount of capital, relatively small fishing vessels, making short fishing trips, close to shore, mainly for local consumption. In practice, definition varies between countries, e.g. from hand-collection on the beach or a one-person canoe in poor developing countries, to more than 20 m. trawlers, seiners, or long-liners over 20m in developed countries. Artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export. Sometimes referred to as small-scale fisheries In general, though by no means always, using relatively low level technology. Artisanal and industrial fisheries frequently target the same resources that may give rise to conflict. However, these are very vague terms and could translate into almost any level of fishing.

[51] This would likely be beneficial, and good insurance, particularly given the regional variations in fish abundance. In Chagos and difficulties in setting clear-cut catch quotas. To work properly, any reserve as to be respected. A comprehensive review of fisheries in the context of the Chagos No-Take MPA has recently been produced, and provides many other details and perspectives.

[52] E.g. Williamson et al., 2004. No-take marine reserves increase abundance and biomass of reef fish on inshore fringing reefs of the Great Barrier Reef. Environ. Conserv. 31, 149-159.

[53] For example, the following might be possible broad options: in Salomon fishing across a significant proportion of the atoll, with only fisheries NTZ areas; on Peros Banhos, large conservation NTZ areas as well as fisheries NTZ areas; in Diego Garcia inclusion of a very large proportion of conservation NTZ (M. Spalding, communications). However, these are tentative options from a range of possibilities, and certainly not recommendations. The implementation and locations of any No Take Zones/Areas are policy issues beyond the scope of this feasibility study and would be a decision for UK government.

[54] E.g. Glasson et al., 2005, Scottish Natural Heritage (SNH), 2013, Wood, 2002.

55 Aerial photography of BIOT is another example of likely additional downstream costs. This would be valuable tool for assessment (Annex 5.2, but a very significant cost. However, costs cannot yet be determined, so are not included in Annex 5.3. In the absence of aerial photography, use would need to be made of satellite imagery alone in EIA and environmental monitoring.

[56] i.e. later costs that may or may not be incurred depending whether or not resettlement generates environmental costs that need to be mitigated through additional investment

[57] In BIOT the probability is low because of its remote location with limited access for independent environmental assessment or direct damage to third parties. However, convening technical experts and workshops in the future to consider implications of 'exceedances' that might arise in the course of resettlement are a contingent liability. Potential legal disputes are not limited to resettlement issues or to environmental issues.

[58] Price & Firaq, 1996.

[59] Extensive coastal infilling and reclamation occurred around the capital, Malé, which is now almost square. This greatly impaired the natural protective capacity of the reefs, resulting in the need for an artificial breakwater on the south of the island for protection against flooding events. This high technology solution, costing US$12 million, or US$8,000 per linear metre, would not have been necessary had the possibility of adverse environmental impacts been considered.

[60] Construction of raised dwellings and other buildings to confront sea level rise and/or overtopping is one example, and a practice of clear relevance to BIOT if resettled.

[61] E.g. Price et al., 1998'.

[62] Any 'compensation' should not be seen as reparations or punitive measures following resettlement; nor is it intended in this way, but rather as a means of helping to offset inevitable effects of development and human settlement and activity. Care would also be need to ensure that project to offset environmental damages associated with resettlement is not blamed for environmental injury that might reflect other causes, such as seawater warming and coral death from bleaching.

[63] This does not necessarily preclude other islands for any later phases of resettlement although, as noted, a cap on the total number of islands developed may be desirable to maintain the environmental health of Chagos.

[64] Under former occupation of Chagos, soil was apparently imported from Sri Lanka on some islands.

[65] See Ch. 4 and Posford Haskonig (2002) feasibility study. Some soils are phosphate-enriched by guano from nesting seabirds.

[66] On all islands, food crop production may be influenced more by human issues (settlers' capabilities & aspirations) than agronomic limitations.

[67] For reef shark biomass, no significant difference between atolls is evident (Graham et al., 2013).

[68] Ecological importance encompasses biodiversity (range of ecosystems & species richness), biological productivity, critical habitats or feeding areas for species of economic and conservational value (e.g. seafood species, birds, turtles), and as a fishery replenishment area (e.g. source of larvae for adjacent areas). Information for many of these factors in Chagos is very incomplete and complex – as in the case of birds, whose island preference can vary temporally. It is added that presence of a valuable ecological feature (e.g. occurrence of mangroves or special hardwood trees) in itself need not be factor precluding resettlement, as options for infrastructures or activities may be open in areas where these species are not present on the island.

[69] Here, conservational value is given to special biogeographic features, in particular whether the area contains 'endemic' or unique species, or is representative of a biogeographic 'type' or assemblage, or contains unique geographical features or seascapes. Such knowledge is incomplete for Chagos. Not many endemics are known for the archipelago, but levels may be higher than previously supposed.

[70] According to this factor, areas where ecological or environmental information is absent or incomplete should be less favoured development sites than those where reasonable information exists, assuming the latter are suitable from an environmental viewpoint. This will potentially help safeguard unknown and potentially important environmental areas.

[71] The conservation value associated with naturalness is considered the most important application of this environmental factor. However, unforeseen environmental and/or economic consequences, arguably, might be more likely in artificial or degraded areas (e.g. extensive coastal infilling in Diego Garcia, which may be a factor causing need for costly sea defences) than in more natural areas. Applying the naturalness criterion in this way, disturbed islands would be less (not more) favourable for resettlement than more natural areas.

[72] Other considerations also prevail, as noted. For example, resettlement on the eastern arm of Diego Garcia would bring human populations closer to some of the largest areas of remaining hardwood forest in Chagos. On the other hand, Chagossians could help restore naturalness, which would bring conservation benefits and help partially offset some resettlement impacts.

[73] The extent to which settlers could support research on different islands is a separate but related issue, although it is not clear if there would be any significant differences in the potential for research support between the different island options identified.

[74] Ramsar sites are sites recognised under the Convention on Wetlands, called the Ramsar Convention, In addition to 'wetlands', it affords protection to coral reefs, which are regarded by the convention as wetlands.

[75] Created as part of the Ocean Legacy Program.

[76] Olson & Dinerstein, 2002, Roberts et al. 2002.

[77] Coral reef accretion rates in Chagos have not yet been determined. A study of coastal erosion and shoreline changes in Diego Garcia has recently been completed (Purkis, 2015). Preliminary findings indicate very complex coastline changes over the last half-century. Some coastal areas on Diego Garcia, as noted, appear to have sediment accumulation while others have eroded. Interestingly, the net coastal change is close to zero; island area gained by shoreline extension is cancelled elsewhere by retreat – excluding modified areas (i.e. port, airport). It is not yet clear if there are differences in between Diego Garcia, Ile du Coin and Boddam, although patterns for these islands may well also be very complex. Similar findings were found in earlier work (Hamylton & East, 2012).

[78] Wave size and storminess are also determinants of vulnerability to coastal erosion. However, inter-atoll differences for Chagos are not evident. The last known cyclone to pass over the islands was in 1891 (Posford Haskonig, 2002), and there are no projected future changes in either the location of the tropical cyclone belt or frequency of storms for the Indian Ocean (IOPC, 2013a,b).

[79] Hence, the choice of Diego Garcia for the US Naval Support Facility is unsurprising.

[80] While comprehensive survey data are available for Diego Garcia, less detail is known for the other potential island options.

[81] However, as frequently noted, without adequate safeguards and monitoring, marine resource quantity and quality can easily diminish, even at relatively modest fishing levels.

[82] Recreational fishing on reefs from boats and, in particular, anchor damage to reefs can quickly constitute a major environmental problem following diving and ecotourism. Should this develop in BIOT, fixed moorings, fishing regulation and many other conservation measures would be needed.

[83] CCT Trustees have no view on tourism as it relates to BIOT other than to believe that it should not be ecologically damaging. Twenty years ago CCT proposed a mechanism for this. However, to date, government has not permitted it. Especially where tourism is ship-based, it need not be too damaging to reefs given proper control. Any tourist facilities and activities would need to be sited and managed to ensure that they did not impact bird colonies, turtle nesting beaches and other sites of particular value.

[84] However, high conservation attraction could also increase risks to wildlife populations on Diego Garcia from any (further) recreation and ecotourism – on top of visits to these areas by personnel at the US Naval Support Facility.

[85] For any island, monitoring should be undertaken probably twice a year, using a broad set of environmental parameters as outlined in Section 5.2.6.

[86] As yet, only indicative impacts from construction, infrastructures and operations given, as outlined facilities for resettlement at this juncture are more notional than specific, pending detailed specifications being drawn up.

[87] There was also a consensus from questionnaire respondents that none of the islands, apart from Diego Garcia, could sustain a resettlement based on a modern lifestyle. The ecology generally is seen as extremely fragile and resettlement likely to cause major environmental damage. It would be preferable to limit future development to Diego Garcia, since it already has the infrastructure to support a modern lifestyle.

[88] The Ramsar site and adjacent southern 'barachois', which is also protected, is of particular importance for juvenile Hawksbill turtles and other wildlife.

6 Infrastructure Analysis

6.1 Introduction and overview

People have lived on various islands in BIOT over the last several hundred years. Humans have inhabited housing, had access to drinking water, disposed of liquid and solid waste in various ways, and have utilised copra waste and other fuel wood as a cooking or heating source, and undertaken various commercial activities. Basic infrastructure was built to support those endeavours. For example, for copra post-harvest production, there were rails for hand-pushed trolleys to transfer materials to processing areas and to jetties. However the infrastructure has now become dilapidated and any resettlement area would need all infrastructure to be built new to meet modern quality, efficiency and environmental standards.

Much has changed over the years that influences the practicality, cost, and feasibility of replacement or additional infrastructure. Relevant factors include potential population size; the designation of an arguably unique international marine environmental protected area reserve; and many changes to the definition of acceptable international best practice and infrastructure standards.

Expectations around living standards have also changed, with many potential settlers indicating an expectation of a developed country standard of living. We have also considered the provision of housing and public services in other British Overseas Territories (See Box 6.1 at end of this Chapter), and norms in the region and in other Small Island Developing States (SIDS)[1].

Consideration of the need for infrastructure has also taken into account the following core principles:

- Do minimum additional harm to the environment (See Section 5);
- Focus on environmental protection and sustainability (See Section 5);
- Take into account economic and financial aspects, value for money, and sustainability (See Sections 7 and 8);
- Review demands and requests neutrally and objectively; and
- Respond to reasonable needs with feasible options (See Section 8).

The remainder of this section discusses the key infrastructure requirements likely to be associated with any possible resettlement. It summarises the key sources of information on which the study has drawn, and the key assumptions underpinning the possible costs of infrastructure development, which are set out in detail in Section 7 of this report.

This chapter is not organised around the resettlement options, but discusses infrastructure principles which are common to all options as well as those which are specific to Outer Island resettlement (Option 1). However, in Chapter 7 and Chapter 8 (and the Annexes for those chapters), infrastructure capital and operating costs are specifically tailored to the scale and type of resettlement being described.

6.2 Assessment of key infrastructure issues

6.2.1 Design, cost and contracting issues

The Chagos Islands pose specific and complex design and contracting challenges and these inevitably have a bearing on probable cost scenarios and contingencies that may be required for physical risk mitigation. Design issues can be divided into two broad headings: a) for Diego Garcia and b) for other islands.

Diego Garcia

At present, the BIOT Administration on Diego Garcia comprises a staff of approximately 25. Military salaries and service requirements permit personnel costs to be held to well below the market rates for such a remote location, also lacking access to many recreational and rest facilities. Civilian international contractors providing services have substantially higher costs than the BIOTA arrangements.

Infrastructure design on Diego Garcia fulfils military service specifications, and generally assumes unaccompanied status for staff (i.e. neither spouses nor children). Medical services are basic and patients with even moderately complicated issues are evacuated by air. Potable water, all of which originates from rainwater and aquifers, is not presently available on tap in accommodation facilities on Diego Garcia. It is only available from water bowsers spaced at regular intervals around the facility – from which bottles/containers are filled for carrying back to accommodation blocks.

The western arm of Diego Garcia is a UK/US military environment, and the eastern arm is an unoccupied nature reserve with occasional unpaved road maintenance by US contractors at the request of the BIOT Administration. This region encompasses the Old Plantation and its heritage sites. Diego Garcia US NSF and BIOTA buildings are generally robust, and in the past limited efforts have been made to incorporate energy-efficiency features. Buildings are not architecturally in keeping with regional or historic styles, and materials are generally sourced from regions outside BIOT.

Other islands

The other islands lack airport and/or landing strip provision, and any means of getting people and supplies ashore. An airport proposal would face challenges (including overall airspace security) and costs, and is a less practicable prospect than the building of harbour facilities capable of handling ship cargoes and passengers.

All commodities and materials used in BIOT are expensive for a combination of reasons:

- The US military-linked contracting process, which tends to require the highest performance standards;
- The transportation cost of materials and the cost of staff at this location;
- The absence of local competition for delivery of goods and services which comply with US Department of Defence procurement standards; and
- The relative absence of a local competitive market, supply-chain arrangements and related public and private sector institutions.

Thus costs from other regional sources for food, cement, steel, wood and other building materials are lower than the current prices being paid on BIOT. It would not however be appropriate to apply these costs for Diego Garcia, as the most plausible approach would be to integrate the infrastructure provision within the common existing supply chain. However options should certainly be explored to reduce costs through design and supply if resettlement investments are undertaken.

There are few direct comparisons and comparators that can be applied, as might be the norm on a more typically populated island, or mainland location. For example, in the UK, the Royal Institution of Chartered Surveyors produce ' benchmark' prices[2]. We have reviewed relevant regional institutions, professional engineering and building bodies, international maritime and aviation authorities, and a number of regional bodies and countries to identify a range of costs that permit an estimate to be inferred for particular infrastructure provision. Without more detailed site investigation against specific designs, any particular estimates remain 'indicative' and subject to a wide range of design and cost uncertainty.

Maintenance of infrastructure assets is an often neglected and underfunded activity –evidenced in many developing countries by severely potholed roads. Adequate routine maintenance results in long-term cost reductions, reducing the need for partial or complete replacement. Some of the key approaches and issues are set out in Annex 6.2, which also gives guidance on the percentage of capital value that should be allocated for maintenance.

US NSF services are provided by the current prime US contractor, G4S. It is mandated that Federal Contracts for Diego Garcia be a Joint Venture (JV) between a US Prime Contractor and a subsidiary UK company[3]. There is no independent UK service provision, outside of that provided by the BIOTA staff on Diego Garcia. All services and all other supply logistics are supplied by means of request to the US military and US State Department, which are translated into a service order to G4S, which provides a cost estimate for BIOTA approval and payment. This arrangement would need to be re-negotiated to be made available to any wider expansion of a civilian population on Diego Garcia or the other islands. Alternative contracting arrangements are likely to need to be put in place.

There can be no automatic presumption that existing US navy facilities on Diego Garcia would be allowed to be made available to an expanded BIOTA and new civilian population (e.g. airport, harbour, water supply, wastewater treatment, solid waste disposal, electricity, etc.). This would all be a matter of future negotiation between the UK and US Government.

6.2.2 Transport and island access

Remoteness, distance from each other, and from any sizeable mainland are amongst the greatest challenges for any potential inhabitants of BIOT. Air and sea transport to and between the islands have been considered in this study. The options depend largely on the number and type of transit movements required.

Air transport

For a stable small population (say 150 to 500 people) based on Diego Garcia, semi-commercial arrangements using either existing or enhanced flights to the US NSF may be sufficient. As stated previously, the US authorities would need to review its position for any such support. Diego Garcia is a military airfield, which was not intended or designed for civilian use.

