Anadarko Moçambique Área 1, Lda

Annex A

Public Participation Report



Mozambique Gas Development Project, Cabo Delgado Province

Public Participation Report (PPR)
Scoping (EPDA) and Impact Assessment Phases

Project ref: 0133576

February 2014

Anadarko Moçambique Área 1, Lda

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Mozambique Gas Development Project, Cabo Delgado Province

Public Participation Report (PPR)

Scoping (EPDA) and Impact Assessment Phases

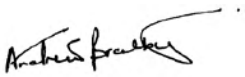
February 2014

Project Ref: 0133576

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ACRONYMS

AMA1	Anadarko Moçambique Area 1, Lda
CRT	Comments and Responses Table
DIPREME	Direcção Provincial dos Recursos Minerais e Energia (Provincial Directorate of Mineral Resources and Energy)
DNAIA	Direcção Nacional de Avaliação do Impacto Ambiental (National Directorate of Environmental Impact Assessment)
DPCA	Direcção Provincial para Coordenação da Acção Ambiental (Provincial Directorate for Coordination of Environmental Affairs)
DPOPH	Direcção Provincial das Obras Públicas e Habitação (Provincial Directorate for Public Works and Housing)
EIA	Environmental Impact Assessment
EIS	Environmental Impact Study
EMP	Environmental Management Plan
ENH	Empresa Nacional de Hidrocarbonetos
eni	Eni East Africa S.p.A
EPDA	Estudo de Pré-viabilidade e Definição do Âmbito (Environmental Pre-feasibility Report and Scope Definition)
ERM	Environmental Resources Management
ESMP	Environmental and Social Management Plan
I&AP's	Interested and Affected Parties
INP	Instituto Nacional do Petróleo (National Petroleum Institute)
LNG	Liquefied Natural Gas
MICOA	Ministério para a Coordenação da Acção Ambiental (Ministry for the Coordination of Environmental Affairs)
NGO	Non-Governmental Organization
PC	Public Consultation
PP	Public Participation
PPPR	Public Participation Process Report
ToR	Terms of Reference

1 INTRODUCTION

Anadarko Moçambique Area 1, Lda (AMA1) and Eni East Africa S.p.A. (eni) are joint proponents for the Liquefied Natural Gas (LNG) Project (hereinafter referred to as 'the Project') which involves the development of the offshore gas fields in Areas 1 and 4 in the Rovuma Basin and an LNG Facility onshore on the Afungi Peninsula.

AMA1 holds exploration rights to explore and develop natural gas reserves in Area 1 Offshore in the Rovuma Basin. Likewise, eni holds rights to explore and develop natural gas reserves in Area 4 of Rovuma Basin. These areas are positioned adjacent to one another and a number of gas reservoirs or gas fields (including both standalone reservoirs and one connected reservoir) have been discovered within each of the areas. AMA1 and eni will each coordinate the development of their natural gas reservoirs in compliance with the applicable Mozambican laws and regulations. With a view towards optimizing the development, construction and operation of the initial liquefaction facilities, AMA1 and eni have entered into a Term Sheet that provides for the coordinated development, construction and operation of the LNG Facility. The Project will be implemented by means of one or more coordinated Development Plans which will be approved by the Government of the Republic of Mozambique.

On 22 August 2011, the Project was classified as a Category A project by the Ministry for the Coordination of Environmental Action (MICOA) through the Provincial Directorate for the Coordination of Environmental Action of Cabo Delgado (DPCA). The project is therefore subject to a comprehensive Environmental Impact Assessment (EIA) process.

Environmental Resources Management Southern Africa (Pty) Ltd, (ERM), in association with *Projectos e Estudos de Impacto Ambiental, Lda.* (IMPACTO), was commissioned to undertake the EIA process for this Project in April 2011 on behalf of the project proponents.

The need to undertake a Public Participation (PP) process for a Category A projects is a legal requirement under the Environmental Impact Assessment Regulation (Decree 45 / 2004 of September 29). In addition, Public Consultation (PC) is an integral part of the EIA process for projects classified as Category A as laid out in Article 19 of the Environmental Regulations for Petroleum Operations. The PP process undertaken for this project has been carried out in accordance with the provisions of the aforementioned decree and regulations as well as the General Directive for the Public Participation Process in the Environmental Impact Assessment Process (Ministerial Order 130 / 2006 of July 19).

This document describes the PP process activities undertaken as part of the EIA process for this project. It details the public meetings undertaken at a local

(Palma District), regional (Pemba) and national (Maputo) level during the various phases of the EIA process.

In addition, it details the focus group meetings also carried out in Maputo and Pemba during the impact assessment phase. These meetings were facilitated by the Environmental Impact Study (EIS) Team to provide a forum for providing project information and findings of specialist studies to key and address concerns and comments as the EIS progressed.

2 *PUBLIC CONSULTATION GOALS*

Integral to public consultation is the solicitation of the views of the communities and other Interested and Affected Parties (I&AP's) on the potential impacts of the planned project on their lives and livelihoods. The involvement of I&AP's is a right embedded in legislation, namely the Regulation on the Environmental Impact Assessment Process (Decree No.45 / 2004) and the General Directive for Public Participation in the Environmental Impact Assessment Process (Ministerial Order 130/2006).

The General Directive for the Public Participation Process in the Environmental Impact Assessment Process (Ministerial Order 130 / 2006 of July 19) has been developed to standardize public participation processes. The Ministerial Order sets out a five-step public participation process that should be followed:

1. Stakeholder identification;
2. Information dissemination;
3. Stakeholder dialogue;
4. Assimilation of points of view and concerns; and
5. Feedback to stakeholders

The main goal of public consultation is to understand the concerns of the I&AP's on key matters that affect – or may affect – the project in each phase of the EIA process, and to guarantee that their questions are recorded and considered by the EIA Team, providing them the opportunity to comment on the results of the studies. It also enables opening a communication channel between the public and the Consultant, as well as between the public and the Proponents, to be used throughout the EIA process in a comprehensive, open and transparent manner.

PC activities were carried out during each of the phases of the EIA process:

- EPDA (Estudo de Pré-viabilidade e Definição do Âmbito - Environmental Pre-feasibility Report and Scope Definition); and

- Impact Assessment phases.

The PC for the EPDA phase was carried out taking into consideration the fulfilment of the following specific goals:

- Provide general information on the project description and the Proponents to the I&AP's, potential environmental and socio-economic impacts and the respective mitigation measures;

- Present an overview of the draft EPDA report and the Terms of Reference (ToR) for the EIS;

- Outline the EIA process and the EIA and project schedule;

- Collect questions and concerns on the project by the I&AP's;

- Establish / disclose the communication channels between the Consultant, Proponents and I&AP's;

- Create an opportunity for the I&AP's to comment and present suggestions on key issues to be considered during the EIS; and

- Update the EPDA and ToR in accordance with the relevant suggestions made by the I&AP's.

The public consultation conducted for the EIS phase had the following goals:

- Provide updated information on the project description;

- Present the findings of the specialist studies and the Draft EIA Report: environmental and socio-economic impacts identified and assessed, and mitigation, management and monitoring measures proposed; and

- Provide the I&AP's an opportunity to comment on the findings of the EIS, namely the evaluation of impacts and identification of mitigation measures, to contribute toward improving content and consequently, the project's environmental sustainability.

Focus group meetings were held with key stakeholders, during the EIS phase with the following objectives:

- Provide information on the progress of the technical studies and the project in order to keep the main sectors of the central and provincial government, including tour operators, informed on the progress of the technical studies (Environmental Impact Study and Resettlement Studies) which were being carried out and/or would soon be carried out.

- In these meetings, consultants from the EIS Team and Proponents team were present to deliver the brief report and reply to questions asked of them.

3 PUBLIC PARTICIPATION PROCESS

This section describes the approach taken for the preparation of the PP activities undertaken during the EPDA and EIS phases, including the legislated public consultation meetings, and other meetings held with focus groups and communities.

Copies of all relevant documentation such as the I&AP's stakeholder database, letters of invitation, the advertisements and notices published, meeting minutes and comments and response tables (CRT's), the attendance registers and the written comments received by the I&AP's can be found in *Appendix A - F* of this report.

A five stage approach was undertaken during the public consultation process to achieve the goals set out in Section 2, as follows:

- Identification of Interested and Affected Parties (I&AP's)
- Dissemination of Information and Involvement of the I&AP's
- Convening Public Consultation Meetings
- Collection and Recording of Contributions by the I&AP's
- Preparation of the PP Process Report

These steps are further detailed below.

3.1 IDENTIFICATION OF THE I&APS

During the initial phase of the project, a preliminary list of I&AP's was developed based on similar or previous projects undertaken in the area (eg AMA1's onshore exploration EIA and AMA1 and eni's offshore exploration EIA's). Key to a successful public participation process is the involvement of stakeholders from all levels, particularly those likely to be affected at a local level ie Palma District and local communities within the area affected (Afungi Peninsula). Given the nature and scale of the project, a decision was made to involve those interested at a provincial level as well as at a national level ie Pemba and Maputo respectively.

In summary, the following I&AP's were identified as applicable to engage during the project:

Table 3.1 Identified Interested and Affected Parties

Level	Interested and Affected Parties (I&AP's)
	Maputo
National	Government Institutions (Ministries, National Directorates, Government Institutions, etc.) Environmental and developmental Non-Government Organizations (NGO's) Teaching and research organizations Social communication agencies Civil society
	Cabo Delgado
Provincial	Provincial Government Government authorities in the sectors of the Environment, Mineral Resources and Energy, Fisheries, Tourism, Public Works and Housing, Agriculture, Labor, etc Local and international NGO's active in the environmental field NGO's involved in activities within the project area Existing tourism operators at the project's sites of influence and implementation Teaching and research organizations Social communications organizations Civil society
	Palma
District	District Government Local Council of the Palma Administrative Post Owners of concessions in the project area Civil society
	Palma / Afungi Peninsula
Community	Villages covered by the project: Maganja, Nfunzi, Kibunji, Mpaia, Nsemo, Quitupo, Milamba 1, Milamba 2, Barabarane, Simo, Senga, Macala, Mangala, Patacua and Quitunda

The preliminary list of I&AP's was updated as a live document throughout the EIA process. For example, radio and newspaper advertisements informed the public of the project (and various draft reports available for public comment) and requested them to register as I&AP's if they would like to participate in the EIA process. I&AP's that responded to such advertisements were included on the project database. In addition, I&APs identified by the Project Proponents were added to the database.

The exhaustive list of the project I&AP's is detailed in *Appendix A* of this report.

3.2 DISCLOSURE OF INFORMATION AND INVOLVEMENT OF THE I&AP'S

3.2.1 Disclosure of Documents

Information Documents

The documents disclosed for public consultation were the Draft EPDA and EIS Reports, and the respective Non-Technical Summaries (NTS's). All documents were distributed fifteen days prior before holding the public consultation meetings, along with the letters of invitation (in accordance with the Regulations). Additional copies of the NTS's were made available at the public consultation meetings.

For community meetings, during the EIS phase, the NTS was simplified and translated into the main local language (Kimwani), understandable to most people. It was distributed in Portuguese and Kimwani. Furthermore, copies of the NTS, in both languages, were placed with the District Administration and delivered to the key persons in the community, such as the heads of the Nkutanos (People's Newspaper) and local leaders, for consultation by people who had not received a copy. Finally, the notices were placed in Nkutanos included a telephone number that people could call to ask questions about the Draft EIS Report and the NTS.

After providing information on the Proponents, the proposed project, the goals of the Public Consultation, the EIA process, the main potential environmental impacts identified for the project and the project's mitigation, environmental and social mitigation measures, the EIS Team hoped to create a mechanism for gathering questions, comments and suggestions related to the EIA process, encouraging I&AP's to participate in the process.

Consultation of the EPDA and EIS Reports

The draft EPDA and EIS reports were made available for public consultation at the relevant locations:

Table 3.2 Locations for Consultation of the EIS Report for the Public

	Institution
Maputo	DNAIA - Direcção Nacional de Avaliação do Impacto Ambiental (National Directorate of Environmental Impact Assessment) INP – Instituto Nacional do Petróleo (National Institute of Petroleum) IMPACTO offices AMA1 offices
Pemba	DPCA – Direcções Provinciais para Coordenação da Acção Ambiental (Provincial Directorate for Coordination of Environmental Affairs) DIPREME (Direcção Provincial dos Recursos Minerais e Energia)– Provincial Directorate of Mineral Resources and Energy / INP Delegation AMA1 offices
Palma	Offices of the Palma District Administration At the AMA1 camp

Electronic copies of the EPDA report in Portuguese and English, were also made available for consultation by I&APs on IMPACTO's website: http://www.impacto.co.mz.

Electronic copies of the EIS report were made available at the following websites:

- In Portuguese: http://www.impacto.co.mz/relatorios.html
- In English: http://www.erm.com/EIA-LNG-Rovuma-Basin

3.2.2 Disclosure Methods

Opportunities for involvement of I&AP's, disclosure of information documents, the invitation to monitor the entire EIA process and the invitation to participate in the public meetings were disclosed by the following means:

Newspapers and Radio Advertisements

The disclosure of the draft EPDA and EIS reports were publicized through notices in Newspapers and Radio Stations with the greatest national and provincial coverage, namely the Notícias, Diário de Moçambique and Rádio Moçambique, the main provincial station in Cabo Delgado, on the dates appearing in the table below.

Table 3.3 Notices Published

Phase	Means of communication	Date
EPDA	Notícias and Diário de Moçambique newspapers	09-12-2011 & 09-23-2011
	Rádio Moçambique (Cabo Delgado)	09-12-2011 & 09-23-2011
EIS	Notícias newspaper	08-27-2013 & 09-06-2013
	Rádio Moçambique (Cabo Delgado)	08-27-2013 & 09-10-2013
	Notícias newspaper	10-02-2013
	Nkutanos (People's newspaper)	As of 10-02-2013 until the day of the meetings
	Notícias newspaper	10-08-2013 & 10-11-2013
	Rádio Moçambique (Maputo and Cabo Delgado)	10-08-2013 & 10-11-2013

The purpose of placing newspaper and radio advertisements or notices was to disclose information about the EIA process, invite people to register their interest in the project (as an I&AP), inform I&AP's of the public meeting dates, times and venues, disclose information on where information documents could be consulted prior to the meetings. The first notification is typically published 15 days before a public consultation meeting is convened (in

accordance with the Regulation). Follow up notifications were made as derailed in the table above to remind the I&AP's of the upcoming meetings.

After the public consultation meetings for the EIS phase, in order to give the I&AP's more time read the Draft EIA Report, the deadline for comment submissions was extended by over thirty days. Notices announcing this extension were made in the Notícias and Diário de Moçambique newspapers and over the radio on Rádio Moçambique, the national (Maputo) and provincial (Cabo Delgado) radio station.

In the EIS phase, disclosure of the community meetings to be held was made through a notice in the Notícias newspaper on 02/10/13 and disclosure by the Internet (website: http://www.impacto.co.mz). It was translated into the local language (Kimwani) and posted to the Nkutanos, a popular newspaper found in the local communities. Furthermore, a team of the Community Liaison Office (CLOs) for the Project undertook community information and awareness campaigns in order to cause the information to reach the widest number of people possible.

Proof of publication of the notices appears in *Appendix B* of this report.

Letters of Invitation Sent Out

Distribution of personalized letters of invitations were submitted to all the I&AP's on the project database, by post, e-mail and fax. Confirmation of receipt was done through telephone where necessary (see *Appendix C*).

For the meeting at the district level, a letter of invitation addressed to the Administrator was sent out, and the remaining participants (members of the District Government living in the capital and the members of the Local Council of the Administrative Post of Palma) were invited by the Administrator. The Administrator was asked to extend the invitations so as to include relevant entities at his own discretion, as well as other interested parties.

All letters of invitation were accompanied by the Information Document the (NTS for the EPDA and for the EIS).

3.3 CONVENING PUBLIC CONSULTATION MEETINGS

The PP process extends throughout the EIA process. It creates a forum for discussion and negotiation between the parties involved in the development process, enables impartial discussion and analysis of the impacts that can be caused by an activity, in which matters of an environmental, and socio-economic nature as considered as a whole, helping to achieve the sustainable development of the EIA.

Involvement of I&AP's, including communications with the local community, is a critical part of the EIA process, and for this reason meetings were held at key stages of the process to ensure that the concerns and comments of the interested parties were covered in the EIA. Meetings were held with interested parties during the EPDA and EIS phases, as well as meetings with focus groups at the start of the impact evaluation phase, and community meetings towards the end of the process.

Further details about the public consultation meetings are provided in *Section 4.*

The public consultation meetings held at the central, provincial, district and community level during the EPDA and EIS phases of the project are outlined in the table below.

Table 4.1 Public Consultation Meetings Held

Phase	Type of Meetings	Level	Date	Location
	Meeting - District Consulting Council	District	09-27-2011	Palma
EPDA	Open public meeting	Provincial	09-28-2011	Pemba
	Open public meeting	Central	09-30-2011	Maputo
	Focus group meeting - Provincial Government	Provincial	01-30-2012	Pemba
	Focus group meeting – Tourism operators	Provincial	01-30-2012	Pemba
	Focus group meeting - Central Government	Central	02-01-2012	Maputo
	Open public meeting	Central	09-09-2013	Maputo
	Focus group meeting - Tourism and Fisheries	Provincial	09-10-2013	Pemba
	Meeting - District Consulting Council	District	09-11-2013	Palma
EIS	Open public meeting	Provincial	09-12-2013	Pemba
	Open public meeting	Community	10-17-2013	District of Palma – Seat of the Village of Maganja (including Villages of Nfunzi, Kibunji, Mpaia and Nsemo)
	Open public meeting	Community	10-17-2013	District of Palma – Seat of the Village of Quitupo (including Villages of Milamba 1, Milamba 2, Barabarane and Simo)
	Open public meeting	Community	10-18-2013	District of Palma – Seat of the Village of Senga (including Villages of Macala, Mangala, Patacua and Quitunda)

A total of 13 public consultation sessions were held as part of the EIA public participation process between the District of Palma, Pemba and Maputo.

Public Consultation meetings were facilitated by IMPACTO. The public consultation team consisted of the EIS Team (ERM and IMPACTO) and by the Proponents (AMA1 and eni). Attendance register sheets were signed by participants at the beginning of each meeting (see *Appendix D*).

Table 4.2 shows the level of participation by I&AP's and their contributions at the meetings.

Table 4.2 Participants by Meeting Place and Number of Contributions

Phase	Type of Meeting	Location	No. of Participants	No. of Contributions
EPDA	Meeting - District Consulting Council	Palma	36	13
	Open public meeting	Pemba	44	40
	Open public meeting	Maputo	61	15
EIS	Focus group meeting - Provincial Government	Pemba	25	14
	Focus group meeting – Tourism operators	Pemba	8	13
	Focus group meeting - Central Government	Maputo	21	15
	Open public meeting	Maputo	85	36
	Focus group meeting - Tourism and Fisheries	Pemba	6	13
	Meeting - District Consulting Council	Palma	85	26
	Open public meeting	Pemba	64	31
	Open public meeting	District of Palma – Seat of the Village of Maganja	Representatives of the communities and local population (see photos in section 4.4. below)	13
	Open public meeting	District of Palma – Seat of the Village of Quitupo	Idem	25
	Open public meeting	District of Palma – Seat of the Village of Senga	Idem	16

Both during the EPDA and the EIS phases, meetings at the central and provincial levels were held in Portuguese, as well as English by means of simultaneous translation from Portuguese to English or vice versa. The exception to this was the focus groups, which were carried out only in

Portuguese. At the district-level meetings, a translator was present who translated all information conveyed into Kimwani, the local language; so that all participants could understand the information being shared and participate actively to ensure they could then transmit the information to the other members of their communities.

PowerPoint presentations were prepared and given for each of the meetings by both the EIS Team and the Proponents. Presentations were prepared taking into consideration the participants of each meeting and the most relevant information to be disseminated with such an audience. For example, the district-level meeting presentations were structured to be simple and clear, using non-technical language and illustrations where possible to facilitate understanding by the audience.

At the community level however, presentation was done by means of posters. In addition, the non-technical summaries (NTS) of the Draft EIS Report were made available at the all public meetings for the EIS phase.

At each of the meetings, the Proponents typically introduced themselves, and presented the project description. The EIS Team then presented the findings of the EIS (ie summaries of the Draft EPDA and Draft EIS reports), including the public consultation process (as described in Section 2). This is summarized in *Table 4.3*.

Table 4.3 Presentations at the EPDA and EIS Phases

Phase	Information presented by Proponents:	Information presented by EIS Team:
EPDA	*Presentation meetings for the Draft EPDA Report*	
	• AMA1's activities globally and in Mozambique • The success of offshore exploration in Area 1 • Main elements of the proposed project and the challenges for locating the gas pipeline route • Examples of LNG plants • Timelines envisioned for plant operation	• Criteria and various stages of the site selection process • Potential biophysical and socio-economic impacts expected during the construction and operation phases of the project • Specialist studies to be carried out in the EIA phase • Conclusions of the EPDA
EIS	*Information meeting with Focus Groups*	
		• EIA status report • Information about the project • Specialist studies underway • Activities undertaken as part of the EIA process in 2012 • Resettlement process
	Presentation meetings for the Draft EIS Report	
	• Location of activities currently underway • Discovery of gas offshore • Site selection for the LNG plant General overview of the project development process • Inclusion of partners • Outline of facilities work • Development Plan Proposal - offshore; onshore; and near shore • Work schedule of activities • Basic principles of the project	• Study area • Evaluation of environmental and socio-economic, unplanned events and cumulative impacts – classification of significance • Summary of key environmental impacts offshore, near the coast and onshore and mitigation • Summary of socio-economic impacts and mitigation • Summary of cumulative impacts and mitigation • Summary of unplanned events and mitigation • Environmental and Social Management Plan (ESMP)

At the district level meetings, the respective Administrator was invited to make the official opening and closing.

Preparatory or dry-run meetings were held before each round of meetings with the EIS Team and Proponents in attendance. Before the event, preparatory work was also carried out with translators to familiarize them with the technical terms to be used during the meetings.

Following presentations, time was allocated for question and answer sessions to provide opportunity for all participants to address questions / concerns to the EIS Team or Proponents, and / or share information. Minutes were taken and all the questions raised, as well as the responses provided by the EIS

Team and the Proponents, were recorded in tables known as the Comments and Response Tables (CRT). These are included in the *Appendix E* of this report.

The meeting facilitator provided the website links for downloading the reports prior to closure of the meetings. The dates and contact details for submitting comments on the reports were also provided. All written comments received prior to or following the public consultation meetings by I&AP's are included in *Appendix F*.

Details and photographs of each of the meetings held during the EPDA and EIS phase are presented below.

