



Review of environmental information content of studies undertaken for Little Bay town and port development, Montserrat, 2000-2010

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¹ Consortium comprises Harewelle International Limited, Development Delivery International (formerly known as Natural Resources International Limited), Practical Action Consulting, Cranfield University and AEA Energy and Environment

Executive Summary

A set of ten reports produced during the period 2000 to 2010 and containing environmental information pertinent to Little Bay development, Montserrat, are reviewed for content and application. The environmental assessments for Little Bay town and port development are of good international standard and, along with the construction monitoring plans and procedures, provide an adequate basis on which to proceed with implementation of development. Technical reports dealing with a wide ranging variety of environmental issues of direct relevance to Little Bay have been produced. All contain pertinent data and information and implementable recommendations.

Background

1. Montserrat, an island 104 km² in extent and with a population of some 4500 in the eastern Caribbean is a UK Overseas Territory. Eruptions from the Soufriere Hills volcano, commencing in 1995 and continuing intermittently to the present, have destroyed the capital city and rendered the southern 2/3 of the island largely uninhabitable. Since 1995 the territory has been dependent on UK aid. There is limited economic activity on the island at present; this includes mining and quarrying, construction, financial and professional services and tourism.
2. The Government of Montserrat (GoM) and the Department for International Development (DFID) believe that developing a new capital at Little Bay in conjunction with an adjacent new port and breakwater could be key drivers of future economic growth and help the island to again become self sustainable. Over the past decade planning and design work has proceeded on Little Bay town and port as well as the commencement of Phase I construction work (basic infrastructure). A series of environmental assessments and reports covering various aspects of development have been produced over the period 2000 through to 2010.
3. The objective of this review was threefold :-
 - a) to examine the environmental content of this material and provide a summary;
 - b) to assess the extent to which the key environmental issues have been addressed to date; and
 - c) to highlight aspects that are important but have not yet been adequately addressed.
4. The output from this review is intended to provide the DFID Montserrat Programme Team with an overview of the environmental work already done, and to assist with priority setting for environmental inputs into the next phases of development of Little Bay town and port.

Review

1. Annex 1 summarises the information content of ten environmental reports produced over the period 2000-2010 which contain information pertinent to Little Bay town and port development. The salient information is summarised, along with a classification of the extent of information coverage (comprehensive, basic or mention only), and an indication of whether the information content is time sensitive, i.e. whether it would need revision after an interval of two or more years.
2. Each of the ten reports reviewed fall into one of three categories:
 - a) Environmental assessments & management:
 - i. Buchanan & Partners (2002) provides an environmental assessment of the proposed framework plan for Little Bay town development. The assessment is typically strongly integrated into the overall planning and design, so it is not objective as such, and much of the underlying analysis of cause and effect is simply taken for granted. Nonetheless,

it is a typical planning device of good standard. Although now nearly a decade old, it still represents a sound platform (from an environmental perspective) from which to move forward with actual implementation.

- ii. Townroe *et al.* (2005) covers the same items in terms of assessment of Little Bay town development but report to a different client. It essentially substantiates much of what is recorded by Buchanan & Partners.
 - iii. Environmental Management Consultants (2010) is a sound and detailed environmental assessment of port development at Little Bay. The environmental analyses and assessments are strongly interlinked with the technical and engineering descriptions. The work covers all pertinent physical, biological and social components and is of typically high international standard. Subject to the specific comments on implementation (see below), the report provides a very good basis (from the environmental perspective) on which to proceed with port development.
 - iv. The three short reports produced anonymously for the GoM on environmental monitoring and reporting of construction are of high and detailed standard and prepared according to best international practice. They represent a very adequate basis on which to ensure environmental protection during construction (subject to the comment on implementation below).
- b) Technical reports on a variety of important issues, all underpinning the future development of facilities at Little Bay:
- i. Mouchel Consulting (2000) analyses wave heights and distribution at Little Bay as basis data inputs to design and planning. The information appears to have been used in other reports.
 - ii. Smith Warner International (2003) provides an assessment of the various natural and man-made physical hazards. The report gives a good perspective of these hazards and provides a best standard practice approach to dealing with, and accommodating to, the many hazards which are so frequent on Montserrat.
 - iii. Caribbean Marine Projects (2010) is a brief report on an offshore monitoring study and would hopefully form but one of many similar monitoring surveys undertaken as environmental inputs to environmental management in the Little Bay area.
- c) Large-scale assessment & planning:

Gray 2010 presents a national-level assessment of the likely impacts to Montserrat's ecosystems and communities created by long-term climate changes. This report addresses many of the same issues as the other reports but at much larger spatial and temporal scales. While the other reprints are devices for immediate local implementation, this report is the basis for national-level and long-term action.