For additional movements to Diego Garcia, the United States may support UK government aircraft transporting Chagossian residents to and from Diego Garcia via the military airfield of the NSF. The details would be a matter of negotiation between the UK and US Governments. The costs of associated re-fuelling, customs and passenger-handling personnel and enhanced infrastructure will need to be met by the UK. Again, there can be no automatic presumption that such access would be permitted. Onward transit to the other atolls in the Chagos Archipelago could possibly be done by seaplane, subject to a range of local handling, tethering, air-traffic control, and safe re-fuelling arrangements – all of which would have associated costs.

This report has considered the option of building a new airfield as proposed in the '*Returning Home*' 2008 Chagos Refugee Group proposal. The likely costs to build a facility capable of international civil aviation accreditation will be much higher than the £4 million estimate proposed. The former USAF Airlift Command CO on Diego Garcia[4] provided estimates of £80-£100 million for an island runway and additional capital costs of, for example, electronic instrument landing systems at US$5 million/1,000 ft. (305 metres), and around US$8 million per year maintenance and operational costs for a new civilian airport[5].

Airport construction, maintenance and operation to international standards on remote islands is a difficult undertaking – even without the additional complexity of negotiating access to the BIOT airspace. The on-going cost to HMG, even with a commercial operator managing such a facility, would be considerable (Annex 6.3).

Sea transport

Diego Garcia NSF harbour has the capacity to handle the berthing requirements of a ship of equivalent tonnage and size to the existing Fisheries Patrol Vessel Pacific Marlin. An additional vessel would be required to provide cargo handling and passenger transit support to a larger civilian population on either Diego Garcia or other islands. This would require staff support, including for additional maintenance of facilities, safe waste-disposal and re-fuelling capacity. The terms of any limited military port facilities access would need to be negotiated between the UK and US government. Ocean currents and navigational issues would need careful assessment for any vessel used to transport Chagossians and freight.

Island access

Other than on Diego Garcia, there is no existing provision to land safely other than in small craft capable of being beached. New marine landing structures will be required for any resettlement. These will generally need to be much more robust than any built in the past for copra trading, and be capable of ship mooring and handling to international safety standards. Resettlement will involve an extreme peak load during the initial stages of building – when mechanical equipment and materials need to be transported ashore.

For the purposes of this report we have assumed a minimum safe water depth of 5 metres at the end of any pier or jetty that is built. Landing craft and/or small outboard-engine boats or sailing dinghies running ashore are not a practical proposition for civilian populations of mixed age and ability nor cargo movement. Additional design issues for jetties and marine structures are discussed in Annex 6.4, which also provides reference to the US Navy design codes required for military operations.

Sea defences

US Navy-sponsored studies[6] indicate clearly discernable shoreline loss in places on Diego Garcia. As a result, the US NSF is undertaking a number of 'revetment'[7] construction processes, for coastal defence. Some buildings are located close to the shore, or have been made vulnerable due to removal of vegetation. A recent study in Diego Garcia highlights the highly dynamic nature of BIOT island shorelines[8]. Hence, the recommended approach would remain: to interfere as little as possible with existing natural structures and retain vegetation where possible. Overall, this remains a dynamic, potentially floodable, and changing environment, and precautionary design principles should be adopted.

Costs are complex to calculate, given the need to bring in materials by barge and tug but an indicative cost may be seen from an award of US$8.9 million to Black Construction-Mace International JV to repair 700 ft. of revetment on Diego Garcia in 2010-2011[9]. In a written Ministerial Statement, the FCO flagged a US expenditure of over US$30 million during 2014/15 to protect the Diego Garcia shoreline from gradual erosion[10]. Preserving existing shoreline vegetation is generally desirable to mitigate against erosion, but the cost estimates assume there will be some "hard" engineering required in places (e.g. jetties/landing areas).

On low-lying islands, where tidal or storm inundation is to be expected, sea-defences would in general be very costly and impractical. Instead, housing infrastructure design (e.g. raised on 'stilts'/pillars) and equipment will need to take account of this threat. Storage tanks cannot be buried under-ground – they may "float" and catastrophically break connecting pipes and equipment, so elevated structures are likely to be preferred. Saline intrusion will pose a corrosion design challenge to metal structures and electrical cables. It is also possible to construct buildings that will "float" within restraining rails/dolphins. Examples from the Netherlands and UK are cited in Annex 6.5. The coral rock substructure, however, is likely to complicate suitable building anchoring. No such buildings exist in the Chagos Archipelago. Clearly 'houseboat-type' solutions are possible too, but maintenance costs are likely to be higher than for more traditional structures.

Roads on Islands

Diego Garcia has a mix of concrete and bituminous road surfaces (1-2 vehicle lanes) on the western arm. On the eastern arm, parts of which may be flooding more frequently, is a periodically re-graded rural unmetalled surface single-lane road. On the other islands, to address the issue of sea over-topping the outer perimeter ridge, or at extreme high tides when groundwater rises to flood some of the terrain, in places it would be necessary to elevate walkways by 0.25-0.5 metres to permit transit between buildings.

Initially, a bituminous surface road of approximately 10 km length and two lanes width (less than 5 metres with some passing points for extra-large vehicles) would be required for the eastern arm of Diego Garcia if that were to be substantially resettled. For the other islands, crushed coral rock surface walkways and paths and possibly reinstated rail tracks would suffice in any initial phase. The islands are sufficiently small to render the general use of motor cars unnecessary (and undesirable on environmental, safety, operational and maintenance grounds).

6.2.3 Shelter, governance, and law and order facilities

Shelter

A range of facilities would be required for normal full-time residents. These would include a range of accommodation buildings for various levels of occupancy, at least one meeting and recreational facility, administrative offices, and provision for shop(s), medical and postal services, telecommunications and schooling/play areas. A guide to a wide range of Building Costs is provided in Annex 6.5.

Governance, and law and order facilities

The existing administration on Diego Garcia lacks an independent conference/magistrate's meeting room and has to share facilities with US NSF personnel. Resettlement on a substantial scale is likely to require an independent facility to be built. A proposal to provide new a BIOTA administrative meeting room and administrative office facilities for existing needs has been priced at £3.82 million. At least an additional 3-4 police[11] would be required, with additional holding cell and jail facilities. These will need to be built to satisfactory international standards.

6.2.4 Energy and fuel

Energy (electricity)

Several key design principles will need to be determined before detailed planning and costing is finalised, as follows:

- For Diego Garcia, it is unlikely that off-take from the US NSF would be permitted. At present the US NSF has no authority to provide services to a civilian population. The main Diego Garcia electricity generating facility on Diego Garcia has on-going diesel generator set replacement programmes costing tens of millions of US$.
- If not, then detailed design would need to resolve whether an '*off-grid*' unitary housing solution or a centralised mini-grid from one or more core fossil-fuelled electricity generating unit(s) would be appropriate.
- What practical and value for money renewable energy supplements could be deployed (e.g. solar (PV, thermal, Concentrated Solar Power), wind, wave, heat pump, and biomass burning/incineration (from coconut wood/husks and other waste))?

Wave power has been considered, but has a number of engineering, installation and operational and maintenance challenges that are likely to make it an unattractive option. Additional information on energy and electricity is provided in Annex 6.6. Where practicable, the design principles of environmental sustainability and lower operational/recurrent cost are important factors.

Fuel

Motor vehicle fuel on Diego Garcia is provided by the US NSF and whilst kerosene suitable for aircraft engines is available (JP-5), it results in significant maintenance problems and adaptation requirements for BIOTA vehicles. Costs per gallon are cited in Annex 6.1, and are US$0.71, 0.82 and 0.69 respectively for JP-5, MoGas and Diesel. Diesel for the Pacific Marlin is also provided *via* the US NSF as are storage, handling and fire-defence systems. Operational costs are *circa* £2.5 million per year at present including fuel costing about £1 million annually[12]. On both Diego Garcia and any resettled islands, the prevention of fossil fuel leaks into the marine and land environment will be an absolute imperative, as will adequately trained and equipped fire-defence personnel. New and additional fuel storage and handling facilities will be required.

6.2.5 Other basic services

Safe drinking water

Useable groundwater exists in the form of freshwater 'lenses' on medium to large sized islands. These, coupled with rainwater captured *via* downpipes from roofs, provided a substantial and previously adequate supply of fresh drinking water for all larger islands for the populations which inhabited them. Groundwater lenses are also susceptible to pollution from chemicals, oils and fuels, and potentially, pathogens from buried bodies. On Diego Garcia, the US NSF drinking water source is supplied by a network of 99 wells located in the North West section of the island. Groundwater from these wells is pumped to treatment plants in the Cantonment and Air Operations areas where it is cleaned and disinfected. A Military Construction Project (MilCon P-184, US$26 million) to treat and distribute potable water through pipelines to be available in domestic and administrative accommodation taps is in progress, with a completion date of mid-2015. This plan makes no provision for any substantial change of existing use or user numbers, nor any significant extension of geographic network coverage. In the event that no linkage to US NSF facilities is permitted, then the Report budget provision cost sensitivity ranges will tend to rise to their upper bounds, and/or future detailed design compromises on what can be provided will been to be considered. In practice, there will need to be agreed shared management arrangements concerning water resources between any civilian and military entity in the interests of resource quality and quantity protection.

Toilet facilities and waste disposal

It has been assumed that modern pour-flush systems with reticulated water supply systems will be required. Alternative options such as ventilated pit latrines pose threats to the groundwater lenses, and are unlikely to be attractive operationally to any returnees. The 'WELL' resource centre at the University of Loughborough provides a substantial information resource on the subject[13]. 'Grey water' re-use would be a prudent design approach to reduce discharge volumes.

Wastewater treatment will be required, with liquid discharge of a permitted standard to the extremities of the atoll reef edge by some form of outfall pipe. The engineering difficulties and costs to both build and maintain such systems will play a key role in determining the most feasible options.

Solid waste from the treatment process, and household rubbish, will have to be collected and removed from islands at intervals. Appropriate additional storage and containment systems will need to be built to take account of the total requirement (probably on Diego Garcia as an interim consolidation point before removal of any residue to a mainland environment). An extension/addition to existing private contractor arrangements for off-site disposal would have to be negotiated separately.

Heating, cooking, cooling and lighting

Biomass with low moisture content (dried/pelleted or shredded coconut fuel sources are a possibility) can be used for cooking and heating purposes and a number of commercial companies offer woodchip burner systems for a range of scales[14].

Other primary energy sources include wave, solar and fossil fuels and are discussed in Annex 6.6. Ground source heat pumps and deep water source cooling are also considered Annex 6.6.

Telecommunications

'Sure'[15] has been operating on Diego Garcia since 1982 under a BIOTA licence to provide public telecommunication services on Diego Garcia. These include international telephone, broadband internet and Wi-Fi, GSM mobile, paging services and TV rebroadcast services. Sure International staff on Diego Garcia advised that fixed line telecommunication was unlikely to be cost effective for a user population of less than 500 people. The Diego Garcia 10-metre satellite dish/antenna would need to serve as a primary point from which signals could be transmitted to other BIOT islands with 4-metre antennae/receiving dishes and a vSAT terminal. Electric power (110v or Direct Current) would be required[16].

Costs will depend on many variables, including transport links for specialist service technicians to visit, but an approximate cost of £0.5 million per island would be a basic estimate for 512–2Mb broadband. Television off Diego Garcia would be more challenging and expensive. Operational costs may be estimated to be in the region of up to 20% of the capital investment cost.

Health/medical facilities

Basic medical services are provided from the Branch Health Clinic, Diego Garcia. They are a tenant command 'on-board' US NSF Diego Garcia and their parent command is the US Naval Hospital, Yokosuka, Japan. Because the clinic is designed and equipped to primarily treat general medical conditions, anyone requiring referral or ongoing care from cardiology, dermatology, gynaecology, internal medicine, neurology, orthopaedic, ophthalmology, or psychiatric specialties is not considered suitable for this isolated duty station. As for all other facilities on Diego Garcia, international contractor costs are difficult to determine, but indicative prices can be inferred by a 2007-2009 US$5.41 million contract to renovate Building 151, the Medical Clinic[17]. Annex A.1 gives basic user charges for medical services for contractors on Diego Garcia. It is probable that the US NSF medical resources will not be available for civilian use, and staff with medical competence will need to be part of the population for any of the Options proposed.

Off Diego Garcia, other small island facilities would be relatively rudimentary in the first instance, with emergency transfer to Diego Garcia and then onwards to mainland care is the most probable scenario. Time delay and expense will be a key factor that needs to be considered particularly with any elderly and/or very young resettlers.

Education facilities

There are no schools in BIOT, and any facilities would have to be built. Population demographics and birth rates would determine likely demand. Without estimates of the population age mix it is impossible to estimate costs in any detail. The feasibility of attracting qualified staff to any basic service facilities would need to be assessed. Primary and secondary school facilities would be required. College/university education would not be feasible or viable on BIOT.

Comparison with the provisions for other Overseas Territories is considered to be a reasonable basis for option definition and cost calculation for non-US Military contractors (See Box 6.1 at end of this Chapter).

US Navy contractors on Diego Garcia are likely to charge significantly more than these amounts. The standards, specifications and contracts will be different, and not directly comparable.

6.3 Summary of implications for resettlement

Costs are particularly difficult to estimate in this context, and vary enormously depending on the methodology chosen. Contractors providing extremely robust and high standard engineering services to the US Navy would imply high costs, if applied to resettlement infrastructure. The cost structures of small family businesses on, say, Mauritius, would imply an ability to build houses for a fraction of these costs. The issue for this review has been to find an appropriate balance taking account of:

- The expectations of potential re-settlers consulted;
- Reasonable comparators with other Overseas Territories; and
- The absence or paucity of existing supply chains against which costs can be more accurately calculated.

A key uncertainty is predicting the nature of future UK-USA negotiations over resettlement in principle, and the nature of amendments that would be required to existing service-level agreements with US NSF main contractors. They have not as yet been approached to provide cost estimates for offering to the BIOT Administration equivalent levels of service to a much larger population. That would be the simplest solution. It would, however, introduce a continuous dependency; would not necessarily offer environmentally sustainable solutions; and would not develop opportunities for entrepreneurship and public-private partnership.

The overall physical security enhancements and increased security and police staffing levels that will be required will be influenced by a range of other issues (including for example governance, population demographics, skill sets and training needs, and overall rights of movement on various parts of Diego Garcia and the other Chagos Islands).

A large proportion of Diego Garcia is a military operational facility with munitions, vehicular movement and marine and air deployment on a daily basis. It is always on standby for major war intervention. The US NSF remains an opportunity for those willing and able to work at existing contracting rates offered by prime contractors. In any event, the infrastructure options have assumed a relatively high standard of service provision.

An Option 1 population (up to 1500) would involve high levels of infrastructure provisions, probably with private sector inputs. Incremental expansion to other islands for various economic activities (e.g. fishing, nature tourism) could be considered. Section 7 provides a range of costs for key infrastructure, and these are supplemented by six Annexes. These are not "worked examples" or detailed assessments for infrastructure costs. Rather they provide background and contextual material illustrating the complexity of the issues being considered, and indicative and relevant design standards and codes and international and regional cost ranges to provide typologies of infrastructure. The breadth of coverage also reflects the suggestions and comments received with respect to options and alternatives. 'Budget provision' figures are given for key major elements of infrastructure.

These encompass the infrastructure development cycle (site survey, detailed design, site clearance and preparation, complete installation and commissioning). In coming to judgements and conclusions on these budgets, a range of factors have been taken into consideration, each to varying degrees depending on the strength and availability of evidence and an estimate of risk and uncertainty.

Box 6.1: Overseas Territories Cost Comparators

Airports

- **St Helena** airfield (1,650 metres, concrete), which requires substantial valley infill civil works, will cost some £200 million for design and construction (more than 60% completed), and is likely to cost £46 million for 10 years of airport operation.
- **Montserrat** airfield, a 600-metre runway will cost approximately £17.5 million.