4.1 EPDA PHASE - PUBLIC CONSULTATION MEETINGS

4.1.1 *Meeting – District Consulting Council, Palma*

Date	Time	Location	No. Of Participants	No. of Contributions
09-27-11	09:00 - 12:00	The Palma Club	36	13
Participants				
District Government				
Members of the Local Advisory Board of the Palma Administrative Post				





4.1.2 *Open Public Meeting, Pemba*

Date	Time	Location	No. of Participants	No. of Contributions
09-28-11	09:00 - 12:00	Pemba Beach Hotel	44	40
Participants				
Provincial Government				
Delegations from government institutions				
Local environmental groups, local and international NGOs				
Teaching and research institutions				
Tour operators				
Social communication bodies				





4.1.3 *Open Public Meeting, Maputo*

Date	Time	Location	No. of Participants	No. of Contributions
30-09-11	09:00 - 12:00	Hotel Girassol	61	15
Participants				
Central Government				
Government Institutions				
Environmental and development NGO's				
Teaching and research institutions				
Social communication bodies				




4.2 *EIA Phase - Focus Group Meetings*

4.2.1 *Focus Group Meeting - Provincial Government of Cabo Delgado*

Date	Time	Location	No. of Participants	No. of Contributions
01-30-12	08:30 - 11:30	DPOPH Meeting Room	25	14
Participants				
Provincial Government				





4.2.2 *Focus Group Meeting - Tourism Operators in Cabo Delgado*

Date	Time	Location	No. of Participants	No. of Contributions
30-01-12	08:30 - 11:30	Pemba Beach Hotel	8	13
Participants				
Tour operators				



4.2.3 *Focus Group Meeting - Central Government*

Date	Time	Location	No. of Participants	No. of Contributions
01-02-12	09:00 - 12:00	Girassol Hotel	21	15
Participants				
Central Government				



4.3 EIA PHASE - PUBLIC CONSULTATION MEETINGS

4.3.1 *Open Public Meeting, Maputo*

Date	Time	Location	No. of Participants	No. of Contributions
09-09-13	09:00 - 12:00	VIP Hotel Maputo	85	36
Participants				
National Government – Ministries and National Directorates				
Government Institutions				
Environmental and development NGO's				
Teaching and research institutions				
Social communication bodies				
Private companies				
Civil society				





4.3.2 *Focus Group Meeting – Tourism and Fisheries*

Date	Time	Location	No. of Participants	No. of Contributions
09-10-13	11:00 - 12:30	Kauri Hotel	6	13
Participants				
Provincial Government – Fisheries				
Tour operators				





4.3.3 *Meeting - District Consulting Council, Palma*

Date	Time	Location	No. of Participants	No. of Contributions
09-11-13	09:00 - 12:00	The Palma Club	85	26
Participants				
District Government				
Members of the Local Advisory Board of the Administrative Post of Palma				
Local environmental groups and environmental and developmental NGOs				
Social communication bodies				
Private companies				



4.3.4 *Open Public Meeting, Pemba*

Date	Time	Location	No. of Participants	No. of Contributions
09-12-13	09:00 - 12:00	Pemba Beach Hotel	64	31
Participants				
Provincial Government				
Delegations of government institutions				
Associations and local environmental groups				
Environmental and local and international development NGOs				
Teaching and research institutions				
Social communication bodies				
Private companies				
Civil society				



4.4 EIA PHASE - COMMUNITY MEETINGS IN THE AFUNGI PENINSULA

4.4.1 *Open Public Meeting - Villages of Maganja, Nfunzi, Kibunji, Mpaia and Nsemo*

Date	Time	Location	No. of Participants	No. of Contributions
10-17-13	14.00-16.30	Seat of the Village of Maganja	Representatives of the communities and local population (see photos below)	13
Participants				
Villages of Maganja, Nfunzi, Kibunji, Mpaia and Nsemo				



4.4.2 *Open Public Meeting, Villages of Quitupo, Milamba 1, Milamba 2, Barabarane and Simo*

Date	Time	Location	No. of Participants	No. of Contributions
10-17-13	9.30 -12.30	Seat of the Village of Quitupo	Representatives of the communities and local population (see photos below)	25
Participants				
Villages of Quitupo and Milamba				



4.4.3 *Open Public Meeting, Villages of Senga, Macala, Mangala, Patacua and Quitunda*

Date	Time	Location	No. of Participants	No. of Contributions
10-17-13	09.00 -12.05	Seat of the Village of Senga	Representatives of the communities and local population (see photos below)	16
Participants				
Villages of Senga, Macala, Mangala and Patacua				



5 RECORD OF ISSUES DISCUSSED IN THE PUBLIC CONSULTATION MEETINGS

The opportunities for I&AP's to provide questions, comments and suggestions were provided throughout the EIA process. In particular, requests were made by the EIS Team at the following stages:

- Following distribution of information documents (NTS of the EPDA and the EIS reports);
- On release of the draft EPDA and EIS reports;
- At public consultation meetings held at the central, provincial, district and community level (Maputo, Pemba and Palma) – verbally or through written comments and comment record sheets distributed during the meetings; and
- Throughout public consultation periods - opportunity to make comments directly to the 'Public Consultation Office' at IMPACTO's office in Maputo.

A record of questions, contributions and comments received from I&AP's throughout the consultation meetings and the consultation period, and the respective responses provided by the EIS Team and the Proponents have been captured in CRT's.

5.1 COMMENTS AND RESPONSES TABLES (CRT'S)

Each of the questions, suggestions, critiques, concerns, comments and requests for clarification / further information raised by the participants at the public consultation meetings, and the respective responses provided by the EIS Team and the Proponents, were compiled into CRT's.

A CRT for each meeting held is found in *Appendix E*. The CRT's do not present a transcript of the questions and responses raised, but rather a summary of the questions made and the respective responses provided. Following the meetings, where the EIS Team felt that responses could be improved or more detail provided, this was done to make them clearer.

At a high level, key issues raised by I&AP's relate to:

- Displacement (physical and economic).
- Land acquisition (process followed and communication).
- Job creation and training for local communities.
- Economic benefits and community development.
- Impacts on livelihoods (tourism, fishing and agriculture).

- Impacts on biodiversity and ecosystems (marine and terrestrial).
- Impacts on health, safety and security.
- Implementation of mitigation and management measures (effectiveness of mitigation or capacity of authorities to monitor).

5.2 COMMENTS RECEIVED

Written comments were obtained from the distribution of Comment Register Sheets to record comments, distributed during the public consultation meetings. Some written comments were turned in by the participants at the end of the meetings and others were sent to the Public Consultation Office, located at IMPACTO's offices in Maputo, by fax and / or e-mail. Both the Comment Recording Sheets and the comments submitted to the Public Consultation Office can are found in *Appendix* F.

All comments sent to the Public Consultation Office were included in the written CRT's in *Appendix F*. These were analyzed and answered by the EIS Team with input from the Proponents where applicable. Any issues deemed pertinent and relevant to the EPDA and EIS were addressed and the reports were updated.

The public comment period or the period allocated for receiving questions and comments was 30 days. This period begins fifteen days before meetings are held, on publication of advertisements and release of the notices (with the places where reports could be consulted) and with the distribution of the letters of invitation to meetings (along with the NTS's). A period of 15 days following meetings is allocated to allow people to submit any further comments.

The Draft EIS Report was originally made available for public comment between 23 August and 27 September 2013. At the request of MICOA (following request from NGO's), the commenting period was extended by approximately one month to, 31 October 2013. This was to provide I&AP's with additional time to effectively review the Draft EIA Report given the documents size and complexity.

APPENDICES OF THE PUBLIC PARTICIPATION REPORT

SCOPING (EPDA) AND ENVIRONMENTAL ASSESSMENT (EIS) PHASES

APPENDIX A

LISTS OF THE PROJECT INTERESTED AND AFFECTED PARTIES (I&AP’s)

AMA1 - MOZAMBIQUE GAS DEVELOPMENT PROJECT, CABO DELGADO PROVINCE

TABLE: LIST OF I&AP's FROM MAPUTO – CITY AND PROVÍNCE OF MAPUTO

I&AP's Group	Company / Institution	Name	Position	Address	Telephone	Fax	Celular	E-Mail
Ministers	**CENTRAL GOVERNEMNT**							
	Ministério dos Recursos Minerais	Esperança Bias	Ministra	Av. Fernão de Magalhães, 34, 1º Andar	21314843	21320620	823125030	
		Mário Marques	Assessor				821530580	mario.marques@mirem.gov.mz
	Ministério para a Coordenação da Acção Ambiental	Alcinda Abreu	Ministra	Rua de Kassuende, 167	21492403	21496108	823063020	reinaldo.mendiate@micoa.gov.mz
	Ministério das Pescas	Víctor Borges	Ministro	Rua Marquês de Pombal,285	21357100	21325087	823074150	daf@mozpescas.gov.mz
	Ministério do Turismo	Carvalho Muária	Minitro	Av. 25 de Setembro, 1018	21306210	21306212		
	Ministério da Indústria e Comércio	Armando Inrouga	Minister	Praça 25 Junho, 300, 8º	21352600	21352669		info@mic.gov.mz
		Carlos	AMA 1 SC member					
	Ministério da Agricultura	José Pacheco	Ministro	Praça dos Heróis Moçambicanos	21460011/6	21460055		
	Ministério da Planificação e Desenvolvimento	Aiuba Cuereneia	Minister	Av. Ahmed S. Touré, 21	21495477	21495477	823024993	mpdinf@mpd.gov.mz
		Jonas Tembe	AMA 1 SC member					jtembe@mpd.gov.mz
	Ministério dos Transportes e Comunicações	Paulo Zucula	Ministro	Av. Mártires de Inhaminga, 336	21430152		823106140	
		Ambrósio Sitoe	Director				828600470	ambrosioadolfo@yahoo.com.br, f.gemo@yahoo.com.br
	Ministério do Trabalho	Helena Taipo	Ministro	Av. 24 de Julho, 2351	21428301	21421881		
		Alcino Dias	Assessor	Av. 24 de Julho, 2341, 1º			828832460	alcindias@yahoo.com.br
	Ministério da Energia	Salvador Namburete	Minister	Av. 25 de Setembro, 1218, 3º	21303265	21313971		

		Jorgina Manhengane	Advisor for Fuel Area (AMA 1 SC Member), Assessora do Ministro				82 3275350	jfm@me.gov.mz, jorginam@yahoo.com,
	Ministério das Obras Públicas e Habitação	Cadmiel Muthemba	Ministro	Av. Karl Marx, 606	21430028	21421369		
		Calado Ouana	Director of Planning (AMA 1 SC member)				82 3115750	couana@ane.gove.mz
	Ministério das Finanças	Manuel Chang	Ministro	Praça da Marinha Popular	21315000	21306261		
		Roberto Hamilton de Sousa	AMA 1 SC member					
	Ministério da Educação	Augusto Luís	Ministro	Av. 24 de Julho, 167	21492006	21492196		
National Directorates	Governo da Província de Maputo	Maria Elias Jonas	Governadora	Praça do Município, 152, Matola	21720440	21720440		maria.jonas@maputo.gov.mz
	Conselho Municipal da Cidade de Maputo	David Simango	Presidente	Praça dos Trabalhadores				
	Direcção Nacional de Avaliação de Impacto Ambiental	Rosa Cesaltina Benedito	Directora	Av. Acordos de Lusaka, 2115	21466245	21466245	827505955	cesaltin@gmail.com, igasheva@km.ru, ronaife@yahoo.com.br
		Josefa Jussar	Chefe de Departamento de LA (AMA 1 SC member)	Av. Acordos de Lusaka, 2115			82 4304070	josefajussar200@yahoo.com.br, magaya9@yahoo.com.br, frosana@gmail.com
	Direcção Nacional de Gestão Ambiental	Anselmina Liphola / Sidónio Contage	Directora / Técnico	Av. Acordos de Lusaka, 2115	21465622	21465847		mualymz@yahoo.com.br, sidocontage2008@yahoo.com.br, almeidaalmeid@yahoo.com.br
	Direcção Nacional de Planeamento e Ordenamento Territorial	Isabel Senda, Inês Santos	Directora / Técnica	Av. Acordos de Lusaka, 2115	21485275	21469210		floramole2002@yahoo.com, lintfe@hotmail.com
	Projecto de Gestão de Biodiversidade Marinha e Costeira			Av. Acordos de Lusaka, 2115	21465626			
	Conselho Nacional de Desenvolvimento Sustentável	Jacinta Carlos	Secretaria Executiva	Av. Acordos de Lusaka, 2115	21466971			
	Direcção Nacional de Áreas de Conservação (Mitur)	Francisco Pariela		Av. 25 de Setembro, 1018, r/c	21303650	21303633	827493500	

		Oraca Elias Guambe	AMA 1 SC member					
	Direcção Nacional de Planificação e Cooperação (Mitur)			Av. 25 de Setembro, 1018,1º	21303624			
	Direcção Nacional do Comércio							
	Direcção Nacional da Indústria	Eriksson Duarte	Técnico	Av. Josina Machel, 57, 1º / Av. 25 de Setembro, 1502	21327892		822923740	erikssonduarte@gmail.com
	Direcção Nacional do Ensino Técnico e Vocação Profissional	Gilberto Antero Botas	Director/AMA 1 SC member	Av. 24 de Julho, 167, 7º andar	21490192		82 3150980	gilberto.botas@mined.gov.mz, luis.tembe@mec.gov.mz
	Direcção Nacional de Serviços Agrários			Praça dos Heróis Moçambicanos	21460195			
	Direcção Nacional de Terras e Florestas			Av. Josina Machel, 537	21302555	21321804	823163980	dinatef@yahoo.com
	Direcção Nacional de Transportes de Superfície	Pedro Miguel Paulino- Director		Av. Mártires de Inhaminga, 336, 4º, no M. Trans. Comun.	21305832	21305832	821398510	filipemuejo@yahoo.com.br
	Direcção Nacional de Cooperação e Estudos - Min Trabalho	Eduardo Naftal Chimela	Director				82 33 76 420	edwardochimela@yahoo.com
	Direcção Nacional do Turismo	Jorge Guambe / Eduardo Zuber		Av. 25 de Setembro, 1503, 3º	21313759	21313758		turismo@mitur.gov.mz, edrzuber@gmail.com, gilbertohunguana@yahoo.com.br
	Administração Nacional de Pescas	Armando Cumbane		Rua Consiglieri Pedroso, 347, 1º/5º	21431266	21320335	822526970	ajocu@hotmail.com
	Direcção Nacional de Combustíveis	Pilona Chongo	Directora Nacional Adjunta	Av. 25 de Setembro			825144905	pilona.chongo@yahoo.com.br
	Direcção Nacional de Geologia	Armando Manjate	Técnico de Geologia	Praça 25 Junho, 380	21312082	21429216		dngeologia@teledata.mz
	Direcção Nacional de Minas	Ercília Balengo	Técnica Ambiental	Praça 25 Junho, 380	21320024	21427121		balango75@yahoo.com.br
Government Institutions	**Supervisory and Subordinate Institutions**							
	Instituto Nacional de Petróleo	Isabel Chuvambe, Imelda Marques	Administradora (1)	Av. Fernão de Magalhães, 34, 1º Andar	21308906, 21320935			isabel.chuvambe@inp.gov.mz, nataliacamba@inp.gov.mz, imelda.marques@gmail.com
		Arsenio Mabote	Chairman				82 30 08 210	arsenio.mabote@inp.gov.mz

Empresa Nacional de Hidrocarbonetos (ENH)	Suraia Imussa	HSE Manager	25 de Setembro			824308420	suraia-imussa@enh.co.mz
Instituto de Desenvolvimento de Pesca de Pequena Escala (IDPPE)	Arménio Silva, Leonor Machiana	Técnica	Av. da Marginal, 141/8 / Rua Tenente General Osvaldo Tazama	21490807	21498812	825365557	idppe@idppe.org, mamatyigon@gmail.com
Instituto Nacional de Investigacao Pequeira (IIP)	Ana Paula Santana Afonso / Emídio André / Manuel Taque	Directora / Técnico	Av. Mao T Tung, 389	21490307	21492112	824922690	erandre01@hotmail.com, M.Taque@hotmail.com
Administracao Maritima de Maputo (ADMAR)	Álvaro Cabral	Administrador Marítimo Adjunto	Rua Marques Pombal, 295	21328502		824380770	
Instituto Nacional de Hidrografia e Navegacao (INAHINA)							
Instituto Nacional do Mar e Fronteiras (IMAF)	Miguel Alberto Chissano		Av. Ahmed S. Touré, 61, 6º	21485704	21485707	823116030	marfront@tropical.co.mz
Instituto Nacional da Marinha (INAMAR)	António Ângelo Jopela; Domingos Gomes	Director de Serviços (2)	Rua Marques Pombal, 279	21301963	21324007	823011480	inamar@zebra.uem.mz
Instituto Nacional de Meteorologia (INAM)	Árabe Arcanjo		Rua Mukumbura, 164	21490064	21491150		mozmet@inam.gov.mz
Conselho Nacional de Desenvolvimento Sustentável (CONDES)	Issufo Ivo	Técnico	Av. Emílio Daússe, 82, 1º andar	21328468	21328470		issufojuma2003@yahoo.com.br
Fundo de Energia (FUNAE)	Miquelina Menezes, Nélsia Manhique	PCA, Técnica Ambiental	Rua da Imprensa, Pr.33 andares, 256, 6º	21304717	21309228	82216550	funae@funae.co.mz, fenergia@zebra.uem.mz, nelsiamanhique@funae.co.mz
Centro de Promoção de Investimentos (CPI)	Dique Bacar, Belarmina Capitine	Analista de Projectos / Coordenadora do SDN	Rua da Imprensa, Prédio 33, 332, r/c	21313295, 21313310	21313325	823062320	cpi@cpi.co.mz, amacamo@cpi.co.mz,Mmendonca@cpi.co.mz, iloforte@cpi.co.mz, dbacar@cta.co.mz, bcapitine@cpi.co.mz
Portos e Caminhos de Ferro de Moçambique		PCA	Praça dos Trabalhadores	21430894	21430903	823193770, 823179340	retagi@cfmnet.co.mz, adfondo@tvcabo.co.mz
Instituto de Investigação Sócio-Cultural (ARPAC)			Rua do Bagamoyo, 201	21431366	21328621		arpac@tvcabo.co.mz
Agencia do Zambeze	Armindo Manhiça	Técnico	Av 24 de Julho, Predio do INSS			82-3298170	amanhic2000@yahoo.com

	Instituto Nacional de Gestão de Calamidades (INGC)			Rua da Resistência, 1746, 10º	21414075			
Companies	**Private/Public Entities in the na Area of Trade in Hydrocarbons**							
	Empresa Nacional de Hidrobarbonetos (ENH)	Nelson Ocuane, Fernanda Cossa	PCA, Engª HSE	Av. 25 de Setembro, 270, 1º andar (Time Square)	21302910	21324808		enhexplo@virconn.com, fernanda_khossa@hotmail.com
	Petromoc e Sasol			Av. 25 de Setembro, Edif JAT I, 420, 2º andar	21360278, 21306301	21301810, 21328381	823067050	Marta.henriques@sasol.com, hmadeira@pess.co.mz
	Eni East Africa, SPA	Chiara Cerruti;	HSE & Community Investment Manager	Av. Julius Nyerere, 3504	21497221		843025136	chiara.cerruti@enimozambique.eni.it
		Cristiano Salino	General Manager				843213211	
	SASOL			Av. 25 de Setembro, Edif JAT I, 420, 2º andar	21 357 437	21301810, 21328381, +27 11 219 0422	823067050, 82 155 7630	Marta.henriques@sasol.com, hmadeira@pess.co.mz
	STATOIL	Helge Håland	Representante em Moçambique	Av. 25 de Setembro, 270, Edif. Time Square, 2º Andar; Escritório 19			84 33 77 890	HGH@statoil.com, HEIME@statoil.com
	Petronas Carigali Mozambique			Av. 25 de Setembro, 1230, BI 5, 6º andar	21302409	21302409		tania.andrade@petronas.co.mz
NGO´s and Academic and Research Institutions	**Environmental NGO's**							
	Justiça Ambiental	Daniel Ribeiro		Rua de Marconi, Prédio 110, 1º andar	21496668			daniel@ja.org.mz
	CTV - Centro Terra Viva	Alda Salomão, Raquel Fernandes		Rua D, 27, Bairro da Coop			825201039	cristinammlouro@gmail.com, rfernandes@ctv.org.mz, pascoaviola@hotmail.com
	UICN - União Mundial para Natureza	Roberto Zolho		Av. Francisco M.Castro, 23				robertoz.iucn@tvcbo.co.mz
	Banco Mundial	José Chembeze		Av. Kenneth Kaunda, 1224				jchembeze@worldbank.org
	WWF	Britt Zolho		Rua Macombe Macossa, 213, Sommershield	21483121	21490970	823122250	wwfmoz@wwf.org.mz, brzolho@www.org.mz, lmuaves@wwf.org.mz
		Cláudia Manjate					827384631	cmanjate@wwf.org.mz

Livaningo	António Reina (Dir), Sheila Rati	Director / Oficial de Recursos Naturais	Rua Olivença, 20, 1º andar	21417610	21314439		reina@virconn.com, bongek97@gmail.com
Fórum para a Natureza em Perigo (FNP)	José Zacarias (Dir.Adj)		Rua da Concórdia, 15, 1º andar, flat 2			823065823 843181998	fnp@virconn.com, jm.zacarias@tdm.co.mz
Development NGO's							
ADEL – Agência de Desenvolvimento Económico Local	Fumela Dimas (Presidente)		Rua Sofala, 1067, Matola	21783363			adelmaputo18@gmail.com
CARE Moçambique			Av. Mártires de Mueda, 596	21492064	21492077	823259460	carem@care.org.mz
Cruz Vermelha de Moçambique	Americo Ubisse	Secretario Geral	Av. Agostinho Neto, 284	21485964		823062932	americo.ubisse@redcross.org.mz
OXFAM			Rua Pereira Marinho, 102	21487587			
Fundação para o Desenvolvimento da Comunidade /FDC)			Av. 25 de Setembro, Edif. Time Square Bl 2, 2º	21300810			
Agência Adventista de Desenvolvimento e Recursos Assistenciais (ADRA)			Av. Eduardo Mondlane, 2091	21304422	21320487	823163140	adramozambique@adra.org.mz
KULIMA - Organismo para o Desenvolvimento Socioeconómico Integrado	José Chambal	Técnico de Projectos	Av. Karl Marx, 1452, r/c	21321510			chambalj@gmail.com
Associação de Naturais, Amigos e Simpatizantes de Cabo Delgado (CD em Movimento)	Eduardo Amade Zuber, Jorge Muanahumo	Director de Planifiação (2)	Ministério da Função Pública, Av. 10 de Novembro, 110	21780449		824841030 / 823049775	muanahumo@hotmail.com
MUGEDE- Mulher, Genero e Desenvolvimento	Helio Ernesto	Oficial de Projectos Comunitários	Av Amilcar cabral N 903			82-3977767	hodivage@hotmail.com
KEPA - Serviços de Cooperação	Humberto Ossemane	Oficial de Programas	Rua Simões da Silva N 62			82-3051229	humberto.ossemane@kepa.fi
Iniciativa Moçambicana para a Boa Governação	Amadeu Cossa, Stiven Ferrão	Ponto Focal na Plataforma	Av. 24 de Julho			82-3843954	amadeucossa@yahoo.com.br, stivenferrao@yahoo.com.br
IMPROG	Rolando Cuna	Activista	Av. 24 de Julho			82-2427400	
	Sergio Machavae	Activista				82-5724982	

	GTZ – Cooperação Técnica Alemã			Av. Francisco O Magumbwe, 976	21491245			
	Academic and Research Institutions							
	Universidade Pedagógica			Av. 24 Julho/Clinica 222			823854060, 845732210, 824195370	helderguilamba@yahoo.com.br, vdchichambe@yahoo.com.br, dercioluisroia@yahoo.com.br
	Universidade Eduardo Mondlane (UEM) - Depto de Biologia	Director		Campos Universitário			823133680	adriano@zebra.uem.mz
	Universidade Eduardo Mondlane (UEM) - Depto de Geologia	Director						massingue@uem.mz
	Museu de História Natural - Universidade Eduardo Mondlane	Lucília Chuquela	Directora	Praça Travessia do Zambeze	21485401			bentomcarlos@yahoo.com.br, assanogi@yahoo.com.br
	Universidade Técnica de Moçambique	José Luís Cabaço - Reitor		Av Alberto Lithuli, 418/438	21302116	21302107	823216700	rmara@udm.ac.mz
	Instituto Superior Politécnico e Universitário	Lourenço do Rosário - Reitor		Av. Francisco O Magumbwe, 438	21497616			
	Instituto Superior de Ciências e Tecnologia de Moçambique			Av. Zedequias Manganhela, 322	21312014	21312993	823094130	isctem@isctem.com
Media	Jornal Notícias			Rua Joaquim Lapa, 55	21320119	21320575		noticias@teledata.mz
	Mediacoop - Jornal Savana			Av. Amílcar Cabral, 1049	21302402	21302402		savana@medcoop.uem.mz
	RTP África			Rua Pero Anaia, 248	21497343	21497347		rtp.a.moc@tvcabo.co.mz
	Soico - STV			Rua Timor Leste, 108	21315217	21301865		
	TVM			Av. 25 de Setembro, 154	21308117	21308122		tvm@tvm.co.mz
	Rádio Moçambique			Rua da Rádio				
	Correio da Manhã	Jaime Ubisse		Av. Filipe S. Magaia			828106890	jaimeubisse@yahoo.com.br
International Organizations	World Bank							
	IFC							
	UNDP							
	Fauna e Flora International (FFI)	Bruno Nhancale	Mozambique Country Representative				82-4755720	www.fauna-flora.org; bruno.nhancale@fauna-flora.org