3. The reviewed reports all provide useful and implementable information, guidelines and procedural standards. The largest concern of this review, from an environmental perspective, is not the available material which deals with site-specific items related to development at a specific site, i.e. Little Bay, but rather the broader issues which underpin specific developments and set the stage for future actions. Montserrat is a small island, recently devastated by a natural disaster and which faces future physical environmental threats. The island is poor in natural resources and the remaining population is not well equipped to function in a long-term sustainable manner. It is considered important that development at Little Bay is not considered in isolation of the larger environmental and social background. Issues which should be brought to the fore for consideration, planning and action include the following:

- a) Environmental studies and reports are the essential basis for effective planning and assessment, but over the long-term they are just that – studies and papers. The real driver of

environmentally sustainable project development is successful implementation. From the environmental perspective this requires deployment of well-trained and motivated, preferably local, personnel to monitor, report and communicate with developers, government and communities on issues and problems as they develop so that they can be speedily addressed and dealt with.

- b) Displacement of communities – the transition of Little Bay from the present type of interim and scattered development to a more structured urban centre with commercial, small industrial and international tourism infrastructure will inevitably lead to the displacement of households and people not able to integrate into a developing urban setting. Environmental degradation in areas occupied by such groups is typically severe. Long-term planning of such migrations and the needs of all social groups is essential.
- c) Environmental quality – Montserrat will always be heavily dependent on inflows of capital and financial resources from the outside, principally from international tourism and from seasonal residents from North America, Europe and elsewhere. Montserrat is already in competition with other Caribbean destinations which are well established havens for tourists and seasonal residents. The key environmental component underpinning this type of economic activity is environmental quality, i.e. clean water, air and beaches, and well-functioning infrastructure, roads and services. These are not automatic components of initial short-term development as currently planned at Little Bay but must follow on a planned and structured basis.

Annex 1. Environmental information content of selected reports dealing with development of Little Bay and adjacent areas, Montserrat, 2000-2010.

Report	Environmental Component[s]	Information Content	Information Coverage†			Time Sensitive Information
			M	B	C	
Mouchel Consulting Ltd. 2000. Montserrat Little Bay jetty. Wave measurement and investigations into methods to reduce downtime. DFID.	Offshore waves	Analysis of 12 month dataset on wave heights offshore of Little Bay. Information used in 2010 Little Bay EIA (see Environmental Management Consultants below).			✓	✓
Colin Buchanan & Partners. 2002. Little Bay town centre action area plan. GoM.	General – related to urban surroundings	Overall report is a comprehensive action plan for Little Bay development, includes a checklist social and environmental assessment (SEA) of the proposed facilities. The SEA addresses local population & housing, local economy, tourism, community interactions with development, land use, landscapes, visual impacts, traffic & transportation, cultural heritage sites, sewerage treatment & disposal, solid waste disposal, local hydrological features and drainage, species and area conservation.		✓		✓
Smith Warner International. 2003. Integrated vulnerability assessment of Montserrat. GoM.	Natural (physical) hazards	Analysis of physical hazards in Safe Zone. Assesses occurrences and threats from natural hazards (wind, landslides, storm surges, flooding,			✓	

†M=mentioned only, B=basic information, C=comprehensive description and/or analysis.

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			M	B	C	
		tsunamis, earthquakes and volcanic activity) as well as man-made hazards (oil spills, traffic accidents, waste disposal & aircraft hazards) to provide a) determination of vulnerability of the Safe Zone and especially the proposed Little Bay development area; b) identification and mapping of areas in the Safe Zone prone to multiple hazards; c) description of physical and social infrastructure required to meet Montserrat's ongoing needs; and d) disaster mitigation recommendations.				
Townroe, P., J. Arthur & E. Kyrou. 2005. The Little Bay urban development in Montserrat, W.I. A project appraisal undertaken on behalf of the Department for International Development. Main report, five annexes and two attachments.	Environmental assessment & management process	1. Provides an environmental appraisal of Little Bay development which meets specifications of Montserrat Physical Planning Act 1996 and the DFID Environmental Screening procedure.			✓	✓
		2. Provides ToR for a long-term environmental monitoring programme aimed at detecting groundwater quality impacts in beach and marine areas resulting from wastewater disposal.			✓	
	General environmental status	1. Briefly describes terrain and use status (in 2005) of GoM-owned land area adjacent to Little and Carr's bays targeted for future urban, commercial and recreational development.		✓		✓