Roads and Road Transport

- **St Helena** existing standard roads cost £73.2k/km to £97.1k/km for average width roads of 3.5 metres. Annual maintenance costs are approximately £3k/km per annum.
- **Montserrat** roads cost around £475k/km. This cost includes base drainage, minor land acquisition and minor culverts. Private contractor costs are not known. The costs to maintain 107 km are £3.2k per km per annum.
- **Montserrat** Government vehicle fleet maintenance (70 light and 70 heavy/construction vehicles) costs approximately £196k per year.

Buildings and Housing

- In **St Helena**, the total combined capital value of a new St Helena HM Prison and police station is approximately £250k. Annual maintenance for administrative buildings is £173k. There are 208 government-owned houses, of which 44 are beyond economic repair. Some £414k is spent annually on upgrade and reactive maintenance of 177 social houses, which have a capital value of approximately £5.2 million. Chief Secretary Houses have an estimated capital value of £4.3 million. A planned comprehensive maintenance refit is estimated to be likely to cost £738k.
- In **Montserrat**, the build only cost of a new two-bedroom house (708sq ft.) is £42.1k and a three-bedroom house (910sq ft.) is £54.2k. A three-storey administrative/ministry complex (6,000sq ft.) is £595k. The maintenance of 117 public buildings costs £1.3 million per annum. New builds and maintenance if contracted out (local SMEs) follow JCT IC or DB. Larger (international) contracts follow FIDIC red.
- On **St Helena**, capital costs for three primary schools (392 pupils) and one secondary school (236 pupils) were around £215k.
- On **Montserrat**, school build costs are £83.3p/Sq. ft.

Power

- Power generation for **St Helena** is primarily provided by three 1.6 MW Caterpillar generators along with another 2 back-up elderly 1.0MW Rushton generators and a single 0.8MW Caterpillar generator at Rupert's Valley power plant. The approximate cost to produce electricity is £0.24 per kWh, and the Utility Company Connect St Helena charges consumers between £0.23 and £0.44 per kWh according to a three-band tariff structure.
- On **Montserrat**, peak diesel generator demand had reached 2.0MW before demand was reduced through price rises in the basic tariff, which ranges between £0.11/kWh to £0.13 kWh. Fuel consumption of electricity alone is approximately 3.2 million litres of diesel per year. A new 1.5MW diesel power station is likely to cost £5.3 million, with maintenance and operational costs at £119K per annum, totalling £1.95 million. Geothermal options are being explored, with likely capital costs of around £30 million for a 3.5MW facility.

Factors which have been considered in formulating the budget estimates include: availability of supply chain evidence; imperative to follow international codes and standards and/or US Military standards; existing contracting frameworks and published costs; other OT data sets; assumptions about availability of labour and appropriate skills; previous reports & data, and consultations with UK DFID OT infrastructure experts and other specialist suppliers on appropriate and reasonable cost estimates.

The outline infrastructure budgets proposed will be subject to detailed design choices in the future. These will depend on the demographic composition of resettled group(s), and style choice options that should be detailed through future consultation. A cost-benefit balance will need to be struck between the robustness to hurricane, typhoon, tsunami, or earthquake extreme event forces and overall resistance to routine weather and sea-level rise inundation threats.

The choices are not straightforward, as design solutions for one type risk may conflict with design solutions for others[18]. An initial cost-effective approach could include extreme-event shelters (common administration buildings) to which a small population can retreat for the duration of the event. Emergency supplies and standby equipment can be located in or adjacent to the structures. Advance weather warning or tectonic movement signals will also be required. These are likely to be available from general Diego Garcia systems and/or Indian Ocean, post-Asian Tsunami improved warning systems.

Emergency evacuation and contingency plans have not yet been developed. It would be sensible to develop such plans once a population size and demographic profiles are determined. For extreme and sudden events, emergency evacuation from the island is unlikely to be possible. Instead, basic infrastructure will have to provide protection. For longer-term issues, such as inundation, appropriate solutions will need to be factored into the infrastructure design.

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[1] The SIDS are a group of 52 island economies working together in three geographic regions: the Caribbean Islands; the Pacific; and Africa, Indian Ocean, Mediterranean and South China Sea (AIMS).

[2] 2013 Royal Institute of Chartered Surveyors, Maintenance.

[3] For example, the San Juan Construction Company Inc., formed a JV with John Laing International to win and implement a US$14.16M construction and services contract on Diego Garcia between 2001 and 2004.

[4] Major Morris of the Turner et al CCT 2008 rebuttal of the Howell Report.

[5] The Howell report said (p15): "The capital costs of airport construction are exceptionally difficult to calculate because of the wide variation in site characteristics. This calculation is even more difficult in the case of Chagos because of the need to ensure minimal environmental damage. The best current estimate is £4 million although it may well be higher given uncertainties mentioned above as well as construction challenges Nonetheless, a similar capacity airport receiving international visitors in southern Africa would cost in the region of £1.5 million (including power supply, telecommunications etc.); and South African civil engineers, without any benefit of site inspection, feel that a Chagos airport should not be more than three times that cost." This FS report has the benefit of site inspection and advice from experienced US Air force personnel. Howell envisages what is essentially a "landing strip".

[6] Moffat and Nichol (2008) and Helber Hastert and Planners, Inc (2009)

[7] Revetment: engineered rock shoreline armoring to prevent erosion and inundation

[8] Purkis, 2015.

[9] 2010, October, NAVFAC press announcement.

[10] 2014 March 6th, Diego Garcia: Lagoon Environment, Parliamentary Under-Secretary of State for Foreign and Commonwealth Affairs (Mark Simmonds), written Ministerial Statement, ~1pp.

[11] Interview with BIOT Police, Diego Garcia, May 2014.

[12] Data provided by Public Works Officer, NSF Diego Garcia, in December 2013 "Infrastructure update (for Official Use only).

[13] Loughborough University WELL.

[14] (E.g. Heizomat, ETA HACK, IHC-Innasol, HERZ). HERZ Combustion units capable of servicing the heating needs of ten dwellings cost between £75,000 and £120,000 on the UK mainland.

[15] Sure (Diego Garcia) Limited (previously Cable & Wireless Diego Garcia Ltd until 19 August 2013).

[16] The Sure on-site Manager was consulted and agreed the feasibility of this option in principle.

[17] RC2-04 Building 151, Medical Clinic Renovation at the U.S. Naval Support Facility, Diego Garcia, San Juan Construction Inc. Completed February 2009.

[18] For, example, resistance to earthquakes can be engineered by foundation dampening design, the strength of vertical to horizontal wall joints, and the probable need for A-frame style lighter roof structures – that provide for void space occupant survival potential in the event of building collapse. But these considerations may be at variance with hurricane-wind force resistance requirements.

7 Economic and Financial Analysis

7.1 Introduction and overview

This chapter outlines the economic and financial assessment for the potential resettlement of the Chagos Islands based on the options outlined in Section 3, namely:

- Option 1: Resettlement of 1,500 Chagossians;
- Option 2: Resettlement of 500 Chagossians; and
- Option 3: Resettlement of 150 Chagossians.

The analysis has focused on: (i) indicative estimates of the full cost of each resettlement option; and (ii) potential opportunities to establish and develop sustainable livelihoods, in terms of both income generation and sustainable lifestyles. In this context, reference has been made to other UK Overseas Territories and small island states (SIDS). The main aim of the assessment is to indicate: "*….the likelihood of the economy being financially self-sufficient and meeting prudential financial guidelines, and the timescale if this were to happen.*" A prime aim is the requirement to illustrate the full cost of each resettlement option to the UK.

7.2 Data sources

The analysis is based on a number of detailed supporting annexes that assess: (i) the indicative costs in terms of the capital investment and the annual operations and maintenance costs, plus periodic capital replacement and/or refurbishment; and (ii) the potential economic development opportunities. The supporting data that underpins this financial and economic analysis covers the following:

- Infrastructure costs;
- Environmental impact assessment costs;
- Fisheries;
- Tourism;
- Coconuts; and
- Resettlement options – indicative costs, income generation and financial forecasts.

7.3 Indicative cost estimates

7.3.1 Indicative capital cost estimates

The indicative capital cost estimates for each of the three options are summarised in this section.

Table 7.1 summarises the main infrastructure capital cost estimates, as follows:

- Option 1: £370.8 million, which would include: (i) an airport (capable of handling international flights) costing approximately £125 million; and (ii) a breakwater/harbour facility costing approximately £50 million.
- Option 2: £94.2 million for the main infrastructure components.
- Option 3: £54.6 million for the main infrastructure components.

The estimates in Table 7.1 also illustrate the impact of excluding the costs of the airport and the breakwater/harbour facility under Option 1: these demonstrate the potential savings through negotiating modest shared access to the US NSFDG airfield and port facilities[1]. In the case of Option 1, such an agreement would imply a lower indicative capital cost of £160.8 million – 57% less.

Table 7.1 Infrastructure – indicative capital cost estimates (2014 constant prices)

	Indicative Capital Costs (£ million)			Distribution %		
Component	**Option 1**	**Option 2**	**Option 3**	**Option 1**	**Option 2**	**Option 3**
Total						
Transport & Sea Defences	204	19	9.5	55.0%	20.2%	17.4%
Energy	22	9.5	6.5	5.9%	10.1%	11.9%
Housing & Public Buildings	58	40	23	15.6%	42.5%	42.1%
Utilities and Services	25	10	6.5	6.7%	10.6%	11.9%
Total – Base Costs	309.0	78.5	45.5	83.3%	83.3%	83.3%
Physical Contingencies(1)	61.8	15.7	9.1	16.7%	16.7%	16.7%
Grand Total(2)	**370.8**	**94.2**	**54.6**	**100%**	**100%**	**100%**
Estimates without Airport (Option 1 only)						
Base Costs	184.0	78.5	45.5	83.3%	83.3%	83.3%
Physical Contingencies(1)	36.8	15.7	9.1	16.7%	16.7%	16.7%
Grand Total(2)	**220.8**	**94.2**	**54.6**	**100%**	**100%**	**100%**
Est. Excl. Airport & Breakwater/Harbour (Option 1 only)						
Base Costs	134.0	78.5	45.5	83.3%	83.3%	83.3%
Physical Contingencies(1)	26.8	15.7	9.1	16.7%	16.7%	16.7%
Grand Total(2)	**160.8**	**94.2**	**54.6**	**100%**	**100%**	**100%**

Notes: (1) Physical contingencies set at 20%; and
(2) Totals may not add up due to rounding.
Source: Annex 7.4.

The Environmental Impact Assessment (EIA), prior to the commencement of the prospective infrastructure construction programme(s), is important given the environmental importance of BIOT and the significance of the MPA. The comprehensive EIA is estimated to cost £2.3 million (for all three options). In addition, annual environmental monitoring is anticipated during the construction phase at a cost of £100,000 per year.

The costs estimates have been drawn up on the assumption that it is possible for the UK to provide all key items rather than relying on shared facilities with the US Naval Support Facility (other than restricted use of the airport and port). This is why some service costs for 50-500 people remain high and do not reduce proportionately. The Option 3- has containerised/standby diesel generators, not a "power station" option, within the budget. A discussion of the uncertainties and variability of the costs is found in Annex 7.4 (Section 2, and in particular Table 7.4.1).

Table 7.2 summarises the total indicative capital costs (infrastructure, as per Table 7.1 above plus preparation and supervision, project management unit (PMU), EIA and training costs) for each of the three options with an assumed annual phasing programme:

- Option 1 over six years, indicative capital cost of £423.3 million.
- Option 2 over four years, indicative capital cost of £111.6 million.
- Option 3 over three years, indicative capital cost of £65.4 million.

Table 7.2 also summarises the potential phasing for Option 1 if the airport and breakwater/harbour are excluded. Under this scenario the total indicative capital costs would be £190.2 million i.e. 55% below the inclusive total.

Table 7.2 Total Indicative Capital Cost Estimates – Annual Phasing by Option (£ million, 2014 constant prices)

	Year						
Component	**1**	**2**	**3**	**4**	**5**	**6**	**Total**
OPTION 1 (pop. 1,500)							
Preparation Costs[1]	22.2						22.2
Infrastructure Costs[2] [5]		74.2	74.2	74.2	74.2	74.2	370.8
Construction Supervision[3]		3.7	3.7	3.7	3.7	3.7	18.5
Project Management Unit (PMU)		0.8	0.8	0.8	0.8	0.8	3.8
EIA – Construction Phase	2.3	0.1	0.1	0.1	0.1	0.1	2.9
Training Costs			0.8	1.5	0.9	0.9	5.1
Total[4]	**24.6**	**78.7**	**79.6**	**80.3**	**79.6**	**79.6**	**423.3**
OPTION 2 (pop. 500)							
Preparation Costs[1]	5.7						5.7
Infrastructure Costs [5]		31.4	31.4	31.4			94.2
Construction Supervision[3]		1.6	1.6	1.6			4.7
Project Management Unit (PMU)		0.8	0.8	0.8			2.3
EIA – Construction Phase	2.3	0.1	0.1	0.1			2.7
Training Costs		0.6	0.7	0.4	0.4		2.1
Total[4]	**8.0**	**34.4**	**34.5**	**34.3**	**0.4**		**111.6**
OPTION 3 (pop. 150)							
Preparation Costs[1]	3.3						3.3
Infrastructure Costs [5]		27.3	27.3				54.6
Construction Supervision[3]		1.4	1.4				2.8
Project Management Unit (PMU)		0.8	0.8				1.5
EIA – Construction Phase	2.3	0.1	0.1				2.6
Training Costs		0.3	0.3	0.2			0.7
Total[4]	**5.6**	**29.8**	**29.8**	**0.2**			**65.4**
OPTION 1 (pop. 1,500) – excluding airport and breakwater/harbour							
Preparation Costs[1]	9.6						9.6
Infrastructure Costs [5]		32.2	32.2	32.2	32.2	32.2	160.8
Construction Supervision[3]		1.6	1.6	1.6	1.6	1.6	8.0
Project Management Unit (PMU)		0.8	0.8	0.8	0.8	0.8	3.8
EIA – Construction Phase	2.3	0.1	0.1	0.1	0.1	0.1	2.9
Training Costs			0.8	1.5	0.9	0.9	5.1
Total[4]	**12.0**	**34.6**	**35.5**	**36.2**	**35.5**	**35.5**	**190.2**

Notes: (1) Preparation costs set at 6% of infrastructure costs;
(2) Incl. airport & breakwater/harbour;
(3) Construction supervision set at 5% of infrastructure costs; and
(4) Figures may not add up due to rounding.
(5) The US government has indicated that it will allow limited use of the airport and port for Chagossians. Additional costs would only therefore be required if there is a need (which is not yet possible to determine) for extra capacity

Source: Annex 7.4

The capital costs per head under each option are summarised in Table 7.3. Total costs are as follows:

- Option 1: estimated costs range from: (i) £282,000 per head for all capital cost components; (ii) £171,000 per head, excluding the airport; and (iii) £ 127,000 per head, excluding the airport and the breakwater/harbour.
- Option 2: £223,000 per head.
- Option 3: £436,000 per head.

Table 7.3 Indicative Capital Costs – Per Head by Option (£ 000, 2014 constant prices)

Component	Infrastructure Cost			Total Costs(1)		
	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3
Population	1,500	500	150	1,500	500	150
Costs per Head						
Total	247	188	364	282	223	436
Total – Excl. Airport (Option 1 only)	147			171		
Total – Excl. Airport & Breakwater/Harbour (Option 1 only)	107			127		

Note: (1) Incl. (i) infrastructure costs; (ii) preparation and construction supervision costs; (iii) PMU costs; (iv) EIA costs – construction phase; and (v) training costs.
Sources: Tables 7.1 and 7.2; and Annex 7.4.