Interested Parties	Aurecon	Hassane Abechande					82-6937020	habechande@gmail.com
	Girof Construções	Orlando Matos			21 460285			
	Status Consultores de Comunicação	Aunorio Simbine						status.energiamoz@status.co.mz
	Estudante - UP	Leonel Obet					82-7763190	
	Estudante-ISRI	Michel Belarmino					82-5508658	
	Gestor Ambiental -UP	Rogerio Daniel Chichambe		Av. 24 de Julho, 223			84-5732210	chichambe@hotmail.com
	ALSTOM	Fernando Carreira	Representante	Rua de Tchamba, 405	21-491765	21-491763	82-3168210	dido.carreira@tdm.co.mz
	Estudante - UEM	Helio Bambo						heliobambo@hotmail.com
	Estudante -UP	Gracinda Vilanculos					82-5976976	
	Estudante - UEM	Minaldo Remane					84-7455578	
	Estudante - ARPAC	Helena Ouana	Estudante				825657364	
	Estudante - ISRI	Michael Belarmino					82-5508658	mijobe5@yahoo.com.br
	Plataforma dos Recursos Naturais e Indústria Extrativa	Nathalie Grimoud, Ámina Pais	Oficial de Comunicação (2)	Rua Macombe Macossa, 213			823634566, 824004503	nathaliegrimoud@gmail.com, aminapais@gmail.com
	Fauna and Flora International	Michelle Pfaffenthaler	Technical advisor Mining		+264 64 406041	+264 886 25409	+264 81 208-9444	mish@mweb.com.na
	Corredor de Desenvolvimento de Nacala	Manuel Ruas	Gestor de Projectos	Av. Mártires de Inhaminga (MTC)			823089190	manuelruas@gmail.com
	MISAU	Dércio Zita, Ângela Uamusse	Engª Ambiental	Av. Eduardo Mondlane			820591910	derciozita@yahoo.com.br, celena79@gmail.com
	Consultor independente	Sean Nazeralli					82-3972000	snazerali@wwf.org.mz

AMA1 - MOZAMBIQUE GAS DEVELOPMENT PROJECT, CABO DELGADO PROVINCE

TABLE: LIST OF I&AP'S OF CABO DELGADO PROVINCE – CITY OF PEMBA & DISTRICT OF PALMA

I&AP's Group	Company / Institution	Name	Position	Address	Telephone	Fax	Celular	E-Mail
Provincial Government Autorities	**PROVINCIAL GOVERNMENT**							
	Governo da Província de Cabo Delgado	Eliseu Machava	Governador da Província	Av. 16 de Julho, Edif. Governo	272-20850			eliseu.machava@cdelgado.gov.mz
	Secretaria Provincial de Cabo Delgado	Lina Portugal	Secretaria Permanente	Av. 16 de Julho, Edif. Governo			82-3196166	portugallina@yahoo.com.br
		Ibraimo Carimo	Chefe Depto SP				82-8353670	icarimo@yahoo.com.br
	Direcção Provincial para a Coordenação da Acção Ambiental - DPCA	Policarpo Napica	Director Provincial	Rua Comércio, 54	272-20353		82-4394840	pnapica@gmail.com
		Augusto Assane	Técnico				82-6874330	hafsaa07@yahoo.com.br
		Delfina Mandanda	Técnica				82-8889700	sashamz@yahoo.com.br
	Direcção Provincial dos Recursos Minerais e Energia - DPREME / INP	Ramiro Nguiraze	Director/Delegado	Rua 1º de Maio, 740	272-21900	272-21900	82-9350250	ramiro.nguiraze@inp.gov.mz
	Direcção Provincial do Turismo - DPTUR	Francisco Loureiro	Director	Rua Comércio	272-21911	272-21912	82 3035939	dpturismo.cd@teledata.mz, floureiro26@gmail.com
		Célia Mtambo	Chefe Depto	Rua Geronimo Romero	272-21860	272-21860	84-9187171	celiazeliamz@yahoo.com.br
	Direcção de Áreas de Conservação - DNAC/DPTUR			Rua Comércio				
	Direcção Provincial da Indústria e Comércio - DIC	Mateus Matusse	Director	Av. Eduardo Mondlane, 239	272-20328	272-20328	824192370	dpiccd@teledata.mz
	Direcção Provincial da Agricultura - DPA	Mario Caetano Jone	Director	Av. Joaquim Chipande				
		Mariano Matias	Responsável da área da Fazenda do Bravio				82-6662410	mnavando62@yahoo.com.br
	Serviços Provinciais de Geografia e Cadastro / DPA	Achimo Francisco	Chefe dos Serv. Prov.					achimofranc@gmail.com, spgc-cd@teledata.mz, muitikile@gmail.com
	Serviços Provinciais de Florestas e Fauna Bravia /	Nicolau Moisés	Chefe dos Serv. Prov.	Av. 25 de Setembro	272-20156		826887250	nicolas_192001@yahoo.com.br

DPA							
Direcção Provincial da Mulher e Acção Social	Maria Argentina Simão	Directora	Rua Base Moçambique			829807890	argentina_simao@yahoo.com.br
Direcção Provincial das Obras Públicas e Habitação	Dinó Albino Coutinho	Director	Av. 25 de Setembro				dino_coutinho@yahoo.com.br
Direcção Provincial do Trabalho	João Muti Rodrigues	Director	Av. Eduardo Mondlane, 281			826902270	jomotim@yahoo.com.br
Direcção Provincial dos Transportes e Comunicações	Buanar	Director	Rua do Comércio			823614249	
Direcção Provincial de Saúde	Saozinha Paulo Agostinho	Directora	Av. 16 de Julho, Edif. Governo				
	Cesário Suege	Director Adjunto					cesarioaugusto.suege@yahoo.com.br
Direcção Provincial de Pescas	Carvalho Mário	Director	Rua Alberto Chipande	272-20666	272-21555; 272-21362	82-7925850	carvalhomar@hotmail.com
	Ruy Cossa	Chefe Depto				82-6600640	ruy.cossa.cdelgado@gov.net, rcossa@mozpesca.gov.mz
	Beatriz Izidoro	Técnica				82-9325290	bibiizidoro@yahoo.com.br
Direcção Provincial de Educação e Cultura	Graziela Tembe	Directora	Av. 16 de Junho, Bairro Cimento			82-3085710	grazielatembe@gmail.com
Direcção Provincial do Plano e Finanças	Raimundo Lázaro	Director Adjunto		272-20946	272-21414	826952680	patricioraimundo@yahoo.com.br
Instituto Nacional de Hidrografia e Navegação - INAHINA	Hilário Nhancale	Delegado Provincial	Rua do Comércio	272-20720		82-1562590	hilario.nhancale@gmail.com
Instituto de Desenvolvimento de Pesca de Pequena Escala - IDPPE	Albino Magona	Director	Av. Marginal, 7682	272-21626	272-21626	82-3010217	amagonaffp@yahoo.com.br
	Marie Sophie Amily					82-9905181	amily.sophie@gmail.com
Instituto Nacional de Investigação Pesqueira - IIP	Henriques Bustani	Delegado Provincial	Complexo da DPA			82-6527870	henbustani@gmail.com, limitedpires@yahoo.com.br
Base Naval de Pemba	Joanito Ismael Hacky		Av. da Marginal			84-7597607	
	Joao Chicango	Chefe das Operações				84-7597607	
Polícia Marítima	Tomás Badae	Chefe das Operações	Pemba			82-5526471	
Força de Guarda Fronteira / PRM	Francisco S. Paulo		Rua 1º de Maio			82-4622410	
Administração Marítima	Luís Manuel	Técnico	Pemba			82-5352365	
Porto de Pemba	Oreo Benzane		Rua do Porto		272-20453	82-6016710	
Instituto Nacional de Gestão de Calamidades - INGC (Delegação de CD)	Elizete Manuel	Delegada	Pemba	272-21904	272-21904	82-4468200	

	Instituto de Comunicação Social - ICS (Delegação de CD)	Minós Dausse	Técnico	Rua do Porto	272-21947	272-21892	82-3617376	dausseminos@yahoo.com.br
	Caminhos de Ferro de Moçambique - CFM / Porto de Pemba (Delegação de CD)	Ório Benzane	Delegado Provincial	Rua do Porto	272-20453		82-6016710	oriobenzane@gmail.com
	Administração Nacional de Estradas - ANE (Delegação de CD)	Ernesto Correia	Delegado	Av. Gen. Alberto Chipande, 1654	272-21152, 272-21194	272-21194	82-5643103	delega.cdelgado@teledata.mz
District Government Autorities	**DISTRICT GOVERNMENT**							
	Palma							
	Governo Distrital de Palma	Pedro Romão Jemusse	Administrador do Distrito	Palma-Sede			82-6563959 82 2842532	
	Secretaria Distrital de Palma	Abdul Piconês	SP	Palma-Sede			86-4021548	abdulpicones@gmail.com
	Serviços Distritais de Actividades Económicas de Palma	Constantino Munçule		Palma			82-4073500	
	Serviços Distritais de Planeamento e Infra-estrutura de Palma	Verónico Muicatar		Palma			82-7068160	
	IDPPE (Delegação Distrital)		Representante					
Afected Communities, Individual & Vulnerable Groups (Comunities of Fisheries, Women, Young)	Posto Administrativo de Quionga		Chefe do Posto	Palma				
	Posto Administrativo de Olumbi		Chefe do Posto	Palma				
	Aldeia de Nsenga		Líder da Aldeia	Palma				
	Aldeia de Quitupo		Líder da Aldeia	Palma				
	Aldeia de Maganja		Líder da Aldeia	Palma				
	Fundação Contra a Fome (Palma Branch)	Jordão Artur Choé		Palma				jchoe@fh.org
	Fisherman community (Palma)			Palma				
NGO´s and Academic and Research Institutions	**NGO's / ASSOCIATIONS / PROFESSIONALS ORGANIZATIONS / ACADEMIC AND RESEARCH INSTITUTIONS**							
	Parque Nacional das Quirimbas (WWF)	Mark Hoekstra, José Timana	Representante Provincial	Rua do Comércio, 202	272-21332	272-21332	823029251, 82-7219490	dreynolds@wwf.org.mz, jtimana@wwf.org.mz
		José Dias	Administrador				82-4617360	jodias@tdm.co.mz
	WWF	Luís Augusto	Executor de Projectos	Rua do Comércio, 202			82-3807480	laugusto@wwf.org.mz
		João Manuel					82-9722214	jmanuel@wwf.org.mz
	AMA - Associação do Meio Ambiente	Antonia Macanige		Rua do Porto, 1234	272-21415		82-6876100	antoniamacanige007@yahoo.com.br
		Hélio Abrijal	Gestor Comunicação				82-3887842	ama_helio.abrijal@gmail.com

FOCADE - Fórum das ONG's de Cabo Delgado	Imamo Mussa	Secretario do Conselho de Administração	Rua Comércio, 46, r/c			82-0265820	focade.pemba@tdm.co.mz
				272-20348	272-20348		focade@teledata.mz
	Lucia Jofrice					82-3035367	lucia.jofrice@kepa.fi
Médicos Del Mundo Espanha	Eduardo Bastos		Av. 25 de Setembro, 795	272-21509		82-4171340	bastoseduardo@hotmail.com
Liga dos Direitos Humanos de Pemba	Domingos Valentim		Rua Cª, 132	272-20083	272-20083	82-3893483	domingosjv@yahoo.com
	Virginia Jesus	Coordenadora		272-20082		82-6481590	marianomevirginia@yahoo.com.br
Associação Progresso	Consolata Mifoca		Rua Cemitério, 109, 1º	272-20934		82-6488490	progpemba@teledata.mz
Associação Moçambicana para o Desenvolvimento Rural			Av. Eduardo Mondlane, 824	272-21610			
Helvetas	Barbara Kruspan		Rua CI III, nº 2051 (Rua da Marginal)	272-21624 / 21415		82-7198100	barbara.kruspan@gmx.ch
Gecorena	Faquihe Saide Ali / Assane Simão da Silva		Rua Josina Machel	272-21386		82-5525969	faquihesaide@yahoo.com.br
Centro de Pesquisa do Ambiente Marinho e Costeiro - CEPAM	Hermes Pacule	Director	Av. Marginal, Bairro Chuíbo			82-3988020	hermespacule2004@yahoo.com.br
	Eugidio Gobo	Técnico				828976925	eugidiogobo@gmail.com
Fundação Aga Khan	Sonia Maciel	Directora Regional de Programas	Rua do Comércio	272-219718		82-3075770	sonia.maciel@akda.org
Fórum Terra de Cabo Delgado	Assane Simão da Silva	Coordenador Provincial	Pemba			82-6634490	assanedasilva@gmail.com
Fórum Pescadores da Baia	José Domingos		Pemba			823838593	
Fundação Contra a Fome	Alaice Omolo	Director do Projecto	Pemba			82-2503509	aomolo@fh.org
Agencia Espanhola de Cooperação Internacional para o Desenvolvimento	Cristina Esteban	Tecnica	Av 16 de Junho Edificio do Governo, DP Plano e Finanças	27-221614		826556035	cristina.esteban@aecid.org.mz
	Jesús Pérez	Consul Honorário		272-21614		82-3949865	jesus.perez@aecid.org.mz
Rani Resorts	Adelino Adamo Matola	Director RH	Av. Marginal,5421	272-21770	272-21767	843259390	rhmatola@pembabeach-hotel.co.mz
Organização da Sociedade Civil	José Domingos		Rua do Comércio (IDPPE)			823838593	
GMD - Grupo Moçambicano da Dívida	Manuel Mário	Coordenador Provincial	Av. 16 Junho			845947715	
Núcleo Provincial de Combate ao Sida	Sarangue Atnia		Av. 16 Junho	272-20183			
Iniciativa Local para o Desenvolvimento da Pesca	Isabel Ferreira	Coordenadora	Pemba			82-8501410	iniciativalocal.pemba@gmail.com

	Sustentável na Baía de Pemba							
	KARIBO - Associação dos Naturais e Amigos do Ibo	Imamo Mussa	Delegado				82-0265820	
	Gabinete do Direito Juridico da Mulher	José Paulino	Administrador	Bairro Cimento			82-7079056	josepaulino.cossa@gmail.com
	ADEL	Diamantino João		Rua do Comércio			82-6853054	
	União Provincial dos Camponeses	Augusto Rasse		Rua Eduardo Mondlane, 30			82-8596997	
	CTV - Centro Terra Viva	Énia de Sousa		Rua Capitão Curado, 1757			82-9856550	
	Universidade Católica de Moçambique	Lúcia Alberto	Docente	Av. 25 de Setembro	272-21969	272-21720	82-6070307	fgti.ucm@teledata.mz; fgti@ucmpemba.ac.mz, lucee52@yahoo.com.br
	Universidade Lúrio	Jorge Ferrão		Pemba				
		Isabel Marques da Silva						
Companies	STATOIL	Helge Håland	Representante em Moçambique	Av. 25 de Setembro, 270, Edif. Time Square, 2º Andar; Escritório 19			84-3377890	HGH@statoil.com, HEIME@statoil.com
		Alexandre Eynard	HSE Manager					alexandre.eynard@enimozambique.no.it
	Eni East Africa, SPA	Cristiano Salino	General Manager	Av. A. Tivane, 877			84-3213211	
Media	Rádio Moçambique	Canana	Delegado	Rua Josina Machel	272-21213	272-21213		rmpemba@teledata.mz; epcabodelgado@rm.co.mz
	Rádio Sem Fronteiras	Eleutério Silvestre		Rua 018	272-21315			radiosemfronteiras@tiscali.it
	Televisão de Moçambique (TVM)	Vicente Martins		Rua do Comércio	272-20938		82-5508707	tvmpemba@teledata.mz
	Jornal Horizonte	Buanamade Assane	Chefe da Redacção	Av. 7 de Abril, 373	272-21112	272-21112	82-6719060	horizonte.pemba@teledata.mz, buanamadeassane@gmail.com
	Jornal Diário de Moçambique					272-20535	82-8673090	
	Jornal Notícias	Jonas Wazik		Av. 25 de Setembro	272-20535	272-20535		
Tourism Operators	**HOTÉLS / RESORTS / LODGES**							
	Cabo Delgado Biodiversidade e Turismo (CDBT)	José Óscar Monteiro						
	Tecomaji, Lda	Guy Dobinson	Logistics & Administration				825529826	jkgtimbers@gmail.com

		Karen Shoeman	"				844069379	ilhatecomaji@gmail.com
	Pemba Beach Hotel	Alexandre Torrao		Av. Marginal, 5470, Praia de Wimbe	272-21770/90	272-21779		pembabeach@teledata.mz, pembabeach@raniresorts.com;
	Pemba Magic Lodge	Russell Bott					82-6862730	russellbott@yahoo.com.au
	D.E. Beach Resort Lda	Alberto Veleno Sanikkela	Director Adjunto	Pemba Marringuanha	27-229095/9148		82-4970790/84-4848100	welemosany@yahoo.com.br
	Vamizi Island Lodge / Brunswick Investment Services, Ltd.	Oscar Monteiro		Arquipélago das Quirimbas	272-21299		82-3001050	reservation@maluane.com ; oscarjom@yahoo.com;
		Ryan Pape	Vamizi-resident island manager				823050264	ryan.pape@vamizi.com
		Michael Gera					+44 20 7529 5360	
	Rongui Island Lodge							
	Cabo Delgado investment Lda. / Bruton Advisors Ltd.	Michael Gera	CEO	2nd Floor, 14 Bruton Place, London, W1J 6LX, UK	+447917 615800		84-6989238	mgera@brunswick-is.com, mgera@brutonadvisors.com, michael@michaelgera.com
	bluegreenplanning+design	Derek Chittenden	(Consultant CDI Lda)					derek@bluegreenplanning.com
	Quiramimbi Island	Tom Steenkamp, Alberto Velemune	Managing Director (?), Gestor Assistente				82-4970790	jake.tuggy@gmail.com, welenosamy@yahoo.com.br
	Ilha Metundo	Matteo Vaghi	Administrador	Av da Marginal - Pemba			84-3656361	matteo@metundo.com
	Miti, Lda / Ilha Vumba	Faruk Jamal		Av. 16 de Junho, Palma/Ilha Vuma	272-20082		82-3150900	
		Yussuf Adam						yussufmz@yahoo.com
		Zaide Abubacar	Director	EN106, Muxara, Pemba	26961161 / 26961038	27221920	82/848146946	zaideabubacar@yahoo.com
	Pemba Dive	Radiger Frank					826697050	pembadive@londolodge.com
	Guludo Beach Lodge	Amy / Neil		Parque Nacional das Quirimbas			82-7234470	
	Dawi Safaris / Kilaguni, Lda	Ester Ferreira						estermferreira@hotmail.com
		Russel		Praia de Wimbe			82-6862730	
Interested ans Affected Parties	OHIMYA, Consultoria e Projectos	Mário Jorge Rassul	Director	Av. Marginal, Maringanha			82-3069340	mario.j.rassul@gmail.com
	Mamari Tecle	Mamari Tecle Architectura Consultoria	Responsável	Rua 034 N 82			82-7021310	makkay10@hotmail.com

Arco Norte / Speed	Sérgio Uate	Coordenador	Pemba			82-4133410	sergiowate@gmail.com
Activa	Carolina Allany	Coordenadora				82-7361700	carolinaallany@yahoo.com.br
Conselho Comunitário de Pesca de Ruela -CCP-R	Jaime Mario Semedo	Presidente	Bairro Paquitequete			84-4056987	
GAK Lda.	Gulzar A. Karim		Palma (Forestry concession -FC)			823149420	
Companhia Indicos Lda	Pieter Jacobs		Praia de Wimbe	272-20102		82-6822700	cidivers@teledata.mz
Fauna and Flora International	Michelle Pfaffenthaler	Technical advisor Mining		+264 64 406041	+264 886 25409	+264 81 208-9444	mish@mweb.com.na
Cabo Delgado Investments Limitada (CDIL)	Oscar Monteiro, Michael Gera, Derek Chittenden						
Kaskazine	Genevieve		Pemba Beach Hotel	272-20371		82-3096990	info@kaskazine.com

APPENDIX B

NEWSPAPER AND RADIO ADVERTISEMENTS

EPDA PHASE

Anadarko
Moçambique Area 1, Lda

ENH
Empresa Nacional de Hidrocarbonetos de Moçambique

ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL.

Como parte desse processo de consulta à sociedade civil e para efeitos de apresentação do rascunho do relatório do **Estudo de Pré -Viabilidade Ambiental e Definição do Âmbito (EPDA) e Termos de Referência (TdR) para o EIA**, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas nas Cidades de Pemba e de Maputo e no Distrito de Palma. São convidadas todas as pessoas interessadas a participar nas reuniões a ter lugar nas horas e locais seguintes:

Distrito de Palma	Cidade de Pemba	Cidade de Maputo
Data: 27/09/11 Hora: 09:00 – 12:00 Local: Clube de Palma	Data: 28/09/11 Hora: 09:00 – 12:00 Local: Pemba Beach Hotel	Data: 30/09/11 Hora: 09:00 – 12:00 Local: Hotel VIP

Informa-se que exemplares do rascunho do EPDA e dos TdR estão disponíveis para consulta nos seguintes escritórios em Maputo: DNAIA, INP, Impacto e Anadarko, nas suas delegações em Pemba e na Administração do Distrito de Palma. Versões do EPDA e TdR em Português e Inglês também estão disponíveis no seguinte portal **http://www.impacto.co.mz**

A AMA1 designou a **Environmental Resources Management (ERM)** e a **Impacto, Lda** para efectuarem a Avaliação de Impacto Ambiental (AIA) do projecto.

Para se registar e para eventuais esclarecimentos queiram por favor contactar:

Sandra Fernades
IMPACTO, LDA
A. Mártires da Machava, 968
Tel. 258 21499636
Fax: 258 21493019
Cel. 82 3046650
E-mail: sfernandes@impacto.co.mz

ERM

impacto
Projectos e Estudos Ambientais

Anadarko
Moçambique Área 1, Lda

ENH
Hidrocarbonetos de Moçambique

ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

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Distrito de Palma	Cidade de Pemba	Cidade de Maputo
Data: 27/09/11	Data: 28/09/11	Data: 30/09/11
Hora: 09:00 – 12:00	Hora: 09:00 – 12:00	Hora: 09:00 – 12:00
Local: Clube de Palma	Local: Pemba Beach Hotel	Local: Hotel VIP

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Para se registar e para eventuais esclarecimentos queiram por favor contactar:

Sandra Fernandes
IMPACTO, LDA
Av. Mártires da Machava, 968
Tel. 258 21499636
Fax 258 21493019
Cel. 82 3046650
E-mail: sfernandes@impacto.co.mz
Maputo

ERM

Impacto
Projectos e Estudos Ambientais

Anadarko
Moçambique Área 1, Lda

ENH
Hidrocarbonetos de Moçambique

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ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL.

Como parte desse processo de consulta à sociedade civil e para efeitos de apresentação do rascunho do relatório do **Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito (EPDA) e Termos de Referência (TdR) para o EIA**, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas nas Cidades de Pemba e de Maputo e no Distrito de Palma. São convidadas todas as pessoas interessadas a participar nas reuniões a ter lugar nas horas e locais seguintes:

Distrito de Palma	Cidade de Pemba	Cidade de Maputo
Data: 27/09/11 Hora: 09:00 – 12:00 Local: Clube de Palma	Data: 28/09/11 Hora: 09:00 – 12:00 Local: Pemba Beach Hotel	Data: 30/09/11 Hora: 09:00 – 12:00 Local: Hotel Girassol

Informa-se que exemplares do rascunho do EPDA e dos TdR estão disponíveis para consulta nos seguintes escritórios em Maputo: DNAIA, INP, Impacto e Anadarko, nas suas delegações em Pemba e na Administração do Distrito de Palma. Versões do EPDA e TdR em Português e Inglês também estão disponíveis no seguinte portal: http://www.impacto.co.mz.