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		2. Notes past degradation of terrestrial and marine environments of Little Bay, and recommends avoidance and/or mitigation of future degradation.	✓			✓
	Waste water	1. Makes general prediction of increasing volumes of domestic and commercial waste water to result from further urban development.		✓		
		2. Based mainly on the physical and environmental constraints of the area and the likely pace of physical development, consensus amongst consultants, GoM representatives and the Montserrat Water Company favours a) treatment and disposal via septic tank and soakaway system for Phase I; b) full sewerage and a treatment facility with disposal through a sea outfall for later stages of development.		✓		✓
		3. Recommends preparation of a sewerage master plan for the entire development prior to Phase 1 activities.	✓			
	Offshore marine environment	1. Recommends regular monitoring of biological diversity near reefs, sea grass beds and other sensitive marine environments within and around Little Bay, focusing on areas around marine outfalls and at reef sites. Suggests species counts and use of transect methodology on quarterly basis.		✓		

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		Notes that pollution from increased wastewater and silt-laden stormwater discharges from development constitute a significant risk to fishing industry in Little and Carr's bays (remains of most of Montserrat fishing industry since the eruption of Soufriere Hills eruptions).	✓			
	Environmental risks	Mentions possibility of impacts to beachfront development from storm surges.	✓			
	Agriculture	Assesses direct impacts to grazing areas (80ha alienated)		✓		✓
	Landscape	1. Qualitative assessment of local landscape impacts. Substantial proportions of flat terrain adjacent to beachfront will be taken up by development. Notes status (in 2005) of general area as degraded by deforestation, overgrazing and general uncontrolled community use.		✓		
		2. Notes ecological value of Piper's Pond, small area of associated mangroves, Silver Hills and Rendezvous Hills.	✓			✓
	Air quality	Qualitative assessment of air quality impacts from construction and long-term operations (traffic)		✓		
	Solid wastes	Qualitative assessment of solid waste generation by households and commercial & institutional establishments within Little Bay development. Expects that privately operated collection systems will handle additional solid waste generated. Notes high likelihood of incremental increase in waste disposal at open dump site at Jack Hill, and		✓		✓

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		the need for development of a more efficient sanitary landfill.				
	Heritage resources	Mentions great house site as heritage area in Little Bay, and recommends site conservation and involvement of Montserrat Heritage Trust to preserve.	✓			
Government of Montserrat. n.d. Little Bay Infrastructure Development – Interim Phase. Environmental Management Plan (EMP) [Report #1].	Environmental management process	Detailed EMP for interim Little Bay infrastructure development, detailing a) responsibilities of contractor(s) and engineer; b) responsibility for adherence to applicable legislation and regulations and obtaining consents and permits; c) specific details for types of plant to be used; control of construction noise, vibration and dust; specified working hours and working methods; handling and disposal of hazardous materials; minimum standards for liquid and solid waste disposal; on-site protection of vegetation and wildlife; and dealing with exposed archaeological artefacts; d) recording procedures; e) community liaison; f) emergency measures; and g) procedures for environmental inspections.			✓	

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Government of Montserrat. n.d. Little Bay Infrastructure Development – Interim Phase. Contractors Environmental Management Plan (CEMP)	Environmental management process	Detailed plan for site management in interim phase by designated contractor(s), covering identification of responsibilities, environmental inspection procedures, handling of incidents and complaints, prescriptions for corrective actions, and procedures for monthly reviews and sign-off by employer(s).			✓	
Government of Montserrat. n.d. Little Bay Infrastructure Development – Interim Phase. Environmental Management Plan (EMP). [Report #2].	Environmental management process	Detailed EMP for interim Little Bay infrastructure development, covering identical material as in <i>Report #1</i> (see above), but in more detail. Specifies specific responsibilities and detailed step-by-step construction monitoring, auditing and reporting procedures.			✓	
Caribbean Marine Projects. 2010. Environmental assessment of Little Bay, Montserrat: Port Jetty to Moose's Bar Section.	Offshore marine environment	1. Detailed 2-week field assessment of 8000 m ² of marine habitat, 75m of beach and a dry ghaut, all comprising the main beach and jetty area of Little Bay. Techniques included surface and free dive photographic surveys plus scuba surveys along a transect grid to document marine habitats and occupant species. Information also collected from DoA's Fisheries Unit. 2. Offshore habitats are dominated by a sand and rocky bottom interspersed with rocks 0.2-1.0m in diameter, many covered by white scroll and Y-branched algae. Predominant corals species recorded were Symmetrical Brain and Orange Cup corals. No major coral reefs occur. Adult and juvenile fish species found in this area included			✓	✓