7.3.2 Indicative annual recurrent costs

The indicative estimates of annual recurrent costs are summarised in Table 7.4, covering; (i) operation and maintenance of the infrastructure; and (ii) annual environmental monitoring and evaluation. Estimates of the annual operating and maintenance costs for the infrastructure components are based on standard percentages of the capital cost estimates[2]. These estimates include allowances for salaries/wages, repairs and maintenance, fuel and spares. However, the annual recurrent costs for environmental monitoring and evaluation are estimated to be the same for all three options.

The resulting estimates are as follows:

- Option 1: from (i) £21.5 million p.a. to cover all components; (ii) £11.5 million p.a., excluding the airport; and (iii) £9 million p.a., excluding the airport and the breakwater/harbour.
- Option 2: £6.3 million per year.
- Option 3: £4.7 million per year.

The estimated environmental monitoring and evaluation costs amount to a significant proportion of the annual recurrent estimates.

Table 7.4 Indicative estimates of annual recurrent costs by option (£ million, 2014 constant prices)

	Indicative Annual O&M Costs (£ million)			Distribution (%)		
	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3
Infrastructure						
■ Transport & Sea Defences	14.1					
■ Energy	1.3	1.2	0.6	66%	19%	13%
■ Housing & Public Buildings	2.7	0.6	0.5	6%	10%	11%
■ Utilities and Services	1.2	1.8	1.1	12%	28%	23%
		0.5	0.3	6%	8%	6%

	Indicative Annual O&M Costs (£ million)			Distribution (%)		
	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3
Sub-Total Infrastructure	19.3	4.1	2.5	90%	65%	53%
Environmental Monitoring & Evaluation	2.2	2.2	2.2	10%	35%	47%
Grand Total	**21.5**	**6.3**	**4.7**	**100%**	**100%**	**100%**
Estimates Without Airport (Option 1 only)						
Infrastructure	9.3	4.1	2.5	81%	65%	53%
Environmental Monitoring & Evaluation	2.2	2.2	2.2	19%	35%	47%
Total – Without Airport	**11.5**	**6.3**	**4.7**	**100%**	**100%**	**100%**
Est. Excl. Airport & Breakwater/Harbour (Option 1 only)						
Infrastructure	6.8	3.8	2.3	76%	63%	51%
Environmental Monitoring & Evaluation	2.2	2.2	2.2	24%	37%	49%
Total Excl. Airport & Breakwater/Harbour	**9**	**6**	**4.5**	**100%**	**100%**	**100%**

7.3.3 Periodic capital replacement and refurbishment costs

Periodic capital replacement and refurbishment costs will be required. These have been provisionally estimated at 10% of the infrastructure capital costs every 10 years. The resulting estimates are as follows:

- Option 1: (i) £37 million to cover all components; (ii) £22 million, excluding the airport; and (iii) £16 million, excluding the airport and the breakwater/harbour.
- Option 2: £9 million.
- Option 3: £5 million.

More accurate estimates would be required at the stage of detailed design.

7.4 Income generation and livelihood sustainability

7.4.1 Introduction

This section summarises the main indicators and results of the study investigations into the opportunities for income generation and livelihood sustainability to support potential resettlement. Four main areas of investigation have been covered:

- Fisheries (See Annex 7.1).
- Tourism (See Annex 7.2).
- Coconuts (See Annex 7.3).
- General development opportunities and financial forecasts (See: Annex 7.4).

Each topic has been covered in terms of: (i) general background; (ii) data related to the experience of selected islands in the Indian Ocean, Pacific Ocean and the UK Overseas Territories; and (iii) potential investment opportunities that could generate income and provide for livelihood sustainability. The detailed reviews and data are in each Annex.

7.4.2 Fisheries

Licensed commercial fishing ceased in 2010 with the establishment of the "no take" Marine Protected Area (MPA – April 2010), which covers the territorial sea extending to three (3) nautical miles from each island in the Chagos Archipelago (covering approx. 640,000 km²). The MPA lies within the Fisheries Conservation Management Zone (FCMZ). In addition, fishing for personal consumption is permitted anywhere in BIOT waters, as laid down the Fisheries Ordinance 2007. The creation of the MPA has had important consequences. It has eliminated the important annual income generated by fishing licenses, which has varied from £536,000 (2003/04) to an average of £2 million p.a. in the early to mid-1990s and just over £1 million in 2007/08. BIOTA now operates with a significant annual deficit that has risen from £2.7 million in 2010/11 to £3.2 million in 2013/14 (of which about 80% is expended on the contracted patrol vessel – Pacific Marlin – records indicate that 68% of vessel time is allocated to fishery patrols). Potential future fishing activities related to the resettlement options would require amendments to The Fisheries (Conservation and Management) Ordinance 2007 (amended: 8th December 2008; and 25th October 2013) and the ordinance or law for the Marine Protected Area when it is finalised.

Inshore fishery

The Chagossians expect to engage in artisanal fishing as the main source of food and protein. Fish and fishery products represent a valuable source of fundamental importance for diets. Fish consumption per capita tends to be much higher in coastal areas and small island states. Fish resources need to be managed in a sustainable manner that will ensure appropriate medium to long term community viability.

Estimates of the potential annual artisanal catch for each of the defined resettlement options are based on similar recent figures for islands in the Indian and Pacific Oceans and UK Overseas Territories (See Annex 7.1, Section 5.2). Based on an average per capita consumption of 75 kg/year, the estimates yield annual fish catch requirements of:

- Option 1 – 113 tonnes per year;
- Option 2 – 38 tonnes per year; and
- Option 3 – 11 tonnes per year.

These values were compared with estimates[3] of annual sustainable inshore fisheries yields in the Chagos Archipelago (See Annex 7.1, Table 4.2). The comparison yields the following results for the prospective resettlement islands of Diego Garcia, Peros Banhos (Ile du Coin) and Salomon (Boddam) – based on average consumption per capita of 75 kg/year:

- Diego Garcia: (i) Option 1 exceeds the minimum and maximum sustainable yields by a significant margin; and (ii) Options 2 and 3 are both within the sustainable yield estimates.
- Peros Banhos (Ile du Coin): (i) Option 1 exceeds both the minimum and maximum sustainable yield; and (ii) Options 2 and 3 are both within the sustainable yield estimates.
- Salomon (Boddam): Catch requirements exceed the minimum and maximum sustainable yield estimates for all three options.

These results imply that resettled communities on these islands would also need to fish around other adjacent islands.

Artisanal fishing will require: fishing gear; suitable fishing boats; and chest freezers for storage. The ownership and payment for this equipment will need to be agreed before possible resettlement proceeds. The options could be: (i) individual ownership by Chagossians who choose to work as fishermen; and/or (ii) formation of a fishing cooperative with links to the proposed Community Store.

- Indicative capital costs for fishing boats, fishing equipment and chest freezers for each of the resettlement options are summarised as follows[4]
- Option 1: 13 fishing boats and equipment, capital costs of £152,000 to £201,000.
- Option 2: 5 fishing boats and equipment, capital costs of £59,000 to £76,000.
- Option 3: 3 fishing boats and equipment, capital costs of £35,000 to £42,000.

Mariculture[5] opportunities

Developments in any of the outer islands would require specific amendments to the environmental and "no take" conditions of the Marine Protected Area (MPA). The options that might be considered are: (i) seaweed cultivation and harvesting; (ii) sea cucumber harvesting; (iii) pearl cultivation (iv) aquaculture e.g. prawns and other shell fish; and (v) aquarium fish – capture and export. Each of these would require specific training and expertise, plus appropriate harvesting and storage facilities, transport capability and recognised export markets. These would have to be studied in detail before an investment decision could be made.

Environmental activities related to fisheries conservation and protection

Resettled Chagossians could be engaged in a wide range of environmental and fisheries activities. These could involve employment in the following:

- Environmental monitoring activities – these could be based on prescribed series of tasks and data logging activities[6]. The activities could be carried out on the resettled island(s), adjacent islands and through participation in the patrols of the ship Pacific Marlin.
- Accompanying and assisting the Fisheries Protection Officer in the execution of his duties in island visits and data collection, and supporting scientific and research expeditions to the Chagos Islands.
- Environmental conservation and protection activities on the resettled island(s).

These activities could involve the regular employment of 5 to 6 Chagossians for an average of 100 to 150 days per year. The estimated cost could amount to £26,000 to £47,000 per year (based on £52 per day, based on current UK minimum wage). The Chagossians involved in these activities would require specific training and instructions, which may increase the daily rate depending on the level of expertise required. Specific training may be required by any resettled Chagossians who engage in fishing for personal and/or commercial reasons and in environmental activities related to fisheries protection and conservation. The training would be required to ensure that current and potential future ordinances, licences and regulations are understood and enforced. Chagossians would develop skills for boat handling, operation and maintenance; appropriate fishing methods; completion of all log sheets; reporting of any illegal fishing activity; etc. If commercial fishing is re-instated on Diego Garcia, then it would be expected the private sector partner would be directly involved in the training programme.

The fisheries training could be undertaken by individual fisheries training specialists; a fisheries training company; or one of the three island fisheries training centres in the Indian Ocean region[7]. Training in environmental activities related to fisheries protection and conservation would include instruction in collecting and reporting fish catch and effort data; and environmental monitoring to determine if fishing results in significant decline in target/other species or changes in species composition.

Indicative cost estimates for prospective training would be £140,000 – involving specialists working with the Chagossians on the island(s) for a period of up to seven months. However, finalisation of the training requirements would depend on assessment of the relevant skills and experience of the Chagossians. Details of any proposed resettlement programme and proposed procurement and payment obligations for the fishing boats and equipment would need to be agreed.

Finally, if resettlement were to proceed, then the Fishing Ordinance and regulations relating to the MPA would need to be amended in order to permit the levels of fishing required to provide for sustainable livelihood options in terms of subsistence/artisanal fishing and commercial fishing for sale to the Community Store, contract workers on Diego Garcia, BIOTA and catering division NSFDG. Possible fish processing factory, mariculture opportunities, and sport fishing would also involve appropriate regulations.

7.4.3 Tourism

Tourism development could be an important income generation and employment opportunity to support resettlement. A brief review of tourism on similar small islands is presented in Annex 7.2 for the following islands: (i) Indian Ocean: Comoros, Maldives, Mauritius and Seychelles; (ii) Pacific Ocean: Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Samoa, Tonga and Tuvalu; and (iii) UK Overseas Territories: Anguilla, Falklands, Montserrat, St Helena and Turks & Caicos Islands.

Air access is crucial for small islands heavily dependent on international tourism for economic growth and employment. Annex 7.2. (Table 3.2) illustrates the characteristics of the international and domestic airports and airstrips on each of the selected islands[8]:

- Almost all have at least one international airport that can accommodate most wide-bodied passenger aircraft[9].
- Most of the island nations in the Indian and Pacific Oceans have a number of domestic airstrips that provide air services in small aircraft to outlying islands[10].
- Overseas Territories – those too small and with insufficient land area to construct an airstrip have limited tourism development including Pitcairn (located in the South Pacific Ocean) [11] and Tristan da Cunha[12] (located in the South Atlantic Ocean)

Competing Island Resorts in the Maldives and Seychelles are reviewed in Annex 7.2 (Section 3)[13]. Most of these resorts operate at the upper end of the tourism market, with exclusive facilities on small islands. All transfers from the main international airport involve transport by seaplane, plane, helicopter and/or speedboat – which are not included in the resort prices. Resort prices are generally high, reflecting the geographic location, high investment costs and service exclusivity. These could present a suitable model for BIOT but would require private investment for high end facilities.

The World Tourism Organisation (WTO) and the World Travel and Tourism Council (WTTC) forecast continued and sustained growth in the tourism market for the next 10 to 15 years in the regions that include the islands in the Indian and Pacific Oceans (See Annex 7.2, Tables 3.3 and 3.4).

Two previous reports[14] include references to tourism development and air access. The main conclusions of these reports are reviewed in Annex 7.2 (Section 4). Neither of these studies presented a review of the tourism development potential of the Chagos Islands. The views of the Chagossians were not presented. The need to associate with a private resort development company to invest in and promote an appropriate tourism package was not recognised.

The Chagos Archipelago is an unknown destination in the international tourism market. Nevertheless, it has unique characteristics that could make it attractive to high-end tourism and the eco-tourism markets. The isolation, access and environmental protection/conservation issues would have to be addressed to preserve the unique status of

the archipelago. Nevertheless tourism could offer sustainable opportunities for resettled Chagossians. Section 5 in Annex 7.2 identifies key factors for tourism development.

Development and employment opportunities for resettled Chagossians have been reviewed in terms of different models[15]. Island development in the form of high-end tourism development – similar to the Maldives model is one option, but eco-tourism development to minimise the environmental impact is also possible. Tourism related activities e.g. sport fishing, snorkelling and scuba diving, other water sports, and marine and environmental tours, etc. would be important aspects of this. Other ideas include home-stays with Chagossian families; yachting and vessel safaris; and cruise ship visits. These potential opportunities are reviewed in outline below – with further details in Annex 7.4 (Section 6).

Training requirements for most of the potential livelihood options would have to be assessed based on the range of skills and experience of the Chagossians wishing to resettle. Tourism development opportunities would also be subject to appropriate regulatory controls[16].

High-end tourism development

Several key factors remain to be investigated before a final decision could be taken. These include the interest of potential private sector tourism developers and investors would need to be assessed. Selection of suitable sites on island(s) on which to locate the potential development[17] would be important, taking account of the key issue of transport access[18]. Training of resettled Chagossians in skills needed in high-end tourism hospitality would also be needed.

Indicative estimates were prepared for a resort with 30, 40 or 50 rooms in 2014 constant prices. The main results are summarised in Table 7.5. For a resort with 50 rooms, the figures are indicatively:

- Capital costs – £33-£38 million.
- Staff – 160 nos., with salaries/wages of £1.5 million p.a.
- Financial internal rate of return (FIRR) – 11% to 13%.

The full details, assumptions and parameters are presented in Annex 7.2[19]

Table 7.5 High-End Tourist Resort – Indicative Capital Costs, Staffing and FIRRs

		Facility Size		
Component	**Unit**	**30 rooms**	**40 rooms**	**50 rooms**
Indicative Capital Cost				
■ Upper capex estimate	£ million	27.3	32.6	37.9
■ Lower capex estimate	£ million	24.2	28.7	33.2
Staff Estimates				
■ Senior Management	nos.	8	8	8
■ Middle Administration	nos.	12	12	12
■ All Other Staff	nos.	84	112	140
Total – Staff Estimates	nos.	104	132	160
Estimates of Salaries and Wages	£ million	1.1	1.3	1.5
Financial Internal Rate of Return (FIRR)				
Room Rate: US$ 1,250/£770/day				
■ Upper capex estimate	%	7.7%	9.7%	11.1%
■ Lower capex estimate	%	9.3%	11.5%	13.1%

Source: Annex 7.2 (Section 6.2).

Initially, it is anticipated that prospective employment opportunities for resettled Chagossians would be in the least skilled category. It is assumed that 40% to 60% of such jobs could be allocated to Chagossians. Average salaries for appropriately trained staff would be approximately £620 (US$ 1,000) per month. These percentages would have the following implications for each resort size:

Resort Size	30 room	40 room	50 room
Chagossian Employment	34-50	45-67	56-84
Earnings £000/yr	£250-£370	£330-£495	£415-£620

It is clear that tourism would have potentially important employment implications for resettlement. Employment would however probably be unaccompanied[20] – depending on which island the resort might be located on.