A AMA1 designou a **Environmental Resources Management (ERM)** e a **Impacto, Lda** para efectuarem a Avaliação de Impacto Ambiental (AIA) do projecto.

Para se registar e para eventuais esclarecimentos queiram por favor contactar:

Sandra Fernandes
IMPACTO, LDA
Av. Mártires da Machava, 968
Tel. 258 21499636
Fax 258 21493019
Cel. 82 3046650
E-mail: sfernandes@impacto.co.mz
Maputo

ERM

Impacto
Projectos e Estudos Ambientais

Anadarko
Moçambique Área 1, Lda

ENH
Hidrocarbonetos de Moçambique

ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL.

Como parte desse processo de consulta à sociedade civil e para efeitos de apresentação do rascunho do relatório do **Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito (EPDA) e Termos de Referência (TdR) para o EIA**, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas nas Cidades de Pemba e de Maputo e no Distrito de Palma. São convidadas todas as pessoas interessadas a participar nas reuniões a ter lugar nas horas e locais seguintes:

Distrito de Palma	Cidade de Pemba	Cidade de Pemba
Data: 27/09/11	Data: 28/09/11	Data: 30/09/1
Hora: 09:00 – 12:00	Hora: 09:00 – 12:00	Hora: 09:00 – 12:00
Local: Clube de Palma	Local: Pemba Beach Hotel	Local: Hotel Girassol

Informa-se que exemplares do rascunho do EPDA e dos TdR estão disponíveis para consulta nos seguintes escritórios em Maputo: DNAIA, INP, Impacto e Anadarko, nas suas delegações em Pemba e na Administração do Distrito de Palma. Versões do EPDA e TdR em Português e Inglês também estão disponíveis no seguinte portal: **http://www.impacto.co.mz**.

A AMA1 designou a **Environmental Resources Management (ERM)** e a **Impacto, Lda** para efectuarem a Avaliação de Impacto Ambiental (AIA) do projecto.

Para se registar e para eventuais esclarecimentos queiram por favor contactar:
Sandra Fernandes
IMPACTO, LDA
Av. Mártires da Machava, 968
Tel. 258 21499636
Fax 258 21493019
Cel. 82 3046650
E-mail: sfernandes@impacto.co.mz
Maputo

ERM

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Projectos e Estudos Ambientais

ANÚNCIO PARA SER DIVULGADO NA RÁDIO MOÇAMBIQUE

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

CONVITE PARA REUNIÕES

Em Dezembro de 2006 a Anadarko Mozambique Area 1 (AMA 1) e o seu parceiro Empresa Nacional de Hidrocarbonetos E.P. (ENH) assinaram um Contrato de Pesquisa e Produção de hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL.

A Environmental Resources Management (ERM) e a Impacto, Lda que foram contratadas para realizar o Estudo de Impacto Ambiental (EIA) do projecto, irão apresentar o rascunho do Estudo de Pré-viabilidade Ambiental e Definição do Âmbito (EPDA) e dos Termos de Referência (TdR) do EIA ao público. Assim, convidam-se pessoas interessadas a participar nas reuniões que terão lugar no Distrito de Palma no dia 27 de Setembro entre as 09:00 e as 12:00 horas no Clube de Palma e na Cidade de Pemba, no dia 28 de Setembro, entre as 09:00 e as 12:00 horas, no Pemba Beach Hotel.

Informa-se que exemplares do rascunho do EPDA e dos TdR estarão disponíveis para consulta nos seguintes escritórios em Maputo: DNAIA, INP, Impacto e Anadarko, nas suas delegações em Pemba e na Administração do Distrito de Palma. Versões do EPDA and TdR em Português e Inglês também estarão disponíveis no seguinte portal da internet: http://www.impacto.co.mz. Para eventuais esclarecimentos queiram por favor contactar a IMPACTO, LDA, pelo Telefone 21499636, Fax 21493019, Celular 82 3046650 ou E-mail: sfernandes@impacto.co.mz, em Maputo.

EIS PHASE

Anadarko Moçambique Área 1, Lda

eni

ENH Hidrocarbonetos de Moçambique

ESTUDO DE IMPACTO AMBIENTAL

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

A Anadarko Mozambique Area 1, Lda (AMA1) e a Eni East Africa S.pA. são os proponentes de um Projecto de Construção de uma Fábrica de Gás Natural Liquefeito, poços de produção em alto mar e infra-estrutura associada na Província de Cabo Delgado, no Norte de Moçambique. Ao abrigo do Regulamento sobre o Processo de Avaliação do Impacto Ambiental e do Regulamento Ambiental para as Operações Petrolíferas, o projecto está sujeito a uma Avaliação do Impacto Ambiental (AIA). A **Environmental Resources Management (ERM)** e a **Impacto, Lda,** foram contratadas para realizar o Processo de AIA deste Projecto, que está próximo da sua conclusão.

A Participação Pública é uma componente chave do processo de AIA. Neste contexto, a ERM e a Impacto, Lda, irão realizar reuniões públicas no Distrito de Palma e nas Cidades de Pemba e Maputo. São convidadas todas as pessoas interessadas a participarem nas reuniões, que terão lugar nos seguintes locais e horários:

Cidade de Maputo	Distrito de Palma	Cidade de Pemba
Data: 09/09/13	Data: 11/09/13	Data: 12/09/13
Hora: 09:00 – 12:00	Hora: 09:00 – 12:00	Hora: 09:00 – 12:00
Local: Hotel VIP Maputo	Local: Clube de Palma	Local: Pemba Beach Hotel

Informa-se que exemplares do rascunho do EIA estão disponíveis para consulta nos escritórios das seguintes instituições: em **Maputo:** Direcção Nacional de Avaliação do Impacto Ambiental (DNAIA), Instituto Nacional do Petróleo (INP) e Impacto; em **Pemba:** Direcção Provincial para a Coordenação da Acção Ambiental (DPCA) e Direcção Provincial dos Recursos Minerais e Energia (DPRME); e em **Palma**: Administração do Distrito de Palma. Mais se informa que versões do EIA em Português e Inglês estão também disponíveis no seguinte portal: http://www.impacto.co.mz.

Para se registar como parte interessada e para eventuais esclarecimentos, queira por favor contactar:

Sector de Consulta Pública
Impacto, Lda
Av. Mártires da Machava, 968
Tel.: +258 21499636
Fax: +258 21493019
Cel.: +258 82 3046650 / +258 84 3011956
E-mail: consulta.publica@impacto.co.mz
Maputo

IMPACTO PROJECTOS E ESTUDOS AMBIENTAIS

ERM

Anadarko Moçambique Área 1, Lda

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ENH

ESTUDO DE IMPACTO AMBIENTAL

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

A Anadarko Mozambique Area 1, Lda (AMA1) e a Eni East Africa S.pA. são os proponentes de um Projecto de Construção de uma Fábrica de Gás Natural Liquefeito, poços de produção em alto mar e infra-estrutura associada na Província de Cabo Delgado, no Norte de Moçambique. Ao abrigo do Regulamento sobre o Processo de Avaliação do Impacto Ambiental e do Regulamento Ambiental para as Operações Petrolíferas, o projecto está sujeito a uma Avaliação de Impacto Ambiental (AIA). A **Environmental Resources Management (ERM)** e a **Impacto, Lda**, foram contratadas para realizar o Processo de AIA deste Projecto, que está próximo da sua conclusão.

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Cidade de Maputo	Distrito de Palma	Cidade de Pemba
Data: 09/09/13 Hora: 09:00 – 12:00 Local: Hotel VIP Maputo	Data: 11/09/13 Hora: 09:00 – 12:00 Local: Clube de Palma	Data: 12/09/13 Hora: 09:00 – 12:00 Local: Pemba Beach Hotel

Informa-se que exemplares do rascunho do EIA estão disponíveis para consulta nos escritórios das seguintes instituições: em **Maputo:** Direcção Nacional de Avaliação do Impacto Ambiental (DNAIA), Instituto Nacional do Petróleo (INP) e Impacto; em **Pemba:** Direcção Provincial para a Coordenação da Acção Ambiental (DPCA) e Direcção Provincial dos Recursos Minerais e Energia (DPRME); e em **Palma**: Administração do Distrito de Palma. Mais se informa que versões do EIA em Português e Inglês estão também disponíveis no seguinte portal: http://www.impacto.co.mz.

Para se registar como parte interessada e para eventuais esclarecimentos, queira por favor contactar:

Sector de Consulta Pública
Impacto, Lda
Av. Mártires de Machava, 966
Tel.: +258 21499036
Fax: +258 21493019
Cel.: +258 82 3046660 / +258 84 3011956
E-mail: consulta.publica@impacto.co.mz
Maputo

IMPACTO
PROJECTOS E ESTUDOS AMBIENTAIS

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ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

No âmbito do Projecto do Gás Natural Liquefeito na Província de Cabo Delgado, proposto pela **Anadarko Mozambique Area 1 (AMA 1)** e pela **Eni East Africa S.pA (Eni)**, a Environmental Resources Management (ERM) e a Impacto, Lda, empresas responsáveis pelo Processo de Avaliação de Impacto Ambiental (AIA) do projecto, pretendem, na sequência das reuniões de consulta pública realizadas em Maputo, Pemba e Sede do Distrito de Palma, apresentar o rascunho do **Relatório do Estudo de Impacto Ambiental (REIA)** às comunidades residentes na Península de Afungi.

São convidadas todas as pessoas interessadas a participar nas reuniões a ter lugar nas horas e locais seguintes:

Maganja (incluindo Nfunzi, Kibunji, Mpaia e Nsemo)	Quiupo (incluindo Milamba)	Senga (incluindo Macala, Mangala e Patacua)
Data: 16/10/13 Hora: 09:00 – 12:00 Local: Na sede da Aldeia de Maganja	Data: 17/10/13 Hora: 09:00 – 12:00 Local: Na sede da Aldeia de Quiupo	Data: 18/10/13 Hora: 09:00 – 12:00 Local: Na sede da Aldeia de Senga

Informa-se que exemplares do rascunho do REIA estão disponíveis para consulta na Administração do Distrito de Palma e com o Sr. Horácio Gervásio, contactável pelo número 843019160. Exemplares de um Resumo não Técnico do Relatório, em Português e Kimwani, serão antecipadamente distribuídos e estarão disponíveis para consulta junto dos chefes dos Nkulanos.

Quaisquer esclarecimentos adicionais poderão ser encaminhados à equipa de Oficiais de Ligação com as Comunidades, que farão chegar à equipa de consulta pública da Impacto, Lda. Alternativamente, os interessados poderão contactar directamente o sector de consulta pública da Impacto, Lda, através dos seguintes contactos:

Av. Martires da Machava, 968
Tel.: +258 21499636
Fax: +258 21493019
Cel.: +258 82 3046650 / +258 84 3011956
E-mail: consulta.publica@impacto.co.mz
Maputo

ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

No âmbito do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado, proposto pela **Anadarko Moçambique Area 1 (AMA 1)** e pela **Eni East Africa S.pA (Eni)**, a Environmental Resources Management (ERM) e a Impacto, Lda, empresas responsáveis pelo Processo de Avaliação de Impacto Ambiental (AIA) do projecto, pretendem na sequência das reuniões de consulta pública realizadas em Maputo, Pemba e Sede do Distrito de Palma apresentar o rascunho do **Relatório do Estudo de Impacto Ambiental (RElA)** às comunidades residentes na Península de Afungi.

São convidadas todas as pessoas interessadas a participar nas reuniões e ter lugar nas horas e locais seguintes:

Meganja (incluindo Ntunzi, Kiburji, Mpala e Nacmo)	**Quitupo (incluindo Milamba 1, Milamba 2, Barabarape e Simo)**	**Senga (incluindo Macala, Mangala, Patacua e Quitunda)**
Data: 16/10/13 Hora: 09:00 – 12:00 Local: Na sede da Aldeia de Meganja	Data: 17/10/13 Hora: 09:00 – 12:00 Local: Na sede da Aldeia de Quitupo	Data: 18/10/13 Hora: 09:00 – 12:00 Local: Na sede da Aldeia de Senga

Informa-se que exemplares do rascunho do RElA estão disponíveis para consulta na Administração do Distrito de Palma e com o Sr. Norécio Gervasio, contactável pelo número 843019160. Exemplares de um Resumo não Técnico do Relatório, em Português e Kimwani, serão antecipadamente distribuídos e estarão disponíveis para consulta junto dos chefes dos Ntutanos.

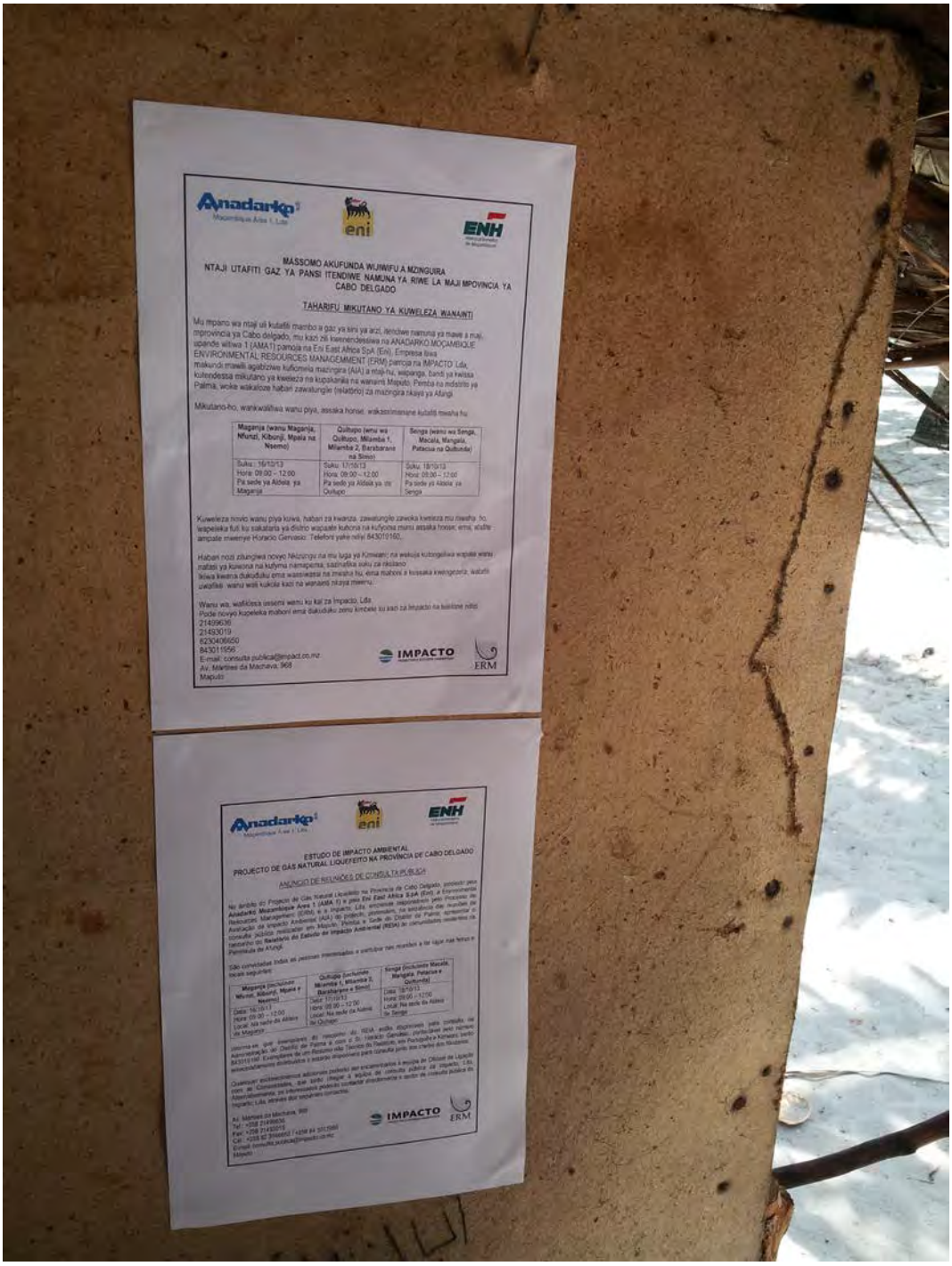
Quaisquer esclarecimentos adicionais poderão ser encaminhados a equipa de Oficiais de Ligação com as Comunidades, que farão chegar à equipe de consulta pública da Impacto, Lda. Alternativamente, os interessados poderão contactar directamente o sector de consulta pública da Impacto, Lda, através dos seguintes contactos:

Av. Martires da Machava, 968
Tel.: +258 21499636
Fax: +258 21493015
Cel.: +258 82 3046660 / +258 84 3011958
E-mail: consulta.publica@impacto.co.mz
Maputo

NKUTANO – MAGANJA



NKUTANO – QUITUPO



MASSOMO AKUFUNDA WUWIFU A MZINGUIRA
NTAJI UTAFITI GAZ YA PANSI ITENDIWE NAMUNA YA RIWE LA MAJI MPOVINCIA YA CABO DELGADO

TAHARIFU MKUTANO YA KUWELEZA WANAINTI

Mu mpano wa ntaji uli kutafiti mambo a gaz ya sini ya arzi, itendiwe namuna ya mawe a maji, mprovincia ya Cabo delgado, mu kazi zili kwenendessiwa na ANADARKO MOCAMBIQUE ENVIRONMENTAL RESOURCES MANAGEMMENT (ERM) pamoja na Eni East Africa SpA (Eni), Empresa liwa makundi mawili agabiziwe kufuomwa mazingira (AIA) a ntaji hu, wapanga, bandi ya kwissa kutendessa mkutano ya kweleza na kupokanka na wanainti Maputo. Pemba na ndistrito ya Palma, woke wakalonze habari zawalungile (relatório) za mazingira nkaya ya Afungi.

Mkutano-ho, wankwalihwa wanu piya, asaaka honse. wakasinsinsane kutafiti mwaha hu

Maganja (wanu Maganja, Nfunzi, Kibunji, Mpala na Nsemo)	Quitupo (wnu wa Quitupo, Milamba 1, Milamba 2, Barabarane na Simoi)	Senga (wanu wa Senga, Macala, Mangala, Patacua na Quitunda)
Suku.: 16/10/13 Hora: 09.00 – 12:00 Pa sede ya Aldeia ya Maganja	Suku: 17/10/13 Hora: 08.00 – 12:00 Pa sede ya Aldeia ya ste Quitupo	Suku: 18/10/13 Hora: 08.00 – 12:00 Pa sede ya Aldeia ya Senga

Kuweleza nnvio wanu piya kuwa, habari za kwanza. zawalungile zawoka kweleza mu mwaha ho. wapeleka full ku sakatarla ya distrio wapate kukona na kufyosa muru asaaka honse; ema, atutte ampate mwenye Horacio Gervasio. Telefoni yake ndiyi 843010160,.

Habari nozi zilungiwa novyo Nkizungu na mu luga ya Kimwani; na wakuja kutongalikwa wapate wanu mafatsi ya Kukona na kufyma namapema; sazinatika soku za nkolano
Ikiwa kwana dukuduku ema wanswasa na mwaha hu, ema makoni a kusaaka kwongezela, aututi uwalileli wanu wali kukola kazi na wanainti nkaya mwenu.

Wanu wa, wafikisa ussemi wenu ku kai za Impacto, Lda.
Pode novyo kupeleka mahoni ema dukuduku zenu kimbele ku xaio za Impacto na kalilone nihti
21499636
21492019
823040650
843011656
E-mail: consulta publica@impact.co.mz
Av. Martires da Machava. 968
Maputo

IMPACTO ERM

ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

ANÚNCIO DE REUNIÕES DE CONSULTA PÚBLICA

No âmbito do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado, promovido pela **Anadarko Mozambique Area 1 (AMA 1)** e pela **Eni East Africa S.p.A** (Eni), a Environmental Resources Management (ERM) e a Impacto, Lda. encontram-se responsáveis pelo Processo de Avaliação de Impacto Ambiental em Maputo, Pemba e Sede do Distrito de Palma, representar o interesse do **Ministério da Coordenação da Acção Ambiental (MICOA)** de comunidades residentes na Península de Afungi.

São convidadas todas as pessoas interessadas a participar nas reuniões a ter lugar nas horas e locais seguintes:

Maganja (incluindo Nfunzi, Kibunji, Mpala e Nsemo)	Quitupo (incluindo Milamba 1, Milamba 2, Barabarane e Simoi)	Senga (incluindo Macala, Mangala, Patacua e Quitunda)
Data: 16/10/13 Hora: 09.00 – 12:00 Local: Na sede da Aldeia de Maganja	Data: 17/10/13 Hora: 08.00 – 12:00 Local: Na sede da Aldeia de Quitupo	Data: 18/10/13 Hora: 08.00 – 12:00 Local: Na sede da Aldeia de Senga

Informa-se que, brevemente, do resumo do REIA estão disponíveis para consulta na Administração do Distrito de Palma e com o Sr. Horácio Gervásio, pertencente a Komanil, bairro 843010160. Exemplares de um Resumo não Técnico do Relatório, em Português e Kimwani, serão posteriormente distribuídos e estarão disponíveis para consulta junto dos chefes das Aldeias.

Quaisquer esclarecimentos adicionais poderão ser encaminhados à equipa de Difusão de Liquefeito com as Comunidades, que tenho chegar à equipa de consulta pública da Impacto, Lda. Alternativamente, os interessados poderão contactar anteriormente o sector de consulta pública da Impacto, Lda. através dos seguintes contactos:

Av. Martires da Machava, 968
Tel.: +258 21499636
Fax: +258 21492019
Cel.: +258 82 3144000 / +258 84 3010560
E-mail: consulta.publica@impacto.co.mz
Maputo

IMPACTO ERM

NKUTANO – SENGA



Telef.: 23352229 * Fax: 23352228 * Telem.: 823254000/863254000/843254000
E-mail: vr1938@gmail.com

Anadarko Moçambique Área 1, Lda

eni

ENH Hidrocarbonetos de Moçambique

ESTUDO DE IMPACTO AMBIENTAL PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

EXTENSÃO DO PRAZO DE ENVIO DE COMENTÁRIOS

No âmbito do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado, proposto pela Anadarko Mozambique Área 1 (AMA 1) e pela Eni East Africa S.pA (Eni), cujas reuniões de Consulta Pública para apresentação do rascunho do Relatório do Estudo de Impacto Ambiental (REIA) decorreram em Maputo, Pemba e Palma, de 9 a 12 de Setembro de 2013, a Environmental Resources Management (ERM) e a IMPACTO, Lda, empresas responsáveis pelo Processo de Avaliação de Impacto Ambiental (AIA) do projecto, informam que o **prazo de envio de comentários ao REIA**, inicialmente marcado para 27 de Setembro de 2013, foi **alargado** para o dia **30 de Outubro de 2013**.

Deste modo, quaisquer comentários/questões/sugestões devem ser enviados até 30 de Outubro de 2013 para o seguinte endereço:

Sandra Fernandes
AMA1 LNG Project
ERM/ Impacto Ref: 0133576
IMPACTO Lda – Sector de Consulta Pública
Av. Mártires da Machava, 968
Maputo, Moçambique
Tel: +258 21 499 636; Fax: +258 21 493019
E-mail: consulta.publica@impacto.co.mz;
sfernandes@impacto.co.mz

IMPACTO ERM

Diário de Moçambique, 08/10/13, pág. 4

Anadarko Moçambique Área 1, Lda

eni

ENH Hidrocarbonetos de Moçambique

ESTUDO DE IMPACTO AMBIENTAL
PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

EXTENSÃO DO PRAZO DE ENVIO DE COMENTÁRIOS

No âmbito do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado, proposto pela Anadarko Mozambique Area 1 (AMA 1) e pela Eni East Africa S.pA (Eni), cujas reuniões de Consulta Pública para apresentação do rascunho do Relatório do Estudo de Impacto Ambiental (REIA) decorreram em Maputo, Pemba e Palma, de 9 a 12 de Setembro de 2013, a Environmental Resources Management (ERM) e a IMPACTO, Lda, empresas responsáveis pelo Processo de Avaliação de Impacto Ambiental (AIA) do projecto, informam que o **prazo de envio de comentários ao REIA**, inicialmente marcado para 27 de Setembro de 2013, foi **alargado** para o dia **30 de Outubro de 2013**.