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		Sergeant Major, Blue Tang, Spotted Moray, Purple-Crowned Sea Goddess, Small Mouth Grunt and Brown Chromis. Large numbers of small bait fish periodically inhabit the area throughout the year and attract pelagic species such as jacks, tuna, and dolphin to the bay. 3. Significant negative environmental features recorded included large amounts of trash and debris in the offshore areas, and uncontrolled use of near-shore quarries and gravel piles leading to sedimentation of shallow marine habitats.				
Environmental Management Consultants (Caribbean) Ltd. 2010. Environmental impact assessment for the proposed marine structures and harbour design at Little Bay, Montserrat. Montserrat Port Authority.	Environmental assessment & management process	1. Provides a detailed EIA of the proposed Little Bay harbour upgrading, which includes a multi-purpose marina with piers for access, cargo pier and container storage, an RO/RO ramp, a bulk storage area, an armoured breakwater/revetment and associated land filling and reclamation, widening of the jetty access, concrete pavement, new terminal and operations buildings, access bridge and vehicle pick-up/drop-off area.			✓	
		2. Detailed review of applicable legislative and administrative framework			✓	
		3. Detailed mitigation proposals included in pertinent sections.			✓	
	Coastal & near shore landforms	1. Assesses mass wasting and erodibility of bluffs and slopes adjacent to Bay.			✓	

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		2. Beach stability assessed as transient				
	Offshore marine environment	1. Water circulation within the harbour – long-term persistent change.			✓	
		2. Water & sediment quality – long-term persistent change.			✓	
		3. Coastal flora & fauna – transient impacts assessed for benthic cover, sea grass, macro-benthic in-fauna, marine turtles, marine mammals and overall fisheries resources.			✓	
	Environmental Risk	Assesses climatic & oceanographic hazards, tropical storms, geological hazards, landslides, rapid sedimentation, volcanic hazards & earthquakes – project design considered adequate.			✓	
	Socio-Cultural Impacts	Addresses the human & built environment, including environmental quality & public health, air quality & noise emissions, and local heritage resources.			✓	
	Significant cumulative impacts identified and assessed	Solid waste production, risk of invasive species, operational traffic impacts, land use & socio-economics, natural hazard risk and carbon footprint increases.			✓	
	Persistent impacts	Light pollution, hydrodynamic change, landscape change, water quality, sediment quality & benthic habitats			✓	
Gray, G.A.L. 2010. Montserrat national climate change issues paper. Towards the	Environmental, economic and	1. Paper intended to set stage for the development of a National Climate Change Adaptation Policy			✓	

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formulation of a national climate change (adaptation) policy and action plan. Min. Agriculture, Land, Housing and the Environment, Montserrat.	social vulnerabilities	and Action Plan for Montserrat. 2. Notes severe vulnerabilities in Montserrat: a) high exposure to cyclones, storm surges, drought, floods, tsunamis, volcanic eruptions b) limited space for development c) economic remoteness d) limited natural resources and over-exploitation e) lack of economic diversity f) thin water lenses and decreasing fresh water availability g) import dependence h) high rates of migration and changes in social structure i) rapidly developing infrastructure in coastal and steep areas j) limited financial and human resources.				
	Ecosystems	Sea-level rise, hurricane, storm surges, changes in rainfall and temperature patterns will potentially affect coral reefs, sea grass beds, mangroves and beaches.			✓	
	Comparison of risks, threats and extent of climate-related impacts	Used a workshop methodology to assess and rate the importance of eight climate-related changes (sea-level rise, increase in storm surges, flash floods; tropical cyclones, changing distribution of disease vectors, increased incidence of hot days, changes in rainfall patterns, acidic oceans) on Montserrat's ecosystems, resources and communities. Findings ranked in terms of			✓	

Report	Environmental Component[s]	Information Content	Information Coverage†			Time Sensitive Information
			M	B	C	
		importance (measured as national significance + certainty of occurrence + severity of threat/impact + urgency of need to respond) for 13 components from most severe (definitely happening nationally and regularly with extreme threat to likely happening nationally with high level of threat within the next 5-10 years. Components (in order of severity from highest to lowest) were fisheries, agriculture, biodiversity, tourism, beaches, coastal zone, access to critical infrastructure, reefs and other marine life, human settlements, water/ hydrology, financial sector, damage to critical infrastructure, human health, and coastal underground aquifers.				