Leading resort development companies may require assurances on the issue of transport access. The successfulness of marketing of the Chagos Islands with an unknown brand, and the price that high-end tourists would be willing to pay for an isolated pristine island resort would be key questions. It is difficult to produce accurate cost estimates[21]. Any investor would face significant uncertainty concerning the average occupancy rate, especially in the early years of operation. They would also face the challenge of major objections from environmental groups that may affect the investment decisions of well-known resort development companies.

Eco-tourism development

An eco-tourism facility adjacent to a Chagossian resettlement community could create direct employment opportunities and maximise the benefits to the Chagossians. Factors which would need to be investigated include:

- Potential interest of private sector operators of similar eco-tourism facilities to assist, train and mentor the Chagossians to develop the idea.
- Site selection adjacent to a Chagossian community – with the necessary privacy and access to an appropriate range of environmental and leisure activities.
- Transport access to/from the eco-tourism facility (i.e. same facilities used by the Chagossian resettled community).
- Training of resettled Chagossians in wide range of skills needed in eco-tourism hospitality.

Indicative estimates were prepared for a facility with 10, 20 or 30 chalets in 2014 constant prices. The main results are summarised in Table 7.6. For an eco-tourism facility with 30 chalets, the indicative estimates are:

- Capital costs – £12 to £14 million.
- Staff – 36 nos., with salaries/wages of £360k p.a.
- Financial internal rate of return (FIRR) – 11% to 13%.

The full details, assumptions and parameters are presented in Annex 7.2.

Table 7.6 Eco-Tourism Facility – Indicative Capital Costs, Staffing and FIRRs

		Facility Size		
Component	**Unit**	**10 chalets**	**20 chalets**	**30 Chalets**
Indicative Capital Cost				
■ Upper capex estimate	£ million	4.7	9.4	14.3
■ Lower capex estimate	£ million	4.1	8.1	12.1

Component	Unit	Facility Size 10 chalets	20 chalets	30 Chalets
Staff Estimates				
■ Senior Management	nos.	2	2	2
■ Middle Administration	nos.	4	4	4
■ All Other Staff	nos.	10	20	30
Total – Staff Estimates	nos.	16	26	36
Estimates of Salaries and Wages	£ 000	210	290	360
Financial Internal Rate of Return (FIRR)				
Room Rate: US$ 650/£400 per day				
■ Upper capex estimate	%	8.6%	10.2%	10.6%
■ Lower capex estimate	%	10.5%	12.3%	12.9%

Source: Annex 7.2 (Section 6.3).

It is assumed that 100% of low skilled jobs could be allocated to Chagossians – average salaries would be approximately £620 (US$ 1,000) per month, but could be less. This percentage would have the following implications for each eco-tourism facility:

Resort Size	10 chalet	20 chalet	30 chalet
Chagossian Employment	10	20	30
Earnings £000/yr	£75	£150	£220

The appropriate skills and experience of the resettled Chagossians, and their willingness to undertake appropriate training is unknown, as is their willingness to accept and inter-act with an adjacent eco-tourism facility. Chagossians may not have the necessary skills and experience to manage and administer the proposed eco-tourism facility. However, it has been assumed that expatriate management will be required for the first 3 to 5 years.

The configuration (and cost) of transport access is likely to be an important factor for eco-tourists. Again, there would need to be effective promotion of eco-tourism on the Chagos Islands. This would probably require the appointment of a Tourism Marketing Representative focusing on the most appropriate markets in Europe and Asia[22].

Tourism related activities

Potential employment opportunities also exist in a number of tourism related activities. These could include:

- Tourist and environmental guides on or to individual islands[23].
- Sport fishing[24].
- Snorkelling and scuba diving[25].
- Other water sports.

Many of these activities are likely to be offered by the high-end tourist resort(s), and could be staffed by Chagossians employed by the resort. Services could also be developed by entrepreneurial Chagossians.

Homestays with Chagossian families could be a small source of income from visitors wanting to experience a unique lifestyle. There are intrepid travellers who seek to experience faraway places that are "off the beaten track"[26].

Yachting and vessel safaris charter yacht services for cruising, sport fishing, snorkelling and diving, environmental exploration and photography in and around the islands could be developed over time[27]. These services could be offered as specific holiday options or day trips from resort island(s).

Cruise ships might be another revenue earning opportunity in the medium or long term[28]. This would not involve the construction of an expensive cruise ship terminal, but would be facilitated by ships' lighters to/from the settlement's landing jetty. These visits are carried out successfully in a number of Overseas Territories[29].

Training – involvement of resettled Chagossians in tourism will require a detailed Human Resources Study, which will include an assessment of skills, aptitude and training needs and staffing requirements. This would involve any prospective private tourism development company or companies. Hospitality training centres in the region[30] might well be involved.

7.4.4 Coconuts

Coconuts and their cultivation are deeply embedded in the history of the Chagos Archipelago and the Chagossians. The international market for coconuts and competing products has changed significantly over the last 40 years – favouring large producing countries with direct access to major shipping routes[31]. The Chagos Islands have major disadvantages vis à vis the international market for coconut products: (i) isolation and high shipping costs; (ii) requirement for substantial land clearance and replanting of old coconut areas; (iii) high investment costs in new processing and transport facilities; (iv) doubts as to whether a private agro-based investment company would be prepared to take the risk – without the support of substantial subsidies.

The estimated land area of the islands visited is approximately 2,088 has. Of which about 1,095 has. (52%) are covered by coconut trees (See Annex 7.3, Table 3.1). The largest are those that were previously inhabited[32]. The density of coconut trees is mostly very high because the plantations were abandoned more than 40 years ago, so access to the interior of many islands is very difficult. Rehabilitation and/or resettlement would require significant effort[33] and cost to clear the space necessary for coconut production[34], resettlement, or other rehabilitation and development[35].

Annex 7.3 includes a brief review of available indicators and data for coconuts and coconut products on a selection of small islands – many in isolated geographic locations, with small populations, limited natural resources, but with sandy soils in coastal areas that are suitable for coconut cultivation[36]. Development of substantial palm oil plantations in the 1960s, 70s and 80s (especially in Indonesia and Malaysia) had a significant impact on the international trade in coconut oil. This lead to increased focus on economies of scale, which in turn favoured the larger producers with more efficient bulk transport links. Small and isolated island producers have found it increasingly hard to compete. Most coconut growers are small farmers[37].

Currently, international concern has been expressed by the Asian & Pacific Coconut Community (APCC) and the FAO that production and trade is falling behind as coconut trees continue to age (i.e. more than 30 years old) and are not being replaced with sufficient speed, because small farmers do not have the necessary financial resources[38].

Market demand for certain coconut products (e.g. fresh coconut water and milk) are forecast to grow steadily over the medium to long term, given the market trend in health and wellness products[39].

Overall therefore, it is doubtful that the market for coconuts would be successful on BIOT for the following reasons:

- International market for coconut products is dominated by the big producers[40].
- Re-establishment of an export-oriented coconut industry would be expensive[41] and unlikely to attract a development partner from the private sector.

- Sea transport would be expensive compared to the large regional producers.
- Rates of return in commercial small-holder coconut production are generally low.

There is however some scope for the resettled Chagossians to develop small coconut plots for their own consumption and use, plus potential supply of by-products to NSFDG, tourism developments and the construction sector. Coconut by-products could have applications for: (i) food, beverages and related products; (ii) household and agricultural uses; (iii) animal feed; (iv) ornaments and handicrafts; and (v) construction materials. Indicative costs of coconut cultivation and land clearance costs are illustrated in Annex 7.3. (Section 7.3).

Indicative estimates of the rehabilitated areas that could be required to satisfy potential coconut demand under the three development options[42] are:

- Option 1 indicative area required: 13 to 39 hectares.
- Option 2 indicative area required: 4 to 13 hectares.
- Option 3 indicative area required: 1.5 to 4 hectares.

Environmental impact assessment (EIA) and future monitoring activities would ensure that mono-crop and inter-crop cultivation conform to the required environmental standards. Relevant ordinances would need to be amended and/or new ones drafted. Rehabilitation and cultivation of old coconut areas will require a review of the range of agronomic skills and experience of the Chagossians wishing to resettle. Training could be organised by an experienced and qualified agronomic consulting company. Training visits could be commissioned by extension specialists from training centres in major regional producing countries. It would be worth also training a cadre of trainers in the region.[43]

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[1] cf. shared use of Wideawake Airfield on Ascension Island in the Atlantic Ocean.

[2] Ranging from 3% p.a. for energy transmission and distribution, to 5% p.a. for potable water and wastewater facilities, 8% for diesel generators and 10% for support service equipment.

[3] MRAG Ltd.

[4] Based on per capita consumption of 75 kg per year and average catches per boat of 50 kg per day (full details are presented in Annex 7.3, Table 5.4).

[5] (Cultivation of marine organisms for food).

[6] Set by: (i) BIOTA's environmental adviser; (ii) MRAG; and (iii) requests from scientific researchers with direct interests in the Chagos Islands, the impacts of climate change, etc.

[7] (i.e. (a) Maldives – Maldives Fisheries Training Centre; (b) Mauritius – Fisheries Training and Extension Centre; or (c) Seychelles – Maritime Training Centre).

[8] Other factors that are important for domestic airports/airstrips: (i) runway surfaces range from grass to gravel (coral) and paved; (ii) operation and ownership is both public and private, especially in the Maldives and Seychelles; (iii) scheduled and non-scheduled services; (iv) generally no night landing or refueling facilities; (v) most have limited terminal facilities; and (vi) many of the domestic airstrips on the Pacific Islands were constructed by the US military in 2nd World War, and the main construction costs were not incurred by the islands themselves.

[9] The only exceptions are in the Overseas Territories: (i) Anguilla and Montserrat – serviced by links to neighbouring Antigua; and (ii) St Helena – new airport is under construction and scheduled for completion by February 2016 (runway length 1,550 metres).

[10] These are particularly important in the Maldives, Seychelles and many islands in the Pacific Ocean, where tourism is continuing to grow.

[11] Transport access is by chartered ship that provides scheduled passenger services to/from one of the outer islands of French Polynesia.

[12] Transport access is by fishing vessels (operated by the lobster concessionaire) that include scheduled passenger services to/from Cape Town.

[13] Including: (i) names; (ii) number of rooms, chalets or villas; (iii) distance from the main international airport; (iv) mode of transport from the main international airport; and (v) range of room prices.

[14] Returning Home – A Proposal for the Resettlement of the Chagos Islands, March 2008

An Evaluation of "Returning Home" – A Proposal for the Resettlement of the Chagos Islands (Howell Report), Dr J R Turner et al, June 2008.

[15] Basic cost and operational data were provided by: (i) Rider Levett Bucknall (RLB) – independent global property and construction practice, services include: cost management, project management and advisory services directly related to tourist resort development worldwide; and (ii) BDO – Hotels, Leisure and Hospitality, Travel and Tourism Division.

[16] Development may require: (i) the drafting of new ordinances and/or amendments to existing ordinances; (ii) adherence to BIOTA's building regulations – if they exist, if not then specific regulations may need to be drafted; and (iii) review of the ordinance or law for the Marine Protected Area when it is finalised.

[17] (E.g. island in the Salomon Atoll or Diego Garcia – if Île Anglaise is not suitable).

[18] I.e. dedicated island airport or access to the Diego Garcia airfield.

[19] (Section 6.2 and Appendix B – including the Cost-Benefit tables over a discount period of 25 years).

[20] i.e. employees would be under contract for specified periods, with periodic home visits

[21] Which would be fine-tuned with (i) more detailed site investigations; (ii) transport of machinery, materials and supplies; (iii) cost over-runs; and (iv) issues relating to climate change and sea defences.

[22] (cf. Pitcairn Island Tourism has recently appointed such a representative in Sydney).

[23] For example for walking or sailing. These services could include presentations of Chagossian history and visits to old settlement sites.

[24] Subject to the prevailing environmental, fishing and safety ordinances, and the availability of suitable boats and equipment.

[25] Subject to the prevailing environmental and safety ordinances, and the availability of appropriate equipment.

[26] This type of visit occurs in a number of Overseas Territories: (i) Falklands (via the RAF air-bridge from the UK and Ascension Island); (ii) Pitcairn (via air flights to Tahiti and Mangareva, then chartered ship to Pitcairn); (iii) St Helena (via the RMS St Helena from Cape Town or Ascension Island – ship will cease operations in 2016 when the new airport is completed) ; and (iv) Tristan da Cunha (via fishing vessel from Cape Town, operated by the lobster concessionaire).

[27] These services are active in the Maldives and Seychelles – according to the respective Tourism Boards: (i) Maldives – 99 registered yachts and cruisers; and (ii) Seychelles – 13 registered companies hiring out yachts and cruisers.

[28] (i) Passenger landing fees; and (ii) Sales of souvenirs and curios by the Chagossians.

[29] Including the Falklands, Pitcairn and Tristan da Cunha, plus Easter Island and the Galapagos.

[30] Maldives – (i) Faculty of Hospitality and Tourism Studies (Malé); and (ii) Villa College – Faculty of Hospitality Management and Tourism Studies. Mauritius – Mauritius Institute of Training and Development; and (ii) Constance Hospitality Training Centre. Seychelles – Seychelles Tourism Academy.

[31] Although some Pacific islands still export small to modest volumes of coconut products.

[32] Diego Garcia, Île du Coin and Boddam.

[33] In the context of these observations, it is worth quoting the following:

> "……Yet all would require substantial restoration of some of the plantations at least – and it must be appreciated that the plantations are now very overgrown and virtually impenetrable. Without mechanical equipment, the effort required to clear or restore significant coconut plantations will require millions of person-hours. For example, it took 1000 person days to clear much less than 1% of understorey vegetation on Eagle Island in 2006 during the rat eradication project." (Source: An Evaluation of "Returning Home" – A Proposal for the Resettlement of the Chagos Islands (Howell Report), page 10, last para.)

[34] (i) optimum yield of coconut trees is 10 to 30 years of age; and (ii) optimum planting is 158 coconut trees per ha. (Source: Coconut Development Authority, Sri Lanka).

[35] Of special significance to Chagossians and as possible tourist attractions – on Diego Garcia, Île du Coin and Boddam. For example on Diego Garcia, such rehabilitation might include: (i) manager's house; (ii) church; (iii) cemetery; (iv) hospital; (v) jail cells; (vi) copra drying facilities; (vii) rail track; etc. (See: Plan of East Point Plantation, Peak of Limuria, R Edis, Chagos Conservation Trust, 1993 – page 42).

[36] Basic data are presented for the following: (i) Indian Ocean: Comoros, Maldives, Mauritius and Seychelles; (ii) Pacific Ocean: Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Samoa, Tonga and Tuvalu; and (iii) major producing countries: Indonesia, Philippines, India, Sri Lanka, Vietnam, Papua & New Guinea, Thailand and Malaysia. No data have been included for the UK Overseas Territories because production is either very small or non-existent.

[37] The FAO estimates that about 95% of coconut trees are harvested by small holders with low incomes and significant levels of poverty.

[38] "Many of the coconut farmers, especially in the top producing countries are poor to begin with, so even if they want to replace the trees on their plot of land, they may not be able to do so." – R Pastor, editor of the Southeast Asia Commodity Digest.

"Asia and the Pacific's aging coconut trees simply can't keep up with growing demand" – Hiroyuki Konuma, Assistant-Director and Regional Representative for FAO.

[39] Source: Euromonitor, May 2014

[40] I.e. Indonesia, Philippines, Sri Lanka, etc.

[41] (Including extensive clearance and replanting of old and densely-packed coconut trees).

[42] The estimates are based on the following assumptions:

> FAO Food Balance Sheets for 2011 indicate the following annual unit coconut consumption for selected countries: (i) Fiji – 62.9 kg/head (equivalent to 44 nuts, average weight per nut 1.44 kg); (ii) Sri Lanka – 66.3 kg/head (46 nuts); (iii) Kiribati – 123.2 kg/head (85 nuts); and (iv) Samoa – 173.8 kg/head (120 nuts).
>
> Resettled Chagossians – potential consumption range: 50, 100 and 150 nuts per head/year.
>
> Average yield – 7,000 nuts per hectare/year.