Desde modo, quaisquer comentários/questões/sugestões devem ser enviados até 30 de Outubro de 2013 para o seguinte endereço:

Sandra Fernandes
AMA1 LNG Project
ERM/ Impacto Ref: 0133576
IMPACTO Lda – Sector de Consulta Pública
Av. Mártires da Machava, 968
Maputo, Moçambique
Tel: +258 21 499 636; Fax: +258 21 493019
E-mail: consulta.publica@impacto.co.mz; sfernandes@impacto.co.mz

IMPACTO PROJECTOS E ESTUDOS AMBIENTAIS

ERM

APPENDIX C

MODELS OF LETTERS OF INVITATION TO THE PUBLIC CONSULTATION MEETINGS

EPDA PHASE

Maputo, 12 de Setembro de 2011

Para:

Cabo Delgado

Assunto: Convite para reunião de apresentação do rascunho do relatório do Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito (EPDA) e dos Termos de Referência (TdR) do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado

Ex$^{mo/a}$ Sr./Sr^{a}.,

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL.

A AMA1 designou a **Environmental Resources Management (ERM)** e a **Impacto, Lda** para efectuarem a Avaliação de Impacto Ambiental (AIA) do projecto.

O processo de consulta à sociedade civil é parte integrante da Avaliação de Impacto Ambiental. Deste modo, como parte desse processo de consulta pública e para efeitos de apresentação do rascunho do relatório do **Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito (EPDA)**

e Termos de Referência (TdR) para o EIA, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas nas Cidades de Pemba e de Maputo e no Distrito de Palma.

Deste modo, a ERM e a IMPACTO têm o prazer de convidar V. Excia a participar na reunião de Consulta Pública que irá decorrer na Cidade de Pemba no dia 28 de Setembro de 2011, no Pemba Beach Hotel, das 09:00 às 12:00 horas. A sua presença será para nós muito importante.

Informa-se que as versões do EPDA e TdR em Português e Inglês estão disponíveis no portal: **http://www.impacto.co.mz** e exemplares do rascunho do EPDA e dos TdR também estão disponíveis para consulta nas seguintes instituições **em Pemba**:
DPCA – Direcção Provincial para a Coordenação da Acção Ambiental
INP/DIPREME – Instituto Nacional de Petróleos (Delegação em Pemba)
ANADARKO – Rua 1, nº 432 (Delegação em Pemba)

Em anexo enviamos o **Resumo Não-Técnico** do EPDA.

Para se registar e para eventuais esclarecimentos queiram por favor contactar o **Gabinete de Consulta Pública**: Impacto Lda, Att: Sandra Fernandes, através dos endereços sfernandes@impacto.co.mz ou pelo Telefone: +258 21499636, Fax: +258 21493019 ou Telemóvel: +258 82 3046650.

Agradecemos a confirmação da participação através dos contactos indicados acima até ao dia 23 de Setembro de 2011. Caso não possa participar solicitamos que se digne considerar fazer-se representar por um técnico dessa instituição.

Sem mais de momento, subscrevemo-nos com elevada estima e consideração.

Atenciosamente,

António Emílio Leite Couto
Director Geral

Ref. Impacto.C.0487/11

Maputo, 12 de Setembro de 2011

Para:

Governo Distrital de Palma

Att: Senhor Pedro Romão Jemusse

Administrador do Distrito

Cabo Delgado

Assunto: Convite para reunião de apresentação do rascunho do relatório do Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito (EPDA) e dos Termos de Referência (TdR) do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado

Exmo Sr. Administrador,

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL.

A AMA1 designou a **Environmental Resources Management (ERM)** e a **Impacto, Lda** para efectuarem a Avaliação de Impacto Ambiental (AIA) do projecto.

O processo de consulta à sociedade civil é parte integrante da Avaliação de Impacto Ambiental. Deste modo, como parte desse processo de consulta pública e para efeitos de apresentação do rascunho do relatório do **Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito (EPDA) e Termos de Referência (TdR) para o EIA**, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas nas Cidades de Pemba e de Maputo e no Distrito de Palma.

Neste contexto, a ERM e a Impacto solicitam um encontro com V. E^{xcia} e os membros do Conselho Local do Posto Administrativo de Palma, para o dia 27 de Setembro de 2011, no Clube de Palma, das 09:00 às 12:00 horas.

Informamos que o rascunho do relatório do EPDA segue em anexo para essa instituição, para consulta pelas partes interessadas e afectadas, e 10 exemplares do Resumo Não-Técnico.

Esperando a valiosa colaboração de V. Excia, subscrevemo-nos com elevada estima e consideração.

Atenciosamente,

António Emílio Leite Couto
Director Geral

EIS PHASE

From: Mia Couto [mailto:miacouto@impacto.co.mz]
Sent: sexta-feira, 20 de Janeiro de 2012 8:54
To: 'portugallina@yahoo.com.br'
Subject: Reuniao da Anadarko

Exma Sra
Dra. Lina Portugal

Em primeiro lugar, a minha gratidão pelo apoio que tem dado na preparação da reunião de informação sobre o projecto da ANADARKO para a construção de uma Unidade de Liquefacção de Gás no distrito de Palma.
Conforme lhe disse, esse encontro destina-se a manter informados os principais sectores do governo da província sobre o estado e planos dos estudos de impacto ambiental e sobre os estudos de reassentamento. Consultores do consórcio ERM/IMPACTO e quadros da Anadarko estarão presentes para prestar esse breve relatório e responder às questões que lhes forem colocadas. Esse encontro, conforme acertado por telefone, terá lugar no dia 30 de Janeiro, pelas 8:30 e decorrerá nas instalações do Governo Provincial. Gostaríamos de lhe pedir apoio para convidar os membros do governo que considerasse relevantes, estando nós abertos a que essa lista de convidados seja aberta. Os sectores mais importantes a nosso ver são a Coordenação Ambiental, as Pescas, o Turismo, os Recursos Minerais, os Transportes e Estradas, bom comos os sectores da Lei e Ordem. Sabemos da existência da Comissão Intersectorial e cremos que seja importante a sua presença.
Gostaríamos de informar que nesse mesmo dia, pelas 14 30 iremos reunir com os operadores turísticos com o mesmo objectivo de os manter envolvidos do processo.

Saudações cordiais

Mia Couto

From: Rosa Alface [mailto:ralface@impacto.co.mz]
Sent: quinta-feira, 19 de Janeiro de 2012 16:33
To: 'jkgtimbers@gmail.com'; 'ilhatecomaji@gmail.com'; 'pembabeach@teledata.mz'; 'pembabeach@raniresorts.com'; 'tratschnig@pembabeach-hotel.com'; 'russellbott@yahoo.com.au'; 'welemosany@yahoo.com.br'; 'reservation@maluane.com'; 'oscarjom@yahoo.com'; 'ryan.pape@vamizi.com'; 'derek@bluegreenplanning.com'; 'jake.tuggy@gmail.com'; 'amy@bespokeexperience.com'; 'mavula25@yahoo.com.br'; 'matteo@metundo.com'; 'sarjamal23@yahoo.com.br'; 'mafunga1@yahoo.com.br'; 'yussufmz@Yahoo.com'; 'info@londolodge.com'; 'pembadive@londolodge.com'; 'info@kaskazine.com'; 'albertowelemosany@yahoo.com.br'; 'pemba@guludo.com'
Cc: 'miacouto@impacto.co.mz'
Subject: Convite para a reunião do projecto de instalação de uma Fábrica de gás

Prezados Senhores,

No âmbito do projecto para a instalação de uma fábrica de gás liquefeito a ser desenvolvido pela ANADARKO, é intenção das empresas de consultoria ERM e Impacto manter os operadores turísticos informados sobre o desenvolvimento dos estudos técnicos que estão sendo efectuados. Assim, gostaríamos de convidá-los para um encontro a realizar-se na cidade de Pemba no dia 30 de Janeiro de 2012 nas instalações do Pemba Beach Hotel pelas 14:30 horas.

Para mais informações, entrem em contacto pelos endereços abaixo:
sfernandes@impacto.co.mz & ralface@impacto.co.mz

Agradecemos desde já a vossa colaboração.

Cumprimentos,

Mia Couto.

Ref. Impacto.C.0039/12
Maputo, 24 de Janeiro de 2012

Para:

Maputo

Assunto: Convite para Reunião de Informação sobre o Desenvolvimento dos Estudos Técnicos e do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado

Ex$^{mo/a}$ Sr./Sr^{a}.,

No âmbito do projecto para a instalação de uma fábrica de gás liquefeito a ser desenvolvido pela Anadarko na Província de Cabo Delgado, é intenção das empresas de consultoria ERM/Impacto manter informados os principais sectores do Governo Central sobre o desenvolvimento dos estudos técnicos (Estudo de Impacto Ambiental e estudos de reassentamento) que estão sendo efectuados.

Assim, gostaríamos de convidar V. Excia para um encontro a realizar-se na Cidade de Maputo no dia 1 de Fevereiro de 2012, no Hotel Girassol, das 09:00 às 12:00 horas.

Consultores do Consórcio ERM/IMPACTO e quadros da Anadarko estarão presentes para prestar esse breve relatório e responder às questões que lhes forem colocadas.

Agradecemos a confirmação da participação de V. Excia, através dos contactos indicados abaixo, até ao dia 30 de Janeiro de 2012. Caso não possa participar solicitamos que se digne considerar fazer-se representar por um técnico da V. instituição.

Endereço de contacto: Gabinete de Consulta Pública - Impacto Lda, Att: Kete Fumo, kfumo@impacto.co.mz, Telefone: +258 21499636, Fax: +258 21493019 ou Telemóvel: +258 823046650.

Sem mais de momento, subscrevemo-nos com elevada estima e consideração.

Atenciosamente,

António Emílio Leite Couto
Director Geral

Ref. Impacto.C.143/13
Maputo, 22 de Agosto de 2013

Para:

Maputo

Assunto: Convite para reunião de apresentação do rascunho do relatório do Estudo de Impacto Ambiental (EIA) do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado

Ex$^{mo/a}$ Sr./Sr^{a}.,

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL. Actualmente, tal como a AMA1, a **Eni East Africa S.pA.** também é proponente do projecto.

A **Environmental Resources Management (ERM)** e a **Impacto, Lda** foram designadas pelo proponente (AMA1 e Eni East Africa S.pA.) do projecto para conduzirem o Processo de Avaliação de Impacto Ambiental (AIA) do projecto.

O processo de consulta à sociedade civil é parte integrante da Avaliação de Impacto Ambiental. Como parte desse processo de consulta pública e para efeitos de apresentação do rascunho do relatório do **Estudo de Impacto Ambiental (EIA)**, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas no Distrito de Palma e nas Cidades de Pemba e Maputo.

Deste modo, a ERM e a IMPACTO têm o prazer de convidar V. Excia a participar na reunião de Consulta Pública que irá decorrer na Cidade de Maputo, no dia 9 de Setembro de 2013, no Hotel VIP, das 09:00 às 12:00 horas.

Informa-se que as versões do EIA, em Português e Inglês, estão disponíveis no portal: http://www.impacto.co.mz e exemplares do rascunho do EIA estão também disponíveis para consulta nas seguintes instituições em Pemba:

- DPCA – Direcção Provincial para a Coordenação da Acção Ambiental
- INP / DIPREME – Instituto Nacional de Petróleos (Delegação em Pemba) / Direcção Provincial dos Recursos Minerais e Energia

Em anexo enviamos o **Resumo Não-Técnico** do EIA.

Para se registar e para eventuais esclarecimentos, queira por favor contactar o **Sector de Consulta Pública**: Impacto, Lda, através dos endereços consulta.publica@impacto.co.mz ou pelo Telefone: +258 21499636, Fax: +258 21493019 ou Telemóvel: +258 82 3046650.

Agradecemos a confirmação da participação através dos contactos indicados acima até ao dia 6 de Setembro de 2013. Caso não possa participar solicitamos que se digne considerar fazer-se representar por um técnico dessa instituição.

Sem mais de momento, subscrevemo-nos com elevada estima e consideração.

Atenciosamente,

António Emílio Leite Couto
Director Geral

Ref. Impacto.C.292/13
Maputo, 22 de Agosto de 2013

Para:

Cabo Delgado

Assunto: Convite para reunião de apresentação do rascunho do relatório do Estudo de Impacto Ambiental (EIA) do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado

Ex$^{mo/a}$ Sr./Sr^{a}.,

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas especificamente para transportar GNL. Actualmente, tal como a AMA1, a **Eni East Africa S.pA.** também é proponente do projecto.

A **Environmental Resources Management (ERM)** e a **Impacto, Lda** foram designadas pelo proponente (AMA1 e Eni East Africa S.pA.) do projecto para conduzirem o Processo de Avaliação de Impacto Ambiental (AIA) do projecto.

O processo de consulta à sociedade civil é parte integrante da Avaliação de Impacto Ambiental. Como parte desse processo de consulta pública e para efeitos de apresentação do rascunho do relatório do **Estudo de Impacto Ambiental (EIA)**, a ERM e a Impacto, Lda, irão realizar reuniões de consulta às partes interessadas e/ou afectadas no Distrito de Palma e nas Cidades de Pemba e Maputo.

Na Cidade de Pemba será realizada, para além de uma reunião pública aberta, uma reunião com um grupo específico, nomeadamente constituído por partes interessadas dos sectores de Turismo e Pescas ou relacionadas com estes sectores (aqui designado "Grupo de Turismo e Pescas" para efeitos de consulta pública para este projecto). Pretende-se, juntando este grupo, criar uma oportunidade de discussão mais profunda e detalhada de questões de interesse particular para estes sectores.

Assim, **a ERM e a IMPACTO têm o prazer de convidar V. Excia a participar na reunião do "Grupo de Turismo e Pescas", a ter lugar na Cidade de Pemba no dia 10 de Setembro de 2013, no Hotel Kauri, das 14:00 às 16:00 horas.**

Como parte do grupo do "Grupo do Turismo e Pescas", está igualmente convidado a participar na reunião de Consulta Pública (reunião aberta) que irá decorrer na **Cidade de Pemba no dia 12 de Setembro de 2013, no Pemba Beach Hotel, das 09:00 às 12:00 horas.**

Informa-se que as versões do EIA, em Português e Inglês, estão disponíveis no portal de Internet: http://www.impacto.co.mz e exemplares do rascunho do EIA estão também disponíveis para consulta nas seguintes instituições em Pemba:

- DPCA – Direcção Provincial para a Coordenação da Acção Ambiental
- INP / DIPREME – Instituto Nacional de Petróleos (Delegação em Pemba) / Direcção Provincial dos Recursos Minerais e Energia

Em anexo enviamos o **Resumo Não-Técnico** do EIA.
Para se registar e para eventuais esclarecimentos, queira por favor contactar o **Sector de Consulta Pública**: Impacto Lda, através dos endereços consulta.publica@impacto.co.mz ou pelo Telefone: +258 21499636, Fax: +258 21493019 ou Telemóvel: +258 82 3046650.

Agradecemos a confirmação da participação através dos contactos indicados acima até ao dia 6 de Setembro de 2013. Caso não possa participar solicitamos que se digne considerar fazer-se representar por um técnico dessa instituição.

Sem mais de momento, subscrevemo-nos com elevada estima e consideração.
Atenciosamente,

António Emílio Leite Couto
Director Geral

N/Refª. Impacto.C.139/13
Maputo, 22 de Agosto de 2013

Para:
Ex.mo Sr. Administrador do Distrito de Palma
Senhor Pedro Romão Jemusse

Distrito de Palma - Cabo Delgado

Assunto: **Projecto de Gás Natural Liquefeito na Província de Cabo Delgado**

Exmo Sr. Administrador,

No âmbito do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado, proposto pela **Anadarko Mozambique Area 1, Lda (AMA 1)** e pela **Eni East Africa S.pA**, a Environmental Resources Management (ERM) e a Impacto, Lda, empresas responsáveis pela Avaliação de Impacto Ambiental (AIA) do projecto, pretendem apresentar o rascunho do relatório do **Estudo de Impacto Ambiental** nas Cidades de Pemba e Maputo e no Distrito de Palma.

Neste contexto, a ERM e a Impacto solicitam um encontro com a Administração do Distrito que V. Excia dirige, a realizar-se no dia **11 de Setembro de 2013, das 9:00 às 12:00 horas, na sala de reuniões do Clube de Palma,** para a apresentação do rascunho do relatório de EIA.

De modo a assegurar uma ampla divulgação deste Projecto, sugerimos e solicitamos a V. Excia que para este encontro possam ser convidados os membros do Governo do Distrito residentes na sede e os membros do Conselho Local do Posto Administrativo de Palma. Dada a natureza do projecto, solicitamos ainda que a Administração estenda o convite a todas as partes interessadas que possuem concessões em Palma (não nos foi possível até ao momento obter das entidades governamentais a nível da Província uma lista confirmada de Concessionários, à excepção dos senhores Gulzar A. Carim, Omar Nuro e Fátima Jacob, pelo que contaríamos, se possível, com o apoio da Administração para contactar aqueles de que tenham conhecimento no distrito).

Gostaríamos de fazer uso desta oportunidade para colocar à disposição da Administração do Distrito, para efeitos de consulta, dois exemplares do rascunho do **Relatório do Estudo do Impacto Ambiental**. Enviamos ainda 50 exemplares de um **Resumo Não Técnico**, para ser distribuído pelos convidados à reunião e a outras pessoas ou entidades consideradas relevantes pela Administração do Distrito.

Aproveitamos a oportunidade para solicitar os bons préstimos da Administração no sentido de assegurar a reserva do Clube de Palma para a realização da referida reunião.

Antecipadamente agradecemos a valiosa colaboração de V. Excia e subscrevemo-nos com elevada estima e consideração.

Atenciosamente,

Jorge Lacerda
Director Executivo

Ref. Impacto.C.143/13
Maputo, 22 de Agosto de 2013

Para:

Cabo Delgado

Assunto: Convite para reunião de apresentação do rascunho do relatório do Estudo de Impacto Ambiental (EIA) do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado

Ex$^{mo/a}$ Sr./Sr^{a}.,

Em Dezembro de 2006 a **Anadarko Mozambique Area 1 (AMA 1)** e o seu parceiro **Empresa Nacional de Hidrocarbonetos E.P. (ENH)** assinaram um Contrato de Pesquisa e Produção de Hidrocarbonetos (EPCC) com o Governo de Moçambique para a Área 1 da Bacia do Rovuma, no Norte de Moçambique.

Desde então, a AMA1 e seus parceiros adquiriram informação sísmica com segurança e anunciaram quatro grandes descobertas de gás natural em águas profundas na Bacia do Rovuma. Em virtude deste sucesso extraordinário, a AMA1 está agora a planificar o desenvolvimento comercial. O desenvolvimento proposto poderá envolver a perfuração de poços adicionais em mar aberto, o transporte do gás através de um gasoduto submarino para a costa e a construção de uma fábrica de Gás Natural Liquefeito (GNL) para converter o gás natural em líquido. Prevê-se que o GNL seja transportado através de um gasoduto para um cais em mar aberto e exportado por embarcações concebidas para transportar GNL. Actualmente, tal como a AMA1, a **Eni East Africa S.pA.** também é proponente do projecto.

A **Environmental Resources Management (ERM)** e a **Impacto, Lda** foram designadas pelo proponente (AMA1 e Eni East Africa S.pA.) do projecto para conduzirem o Processo de Avaliação de Impacto Ambiental (AIA) do projecto.

O processo de consulta à sociedade civil é parte integrante da Avaliação de Impacto Ambiental. Como parte desse processo de consulta pública e para efeitos de apresentação do rascunho do relatório do **Estudo de Impacto Ambiental (EIA)**, a ERM e a Impacto, Lda, irão realizar reuniões públicas abertas no Distrito de Palma e nas Cidades de Pemba e Maputo.

Deste modo, a ERM e a IMPACTO têm o prazer de convidar V. Excia a participar na reunião de Consulta Pública que irá decorrer na Cidade de Pemba no dia 12 de Setembro de 2013, no Pemba Beach Hotel, das 09:00 às 12:00 horas.

Informa-se que as versões do EIA, em Português e Inglês, estão disponíveis no portal: http://www.impacto.co.mz e exemplares do rascunho do EIA também estão disponíveis para consulta nas seguintes instituições em Pemba:

- DPCA – Direcção Provincial para a Coordenação da Acção Ambiental
- INP / DIPREME – Instituto Nacional de Petróleos (Delegação em Pemba) / Direcção Provincial dos Recursos Minerais e Energia

Em anexo enviamos o **Resumo Não-Técnico** do EIA.

Para se registar e para eventuais esclarecimentos, queira por favor contactar o **Sector de Consulta Pública**: Impacto Lda, através dos endereços consulta.publica@impacto.co.mz ou pelo Telefone: +258 21499636, Fax: +258 21493019 ou Telemóvel: +258 82 3046650.

Agradecemos a confirmação da participação através dos contactos indicados acima até ao dia 09 de Setembro de 2013. Caso não possa participar solicitamos que se digne considerar fazer-se representar por um técnico dessa instituição.

Sem mais de momento, subscrevemo-nos com elevada estima e consideração.

Atenciosamente,

António Emílio Leite Couto
Director Geral

APPENDIX D

RECORDS OF PARTICIPANTS OF PUBLIC CONSULTATION MEETINGS

EPDA PHASE

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

1ª Reunião de Consulta Pública (Fase de EPDA): Palma, Terça-feira, 27 de Setembro de 2011, 09h00 – 12h00

Distrito de Palma

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Assane Issa	Mute	C.C. Posto	
Beatriz Fernandes	Intuluarino	C.C. Posto	
Abiba Buraimo	Barabarane	C.C. Posto	

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Distrito de Palma

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Salvador Vasco	SECRETARIA DISTRITAL	Técnico do Património	825276577
Pedro Romão Jemusse	— " —	Administrador	822842532
ALFANE CÉSAR	CAO DIST PRM	COMANDANTE	824677070 840291493
MÁRIO J. RASSUL	ANADARKO	Env. Public Affairs	823069380
John Poffe	Anadarko	D6	848342410
Isabel Evans	ERM	Env. Consultant	0027 [illegible]

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Issufo Assane	B. BaraBarane	Lider Comunita	
Saide Tarize	B. Bazaila	Lider C.	829696427
Nacir Selemani	Bairro Mudha	Lider	
Bacar Ali Mbale	Bairro Quilava	Lider comunitario	
Auazy Saide	Bairro Quiliwani	Lider comunitario	820847647
[illegible]	[illegible]	[illegible]	21.48 29678

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Saide Arnibeia	Membro da Comunidade	Convidado Permanente	820768334
Ali Ismail Jongo	" "	Influente	
Jorge Selimo Ali	" "	"	
Gonçalves Bacar	membro do C C Posto	C.C. Local: Palma	822866082 842450214
Issufo Meridine	Comunidade Islâmica	Influente	
Meridine Abdala	" "	"	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Faustino Gilberto	Téc. do SDEJT	Membro do Conselho Técnico	840575226 823187101
Cristóvão S. Muanantte	Téc. S. Distrital	Membro CTD	827746855
Feliciano Monteiro	Com. Registo Civil	Membro	825815801
Padre Faustino Dimbamba	Igreja Católica	Pároco	842226595
Pedro Varela Ch. Mendes	SDAE – Tec Pescas	TEC- PESCAS	828428620
Vasco Quitero Meia	SDAE – CAJU	AGRICULTURA	823141541

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Benito Namuito	Mute	Membro CC. Poto	
Cristino Assane	Mute	" "	
Amade Selemane	Bagala	Líder Religioso	
Ali Mamade	Barabarane	" "	
Selemo Said Capata	Bagala	" "	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Joaquim Lucas Namúa	Serviços Distrital de Educação	Director do Serviço	825437040
Eudóxio Valdo Viage	Serviço Distr. Saúde, M. e Acção Social	Director do Serviço	825136531 847561041
Antonio Valério Kantiko	Comité Distrital - FRELIMO	1º Secretário C.D. Palma	825644115

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Pemba Beach Hotel

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
SÓNIA	MACIEL	AGA KHAN FOUNDATION	DIRECTORA REGIONAL DE PROGRAMAS	PEMBA	Tel No:	
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[illegible]	[illegible]	"	"	"	Tel No:	
					Fax No:	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Amade Garrett	GARRETT	IDPPE - Pemba	Técnico de desenvolvimento Social	Bairro 3 Fevereiro	Tel No:	826410624
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Jaime Pedro	Semedo	Conselho Comunitário de Pesca de Ruela (CCP-R)	Presidente	Bairro de Paquitequete	Tel No:	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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LEOPOLDINO	JERÓNIMO	HELVETAS SWISS INTERCOOPERATION (CABO DELGADO)	OFICIAL DE COMUNICAÇÃO	Rua (Rangiva) CI III nº2051, C.P.79, Pemba	Tel No:	272 21425
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Barbara	Kruspán	Rede Helvetas	Consultora	c/o FOCADE, Rua Vag-val, Pemba Rua CI III nº2051, Pemba	Tel No:	27
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SURAIA	MUSSA	ENH	HSE	MAPUTO	Tel No:	
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CONSTANTINO	AUGUSTO	FÓRUM TERRA DE CABO DELGADO GRUPO TEMÁTICO DE RECURSOS - NATURAIS.	FÓRUM TERRA - (OFICIAL DE PROG.) GRUPO TEMÁTICO FORMADOR EM RECURSOS NAT	JUNTO A FDC A DE - PEMBA.	Tel No:	827347860
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Paulina	Sarrilahti-Jimenez	Centro de serviços de desenvolvimento e cooperação (KEPA) – GRUPO TEMÁTICO DE GOVERNAÇÃO E MEIO AMBIENTE	Official de Programas	Av. Eduardo Mondlane, Edifício STEGIário	Tel No:	82 3032108
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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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					Cell No:	
					e-mail:	
					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

1ª Reunião de Consulta Pública (Fase de EPDA): Maputo, 30 de Setembro de 2011, Hotel Girassol Bahia, 9 - 12H

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

1ª Reunião de Consulta Pública (Fase de EPDA): Maputo, 30 de Setembro de 2011, Hotel Girassol Bahia, 9 - 12H

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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EIS PHASE

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Provincial (Fase de EIA)
Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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Dino	CANTINHO	DPOPH	Director Provincial	PEMBA	Tel No:	
					Fax No:	
					Cell No:	828292556
					e-mail:	dino_cantinho@yahoo.com.br

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Provincial (Fase de EIA)
Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Teresa-Mar	Nhaue	DPREME	Chefe DPT	RUA 12	Tel No:	272 21 900
					Fax No:	
					Cell No:	826885390
					e-mail:	
SAMUEL	BUANAR	DPTC	DIRECTOR	RUA JERONIMO ROMERO	Tel No:	
					Fax No:	
					Cell No:	826835630
					e-mail:	
Luis	Manuel	ADMAR	Technico	PORTO	Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	
Maria	Salia	CHAEM	Inspectora Sanitaria	C.S CIMENTO	Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Provincial (Fase de EIA)
Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Tiago	Cherene	DPA/SPGC	Chefe dos Serviços Provinciais	Paiuno Cimangone	Tel No:	27221029
					Fax No:	826081186
					Cell No:	
					e-mail:	
José	Julius	SProv.	Técnico da Secretaria	SProv.	Tel No:	847427193
					Fax No:	
					Cell No:	
					e-mail:	
GARRET	AMADE	IDPPE	Técnico		Tel No:	
					Fax No:	
					Cell No:	826410624
					e-mail:	
Manuel	Daniel	IDPPE	Delegado	Bairro NOTITE	Tel No:	~~27221626~~
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Provincial (Fase de EIA)
Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
NICOLAU	MOISÉS	Serviços Provinciais de Florestas e Fauna Bravia	Chefe Fiscalização	Pemba Expo now	Tel No:	
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Delfina	Mandanda	DPCA	Técnica	Rua Jerónimo Romero	Tel No:	
					Fax No:	
					Cell No:	82 28297070
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Graziela Temba	Temba	DPEC	Directora	Av. 16 de Junho	Tel No:	26961518
					Fax No:	27221254
					Cell No:	823085710
					e-mail:	grazielatemba@gmail.com
José	Domingos	F. dos Passados	Membro	B. Natite	Tel No:	823838593 ? diz?
					Fax No:	
					Cell No:	823838593
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Provincial (Fase de EIA)
Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
Augusto	Arsane	DPCA	Técnico	R. Jerónimo Romero	Tel No:	272 20353
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					Cell No:	82 6874330
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					Fax No:	
					Cell No:	82 5408403 / 84063 83602
					e-mail:	acmazumo@gmail.com
Raimundo	Cagano	DPPF	Director Adjunto	Pemba	Tel No:	27220946
					Fax No:	27221414
					Cell No:	826952680
					e-mail:	portinho.raimundo@yahoo.com.br
Cassiano	Sengo	DPS	Médico Delegado Provincial	Av. 16 Junho	Tel No:	27220536
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					Cell No:	827749410
					e-mail:	cesariosaugustosengo@yahoo.com.br

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Provincial (Fase de EIA)
Cidade de Pemba, Governo Provincial, 30 de Janeiro de 2012, 08:30h – 11:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
hirua	Portugal	Secretaria Provincial	Secretária Permanente	Av. 16 de Junho	Tel No:	
~~Portugal~~					Fax No:	
					Cell No:	823196166/843196166
					e-mail:	Portugallima@yahoo.com
					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	
					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	
					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com os Operadores Turísticos (Fase de EIA)
Cidade de Pemba, Pemba Beach Hotel, 30 de Janeiro de 2012, 14:30h – 17:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
JAIME	ABUBACAR	MITILDA ILHA NUMBA	DIRECTOR	ESTRADA NACIONAL Nº 106 - CP 77 MUXARA - PEMBA	Tel No:	26961261/26961098
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					Cell No:	825146946/847146946
					e-mail:	mailto:mitilda@tvcabo.co.mz
Karen	Schaeman	Tecomaji	Administrator	EN 106 Muxara, Pemba	Tel No:	
					Fax No:	
					Cell No:	82 552 9826.
					e-mail:	kabimbers@gmail.com.
	Samikkela	DOE BEACH RESORT	Actg Dir	Pemba Mariangoulo	Tel No:	272 29095
					Fax No:	
					Cell No:	824970790/844848100
					e-mail:	Welcomesamy@yahoo.com.br
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					Cell No:	
					e-mail:	info@kaskazini.com

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com os Operadores Turísticos (Fase de EIA)
Cidade de Pemba, Pemba Beach Hotel, 30 de Janeiro de 2012, 14:30h – 17:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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					e-mail:	russellbott@yahoo.com.au
CASSIANO	CRUZ	GULUDO BEACH LODGE	COORDENADOR DAS RELAÇÕES COM CLIENTES	MACOMIA MUCOJO	Tel No:	27221757
					Fax No:	
					Cell No:	827234470
					e-mail:	pemba@guludo.com
ISMAEL (FERREIRA)	FERREIRA	KILACUNI, LDA & DAWI SAFARIS, LDA	REPRESENTANTE	PEMBA	Tel No:	
					Fax No:	
					Cell No:	828501410
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					Fax No:	
					Cell No:	843061326
					e-mail:	chimpo@pembabeach-hotel.co.mz

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Nacional (Fase de EIA)
Cidade de Maputo, Governo Nacional, 1 de Fevereiro de 2012, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Filimão	Chonga	M. Energia	Director Nacional Adjunto de Combustíveis	Av. 25 de Setembro	Tel No:	
					Fax No:	
					Cell No:	82514 4905
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Pedro	MAGAIA	MICOA/DNAIA	Técnico	Av. Acordos de Lusaka	Tel No:	82 891 3903
					Fax No:	
					Cell No:	82 891 3900
					e-mail:	magaiapedro@yahoo.com.br
Jorgina	Henriques	M. Energia	Assessora do Ministro	Av. 25 de Setembro	Tel No:	
					Fax No:	
					Cell No:	87 327 5350
					e-mail:	jorgina@yahoo.com
Almeida	Almeida	MINAG-DNSA	Técnico	Rua da Zambézia Nº 1724 2º and.	Tel No:	almeidaalbuleke@yahoo.com.br
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Nacional (Fase de EIA)
Cidade de Maputo, Governo Nacional, 1 de Fevereiro de 2012, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
MÁRIO	MAHAJUL	MIN RECURSOS MINERAIS	ASSESSOR	AV. TOMÁS DE MACHAMBA, 34 1º ANDAR	Tel No:	
					Fax No:	
					Cell No:	82153058
					e-mail:	mario.machava@mireme.gov.mz
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					e-mail:	natalia.cumbe@inp.gov.mz
MANUEL	TAQUE	IIP	TÉCNICO GIS	MAO-TSÉ-TUNG 389	Tel No:	823983314
					Fax No:	21492112
					Cell No:	82 31 85 30
					e-mail:	M.taque@hotmail.com
Rosana ~~Francisco~~	Francisco	MICOA/ DNAIA	Técnica	AV. Acordos de Lusaka 2115	Tel No:	84 41 51 300
					Fax No:	
					Cell No:	
					e-mail:	Rosana@mail.com

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Nacional (Fase de EIA)
Cidade de Maputo, Governo Nacional, 1 de Fevereiro de 2012, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Aleivo	Dias	Ministério do Trabalho	Assessor	Av. 24 de Julho nº 2341-1º Andar	Tel No:	~~21 21~~
					Fax No:	
					Cell No:	82 88 32 460
					e-mail:	aleivodias@yahoo.com.br
Ambrósio	Sitoe	Ministério dos Transportes e Comunicações	Director	Av. Martires de Inhaminga nº 336	Tel No:	
					Fax No:	
					Cell No:	82 86 00 470
					e-mail:	ambrosiocsitoe@yahoo.com.br
Issufo	Tuma	CCNDES	Técnico	Av. Emília Daússe 82	Tel No:	21328468
					Fax No:	
					Cell No:	82 707 1880
					e-mail:	Issufotuma2003@yahoo.
Fernando	Gemo	MTC	Engº	Av Martins de Inhaminga 336	Tel No:	Com 21
					Fax No:	21305832
					Cell No:	82 855 9750
					e-mail:	f.gemo@yahoo.com.br

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Nacional (Fase de EIA)
Cidade de Maputo, Governo Nacional, 1 de Fevereiro de 2012, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
ALVARO	CABRAL	ADMINISTRAÇÃO MARÍTIMA	ADJUNTO ADMINISTRADOR MARÍTIMO	R. NGUNGUNHANA	Tel No:	
					Fax No:	
					Cell No:	82 43 80 770
					e-mail:	
GILBERTO	BOTAS	MINED	DIRECTOR NACIONAL DO ENSINO TÉC	AV. 24 JULHO 7º ANDAR MINED	Tel No:	21490192
					Fax No:	
					Cell No:	82 315 0980
					e-mail:	
Leonor	Machiana	IDPPE	Técnica		Tel No:	
					Fax No:	
					Cell No:	82 536 5557
					e-mail:	
ERIKSSON	DUARTE	MIC – DNI	TÉCNICO	AV. 25 DE SETEMBRO, 1502	Tel No:	
					Fax No:	21 327 892
					Cell No:	82 292 3740
					e-mail:	eriksonduarte@gmail.com

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Nacional (Fase de EIA)
Cidade de Maputo, Governo Nacional, 1 de Fevereiro de 2012, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Custodio	Mequie	ANE/MOPH	Chefe do Dep. de Cooperação	Av. de Nacala que ANE	Tel No:	476163/7
					Fax No:	47 5437
					Cell No:	826548906
					e-mail:	cmequie@ane.gov.mz
Filoma	Chaúque	MÉ	Directora Adjunta	Av. 25 de Setembro	Tel No:	
					Fax No:	
					Cell No:	823514490
					e-mail:	
Jaime	Chambule	MÉ	Técnico	Av. 25 de Setembro	Tel No:	82261646O
					Fax No:	
					Cell No:	
					e-mail:	
Hadija	Mussagy	ADNAP	Técnico	Av. Zedequias Manganhela	Tel No:	821254180
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Informação com o Governo Nacional (Fase de EIA)
Cidade de Maputo, Governo Nacional, 1 de Fevereiro de 2012, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	
					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	
					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Helena Vilma	De Sousa Rangel	Ministério dos Recursos Minerais – Direcção Nacional de Geologia	Técnico Nº1	MIREM-Maputo	Tel No:	
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					Cell No:	+258 84 616 270/84 710 2818
					e-mail:	
Sean	Nazerali	CONSULTOR INDEPENDENTE			Tel No:	82 397 2000
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					e-mail:	
Penalva	Pene	FUNAE	Engenheiro Electrónico & Telecomunicações		Tel No:	
					Fax No:	
					Cell No:	82 396 7774
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Stelio	MATAVELE	UNIVERSIDADE APOLITÉCNICA	ESTUDANTE ENGENHARIA CIVIL		Tel No:	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
ALDA	SALOMÃO	CENTRO TERRA VIVA	DIRECTORA GERAL	Av. MARIEN NGOUABI 90	Tel No:	
					Fax No:	
					Cell No:	823051660
					e-mail:	asalomao@ctv.org.mz
LINO	MANUEL	CENTRO TERRA VIVA	Coordenador do Programa de intervenção ambiental	Bairro Bagamoyo Maputo	Tel No:	
					Fax No:	
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					e-mail:	linomanuel@yahoo.com.br
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					Cell No:	+258825800395
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					e-mail:	brafael@ctv-org.mz

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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					Cell No:	84 8882232
					e-mail:	mwing@ctv.org.mz
TOMÁS VIEIRA MARIO	MARIO	Centro de Comunicação SEKELEKANI	DIRECTOR EXECUTIVO	Rua da CRUZ VERMELHA, N 48 - 1º Anda	Tel No:	21320389
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Abelina	Chambule	INP	Engº de HSEQ	Av. Fernão Magalhães 34 1º andar	Tel No:	
					Fax No:	
					Cell No:	82 5747261
					e-mail:	abelina.chambule@inp.gov.mz

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
ISSUFO	TANKAR	CTV (Centro Terra Viva)	Coordenador do Projectos	AV. Mamam Mugumabi	Tel No:	
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PAULO	HENRIQUES	GALP	COUNTRY MANAGER	AV. 25 SET MAPUTO	Tel No:	
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					Cell No:	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
Alvaro	Cabral	ADMINISTRAÇÃO MARITIMA - MAPUTO	ADJUNTO ADMINISTRADOR MARITIMO	AV NGUNGUNHANA Nº [illegible]	Tel No:	
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					e-mail:	alvarocabral36@yahoo.com.br
MARCOS	PEREIRA	CTV COMUNIDADE VIVA	Director Gabinete Estudos		Tel No:	
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LUIS	ANJOS	GALP	Director tecnico	AV. 25 de Setembro Nº [illegible]	Tel No:	
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					Cell No:	
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JOSÉ	NICOLAU	GALP	Gestor do Projecto	Galp Rovuma AV. 25 de Setembro Nº [illegible]	Tel No:	
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					e-mail:	jose.nicolau@galpenergia.com

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Hotel VIP Maputo - Fase de EIA
Cidade de Maputo, Dia 09 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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					Tel No:	
					Fax No:	
					Cell No:	
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					Tel No:	
					Fax No:	
					Cell No:	
					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Foco com o Grupo de Turismo e Pescas - Fase de EIA
Cidade de Pemba, Hotel Kauri, 10 de Setembro de 2013, 11:00h – 12:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião de Foco com o Grupo de Turismo e Pescas - Fase de EIA
Cidade de Pemba, Hotel Kauri, 10 de Setembro de 2013, 11:00h – 12:30h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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Herculano	Vilanculo	ENI EAST AFRICA S.p.A	HSE. Community Investment Expert	82, Plexus (Porto de Pemba)	Tel No:	
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					e-mail:	leydevramirez@yahoo.es.

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
ROBERTO MUSSA ABDALA	PARALEGAL	MEMBRO	865452442
Adelino Prieto	Paralegal	Membro	840508432
ALBINO R. MAHABA	Paralegal	Representante	865077362
SAIFA ADINANE	PARALEGAL	REPRESENTANTE	866208813
Abdala Adinane	Adjunto Lider	Representante	863392489
Emídio Beula	SAVANA	Jornalista	827835296

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Adelino Alberto Moises	Administração Pública	Chefe do Posto	86220687 2
Jooge Wazir	Mondlane - Olembe	membro c.c.d.	869242022
Augusto Chande	Mute	membro CCD	866655343
Pedro Mangachia	Policia da Republica	Membro CCD	
Marta Juma	Palma - sede	Membro da asse	866664932
Beatriz Fernando	Palma - sede	Membro do cons	865469855

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Bernardo Bacar	CCD	membro	865766286
Mussa Saide	CCS	LIDER	860132816
CHAFIDADE	CC R	LIDER	866344777
Abiba Buraimo	C C A	M	826371478
MUSANASSA ALBERTO	CC D	MEMBRO	866208730
Sabina Miguel Valombe	CCD	Membro	865234087

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Constantino A. Mumbule	SDAE	DIRECTOR	862206010 824073500
Amina Zavanjang	SDEJT	Directora	825667487
Luis Salomão	INCalaziano	Líder Comunitário	865287704
MTAUHE NACIR	~~BA~~BARANG	LIDER COMUNITAR	867202778
Bacar Ali Mbale	B. Quilawa	Líder comunitário	866650613
Saide Tarize	B. Basala	Líder Comunitário	829696427

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Alberto Adelino	Procuradoria Distrital	Escrivão	827337108
Luis Abdala Salimo	Aldeia Quitupo	Líder Comunitário	865439895
Salimo Ali Amisse	Nagonja	Líder Comunitário	
Stefano momade sede	Pundanhar	membro conselho	826233575
Chida mando Amisse	Pundanhar		
Sofia Salimo	Pundanyali		

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
ISSA ABDALA	C C D Mualhá	MEMBRO	— —
NACIR SELEMANE	C C D – Mualhá	LIDER	— —
Assane Salimo	C C D – Quelimane	Adj. LÍDER Cm.	849184506 826191795
Jorge S. Ali	Quelimane	Sec. Comite. CIRC.	
CHANGAMA Ali	Olumbe	2º VOGAL	866859841
Carlota Fernando	Murie – Sede	1º Vogal	——

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

	NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
1	Maliande Mamade	Bairro INCULARINO (Religioso Islâmico)	Líder	865423858
2	Hola Mecidine	Bairro Quelimane	Membro C.C.D	86545 4921
3	Cayayao Sade	M.E.C Bairro Quilaia	Membro C.C.D	865252330
4	SAIDE ARUBEIA	BAIRRO DE QUELIMANE	MEMBRO C.C.D.	86316144[illegible]
5	Antônio Cardoso	Quionga – Nacate	Líder Comunitário	863840781
	Angélica P. Furmane	Governo - Distrital	Secretário do Adm/do	84166307

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Carlos Paulo	SDAE	Téc. Prof. Agro. Pec	863891397
Marta Jacob	Mute	MCCD - Mute	865474529
Bendita Namuita	Mute	MCCD - Mute	86906229
Américo Mamade	Quionga	MCCD.	866634191
Severiano Martins	Quionga	Chefe da Localidade	865282637
Abudo Bonamuru	Delegado Mueda Maritimo Palma	Delegado Maritimo	860080356

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Martins Chaí	Mute	MCCD - Mute	86 54 66385
Pires Naukelangue	Mute	MCCD – Mute	865288746
Agostinho S. Nkavyanga	Mute	MCCD – Mute	861783613
Amade Omar Mpato	Mute	Chefe da Localidade	866767827
Silvestre Saujanjis	Nhica do Rovuma	chefe da Localidade	866655133
Aleixo Magnómuiro	Pundanhar	MCCD	862061874

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Salima Janibo	Olumbe - SEDE	m e c. c.	866806948
Fátima João	Olumbi - SEDE	m e c. c.	869889268
Saide Abdalo	Olumbe - Sede	ME C. C.	865232183
ASSUMANE AMADE	PUNDANHAR	M C C. C.	869877226
PAZANANI RASHID.	KIYONOSA	M C. C.	863849642
Tomas Tessa	Senga	Líder	867267490

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma - Fase de EIA
Distrito de Palma, Dia 11 de Setembro de 2013, 09:00h – 12:00h

NOME	INSTITUIÇÃO / COMUNIDADE	POSIÇÃO / RESPONSABILIDADE	CONTACTO
Albano de Lilos Benedito	Pundanhar	Subst. chefe do Posto	85402991
Felicidade Jooge	SDEJT - Educação	Organizador de som	820999686

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma – Fase de EIA
Distrito de Palma, 11 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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Pedro	Roucão	Secretaria Distrital	Adm/Dir	Secretaria Distrital Palma	Tel No:	
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					Cell No:	822842532
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Veronica	Pancrácio	SDPI Inspectorate	Directora		Tel No:	
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					Cell No:	821068160
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José	Ernesto	Comando da PRM. Distrital	chefe das operações	Comando Distrital	Tel No:	
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					Cell No:	865480008
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma – Fase de EIA
Distrito de Palma, 11 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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Palmira	Lourenço	Associação dos Pescadores de CD ASPACADE	Oficial de Programas	Av. Chai Lizi Pemba	Tel No:	867773165 / 823369164
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma – Fase de EIA
Distrito de Palma, 11 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma – Fase de EIA
Distrito de Palma, 11 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma – Fase de EIA
Distrito de Palma, 11 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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Pires	Nankulanga	Mccs-pmbo	MCCS	Palma Sede	Tel No:	
					Fax No:	
					Cell No:	865288974
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Clube de Palma – Fase de EIA
Distrito de Palma, 11 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILI-DADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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Jaime	Sumido	C C P Ruela	Presidente	Pemba	Tel No:	844056987
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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Graco	Fernandes	Traços Arquitectos	Administrador	Pemba	Tel No:	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
Ismail	Maquivelo	Direcção Provincial do Plano e Finanças DPPF/CD	Técnico	Rua 16 de Junho	Tel No:	84919014
					Fax No:	27221414
					Cell No:	826732320
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					Fax No:	
					Cell No:	847250091
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José	Tavares	INGC - Instituto Nacional de Gestão de Calamidades	Técnico	Avenida Eduardo Mondlane	Tel No:	827219041
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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Anci Moreira	Moreira	TVM	CAMERAMEN	RUA MARGINAL	Tel No:	
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A [illegible]ABE	GARRETT	IDPE	Técnico		Tel No:	
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					e-mail:	

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

REGISTO DOS PARTICIPANTES

Reunião Pública Aberta, Pemba Beach Hotel - Fase de EIA
Cidade de Pemba, Dia 12 de Setembro de 2013, 09:00h – 12:00h

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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PRIMEIRO NOME	APELIDO	INSTITUIÇÃO (Por favor não utilize acrónimos)	POSIÇÃO/ RESPONSABILIDADE	ENDEREÇO FÍSICO	CONTACTOS	
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APPENDIX E

COMMENTS AND RESPONSES TABLES (CRT's)

EPDA PHASE

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Palma District

Comments and Responses Tables
Date: September 27, 2011
Time: 09:00 – 12:00
Local: Palma Club

Name, Organisation	Comment	Response
1. Issufo Assane (Community Leader)	What is the water surface up to the well? Is it the 1.500m you spoke about?	Yes. The average water depth is 1500 meter. It is the same as the distance from here in the Clube de Palma to the Anadarko´s campsite in Palma. **Mário Rassul - Anadarko**
2. Bacar Ali Mbale (Community Leader)	We started this project together and now we are talking of the construction of the LNG plant and other infrastructure, in places where we have fish, crops and people. I would like to know the procedures that will be followed when the project begins.	The question shows what we came to do in Palma. We already have teams studying the people, crop fields, sacred places, cemeteries, etc. The presentation provided by Ms Uke will show some of the examples of the studies that will be undertaken and then compiled into a single EIA report, which will have to be approved by the Government. This document will identify the fishing grounds and indicate how to combine the interests of the fishermen with those of the company and we will come back here to present you with the results. **Mia Couto - Impacto**
3. Luís Salimo (Community Leader)	Remembered when AMA1 first came to Palma it promised to show respect to the local population and it has fulfilled this promise.	We understand the importance of respecting the local people and their traditional cultures. A number of people from the EIA team will be in Afungi in the coming months to undertake specialist studies. ERM and Impacto will take measures to try and teach these specialists about local customs before they get into the field. He highlighted that if they make any mistakes people should know that these will not be intentional and everyone is encouraged to let us know so that we can prevent mistakes happening again. **Kamal Govender - ERM**
	Pleased that Palma was selected from the various areas being considered which included Mocimboa da Praia, Macomia and Palma as options.	Comments are welcomed and noted. **Mia Couto - Impacto**
	He asked that God makes the LNG project work to bring development to Palma area.	
	He raised concerns regarding impacts on, or loss of fisheries, houses and crops but now, following the presentation understands that studies will be undertaken to understand any potential impacts prior to development taking place.	