[43] E.g.: Sri Lanka: Coconut Cultivation Board (CCB) – Coconut Training Development Center, Coconut Research Institute (CRI) – Technology Transfer Division; India: Coconut Development Board (CDB); Central Plantation Crops Research Institute (CPCRI).

8 Comparison of Resettlement Options

8.1 Choice of resettlement location

A summary evaluation and comparison of island options from an environmental perspective is shown below. This is based on the analysis in section 5. In the event of resettlement, Diego Garcia is the most suitable location, with an average rank score of '1' and having a rank score of '1' for twelve out of fifteen environmental factors assessed. In contrast, Ile du Coin and Boddam1, selected as possible outer island options, both had a rank score of '1' for only four of the factors. A similar pattern would very likely have emerged had other outer islands been used in the analysis (rather than Ile du Coin and Boddam). The suitability of Diego Garcia over Ile du Coin and Boddam also emerged from the questionnaire surveys described in section 3. In the main, respondents did not consider other islands suitable for re-settlement, especially as historically they had not supported permanent communities, apart from (for example) as leper colonies.

Table 8.1 Average (Median) and Frequency of Rankings against environmental factors for the three main islands (Source Table 5.1)

Environmental factor	Diego Garcia	Ile du Coin	Boddam
Median ranking score	1	2	2
Frequency of '1' scores	12	4	4
Frequency of '2' scores	0	10	9
Frequency of '3' scores	3	1	2

The most realistic initial resettlement options for Diego Garcia is 'modern' standards (with limited initial infrastructures and facilities) and for the outer islands (e.g. Ile du Coin or Boddam) the probable option is basic standards of infrastructure with a strong focus on environmental impact minimisation. The anticipated impacts from construction, infrastructure and operations are assessed comparatively in section 5, together with the expected effects of fishing and other human activities. While eastern Diego Garcia is a possible resettlement area, it was designated an internationally important wetland area by the BIOT Government in 2001 under the Ramsar Convention, and contains an Important Bird Area (IBA). The location of the IBA on DG is at Barton Point in the far north-east, where resettlement at East Point would likely have a minimum impact. Nevertheless the resettlement option for Diego Garcia would be significantly less invasive environmentally for BIOT than the option advocated for the outer islands. The main reasons for this judgement are:

'Pros' for Diego Garcia

- Diego Garcia lies outside the large Chagos No-Take MPA – which is of global significance. Nevertheless, as noted, the MPA was not intended as an obstacle to resettlement, and the potential exists for the MPA to be zoned, through revisiting of the regulations, for possible habitation and fishing by Chagossians in certain areas.
- Diego Garcia already has an airport and port, as well as many other facilities (although any civilian use is subject to agreement and cannot be assumed in many cases). Despite disturbance, the Diego Garcia lagoon actually recovered well after the construction. On land, the facility development was built over a plantation. Diego Garcia is the best-suited location for settlement because it has housing and port/other infrastructure already, as well as a number of other advantages over other possible locations.

'Cons' for Outer Islands

- In contrast, Ile du Coin and Boddam are remote, demanding environments, where all infrastructure and facilities would need to be established in the event of resettlement or tourism;

this would be costly environmentally as well as economically. Construction of a port and/or airport would be extremely invasive and create major environmental injuries to the coral reefs.

- Development impacts on one or more outer atolls would also extend to the Chagos MPA, potentially threatening its ecological integrity and diminishing the utility of this asset as a global reference site for environmental monitoring and in other ways. Zoning of the MPA may help alleviate some the impacts, although only to a degree.

Option 3 (with limited initial infrastructure and facilities) and, to a lesser, extent Option 2 (medium-scale development) on Diego Garcia, would appear to provide the strongest comparative environmental advantage. Challenges in the event of resettlement are substantial whichever island and development option/options are selected. This was also an important point emerging from the environmental survey. The reasons for this include the vulnerability of coral islands to natural processes, development impacts and disturbances from sea level rise, coastal erosion and overtopping (See also section 5). The dynamics are complex but still poorly understood for Chagos. In the event of resettlement, maintenance of coral reef health will be paramount, especially against a background of increasing ocean acidification and potential undermining of reef resilience from development pressures.

8.2 Environmental impacts and considerations

Potential or expected environmental impacts from construction and infrastructure for different resettlement options in BIOT, with and without mitigation, are illustrated below. The UK Government exercises complete control over all development in BIOT and also owns all land. Strict compliance is therefore assumed. Without this, impacts will be greater.

Table 8.2: Potential or expected environment impacts from construction and infrastructure for different resettlement options in BIOT, with and without mitigation.

	Impact with no or little mitigation (0 – none, + little/some, ++ moderate, +++ heavy impact)		**Notes and possible mitigation effects (on-going monitoring essential)**
	Option 3 (small-scale resettlement) and Option 2 (medium-scale resettlement)	**Option 1 (Large-scale resettlement)**	
Overall impact on Chagos protected area(s)	+/++ Diego Garcia outside Chagos No-Take MPA; potential impact on Ramsar site and Important Bird Area. Construction impacts much lower than for Ile du Coin or Boddam, as less overall need for new infrastructure and facilities.	++/+++ Threat to integrity of MPA; reduced fish production, reef quality and other assets; undermining of global reference sites for monitoring climate change and other disturbances.	Impacts greater unless strict adherence to MPA and BIOT environmental regulations; quotas on number of islands resettled and resource-use/loss levels permitted will help reduce MPA damage depending on population size.
Port/access facilities (jetties, piers, groynes and breakwaters)	+ Some impact from new facilities in east; assumed resettled population has access to these facilities in west.	+++ Direct loss of coral reefs and island habitats from dredging, infill and sedimentation; major threat to resilience of island against erosion, sea level rise and other impacts.	Some reduction if best construction practices followed, but major impacts to reefs and islands unavoidable.
Airport	0	+++	As for ports (above); severe erosion of coral reef

	Impact with no or little mitigation (0 – none, + little/some, ++ moderate, +++ heavy impact) Option 3 (small-scale resettlement) and Option 2 (medium-scale resettlement)	Option 1 (Large-scale resettlement)	Notes and possible mitigation effects (on-going monitoring essential)
	Access to existing airport for any resettled population assumed.	Impacts as for ports (above), but more substantial, long-lasting and irreversible.	quality and ecosystem services unavoidable.
Roads	+ Some loss of vegetation/habitat and bird life from new roads; assumed resettled population has access to existing roads.	++ Significant loss of vegetation/habitat and bird life from new roads following clearance of vegetation for access.	Some amelioration of impacts if BIOT environmental regulations followed and construction of infrastructure and facilities follows international best practice; minimise use of local coral and sand as building materials for all construction.
Housing School Clinic Administration buildings	++ New buildings needed; types of impacts (habitat loss etc.) as for roads above	++ New buildings and facilities needed; types and severity of impacts as for roads above; non-sustainable use of coral, sand and timber as construction materials.	
Power generation Telecommunications	+/++ Habitat loss etc., as for roads (above); assumed some use of existing facilities.		
Domestic water, sanitation and waste facilities	+ Some habitat loss from construction effects.		
Small tourism resorts	+ Assumed no or limited demand for tourism.	++ Design, size/area of units and number of units determine overall impact.	Advanced and innovative design to help reduce impact, but some habitat/wildlife loss following construction unavoidable.
Shore defences (against sea level rise, erosion) – precautionary principle	+/++ Boulders/defence needed for any resettlement in eastern DIEGO GARCIA; some environmental disruption of island/sea interface.	+/++ Boulders/defence needed for any resettlement in outer islands; some environmental incursion at island/sea interface.	Careful planning and best practice to help minimise impact; minimal removal of Scaevola/vegetation – which affords some natural coastal defence.

Potential or expected environment impacts from operations and human activities for different resettlement options in BIOT, with and without mitigation are shown the second summary table below.

Table 8.3: Potential or expected environment impacts from operations and human activities for different resettlement options in BIOT, with and without mitigation.

	Impact with no or little mitigation (0 – none, + little /some, ++ moderate, +++ heavy impact)		**Notes and possible mitigation effects (on-going monitoring essential)**
	Option 3 (small-scale resettlement) and Option 2 (medium-scale resettlement)	**Option 1 (Large- scale resettlement)**	
Overall impact on Chagos protected area(s)	++ Diego Garcia outside Chagos No-Take MPA; potential impact on Ramsar site and Important Bird Area. Impacts of operations and activities moderate and lower than for Ile du Coin or Boddam, as less overall need for new infrastructures and facilities.	++/+++ Reduced fish production and reef quality; undermining of global reference sites for monitoring climate change and other disturbances.	Impacts of operations and activities greater unless strict adherence to MPA and BIOT environmental regulations – e.g. prevent excessive contaminant concentrations.
Solid waste	+/++ Hazardous materials problematic for human and environmental health; current levels dealt with adequately.	++/+++ Potential major problem on outer islands; some solid waste impacts to islands from visiting yachts; impacts as for Diego Garcia resettlement; macro- and micro-plastics densities high.	Crushers, incinerators and removal of waste materials help alleviate problems; replication of beach clean-up of plastics on Diego Garcia needed on outer islands.
Sedimentation (more a problem from construction)	+/++ From various activities, including shipping; can result from non-sustainable agro-forestry (on any of the islands).	+++ Creation of access routes for port/harbour by blasting of reefs for channels particularly harmful.	Some amelioration of damage through careful construction and operations practices – including sustainable agro-forestry.
Sewage, including possible contamination of aquifer	++ Health implications and harmful environmental effects from nutrients and pathogens (eutrophication, algal overgrowth on coral reefs).		Advanced technologies for sewage treatment; discharge pipes long enough to bypass reef slope and limit impact;
Pesticides, herbicides and other contaminants,	+ Potential entry into aquifers and also the marine environment.	++ Reports of copper (fungicide) residues in aquifer during previous occupation of outer islands.	
Agroforestry	+/++ Soils fragile and fertility easily lost through non-sustainable agriculture or agroforestry; limited buffering capacity of soil can lead to aquifer contamination; potentially non-sustainable use of aquifer water.		Impact reduced by limiting infrastructure development and ground compaction, plus other measures.
Sustainability of fishing	++/+++		Strict adoption of catch quotas and

	Impact with no or little mitigation (0 – none, + little /some, ++ moderate, +++ heavy impact)		Notes and possible mitigation effects (on-going monitoring essential)
	Option 3 (small-scale resettlement) and Option 2 (medium-scale resettlement)	**Option 1 (Large- scale resettlement)**	
	Impairment of fish populations a major concern; already evident for coral fish in Diego Garcia following recreational fishing (See also section 2.4); fishing impact from visiting yachts is probably minimal at the present time;		fishing area restrictions; population depletion less likely if fish also imported (See also section 2.4).
Diving and snorkelling	+ Damage may increase if resettlement, adding to pressures from existing recreational activity.	++/+++ Increased impacts if tourism develops; coral breakage from snorkelling, trampling and scuba diving expected.	Strict enforcement of MPA and BIOT regulation may help reduce reef injury.
Boating, fishing and other effects of tourism	+ As above.	++ As above; anchor damage to coral and fishing and collecting potentially serious impacts.	Monitoring and enforcement of regulations will help reduce damage.

Shoreline defence involving boulders or other coastal armament (Table 8.2) has been put in place in Diego Garcia as a management intervention to help combat sea level rise. By altering coastal dynamics, however, this can also act as an environmental disturbance and actually exacerbate coastal problems, especially if natural vegetation (e.g. Scaevola) is also removed. Such 'hard engineering' may not be an optimal solution for islands such as BIOT. Arguably, if inundation becomes a recurrent problem in the future, resettlement should cease and consideration should be given to evacuating the island(s). On the other hand, a 'precautionary' inclusion of costs for shoreline defences against inundation from high sea-water levels now, or in the future, may be prudent – even if the probability of needing to implement the option is relatively low.

Some of the impacts in Tables 8.2 and 8.3 may be at least partially offset by the potential role of resettlement and Chagossian activities, involving mitigation of impacts to the MPA (from resettlement and/or other influences) and through habitat restoration – particularly on Diego Garcia (See Section 5.2.8).

In summary, any form of development in Chagos has the potential to impact the MPA. A major differential between Ile du Coin and Boddam (or other islands in the outer atolls), compared to Diego Garcia, is that the former two islands bear less of the impact of recent human habitation and start off from a less degraded state. But even the outer atolls are affected from visiting boats/yachts. Hence, these too are not pristine environments, either due to this or due to previous occupation.

8.3 Comparative costs of resettlement options

8.3.1 Resettlement Options – Income Generation and Financial Forecasts

Key aims of the study are to: (i) investigate the possibilities for the development of sustainable livelihoods; (ii) explore income generation opportunities; and (iii) asses the financial implications over the next 5, 10 and 20 years – with specific reference to the medium to long term cost implications. Information was collected for other UK Overseas Territories (OT)[2]. These provide relevant comparisons for obvious reasons[3].

The review of the employment and financial situation in three OTs (St Helena, Tristan da Cunha and Pitcairn) highlights the challenges and difficulties of life and living on small remote islands with limited resources and employment opportunities, low levels of income, and dependence on recurrent budgetary support, capital investment and technical assistance. Reviews of the three OTs are presented in Annex 7.4 and focus mainly on public sector issues[4]. Similar challenges and difficulties are likely to be faced in any prospective resettlement of the Chagos Islands.

The following sections examine the indicators for the three resettlement options in terms of: Employment and Training; Technical Assistance; Income Generation; and Financial Forecasts.

Employment and Training

A **Human Resources Study** would be worthwhile to establish the skills, experience, training, background details and technical assistance requirements of prospective Chagossians wishing to resettle under each of the three Options. The study would address both individual and community needs.

Table 8.4 presents the indicative estimates of the labour force, potential employment by sector and training costs by option. Further details are provided in Annex 7.4. The estimates are based on the following assumptions:

- The labour force is assumed to be 50% of the population.
- Employment is distributed between: (i) public sector employment to sustain the normal operations of the community[5]; (ii) contracted employment for the US NSFDG[6]; (iii) potential tourism developments[7]; and (iv) other employment opportunities – assumed to be 4% of all other activities.
- Training costs assumptions: (i) 50% of potential employees in each sector will require some form of training[8]; and (ii) average training costs of £15,000 per person[9].

The resulting estimates are as follows:

	Option 1	Option 2	Option 3
Labour Force	750	250	75
Community Public Sector	*42%*	*70%*	*75%*
Naval Facility	*42%*	*25%*	*21%*
Tourism	*12%*		
Other Activity	*5%*	*4%*	*4%*
Total Cost	**£5.15m**	**£2.21m**	**£0.81m**

Table 8.4 Indicative Estimates of Potential Labour Force, Employment by Sector and Training Costs by Option

Component	Unit	Option 1		Option 2		Option 3	
		nos.	%	nos.	%	nos.	%
Population and Labour Force							
■ Population	nos.	1,500		500		150	
■ Labour Force	nos.	750	50%	250	50%	75	50%
Indicative Employment and Training Requirements							
Community – Public Sector							
■ Employment	nos.	263	42%	175	70%	53	75%
■ Requiring Training	nos.	131	41%	88	71%	26	74%
■ Training Costs (1)	£ million	1.97	38%	1.31	59%	0.39	48%
US NSFDG							
■ Employment	nos.	263	42%	63	25%	15	21%
■ Requiring Training	nos.	131	41%	31	25%	8	23%
■ Training Costs (1)	£ million	1.97	38%	0.47	21%	0.11	14%
Artisanal Fishing							
■ Training Costs (2)	£ million	0.42	8%	0.35	16%	0.28	35%
Tourism Developments (3)							
■ Employment	nos.	76	12%	0	0%	0	0
■ Requiring Training	nos.	38	12%	0	0%	0	0
■ Training Costs (1)	£ million	0.57	11%	0	0%	0	0
Other Employment Activities							
■ Employment	nos.	30	5%	10	4%	3	4%
■ Requiring Training	nos.	15	5%	5	4%	2	6%
■ Training Costs (1)	£ million	0.23	4%	0.08	4%	0.02	2%
Total							
■ Employment	nos.	631	100%	248	100%	71	100%
■ Requiring Training	nos.	316	100%	124	100%	35	100%
■ Training Costs	£ million	5.15	100%	2.21	100%	0.81	100%

Note: (1) based on average training cost of £15,000 per person; (2) See: Annex 7.1, Section 6; and (3) based on: high-end tourist resort (40 rooms); and eco-tourism facility (20 chalets) – See: Annex 7.2.