Name, Organisation	Comment	Response
	To date the project activities have been focused offshore and future activities will soon take place onshore. He encourages AMA1 to be more careful as there are communities around. He mentioned that within the population there would be many people pro development and there may be some against the development. He encourages AMA1 not to give up the project because of negative concerns raised.	
4. Saíde Arubeia (Member of Community)	Aware that there is a similar project planned in Tanzania. Wanted to know if that project in Tanzania would be exploiting the same wells as AMA1	AMA1 has discovered gas in four offshore wells and plan to start producing gas by 2018. AMA1 have had discussions with the Government of Mozambique to highlight the urgency to exploit the gas. A similar company in Tanzania has also discovered gas, but the wells are not the same. If AMA1 start construction in 2014, we will win the race with Tanzania and other countries. **Mário Rassul – Anadarko.**
5. Saíde Arubeia (Member of Community)	Was confused as sometimes heard that the project would be located in Palma, but other times heard otherwise. He stressed that as the gas was discovered in Palma, it should be processed in a facility in Palma and that Palma was ready for the various infrastructures such as a port and airport.	Seven sites have been considered to date including other districts. Here in Palma, Quionga, Maganja, Cabo Delgado and Afungi have been considered and Afungi (Quitupo) is believed to be the most suitable site. If you go there, you will see machines working. These machines are helping us to see if the land is suitable for a large factory. After this work, if the results show that the land is suitable we will choose Afungi area. We hear that you are telling us not to ignore Palma and that you want the project here, but please do not be afraid to tell us if something is wrong just because you think that the project might be taken away from here. **Mia Couto - Impacto** We must remember that the gas is located far from the shore and other studies must also be undertaken to find out how to get gas to the land and if there are any issueswith this. It will take up to two years to find out if there are any issues. **Mário Rassul – Anadarko.**
6. Pedro Varela (SDAE)	Would like to thank AMA1 as he now feels that finally results are being produced and that first results would be good for Palma. He said that if the project continues the local population must benefit from the project.	Comments are welcomed and noted. **Mia Couto - Impacto**

Name, Organisation	Comment	Response
7. António V (Frelimo Party Representative)	Thanks all the efforts made to allow this project to take place in Palma District. The Tanzanian issue concerns him. How is oil/gas actually discovered? He was told that oil/gas is found very far away. He is concerned that the Mozambicans and Tanzanians may fight for the same gas and asked what would happen in such a case? If AMA1 extract the gas quickly and begin processing in the LNG plant, will this cause conflicts between the two countries? How do we know the AMA1 gas fields that have been discovered are not connected to Tanzania?	Gas from the three wells discovered by AMA1 in front of Cabo Delgado Province/Rongui Island is not linked with the gas field in Tanzania. . and the well close to Metundo Island is also not linked to the gas field in Tanzania. The area between the lighthouse at Cabo Delgado and the Rovuma River is large. In 2012, a drilling vessel will go there and drill another well. If gas is found, AMA1 and the Government of Mozambique will see if it continues into the Tanzanian territory. There is a good relationship between the governments of each country. Similarly, if the Tanzanians find gas near to the border between the countries, they will hold discussions with Mozambique to identify the best way to develop any resources that are common to both countries. The Rovuma River passes through both Tanzania and Mozambique, it belongs to both countries, one part belongs to Tanzania and the other to Mozambique. . AMA1 are not concerned about this issue at this stage but they are considering it as a possibility that may arise. **Mário Rassul – Anadarko.**
8. Mia Couto	How can Anadarko be sure that the wells are Mozambican	Seismic surveys have shown that the three gas fields discovered by AMA1 are not connected to the gas fields in Tanzania. **Mário Rassul – Anadarko.**
9- Alfane César (Police Commandant)	He thanked Anadarko and Impacto and said that we all know with a development comes some sacrifice. From what he knows, the entire local population is excited about the LNG project and everyone is hoping for a good outcome. Raised concerns about the impact of the project to tourism as there are a number of tourist lodges or resorts in operation. Around Vamizi Island and other islands, there are corals that are over 200 years old. Are these corals going to be affected by the project?	We are at a preliminary stage of the EIA process and are planning to undertake a number of studies to find out what is in the study area, i.e. to characterise the baseline of the study area. The proposed pipeline route could pass between two islands where we know there are corals. We also know there are corals around Vamizi Island. I mentioned earlier that increased turbidity may result from project activities. This may have potential impacts to corals. The potential impacts from the project, including impacts to corals, fish ecology and tourism from the project will be assessed during the EIA phase and results will be presented later in the EIA phase at the next round of public meetings. **Uke Overvest - Impacto**

Name, Organisation	Comment	Response
10. Pedro Varela (SDAE)	Concerned about impacts to fishing communities. In general Palma welcomes the project however members of the fishing community may have some concerns. For example, will they be allowed to continue with fishing? I have assured them that they will. Concerns that seismic or drilling activities may cause tsunamis or earthquakes. There are quite a lot of fishermen in the area however few of these are from Palma. Many are from Nacala and the majority are from Tanzania. Concerned that within the area of impact, most of the fishermen are not local. Requested that when studies are carried out that information regarding the fishermen, including number and where they are from is obtained. Requested that when the LNG plant is operational that children will be given the opportunity to visit the facilities to learn about hydrocarbons and petroleum. Emphasised that it would be good to train local Mozambicans from the area rather than foreigners. The coastline is greater than 2700 km and most people who live along the coast live off fishing. Is the project taking place within or outside the Mozambican Economic Exclusion Zone?	There will be a number of specialists undertaking studies and this will include a detailed fisheries study. To date AMA1 has undertaken seismic and drilling activities. These activities do not affect tectonic plates or faults and therefore will not cause tsunamis or earthquakes. **Mia Couto – Impacto.** The wells are located approximately 45 km offshore, thus, in the EEZ (Exclusive Economic Zone). Any training of workers for the LNG project will be carried out by the contractors and there areexamples of how they have done this on other projects outside of Mozambique. In addition, education and training of local Mozambicans is very important for AMA we will liaise with the Minister for Education to identify specific needs and how to best address these needs. **Mário Rassul – Anadarko.**
11. Awasse Saide (Community Leader)	Thanked Kamal Govender for recognising the need to respect local cultures and norms. Raised concerns that recently an AMA1 representative was not very polite to locals who were looking for work. Highlighted that there were very rocky areas between Tecomaji and Rongui Islands. How will the pipeline get through these areas?	Recommended that should people in the local population have issues or concerns about AMA1 that they contact Mario Rassul or Paulo Lima (contact details were provided). Encouraged people not to seek work at the AMA1 camp as they could not be offered work there. Emphasised AMA1's recruitment would take place via the Administrative District and or Administrative Post. **Mário Rassul – Anadarko.** The final pipeline route has not yet been determined. The AMA1 engineering team are undertaking studies to find the best routing for the pipeline. The EIA will assess the potential impacts of the selected preferred route and ERM/ Impacto will present these results in the next public meeting.

Name, Organisation	Comment	Response
		Kamal Govender – ERM.
12. Issufo Ximene (Religious Leader)	Mentioned that during the presentation, Uke Overvest had suggested that as a result of project activities there may be some potential impacts to fauna. In his point of view, himself and the local population don't consider it a negative impact losing some cropland etc. and that the project should still proceed. The project must be very sensitive to people and be more concerned about the local people.	Uke emphasised that she presented potential impacts. Once the specialist studies take place, we will have a better understanding of the nature and scale of all impacts. The EIA will take measures to minimise or mitigate all impacts associated with the project. The objective of the EIA study is to minimise and/or manage negative impacts on the people and the environment as much as possible. **Uke Overvest – Impacto.**
13 Pedro Romão Jemusse (District Administrator)	Thanked all concerned and said he enjoyed the session. He said that from the questions that have arisen it is clear that people are anxious and expecting good things from the LNG project. Recognised that a number of questions raised may be brought up during the next public meetings again. 2017 or 2018 seems a long way away and in the mean time it is important that the people look after their health and try keep illnesses away so they can witness the project in 2019. Highlighted the importance to continue collaboration to help the project go ahead. Understands that the session is aimed at launching the next phase of the EIA. He understands that Anadarko was first looking for oil and have found gas and likened this to fishermen out looking for fish but instead found lobster- how they would continue using/ exploiting the lobster. As Mario Rassul said, AMA1 will continue looking for oil onshore as they originally set out to do. He once again thanked everyone for attending the session to help launch the next phase of the project.	Comments are welcomed and noted.

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Pemba City

Comments and Responses Tables
Date: September 28, 2011
Time: 09:00 – 12:00
Local: Pemba Beach Hotel

Name, Organisation	Comment	Response
1. Matteo Vaghi (Metundo Island)	What proportion of Anadarko's business worldwide is comprised of oil and what portion comprises gas?	Anadarko has both oil and gas exploration and production worldwide of which the gas comprises 60% and oil 40%. **John Peffer/Mário Rassul - Anadarko**
2. Matteo Vaghi (Metundo Island)	Asked about ENI's operations	ENI have rights to explore Area 4, to the east of Area 1 and are currently in the exploration phase. **Mário Rassul - Anadarko**
3. Matteo Vaghi (Metundo Island)	Is the AMA1 drill rig likely to be bigger than ENI's rig?	The AMA1 rig is likely to be of a similar size to the ENI rig. The average number of people living on the rig and the rig is 130 m long. The actual size of the AMA1 rig will be dependent on the design commissioned but is likely to be in this range. **John Peffer/Mário Rassul - Anadarko**
4. Matteo Vaghi (Metundo Island)	What is the minimum water depth that a drill rig can operate in?	This type of drilling rig requires a minimum water depth of approximately 200 m to successfully operate. **John Peffer/Mário Rassul - Anadarko**
5. Matteo Vaghi (Metundo Island)	What is the depth from the Floating Production Unit (FPU) to the sea floor?	If an FPU is required it will need a water depth of approximately 1,500 m. **John Peffer/Mário Rassul - Anadarko**
6. Michael Gera (Vamizi Island) and Isabel Marques da Silva (WWF)	Will there be flares during offshore and onshore exploration and operation works? Has AMA1 undertaken any flaring offshore to date as it looked like some flare light was seen at night.	During testing of the wells flaring will be required. This will be undertaken as a single event, and will be of short duration (approximately a week). AMA1 has not undertaken any flaring to date as no tests have been done to date. The Belford Dolphin, the rig used during exploration activities did not have the capacity to flare. The changing in intensity of light could be the result of the position of the rig that is not moored. Flares will not be required for routine operation of the LNG plant (during production). For safety purposes, there will be flares installed but these will only be used in the event of non- routine conditions. **John Peffer/Mário Rassul - Anadarko**

Name, Organisation	Comment	Response
7. Michael Gera (Vamizi Island)	What are the route options being considered for the LNG carrier route?	John Peffer showed a 3D image of the seabed illustrating the various submarine canyons across the offshore study area. The canyons are up to 2 km wide in the Rovuma Basin. The LNG carrier route will follow a deep canyon into from the basin into Palma Bay. This will minimise the extent of dredging requirements. **John Peffer/Mário Rassul - Anadarko**
8. Michael Gera (Vamizi Island)	Concerns about silting that will take place from dredging.	
9. Michael Gera (Vamizi Island)	What height is the above-water hull of the LNG carriers?	The draught of the LNG carriers, or the height of the vessel that remains below the water level is up to 12 m and the required water depth for safe movement of these vessels is 15 m. From a technical perspective, one of the main reasons Afungi site was preferred was due to the deep water natural channel into Palma Bay which extends close to the near shore area of the Afungi site. The above-water hull of the LNG carriers will be 25- 30 m in height. **John Peffer/Mário Rassul - Anadarko**
10. Michael ? (Vamizi Island)	How frequent will the LNG carriers pass through?	It depends on the market. During the initial start up period of the facility it is likely that one tanker will pass through the study area every 4-5 days.
	What is the capacity of these carriers?	The tankers will carry an average of 165,000m^3 of LNG. **John Peffer/Mário Rassul - Anadarko**
11. Matteo Vaghi (Metundo Island)	In reference to the figure showed during the presentation, what do the red and yellow dots refer to?	AMA1 are currently obtaining current, wind and wave data via monitoring buoys located at various points in the nearshore area as there is very little available physical data for the near shore area. This data will be used to help design the project infrastructure for safe operations as well as the layout such as the pipeline route and port location.
	Will these dots be permanent or can fishing carry on?	The points are to show location of the buoys. There are no disturbances on fishing activities. The buoys will only be there for about two years. **John Peffer - Anadarko**
12. Mia Couto (Impacto)	The location of these dots anticipates the location of the pipeline?	Yes – there is a possible relation between these and the pipeline route. **John Peffer - Anadarko**
13. Lucia Jofrice (FOCADE)	Are there any risks of emergency situations? Will AMA1 prepare an Emergency Response Plan that considers natural disasters to prevent risks that may affect the community? I ask this question because of the oil spill in the Gulf of Mexico, which saw BP taking a long time to respond to the incident.	AMA1 are undertaking a number of studies to examine the risk of non- routine or upset events such as tsunamis and earthquakes to minimise the risks to the biophysical and socio-economic environment associated with such events. In the forty years of LNG production worldwide, there have been no catastrophic events associated with an LNG facility or associated infrastructure or equipment such as LNG carriers. LNG does not have the same impacts as oil, as if there is a release of LNG, it evaporates.

Name, Organisation	Comment	Response
		John Peffer/Mário Rassul - Anadarko
14. Matteo Vaghi (Metundo Island)	Is there a risk of explosion associated with the project (methane gas)?	There is a risk of an explosion occurring as LNG is flammable, however this will only occur under the right environmental conditions. Safety procedures will be core to the design of the LNG facility. In addition an exclusion zone around the facility will be incorporated into the project design as a safety zone or buffer to ensure communities are outside the area of risk. **John Peffer/Mário Rassul - Anadarko**
15. Emerson Ubisse (FOCADE)	Is there safety insurance in case of a disaster?	In the unlikely event o a disaster, Anadarko will be responsible to minimize the impacts. Yes Anadrko will be fully covered. **Mário Rassul - Anadarko**
16. Emerson Ubisse (FOCADE)	In reference to the figure showing the sea floor offshore, it was suggested that if AMA1 can take figures like this they could be invading privacy of the local population. Does it not mean invasion of human rights or National Supremacy?	The imagery shown was partially acquired during our 3D seismic survey and cannot capture people or invade privacy. Part of the image was taken from Google Earth, and mapped using laser beams and part results from an extensive work undertaken in 2008 by several marine biologists to map the sensitive habitats. Some of the people sitting here today have participated in that study. Thus, the image shown results from a combination of 3 images, none of which provides personal details. **Mário Rassul - Anadarko**
17.Assane Simão da Silva (Fórum Terra, Cabo Delgado)	The storage tanks will be located onshore, where people live. Will there be any resettlement? If yes, has a resettlement study been undertaken to know where the population will be resettled? What will be the actual exclusion area surrounding the plant?	People will have to be resettled. Specialist studies will be undertaken to characterise the baseline of the study area. From October 2011, these teams will be in the field and will determine the need for resettlement in order to prepare a Resettlement Action Plan. **Uke Overvest - Impacto** At the moment we can say that there will be resettlement but we do not know the extent and where as the exclusion zones are still not defined, but we will respond to these issues in the during the Resettlement study and the EIA. **Mia Couto - Impacto**
18.Vivaldino Banze (AMA Cabo Delgado)	What determines the need to install the offshore platform or Floating Production Unit (FPU)? Are there risks associated with the FPU? What type of accidents could occur in a project of this type?	It is determined based on gas pressure and how gas flows into the pipeline. An FPU will be required if additional pressure is required to push the gas to shore via the pipelines. Yes there are risks associated with the FPU, but AMA1 will minimise and mitigate risks where possible in the design of the FPU. There are several components to the project which occur offshore and onshore.

Name, Organisation	Comment	Response
		If an FPU is installed, accidents may occur at the FPU. There are risks associated with drilling activities. Since the notable accident last year in the Gulf of Mexico the petroleum industry has re-examined safety procedures particularly for offshore activities. There are risks associated with pipeline ruptures or leaks. AMA1 will undertake detailed analyses and measurements to ensure these risks are minimised. Once installed, AMA1 will continually monitor the pipelines to avoid or prevent leaks from occurring. Should a leak occur, the gas will rise to the water's surface and evaporate. The LNG storage facilities are designed for safety and to minimise the risk of leaks. Containment areas are constructed around the tanks and should a leak occur gas will remain in these areas and then evaporate. In addition, AMA1 will create buffer zones around the plant and project infrastructure to minimise risks to the public and workers. AMA1 will maintain an exclusion zone in Palma Bay around LNG carriers, the Materials Offloading Facility (MOF) and around the vessels within open water to minimise risks of collisions with vessels. **John Peffer/Mário Rassul – Anadarko**
19.Vivaldino Banze (AMA Cabo Delgado)	From the presentation it appears that the project will be all okay, but what studies will be undertaken?	A number of specialist studies will be undertaken as identified in the TOR of the EIA. These will include: • Terrestrial ecology- flora and fauna • Marine ecology • Socio-economics • Waste • Air quality • Land use • Surface water • Landscape and visual • Dispersion modelling • ETC These and other issues will be studies as part of the EIA and the results will be brought here in the next round of public meetings.

Name, Organisation	Comment	Response
	It is important to assess all risks in the different stages, including the risks to the workers.	**Uke Overvest – Impacto.** The consultant will carry out a detailed risk assessments for each component of the project. In addition Anadarko implements the best health and safety standards in the industry and takes the welfare of workers and community very seriously. . **Mário Rassul – Anadarko.**
20 Imamo Mussa (FOCADE)	Fisheries are fundamental for the livelihood and income generation of the local communities. How will fishing communities be identified and compensated for loss of access to fishing or other related impacts? What are the alternative income generating activities that are envisaged?	A fisheries study will be undertaken to characterise the fisheries baseline of the study area. The EIA team will identify measures to compensate the fishermen for loss off livelihood or loss of income **Uke Overvest – Impacto.**
21. Cristina Esteban (Agência Espanhola)	The presentation referred to exploration activities offshore but I know that AMA1 also has a concession onshore. Will you also provide information for the activities onshore?	You are referring to the Seismic activities that will be undertaken onshore next year. We will provide the information about that specific project in other meetings later this year. **Mário Rassul – Anadarko.**
22. António Dias (FOCADE)	What impacts will there be to Cabo Delgado Province in terms of employment or business opportunities? We know the limitations of Cabo Delgado and we are seeing several foreign investors coming in. What associated business opportunities can Cabo Delgado investors gain from the project?	These impacts will be studies in the EIA. This issue should be registered and answered in the next meeting. **Mia Couto – Impacto**
23. Marquiola Lyambuanbue (Progresso)	How much money has AMA1 invested in this project to date and how much the Cabo Delgado Province will gain?	US$ 750 million has been in invested in this project to date. **Mário Rassul – Anadarko.**
24. Policarpo Napica (DPCA, Provincial Director)	During the EIA process it is recommended that the EIA team consult some of the documents produced by MICOA regarding land use in the Palma area.	Noted and acknowledged.
25. Lucia Jofrice (FOCADE)	In the Non Technical Summary of the Draft EPDA, it states that the project will meet international best practice where possible. In what cases will the project not meet international best practice?	The translation in the Draft EPDA may not be clear. The EIA will be undertaken in accordance with international standards. We will re-examine the wording and edit if necessary to provide more clarity. **Kamal Govender - ERM**
26. Isabel Marques da Silva (WWF)	It is considered that dredging activities will definitely impact water quality, corals, fish species and fishing activities. The dredging	The EIA will assess both direct and indirect impacts of project related activities and the study area will be extended to incorporate all potentially affected areas including

Name, Organisation	Comment	Response
	activities are likely to impact the Vamizi area. The Draft EPDA does not acknowledge these impacts to Vamizi Island.	Vamizi Island. However, it should be noted that the exact location of the pipeline is still not known as studies are still ongoing. **Uke Overvest – Impacto**
27. Isabel Marques da Silva (WWF)	Can you provide more information on the proposed near shore infrastructure, in particular the port and LNG carrier turning circle?	Vessels will enter Palma Bay north of Tecomaji Island in the natural deep water channels. The LNG carriers will require 15 m water depth. Support and supply vessels will require approximately 7-8 m of water depth. It is likely that the MOF will be located at the north west of the site as the deep waters come close to the shore in this area. The loading jetty for LNG tankers is found further to the east of the site and will extend to the natural deep water channel. The preferred locations of this infrastructure will minimise the extent of dredging required. Studies undertaken indicate that the substrate typically comprises sands. Sampling has confirmed that the substrate is stable and will not require extensive dredging for construction and installation of infrastructure. It is considered that ongoing maintenance dredging will not be required. The method of dredging employed, if required, will be suction dredging which will allow sand and turbid waters created from dredge activities to be collected. These waters will be brought to the onshore facilities where the sand will be separated from the water. The water will be returned to the sea and the sand will be kept onshore. Turn circle- the LNG carriers require four times their length to safely turn, approximately 1.5 -2 km. Tug boats will help the safely manoeuvre the boats to ensure they stay within the designated areas. **John Peffer - Anadarko**
28. Vivaldino Banze (AMA Cabo Delgado)	In terms of corporate social responsibility, will funds be provided to the state or will AMA1 involve organisations to monitor investment?	Since AMA1 signed contract with the Mozambican Government in 2006, AMA1 has given US$ 1 million to the government (INP) to invest in social projects each year. Going forward AMA1 will consider making additional funds available for social projects which will be managed by AMA1. AMA1 will identify NGOs, particularly in Pemba to help manage these funds. It is envisaged that these funds will be made available for education or training through collaboration with identified NGOs. **Mário Rassul - Anadarko**
29. António Dias (FOCADE)	It was understood an EPDA public meeting was held in Palma on 27th September 2011. Many of the people in Palma are known to be illiterate so how are they supposed to understand the complexity of the proposed project if people in Pemba are struggling to understand?	Representatives from government and the local population attended the meeting in Palma. We used a translator who translated to the local language. The main issues raised at the Palma meeting were related to fisheries. The I&APs expressed their desire for the project to succeed. The EIA team tried to stimulate them to raise issues

Name, Organisation	Comment	Response
		or concerns they may have about the project. Few women attended the meeting and they didn't speak. The EIA will hold focus groups with vulnerable groups including women to provide a forum for these groups to voice their concerns. **Mia Couto – Impacto**
30. Paulina Jimenez (KEPA)	Many subcontractors will be commissioned to work on the project. If there is an accident or leak, will AMA1 take responsibility for the project or will the subcontractor be held responsible for their own actions?	We will have international and local sub-contractors and the main problem lies with the local sub-contractors. The International sub-contracts are signed at our office in Houston, USA and responsibilities are clearly defined and stated in the Contract Agreements. Subcontractors commissioned by AMA1 will take responsibilities for their actions but ultimately AMA1 will be responsible.
31. Emerson Ubisse (FOCADE)	Disturbance, noise and pollution impacts will be associated with increased traffic. Have these issues been assessed for the construction of the yard in Muxara? How waste management practices are being considered in Muxara camp? I do not know if the wastes are hazardous or not. It is requested that in Pemba, AMA1 manage vehicles travelling to and from the port properly to minimise traffic jams.	During the EIA phase of the project appropriate measures to manage impacts associated with disturbance, noise, emissions and dust generation associated with traffic will be developed and incorporated into the Environmental Management Plan. The Waste management in Muxara is managed according to the approved Environmental Management Plan. MICOA conducted an audit and no findings were raised. Anadrko also requested a company to evaluate the air emission for the incinerator and the result was good. The Report was submitted to MICOA and is a public document. A new incinerator have been installed and the waste management will improve even further. There are obvious issues that we can not avoid, such as the moment of trucks between the Pemba Port and Muxara and we expect the traffic to increase. It is our responsibility to avoid accidents. Our trucks are not allowed to drive at more than 30km/h and if our workers drive at speeds higher than 50km/h they will not be allowed to drive again in Mozambique. Thus, this is not only our problem. We also have to assess the general traffic in Pemba. But this is not the correct forum to discuss Muxara. **Mário Rassul – Anadarko**
32. Vivadino Banze (AMA – Cabo Delgado)	The people in the local communities may not think about problems that may arise from the project in the future. They want poverty to be eliminated immediately and they may not think of the negative impacts.	There are likely to be both positive and negative impacts to the local communities from the project. AMA1 and the EIA team will liaise with the government to understand how to best understand and deal with these issues. AMA1 will be dependent on the government to provide clarity. **Mia Couto - Impacto**