Technical Assistance

Technical assistance will be required to support the resettlement. The professionals required are likely to include: administrators, police, doctor, nurses, teachers, family/community advisers, operations managers and utilities managers. This will need to be specified when the results of the Human Resources Study are completed and reviewed. The indicative costs are presented in Annex 7.4 (Table 6.2) and summarised as follows:

- Option 1 – 18 professional specialists, annual cost of £2.2 million.
- Option 2 – 13 professional specialists, annual cost of £1.6 million.
- Option 3 – Seven professional specialists, annual cost of £0.9 million.

Income Generation Opportunities

This section presents indicative estimates of the potential income that could be generated from the employment by sector as summarised in Table 7.7. The income estimates are based on an average salary/wage of £620 ($1,000) per month/£7,440 per year – based on the following:

- Community public sector – average salaries/wages paid by the public sector in the three OTs cited in Annex 7.4.
- US NSFDG – assumes wages would be $1,000 (£620) per month, with the employee living in the prospective Chagossian settlement on Diego Garcia[10].
- Tourism employees (i.e. upmarket tourist resort and eco-tourism facility) are also assumed to earn £620 ($ 1,000) per month (See: Annex 7.2, Section 6).

The resulting indicative annual income estimates by sector and option (all expressed in 2014 constant prices) are:

	Option 1	Option 2	Option 3
Employment	631	248	71
% of Labour Force	84%	99%	94%
Annual Income	£4.69 million	£1.84 million	£0.53 million

Table 8.5. Indicative Estimates of Potential Employment and Income by Sector and Option

		Option 1		Option 2		Option 3	
Component	**Unit**	**nos.**	**%**	**nos.**	**%**	**nos.**	**%**
Population and Labour Force							
■ Population	nos.	1,500		500		150	
■ Labour Force	nos.	750	*50%*	250	*50%*	75	*50%*
Total Potential Employment							
Community – Public Sector	nos.	263	*42%*	175	*70%*	53	*75%*
US NSFDG	nos.	263	*42%*	63	*25%*	15	*21%*
Tourism Developments							
■ High-End Tourist Resort (40 rooms)	nos.	56	*9%*				
■ Eco-Tourism Facility (20 chalets)	nos.	20	*3%*				
Other Activities	nos.	30	*5%*	10	*4%*	3	*4%*
Total – Potential Employment	**nos.**	**631**	***100%***	**248**	***100%***	**71**	***100%***
Percentage of Labour Force	**%**	***84%***		***99%***		***94%***	
Total Potential Salaries and Wages							
Community – Public Sector	£ million	1.95	*42%*	1.30	*70%*	0.39	*75%*
US NSFDG	£ million	1.95	*42%*	0.47	*26%*	0.11	*21%*
Tourism Developments							
■ High-End Tourist Resort (40 rooms)	£ million	0.42	*9%*				
■ Eco-Tourism Facility (20 chalets)	£ million	0.15	*3%*				
Other Activities	£ million	0.22	*5%*	0.07	*4%*	0.02	*4%*
Total – Potential Salaries and Wages	£ million	**4.69**	***100%***	**1.84**	***100%***	**0.53**	***100%***
Average Salary/Wage:							
■ **Per month**	£/month	**620**		**620**		**620**	
■ **Per Year**	£ per year	**7,440**		**7,440**		**7,440**	

Source: Annex 7.4 (Appendix A, Table 15).

Indicative Financial Forecasts

Table 8.6 presents the indicative forecasts of potential revenue and expenditure for each of the three options in 2014 constant prices – from Year three (years one and two are for preparatory studies and investigations). For Option 1, these include the results 'with' and 'without' the annual Operation and Maintenance costs associated with the airport and the breakwater/harbour. The 'without' alternative

has been included in order to indicate the implications of being able to access the existing airfield and harbour facilities on Diego Garcia – instead of having to build separate facilities. Details are presented in Annex 7.4 (in Section 8 of the Annex), including the revenue and expenditure parameters and assumptions.

The main indicative results for each option are summarised as follows:

- Option 1:
  - Revenue[11] is projected to reach £1.86 million in Year 10 and £4 million per year by Year 20.
  - Expenditure is forecast to rise to £28 million by Year 10. Annual expenditure would be dominated by the annual O&M costs for infrastructure, which would account for 69% of the annual costs. However, excluding the annual costs of the airport and the breakwater/harbour, the annual cost would be £15 million in Year 10.
  - Deficit – Option 1 would incur significant annual deficits by Year 10: rising to £26 million with the airport/harbour; or £13 million without these facilities.
  - Deficit cost per islander (pop. 1,500) – in Year 10, the deficit would be equivalent to: (i) with case: £17,350 per islander; and (ii) without case: £8,600 per islander.
- Option 2:
  - Revenue is projected to reach £1.3 million by Year 10 and £2 million by Year 20[12].
  - Expenditure is forecast to reach £10.5 million in Year 10. Annual expenditure would be dominated by the annual O&M costs for infrastructure (39%), followed by EIA – annual M&E (21%), shipping service (19%) and professional specialists (15%).
  - Deficit – the estimated annual deficit would rise to more than £9 million by Year 10. Deficit cost per islander (pop. 500) – in Year 10, the deficit would be equivalent to £8,400 per islander.
- Option 3:
  - Revenue is projected to reach £0.8 million by Year 10 £1.2 million by Year 20.[13].
  - Expenditure is forecast to reach to £7.4 million by Year 10. Annual expenditure would be dominated by the annual O&M costs for infrastructure (33%), followed by EIA – annual M&E (29%), shipping service (20%) and professional specialists (12%).
  - Deficit – the estimated annual deficit would be £6.6 million by Year 10. Deficit cost per islander (pop. 150) – in Year 10, the deficit would be equivalent to £44,100 per islander.

The indicative annual deficit for each option remains substantial throughout the period with little progress towards self-sufficiency. In each option there is a deficit throughout the period. In constant prices the annual deficit is projected to peak and then start to decline slowly. In Option 1 the decline is 9% between year 10 and year 20 (including airport and harbour). In Option 2 the decline is 13.6% between year seven and year 20. In Option 3 the decline is 14.5% between year six and year 20.

Table 8.6 Indicative Financial Forecasts by Option (£ million, 2014 constant prices)

	Years							
Component	**3**	**4**	**5**	**6**	**7**	**10**	**20**	**Distr. (%)**
OPTION 1								
Revenue								
Stamps, Coins, etc.	0.09	0.12	0.15	0.18	0.21	0.25	0.25	*6.3%*
Utility Charges (Electricity/Water/Sewer.)		0.07	0.15	0.22	0.29	0.49	0.61	*15.3%*
Landing Fees							1.00	*25.0%*
Tourism					0.34	0.34	0.68	*17.0%*
Shipping						0.38	0.63	*15.6%*
Taxes						0.23	0.47	*11.7%*
Miscellaneous		0.02	0.03	0.04	0.08	0.17	0.36	*9.1%*
Total – Revenue	**0.09**	**0.21**	**0.33**	**0.44**	**0.93**	**1.86**	**4.00**	***100%***
Expenditure								

Component	Years 3	4	5	6	7	10	20	Distr. (%)
Administration		0.34	0.56	0.77	1.09	1.33	1.33	*4.8%*
Annual O&M Costs		3.85	7.71	11.56	15.42	19.27	19.27	*69.2%*
Shipping Service		2.50	2.50	2.50	2.50	2.50	2.50	*9.0%*
Professional Specialists		0.37	0.74	1.11	1.48	2.22	2.22	*8.0%*
Medevacs		0.08	0.15	0.23	0.31	0.38	0.38	*1.3%*
EIA – Annual M&E[14]					2.17	2.17	2.17	*7.8%*
Total – Expenditure	**0.00**	**7.14**	**11.66**	**16.17**	**22.97**	**27.87**	**27.86**	***100%***
Exp. Without Airport and Breakwater/Harbour	**0.00**	**4.52**	**6.41**	**8.30**	**12.47**	**14.75**	**14.74**	
Surplus/(Deficit)	**0.09**	**(6.93)**	**(11.33)**	**(15.73)**	**(22.04)**	**(26.01)**	**(23.86)**	
Without Airport and Breakwater/Harbour	**0.09**	**(4.30)**	**(6.08)**	**(7.86)**	**(11.54)**	**(12.89)**	**(10.74)**	
OPTION 2								
Revenue								
Stamps, Coins, etc.	0.09	0.12	0.15	0.18	0.21	0.25	0.25	*12.3%*
Utility Charges (Electricity/Water/Sewer.)	0.05	0.09	0.13	0.16	0.21	0.21	0.21	*10.3%*
Landing Fees						0.02	0.03	*1.6%*
Tourism					0.34	0.34	0.68	*33.3%*
Shipping					0.30	0.30	0.50	*24.5%*
Taxes					0.09	0.09	0.18	*9.0%*
Miscellaneous	0.01	0.02	0.03	0.03	0.12	0.12	0.19	*9.1%*
Total – Revenue	**0.15**	**0.24**	**0.30**	**0.37**	**1.27**	**1.33**	**2.04**	***100%***
Expenditure								
Administration	0.18	0.25	0.42	0.48	0.50	0.50	0.50	*4.8%*
Annual O&M Costs	1.23	2.46	3.28	4.10	4.10	4.10	4.10	*39.0%*
Shipping Service	2.00	2.00	2.00	2.00	2.00	2.00	2.00	*19.0%*
Professional Specialists	0.25	0.50	0.87	1.11	1.61	1.61	1.61	*15.3%*
Medevacs	0.04	0.08	0.10	0.13	0.13	0.13	0.13	*1.2%*
EIA – Annual M&E			2.17	2.17	2.17	2.17	2.17	*20.7%*
Total – Expenditure	**3.69**	**5.28**	**8.84**	**9.99**	**10.51**	**10.51**	**10.50**	***100%***
Surplus/(Deficit)	**(3.54)**	**(5.05)**	**(8.53)**	**(9.61)**	**(9.24)**	**(9.18)**	**(8.46)**	
OPTION 3								
Revenue								
Stamps, Coins, etc.	0.09	0.12	0.15	0.18	0.21	0.25	0.25	*20.5%*
Utility Charges (Electricity/Water/Sewer.)	0.06	0.08	0.11	0.11	0.11	0.11	0.11	*9.3%*
Landing Fees						0.01	0.02	*1.3%*
Tourism					0.34	0.34	0.68	*55.5%*
Shipping								
Taxes					0.03	0.03	0.05	*4.3%*
Miscellaneous		0.02	0.03	0.03	0.07	0.07	0.11	*9.1%*
Total – Revenue	**0.15**	**0.23**	**0.29**	**0.32**	**0.76**	**0.81**	**1.22**	***100%***
Expenditure								
Administration	0.15	0.30	0.35	0.35	0.35	0.35	0.35	*48.%*
Annual O&M Costs	1.23	1.84	2.46	2.46	2.46	2.46	2.46	*33.1%*
Shipping Service	1.50	1.50	1.50	1.50	1.50	1.50	1.50	*20.2%*
Professional Specialists	0.26	0.52	0.78	0.91	0.91	0.91	0.91	*12.2%*

Component	Years							Distr. (%)
	3	4	5	6	7	10	20	
Medevacs	0.02	0.03	0.04	0.04	0.04	0.04	0.04	*0.5%*
EIA – Annual M&E		2.17	2.17	2.17	2.17	2.17	2.17	*29.2%*
Total – Expenditure	**3.16**	**6.36**	**7.29**	**7.43**	**7.43**	**7.43**	**7.42**	***100%***
Surplus/(Deficit)	**(3.01)**	**(6.14)**	**(7.00)**	**(7.10)**	**(6.67)**	**(6.61)**	**(6.20)**	

Source: Annex 7.4 (Appendix A, Tables 16, 17 and 18).

These costs are summarised in the table below, in 2014 constant prices. The indicative capital costs include the costs for: (i) physical infrastructure; (ii) preparation and construction supervision; (iii) project management unit; (iv) EIA prior to and during the construction phase; and (v) training costs.

Table 8.7: Resettlement Option Summary Costs

	Option 1	Option 2	Option 3
Indicative total capital cost estimates	£423.3 million – phased over six years	£111.6 million – phased over four years	£65.4 million – phased over three years
Indicative capital costs, without airport and breakwater/harbour (Option 1 only)	£190.2 million – phased over six years	£111.6 million – phased over four years	£65.4 million – phased over three years
Capital costs per head of population 3. Total capital costs 4. Capital costs. without airport and breakwater/harbour (Option 1 only)	 £282,000 per head £127,000 per head	 £223,000 per head £223,000 per head	 £436,000 per head £436,000 per head
Indicative annual O&M costs 1. Total per year 2. Total, without airport and breakwater/harbour (Option 1 only)	 £21.5 million p.a. £9 million p.a.	 £6.3 million p.a.	 £4.7 million p.a.
Indicative capital replacement and refurbishment costs (after 10 years) 1. Total 2. Total, without airport and breakwater/harbour (Option 1 only)	 £37 million £16 million	 £9.4 million	 £5.5 million

Indicative cost estimates have been prepared for a 'pilot resettlement scheme' of about 50 Chagossians – who might form an initial community, before a larger resettlement programme might be planned. A pilot scheme has the advantage of Chagossians being able to experience the conditions and learn lessons before a large programme of resettlement might be implemented.

The estimates presented below assume that the pilot scheme would cater for 50 Chagossians (plus supporting specialists) and would be based on Diego Garcia. However, reducing the initial population to a third of Option 3 (pop. 150) would not reduce the costs proportionately – since there is a range of basic service provisions that would have to be met. Prospectively, the lower number would also entail appropriate selection procedures and not include families with children.

Table 8.8 presents a 'best estimate' of the indicative capital costs for the 'pilot resettlement scheme'. The estimates assume a practical, modern support and lifestyle, and that linkage with US Naval Facility water supply and waste disposal facilities could be agreed. The estimates also assume that the infrastructure provided would be amenable to medium term use, upgrading and expansion. In addition, the indicative estimates include: (i) preparation costs (i.e. site investigations, engineering designs and plans, etc.); (ii) construction supervision; (iii) project management unit; (iv) environmental impact assessment; and (v) training costs.

The indicative capital cost estimates amount to £32.4 million over an implementation period of two years, which would amount to £648,000 per head.

Table 8.8 Option: Pilot Resettlement Scheme – Indicative Capital Cost Estimates in 2014 Constant Prices

Component	£ million	Distribution (%)
Preparation Costs(1)	**1.33**	***4.1%***
Infrastructure – Civil Works		
Transport and Sea Defences(2)	6.00	*18.5%*
Energy(3)	2.05	*6.3%*
Housing and Public Buildings(4)	10.50	*32.4%*
Utilities and Services(5)	3.60	*11.1%*
Sub-Total – Base Costs	22.15	*68.3%*
Physical Contingencies (20%)	4.43	*13.7%*
Sub-Total – Civil Works	**26.58**	***82.0%***
Construction Supervision(6)	**1.11**	*3.4%*
Project Management Unit(7)	**0.50**	*1.6%*
Sub-Total – Infrastructure Costs	**29.52**	***91.1%***
Other Costs		
EIA – Construction Phase + Annual Monitoring(8)	2.50	*7.7%*
Training Costs(9)	0.38	*1.2%*
Sub-Total – Other Costs	**2.88**	***8.9%***
Total	**32.40**	***100%***

Notes:

(1) Set at 6% of infrastructure base costs.

(2) Assumes requirement for berthing of small vessels, lower road traffic and less technical support.

(3) Diesel generation: capex estimate of £2.0 million – minimum estimate for purchase, shipping and installation of two (2) containerised diesel generator sets.

(4) Provision of accommodation, administration, medical and recreation facilities; but no school.

(5) Drinking water supply costs maintained, with reduced costs for wastewater and solid waste disposal.

(6) Set at 5% of infrastructure base costs.

(7) PMU – two specialists for one year.

(8) Estimate prepared by the Environmental Specialist – applies to all options.

(9) Assumes 50% of the Chagossians in the pilot scheme will require training at £15,000 each.

Table 8.9 presents the indicative annual recurrent cost estimates. These imply costs of nearly £5 million per year, which is equivalent to £100,000 per head. The main component costs would be: (i) infrastructure operations and maintenance 36%; (ii) shipping service 30%; and (iii) EIA – annual monitoring and evaluation 20%.

Table 8.9 Option: Pilot Resettlement Scheme – Indicative Annual Recurrent Cost Estimates in 2014 Constant Prices

Component	£ million	Distribution (%)
Administration[1]	0.24	*4.8%*
Infrastructure – Civil Works[2]		
Transport and Sea Defences	0.39	*7.8%*
Energy	0.75	*15.1%*
Housing and Public Buildings	0.48	*9.7%*
Utilities and Services	0.18	*3.6%*
Sub-Total – Infrastructure	**1.80**	***36.3%***
Other Costs		
Shipping Service[3]	1.50	*30.2%*
Professional Specialists[4]	0.41	*8.3%*
Medevacs[5]	0.01	*0.2%*
EIA – Annual Monitoring and Evaluation[6]	1.00	*20.2%*
Sub-Total – Other Costs	**2.92**	***58.9%***
Total	**4.96**	***100%***

Notes:
(1) Set at 5% of all other annual costs.
(2) Estimates prepared by Infrastructure Specialist.
(3) Same estimate as Option 3.
(4) Assumes three (3) professional specialists: doctor, policeman and operations manager.
(5) Set at £250 per head.
(6) Estimate prepared by the Environmental Specialist – reduced to £1 million.

8.3.2 Next Steps

The issues and challenges facing the potential resettlement of selected islands in the Chagos Archipelago are very significant. They include: human, physical (infrastructure), political, environmental, financial and economic. If a decision is taken to proceed, then careful planning and consultation will be required at every stage.

The main steps are:

- Establish how many Chagossians want to resettle and on what basis[15]:
- Conduct further studies and investigations including:
  - **Human Resources Study** of Chagossians proposing to resettle, covering: (i) family size; (ii) age profile; (iii) education and employment background; (iv) skills and experience; (v) aptitude and training potential; (vi) financial resources; etc.
  - **Training Programme** based on the results of the Human Resources Study and commitments by Chagossians wishing to resettle.
  - **Site investigations, engineering studies, final designs and costs** – based on selected island(s). These investigations should also focus on cost minimisation and value for money.
  - **Implementation and Action Plan** – including procedures for appropriate consultation with Chagossians and other stakeholders.
  - **Risk Management Study and Plan** to address all relevant risks and uncertainties; and propose mitigation measures to reduce their impact e.g.: (i) implementation delays; (ii) cost over-runs; (iii) climate change issues; (iv) environmental impacts; (v) welfare for ageing population; (vi) Chagossians who decide not to stay; (vii) limited and insufficient capital resources; (viii) Disaster Management and Evacuation Plan to prepare for unforeseen natural and man-made emergencies[16]

- **Funding Study** to identify sources of funding to support potential resettlement e.g.: (i) capital works[17] and (ii) environmental investigations and monitoring[18]

- Prepare appropriate Constitution and management structure for potential resettlement.
- Investigate potential opportunities for access to facilities of US NSFDG e.g.: (i) airfield and port facilities; (ii) utilities for electricity, potable water, wastewater disposal and solid waste management.
- Investigate potential opportunities to provide services to US NSFDG e.g.: (i) personnel through the facility contractor; (ii) provision of fresh fish, coconut products and other products; (iii) small restaurant and recreational facilities; etc.
- Investigate and promote interest of private sector in opportunities to support potential resettlement e.g. Upmarket Tourism Development and Eco-Tourism Development.
- Investigate and address related issues e.g.: (i) land ownership; (ii) accommodation ownership, mortgages and repayment; (iii) remittances; (iv) entitlement to pensions; (v) access to loans; etc.

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[1] Eagle Island and Egmont atoll were mentioned as possibly suitable for a temporary limited scientific research station and Egmont for an eco-village; See Section 4.

[2] Consulting Programme Managers in DFID's Overseas Territories Department (OTD) and senior managers on the remote OTs of St Helena, Tristan da Cunha and Pitcairn.

[3] (i) small populations; (ii) remote ocean locations; (iii) lack of air access; (iv) shortage of sustained employment opportunities; (v) challenges relating to education, training, health facilities, etc.; and (vi) varying degrees of dependence on UK budgetary support.

[4] Relating to: (i) employment and wages; (ii) revenue and expenditure; (iii) development support; (iv) taxation; (v) unemployment; (vi) pensions; (vii) electricity and water consumption and charges; (viii) engagement of expatriate specialists; etc.

[5] Based on comparative employment levels in the other OTs.

[6] This could be on "single" basis if potential resettlement would be located In Peros Banhos or the Salomons.

[7] In the form of a high-end tourist resort and an eco-tourism facility (See: Annex 7.2).

[8] Actual requirements would depend on the results of a Human Resources Study if a resettlement programme were to proceed.

[9] Final estimates of the training costs may vary considerably, depending on the type and length of training required, and the location of the most appropriate training establishments e.g. UK, Mauritius, Seychelles, etc.

[10] Under this option, the contractor would not be incurring the costs of food and accommodation, etc. which they do in the case of contracted employees from other countries. At present, it is reported contracted employees earn a net average of US$ 300 to US$ 350 (£185 to £216) per month.

[11] The main sources of income are expected to be utility charges, landing fees, tourism levies, shipping receipts and income taxes.

[12] The main sources of income are expected to be tourism levies and shipping receipts; followed by stamps/coins, utility charges and income taxes.

[13] The main sources of income are expected to be tourism levies, stamps/coins and utility charges.

[14] EIA is assumed to commence on completion of the infrastructure. Option 1 EIA therefore starts latest and Option 3 starts earliest. However all Options include EIA investment in year 1 and some ongoing capital investment until the completion of the construction phase. Details are set out in Annex 7.4 and accompanying financial forecasts.

[15] (i) Permanent; (ii) provisional; (iii) periodic visits; etc. Also, including potential need to sign commitment papers.

[16] E.g. reported impact of tsunami on 26th December 2004 was: (i) dead – Sri Lanka 31,000, Maldives 81 and Seychelles <10; and (ii) economic costs – Sri Lanka US$ 1.3 billion, Maldives US$ 0.5 billion and Seychelles US$ 30 million.

[17] FCO and DFID; EU (especially EDF funds); private national and international foundations (e.g. Gates Foundation); public appeals; Chagossian resources and remittances; etc.

[18] FCO and DFID; EU; national and international environmental groups (e.g. Pew Foundation, Bertarelli Foundation, RSPB, universities, etc.); public appeals; Chagossian resources and remittances; etc.

Terms of Reference

For a new Feasibility Study into the resettlement of the British Indian Ocean Territory (BIOT)

January 2014

Foreign and Commonwealth Office

Objective

1. To advise on the feasibility of different options for the resettlement of the British Indian Ocean Territory (BIOT), estimating their likely costs and risks. To address all relevant issues, including financial, legal, environmental, logistics, social, economic and defence.

The Recipient

2. The BIOT Administration.

The Scope

What is included:

3. The **Feasibility Study** will consider a range of **options** for the resettlement of BIOT, **differentiated by factors**, including:
   - The **location**, which would include consideration of the outer islands and of Diego Garcia.
   - The **scale** of possible resettlement and sustainable socio-economic development options in the short (5 years), medium (10 years) and long-term (20 years), including livelihood opportunities.
   - The **types** of possible resettlement drawing on suggestions from the initial consultation.
   - The **environmental carrying capacity** of the proposed locations (access to water, energy, sources of food etc.). The environmental feasibility will take into account likely scenarios of climate change and sea level rise, following good practice from the IPCC (Intergovernmental panel on climate change).
   - Take full account of scientific uncertainty around areas such as climate change, sea level rise and carrying capacity, including fisheries productivity by expressing ranges and probability instead of a single model as the basis.
   - When considering the options, the Study will address the following **questions**:
     - What would be the cost to the UK of establishing and maintaining a settlement over 5, 10 and 20 years?
     - Could a settlement be economically self-sustaining and if so within what time period and under what conditions?
   - The Study will factor in the suggestions made in the **initial consultation** on the review of resettlement of BIOT and propose which specific options will be considered. The options to be analysed will form part of the Inception Report. The Study will take account of the suggestions made during the consultation on the type of resettlement. These suggestions include: a modern lifestyle; a subsistence lifestyle; an eco-village; a pilot resettlement with some employment on the Diego Garcia military base; a scientific research station.

What is excluded:

4. Proposals or suggestions not directly relating to the feasibility of resettlement are outside the scope of this study. This includes any issues relating to sovereignty, nationality, and historical compensation payments.
5. This work is undertaken without prejudice to any on-going litigation.

Requirements

6. The options should be developed using multi-disciplinary expertise. Drawing on experts will be essential, inter alia, in the fields of livelihoods and social development, economics, defence, industrial development, anthropology, health care, education, environment, climate change, science and conservation.
7. The Feasibility Study would need to analyse each option, in a neutral way. It should include analysis of the factors below, but could use an alternative framework to the PESTLE one suggested. The framework must be specified in the Inception Report.

- **Political** factors, including how the US Naval Support Facility on Diego Garcia could impact the feasibility of resettlement options.
- **Economic** factors, including the full 'lifecycle' cost (5, 10, 20 years) of any resettlement option to the UK. All options should consider the development of a sustainable local economy, social and livelihoods development and income generation for any resettled individuals and the infrastructure and other requirements for this. It should assess, with reference to other UK Overseas Territories and other low-lying small island states, the likelihood of the economy being financially self-sufficient and meeting prudential financial guidelines, and the timescale if this were to happen. See below for a fuller analysis of potential cost implications. It should explore economic opportunities through models of eco-tourism or non-damaging eco-system use for example.
- **Social** factors, including the practical aspects of life in a remote location and the extent of public service provision (including health, welfare and social services, education, law enforcement and housing provision at a scale appropriate for each option) and population levels in view of the options in question and of 'basic social needs'. Consider the standards in the Millennium Development Goals.
- **Technological** factors, including the need to establish and maintain access to the islands, both by the resident population and for goods and services; the development of infrastructure (including running water and waste management), transport, communications and coastal engineering.
- **Legal factors**: BIOT ordinances and the nature of the BIOT Marine Protected Area (MPA) can be amended. In considering options, the extent to which existing provisions, in Ordinances and the environmental obligations of BIOT will be considered. The impact on the present MPA, will need to be highlighted, along with any possible new legal implications. Human rights considerations should also be taken into account.
- **Environmental** factors: The study should assess:
  - Environmental factors which would affect habitation: for example, Carrying capacity assessments to examine the potential natural resources in situ which support life (potable water, food, energy) and the viability of economic activities such as tourism development, fishing, and industrial development.
  - A climate change and variability assessment looking at future scenarios and how these might affect life on the island. This should include sea level rise models, rogue waves, coastal erosion and tropical cyclone/storm event frequency and intensity and changes in wave/wind conditions.
  - Possibilities for the island's natural resources to promote economic activities should also be examined, for example, fishing (pelagic, inshore recreational/game fishing), together with the coral reefs and other marine and terrestrial resources and their potential eco-tourism value.
  - Impacts of resettlement on the environment: including change in land use, waste management and economic activities. Costs and benefits associated with each of the options should be considered, including initial capital costs, running costs and contingent liabilities, including from the UK's legal obligations.
- The costs of mitigating risks, in the event of a resettlement, should also be considered. The options should be cognisant of the 2012 HMG White Paper on the Overseas Territories which restates UK policy and obligations, including the policy that their "reasonable assistance needs, where financial self-sufficiency is not possible, are a first call on the aid budget".

8. The 2000-2002 Feasibility Study will be made available for its detailed content and conclusions to be considered as part of this study. Other background material relevant to the Study, including other reports relating to the 2002 Feasibility Study and the extensive documentation gathered as part of the initial consultations of stakeholders in July 2013 will also be made available for consideration.

Reporting requirements:

9. The following are essential:
   - An **Inception report**. This should specify the different options for resettlement to be considered as part of the Study, and the framework for the analysis, including how risk and cost, will be evaluated. It should explain the methodology to be used. It should provide project management information:
     - a standard format for the monthly update reports;
     - a risk management plan for the project; and
     - a proposed timeframe for delivery and reporting, including monthly milestones.
     - A list of proposed experts to be engaged and their subject areas (together with curriculae vitae).

     The BIOT Administration will consult stakeholders on this document before it is finalised.
   - Monthly **update reports** should provide information about progress against the monthly milestones, and include a forward planning timetable. Monthly reports should be kept brief to retain the focus on producing the main study. These reports may be used to inform and consult stakeholders, by the BIOT Administration.
   - **Exception reports** as necessary to bring issues or risks to the attention of the Recipient, including problems with delivery, or proposed amendments to the project.
   - A **Final Report** setting out the different options for resettlement of BIOT and analysis of the feasibility each option. The BIOT Administration is committed to publishing the full factual feasibility study by the consultants, without revision.

Performance requirements:

10. Attention to detail and a sound and agreed quality assurance process is essential. The study will seek input from Chagossians in the UK, Seychelles and Mauritius and other interested parties throughout the review. There should be clarity about how this input relates in process terms to the analysis of the Feasibility Study, and clear parameters on transparency and confidentiality. Consultants will be required to visit the Islands which will be funded by the BIOT Administration.

Security requirements:

11. Consultants contracted to deliver the review will need to comply with contractual security requirements, including compliance with the requirements of the Official Secrets Act.

Information management and reporting:

12. The outputs of the Study and the rights to the material collated in the process of conducting the Study, including all communications will be the property of the BIOT Administration. An information management system should be agreed at the start of the process, including the disclosure of any documents, as per contractual requirements.

Risk and issue management:

13. The consultants should have a robust risk management procedure, including appropriate, agreed mechanisms for internal escalation, and an understanding of when such mechanisms will be invoked.

Timeframe

14. The Inception Report should be agreed, taking account of input from the stakeholders within four weeks of project initiation. The analysis of the feasibility and costs of the options for the resettlement of BIOT should be completed within 12 months. Extensions/amendments to this timeline subject to unforeseen circumstances and requirements of the project shall be agreed by the recipient at least one calendar month in advance.

Competition Criteria

15. We aim to conduct the competition using HMG Consultancy One framework agreement and the evaluation rules which relate to it. Typically we will be looking for a provider who is credible, impartial and can deliver value for money.

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