Name, Organisation	Comment	Response
33. Vivadino Banze (AMA – Cabo Delgado)	Request than AMA1 notify the public of any investment in the community. He could not find any Social Responsibility information on Anadarko´s website and he feels that these issues should be disclosed to the public.	A goal of AMA1's is to be as open and transparent as possible during the process of the project. Transparency is highly important to AMA1. AMA1 is a member of AMOPI, an initiative which supports Mozambique application to the Extractive Industry Transparency Initiative (EITI). **Mario Rassul – Anadarko**
	Suggested that Corporate Social Responsibility be included in the Terms of Reference for the EIA.	The Terms of Reference are related to the project and indicates what the ERM and Impacto consultants will study. Discuss Anadarko´s social responsibility should be done in a different Forum as we, environmental consultants, do not assess the company´s social responsibility actions. In any case, Anadarko has noted the comment. **Mia Couto - Impacto**
34. Bárbara Kruspan (Helvetas)	Impacts from the project will not only be restricted to Palma, e.g. the impacts on the access roads, and the project must therefore consider indirect impacts, including any impacts outside of Palma, extending the extent of the geographic study area if necessary.	The EIA will assess both direct and indirect impacts of project related activities and the study area will be extended to incorporate all potentially affected areas. **Uke Overvest – Impacto.**
35. Hermes Pacule (CEPAM)	What criteria were considered in the site selection process in terms of ecological, socioeconomic and biophysical receptors and resources to determine the preferred site? What were the indicators used for choosing Afungi?	The AMA1 Project Team has over a period of seven months systematically identified and evaluated prospective Liquefied Natural Gas (LNG) sites on the northern coast of Mozambique and finally selected the preferred site on the north side of Afungi peninsula. The evaluation process has considered technical, environmental and social impacts associated with using each site for development of an LNG facility and the data gathered to date show that the Afungi site is the best overall option. Sites were assessed by a marine ecologist, terrestrial ecologist and socio—economist using environmental and social criteria which were developed by these specialists. The criteria considered were: <u>Marine ecology</u>: • Sea grass • Shallow coral reef structures • Sand beaches • Mangroves • Estuaries • Linked biotopes • Shore and nearshore modification (dredging)

Name, Organisation	Comment	Response

- Pipeline shore landing
- Export facility – Trestle jetty and dolphin berth
- Possible discharges from the LNG Facility

<u>Terrestrial ecology:</u>

- Protected areas (legislative issue)
- Wetlands
- Regionally Important Woodland
- Coastal forests
- Mangroves
- Estuaries
- Mammals
- Avifauna
- Herpetofauna habitat

<u>Socio-economics:</u>

- Local government support of project
- Human settlements within site
- Number of inhabitants
- Proximity to large population centre
- Community migration/seasonal use
- Marine access routes
- Subsistence agriculture
- Presence of fishing centers
- Overlap with land uses (other than subsistence agriculture)
- Adjacent land uses
- Cultural, religious and/or historical importance of the site
- Tourism ventures
- Recreational activities and sites
- Eco-tourism uses (community benefit)

Following initial studies the environmental and technical team held a workshop and narrowed down the number of sites. These sites were subject to further field investigations and the sites were ranked against each other based on the above criteria. A second site selection workshop was held with the environmental and technical teams and Afungi was selected as the preferred site.

Further details of the site selection process are available on request.

Name, Organisation	Comment	Response
		Kamal Govender – ERM
36. Isabel Marques da Silva (WWF)	Afungi site is more protected from winds than Cabo Delgado. The population of the Afungi site is greater than that of the Cabo Delgado site so it is confusing that Afungi was selected as the preferred site.	Various criterions were considered in the site selection process. See response above.
37. Paulina Jimenez (KEPA)	It was mentioned here that Anadarko will comply with international requirements and we know that Mozambique is a candidate for the Extractive Industry Transparency Initiative (EITI). Is Anadarko a member?	A goal of AMA1's is to be as open and transparent as possible during the process of the project. Transparency is highly important to AMA1. AMA1 is a member of AMOPI, an initiative which supports Mozambique´s application to the EITI.
		John Peffer – Anadarko
38. Cristina Esteban (Agência Espanhola)	What team will be undertaking the marine ecology study for the project? The area is considered to be of great marine and terrestrial interest and require a special attention. As you may know, this area was subject to several preliminary studies by the National History Museum of Paris and others.	The EIA team can provide a list if each of the specialists involved in the EIA process. We have had contact with the people that have undertaken studies in the area, such as the team of Mr. Timberlake and one of the reasons for not selecting the Cabo Delgado peninsula result from the recommendations of those studies.
		Mia Couto - Impacto
39. Stélio Tandane (AMA Cabo Delgado)	During operational phase, there will be a lot of movement of gas carrier vessels, how will waste be managed, in particular, liquid waste?	A waste management study will be undertaken as part of the EIA to determine the methods for management of waste and to assess potential impacts associated with waste as a result of the proposed development.
		Mário Rassul - Anadarko
40. ?	Will vessels wait offshore for periods of time before entering Palma Bay?	LNG carriers will not wait outside of Palma Bay for extended periods of time. The speed of these vessels will be regulated, slowed down if necessary, so that they will not be required to remain stationary. The vessels are on a tight schedule and will operate on a quick turn around in Palma Bay.
		John Peffer – Anadarko

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Maputo City

Comments and Responses Tables
Date: September 30, 2011
Time: 09:00 – 12:00
Local: Girassol Hotel

Questions/ Comments	Responses
1. Thanked AMA 1 for locating the camp in the district of Palma, as it is considered that it will help contribute to improved social and economical conditions for the local population. It was understood that the camp may move to Mocímboa da Praia but now is it clear that the camp will stay in Palma and the community of Palma are happy about this. Because I represent the tourism sector, I am concerned about impacts to existing ecosystems. The district of Palma and the province of Cabo Delgado have valuable biological resources. AMA 1 must respect the cultural heritage of the area. The deepwater and coastal areas are valuable heritage areas and being from Palma, I would like to see areas or aspects of heritage preserved. There is a site in Cabo Delgado where a sultan was buried and this area attracts a lot of visitors. AMA 1 must also respect local cultural customs. In many countries where oil or gas is discovered there is conflict and there are no positive socio-economic changes. This project must avoid making similar mistakes and must contribute towards improving the conditions for the local community both in Palma and in the province of Cabo Delgado. We suggest that AMA1 carry out a training program to ensure local people benefit from jobs the project will create. **Eduardo Zuber – Ministry of Tourism**	**1.** The camp in Palma was established to support seismic activities being conducted by the ARTUMAS company. There was a break in activities while the company studied the results of the seismic study and the camp was kept on standby. AMA1 is aware of the resulting frustrations. A major concern of AMA1 was not to raise expectations. We held several meetings with the Consultative Council to inform them that the camp was on standby and control expectations as we did not know the future of the project. A deepwater campaign then started and all operations were planned to be based out of Mocímboa da Praia (including helicopters, accommodation for pilots, fuel tanks etc). As the distance from Pemba to the drilling sites would increase additional operational costs. Containers were moved to Mocímboa da Praia. As the conditions of our operations changed, more than half of all containers that were sent to Mocímboa da Praia have been returned to Palma. The settlement in Palma will grow twice as big as it was in 2008. We liaise with the District Administrator prior to doing anything as ongoing communication is important. **Mário Jorge Rassul – AMA 1** The issues raised with regard to sacred sites that are of tourism significance are very important, and we have noted and acknowledge your comment. **Mia Couto – Impacto** We are already aware of the location of a number of sacred sites and may find more during baseline studies. However, only after the specialists conduct field studies will we be

	able to identify all sacred sites, tourist sites and other land uses. We will then assess the impacts of the project on these receptors/ resources. Alternatives and recommendations will come after the specialist studies. Mitigation measures will be proposed, once the impacts are identified to minimize impacts to these receptors/ resources and these will be presented in the EIS. **Uke Overvest - Impacto**
2. It has been mentioned that fishing is the main activity of the local population. What alternative income-generating activities are there for communities where fishing will be impacted? There will be direct impacts to fishing activities and a loss of available fishing grounds. With regard to the areas where the gas pipeline will be installed, sediments can contribute to changes in the benthic faunal community, thereby impacting fisheries. How will this issue be dealt with in specialist studies? **Amadeu Cossa – Mozambican Initiative for Good Governance**	**2.** With regard to fishing, this activity will have to take place outside the exclusion zone. After the baseline fishing characteristics of the area are studied, the impact will be assessed, along with the respective alternatives, mitigation steps, etc. **Uke Overvest - Impacto**
3. Between 2000 and 2007 coastal and marine biodiversity conservation projects in Palma and a few districts of Nampula were being undertaken and provided for the establishment of two marine reserves, one in Palma and the other in Mossuril. Do you have information on these proposed marine reserves? What is your approach to considering the recommendations set out for these reserves? Considered it good that the population in Palma has raised issues and concerns regarding the project as it shows that they are aware. **Michael Belarmino – Students from the International Relations Institute**	**3 and 5.** The ESHIA team is aware of both proposed and existing conservation areas. Timberlake's study described the coral rag forest to the north of Afungi site and the proposed marine conservation area. Currently the project is not located within an existing conservation area. Once we understand the objectives of the conservation areas we can to try to ensure the project is aligned with the objectives of the conservation areas. AMA1 will need to understand the goals of the conservation area and how to make the project coexist with the conservation areas. **Kamal Govender - ERM**
4. It is understood that the majority of the population in Palma are illiterate and it is important that AMA1 find mechanisms to provide training to local communities so that	**4. and 8.** A decision was made between ARTUMAS and AMA1 not to use heavy machinery during the seismic phase, in order to provide work for the local people. It was

they can access jobs that will become available. This would prevent marginalizing these communities and any riots that could ensue. **Michael Belarmino – Student from the International Relations Institute**	necessary to work with those who had jobs to prepare them for the end of the seismic phase work and loss of associated income. . AMA 1 is aware that it must develop and adopt a strategy that creates a balance between ensuring profit for AMA1 while providing social benefits to local communities. It is easier to work with technology, although this will not benefit the people of Palma. One of the strategies established by AMA1 is to contribute to social projects. Since AMA1 signed the contract with the Mozambican Government in 2006, AMA1 has given US$ 1 million to the government to invest in social projects each year. In order to manage those funds, an inter-institutional committee was created, in which AMA 1 participates, and where priorities will be established for using the funds. Going forward AMA1 will make additional funds available for social projects which will be managed by AMA1 starting in 2012. The amount and a strategy on how best to manage this fund is still under discussion internally and AMA1 will have discussions with various levels of Government. It is envisaged that these funds will be made available for education or training through collaboration with identified NGOs. The Ministry of Education for example have expectations and similarly so do those at District level. AMA1 will engage the various levels of government to devise the best strategy. **Mário Jorge Rassul – AMA 1**
5. In line with Mr. Belarmino´s comment regarding the 2007 project, it outlined an area for marine preservation and that the study recommended that a change be made to the recommended marine reserve area outlined in Palma. Is Impacto aware of information relating to these proposed reserves? **Natalia Camba - INP**	See response to point 3 above.
6. Where will water be sourced from for the project? Will sea water be used? If yes, what treatment methods will be used to treat the water before it is disposed of, back into the sea. **Natalia Camba - INP**	**6.** Throughout the design phase we will look at the volume of water required for the project. In the long term, small volumes of water will be required, mainly for domestic use. We will drill bore holes in Afungi to determine what volumes of water are available from the groundwater. Another option would be

	desalinization of seawater. During the EIA process the various options will be considered, however the preferred option is dependant on the volume of water available. **John Peffer – AMA 1**
7. It is understood that the project will be implemented in Afungi as the conditions are better and impacts to the environment will be less. There are some major tourism projects in this area. What is the proposed strategy to allow for these two industries to co-exist harmoniously? **Natalia Camba - INP**	**7.** The strategy will be to engage with the various tourism operators to identify how the project will impact investments in tourism and what appropriate measures could be adopted to either eliminate or minimize these impacts. **Kamal Govender – ERM** We have had meetings with a number of tourism operators in Palma, the owners from Tecomaji, Vamizi and Rongui islands. We explained the project and listened to their plans on how to make these two types of developments coexist. Dialogue with the tourism industry has already begun and will continue. **John Peffer – AMA 1**
8. It was mentioned previously that people in Palma are illiterate. This does not mean that they have no skills. These people can be trained for the project. What training programs will AMA1 have available to allow local communities have access jobs created by the project? **Luís Tembe – National Directorship for Technical Education**	**8.** At peak periods during the construction phase, there will be up to several thousand workers on site a large number of which will be unskilled and semi-skilled. AMA1 will source as many as possible from Palma District and Cabo Delgado Province and will be examining how best to do this through liaising with the authorities. AMA1 will contract EPC contractors which in turn will contract subcontractors. These EPC contractors have experience in many countries around the world, such as Angola, Egypt, Indonesia, etc. In the EPC contracts AMA1 will will stipulate that they must support training initiatives to maximize the provision of training. **John Peffer – AMA 1**
9. The contract between AMA1 and INP does not stipulate that a Strategic Environmental Assessment (SEA) should be conducted to strategically assess the environmental changes. What will the implications of the recommendations outlined in the SEA be on the AMA1 project? **Décio Monteiro – INP**	**9.** Impacto is involved in the SEA. The SEA is still in the preliminary stage. Any recommendations outlined in the SEA will be considered in the AMA1 project as there is still time available to allow this. **Uke Overvest – Impacto**

10. The Terms of Reference (TOR) of the EIA are not very specific and have some gaps. Propose some changes are made to the TOR: a) The findings of the SEA that is currently being conducted should be integrated in the study TORs as these are binding. b) Include the estimated amount of carbon emissions that will be caused by the project and provide mitigation measures in accordance with the conventions ratified in Mozambique. c) Expand the scope of the study area, particularly the marine area so as to include all areas that are going to be affected by the project, including gas transportation and export routes of gas that cover not only the Bay of Palma, but also a much larger area within the Mozambique channel. It is also necessary to include the areas that may be impacted by dredging such as coral reefs and fishery areas. d) Studies of climate change should also be included for the purpose of demonstrating the impacts the project will have on climate change at a project level in the project area as well as in Mozambique. In addition, it would be important for the project to undertake long term studies that can contribute towards increasing the scientific knowledge of climate change in Mozambique. The development of a meteorological station should be proposed in the EMP, for instance, so as to monitor sea levels in this area and thus anticipate impacts [of climate change] on our country. Currently the nearest station to measure sea levels is in Zanzibar. e) The EIA ToR should identify long term studies to be conducted for biological and social topics where there are information gaps, such as fisheries and whale migration patterns, etc. These studies should be included in the EMP.	**10.** We thank you for the suggestions provided here and we will include them in the study of environmental impact. Impacto is involved in the SEA. The SEA is still in the preliminary stages. Any recommendations outlined in the SEA will be considered in the AMA1 project as there is still time available to allow this. **Uke Overvest – Impacto** Regarding the SEA, AMA1 is one of two companies in Mozambique which has contributed to that study and we are also interested in its results. AMA1 has conducted 4 EIAs previously and has made these available to the SEA team. A number of studies will be undertaken for the EIA which will include climate change. With regard to climate change, It should be highlighted that out of all the carbon based fuels, LNG is by far the cleanest energy source. LNG is a dry gas with no CH_2 or H_2S. **John Peffer – AMA 1**

f) There is a need to publish various impact assessment studies during the EIA process, rather than all at once. The project should have regular meetings with stakeholders. g) There is a need to have mechanisms in place to monitor the real impacts of the project on the environment. Typically projects do not measure impacts that actually occur. h) There is a need to review social mechanisms and strategies for a long term relationship between AMA1 and local communities. We would suggest that permanent mechanisms be developed rather than ad-hoc mechanisms to prevent the strategy from being changed, if and when for instance the rights to explore the area are transferred from AMA1 to another company. These mechanisms could be included in the EMP as this will ensure they are binding with the government. i) How will a safety program for the facilities be developed? And how will this program contribute towards improving safety and security of the coast. **Sean Nazerali – WWF**	
11. What is the expected timeline of the project? What are the prospects in terms of the social commitments and expectation management that AMA1 is expected to adopt? Would like to understand concerns of social issues in Mozambique based on working in other markets. Suggest that this study take into account other studies that have already been conducted. In Cabo Delgado Province there is a white book that identified all resources at a provincial level. This should be considered. **Jorge Muanahumo – Association of friends**	**11.** From today, it will take roughly six years before first gas, or when LNG is produced. The duration of the operational phase of the project is expected to be at least 20 years. **John Peffer – AMA 1** Impacto has access to the white book and will certainly use it in our studies. **Uke Overvest – Impacto**

and supporters of Cabo Delgado	
12. Need to manage expectations in the Rovuma Basin. The quantity of existing gas may be compared to the amounts that were discovered in Brazil. It is really important to manage expectations and know what we should expect from this project. AMA1 will have a responsibility to provide training but there is a responsibility of the Government to prepare people for the project e.g, provide training to become electricians, carpenters etc as they will not have the necessary skills if they wait for AMA1 training, Technical education should prepare our students to be in a position to compete and get access to jobs. **Natália Camba – INP**	Comments are welcomed and noted.
13. Expressed thanks for conducting public consultation meetings and sharing information regarding the project. Recognized the efforts made by AMA1. Suggests that local communities also be consulted when establishing priorities within the scope of social projects as it is important that local communities have a say. We should take account of the need of the population and how the project will benefit the local people. Suggests that gender is considered when conducting studies and engagement activities and that disadvantaged groups should be considered as reports show that it is these people who suffer the most. **Stiven Ferrão – Mozambican Initiative for Good Governance**	**13.** We intend to consider minority groups such as women, elderly and children in our socioeconomic studies. **Uke Overvest – Impacto**
14. Agree that the Government should not redeem itself from responsibility. There is a need for local training and involvement of the local community. It must prepare to welcome large projects by training people who are going to apply for the jobs offered by the projects. Suggests that socioeconomic studies are developed in order to survey the training needs of local communities.	**14.** The Afungi site was selected as the preferred site for a number of reasons including that it did not have as many sensitive terrestrial ecology features as the Cabo Delgado site. This is not to say that the fungi site has no sensitive areas. The potential ecological impacts will be assessed and mitigation measures provided. **Kamal Govender – ERM** Where sensitive habitats or areas are lost, we

In terms of the site selection process, inside the Afungi Peninsula, there is an environmentally sensitive terrestrial ecological area that coincides with the area where the project will be implemented. How will the project compensate for loss of these areas? This should be included in the EMP as recommendations**.** **Claudia Manjate – WWF**	will look at offsetting these. **Mia Couto- Impacto**
15. Where are the gas wells that are going to be explored located and how deep are they? **Orlando Matos – Jirrof Construções**	**15.** The water column has a depth of approximately 1,500 m. From the seafloor to the prospect, it is approximately 3,500 m**.** **Mário Jorge Rassul – AMA1**

EIS PHASE

Liquefied Natural Gas Project in the Province of Cabo Delgado

Focus Group Meeting - Provincial Government of Cabo Delgado

Comments and Responses Tables
Date: January 30, 2012
Time: 08:30 – 11:30
Local: DPOPH Meeting Room

Participant	Question Raised	Answer
***Mateus Matusse**, Provincial Director, Office of the Provincial Director of Industry and Commerce*	I would like to welcome the initiative of the Developer/Consultants to provide the Provincial Government about the development of the studies.	Comment welcome and noted. (Mia Couto, Impacto)
***Mateus Matusse**, Provincial Director, Office of the Provincial Director of Industry and Commerce*	It would be important if the members of the Government could visit the project area (over phases), during its different stages, to get a better understanding of the project area.	Suggestion noted. (Mia Couto, Impacto)
***Mateus Matusse**, Provincial Director, Office of the Provincial Director of Industry and Commerce (DPIC)*	It was reported that resettled individuals are going to benefit from professional training. In the meantime, it is suggested that this training is aimed at the provincial level and is focused on the different types of work that will be necessary throughout the stages of construction and operation of the project. It is recommended that AMA1 discuss this issue with the Government. In Cabo Delgado, we already have the National Institute of Employment and Professional Training (INEFP), and we can think about disciplines that are related therewith, even indirectly, with other services that the project is going to need. The Provincial Directorate of Industry and Commerce DPIC is planning to install a corporate	It was reported that the professional training is aimed at individuals who will be resettled, but this does not mean to say that the EIA is not going to address this issue. The social impact of the project will be studied by a team and will include the possibility of providing social training. The EIA can recommend maximizing the possibilities of professional training, as a social responsibility of AMA1. I suggest that AMA1 creates its own momentum to discuss the questions of professional training with the institutions of the Government at a central and provincial level. Impacto/ERM can study how to obtain the maximum possible benefit regarding the provision of training, which must begin now, so that, by the time that the project starts, matrices have already been prepared to provide solutions, in coordination with the programs which already exist at the national and provincial level.

	orientation center focused on the exploration of gas, through indirect services, as a manner to value and benefit small and medium-size companies in the Province of Cabo Delgado. The information sharing and contact with the Government must continue to ensure that the corporate sector of the province (local vendors/business people) is informed about the service needs that the project will have.	(Mia Couto, Impacto) AMA1 will set up a meeting with the Provincial Government to discuss any issues that are involved in the gas project - development of small and mid-size companies, professional training, among others. It is an objective of AMA1 to provide professional training within a wider scope, including the construction of new training centers, subject to agreement with the Ministry of Education. (Mário Rassul, AMA1)
***Graziela Tembe**, Provincial Director, Office of the Provincial Director of Education and Culture*	Professional training must be understood within the general context of the province and not only regarding the area of resettlement. What will be the model for providing professional training? Is it going to make use of existing institutions, through coordination of the necessary courses, or is an institution going to be established for specific areas of expertise?	Thank you. The previous response also answers this question. (Mia Couto, Impacto)
***Lina Portugal**, Permanent Secretary, Provincial Ministry*	Taking into account that the majority of the local residents that will be resettled rely on the sea as the basis of their sustenance, we suggest that, during the process of resettlement (movement of persons from their normal environment to another area- the host area), the relationship of these populations with sea-related activities (fishing) and other activities should be taken into account, so that their lifestyles are not dramatically changed and to avoid any negative impacts.	Comment noted. In addition to the dependence of people on the sea, it was verified that, furthermore, the project may interfere with transportation routes of people and cargo in the area. (Mia Couto, Impacto) We are concerned about the impacts to the sea users as we know that it is not only as an important resource for fishing but also because we know that many of the local communities use the coastal area as a transport route to Palma (for trading, transportation and other purposes). However, the traffic associated with the project is going to cause a series of disturbances to sea users and we have to evaluate all of this with sensitivity. (Victor Nicolau, Impacto)
***Lina Portugal**,*	Taking into account that several	We will undertake studies to access

Permanent Secretary, Provincial Ministry	pipelines will be installed, what is the environmental impact of possible leaks on the sea floor (by gas) and onshore (by fuel of the project vessels), on both ecosystems and tourism?	the possibilities of all unplanned events or emergencies, including spills. We will develop measures to prevent and mitigate the occurrence of these accidents. Once these studies are completed, we will come back to present the findings. (Kamal Govender, ERM)
***Tiago Cherene**, Chief of the Provincial Services of Geography and Registry, Office of the Provincial Director of Agriculture*	Within the area requested by AMA1, there are three villages: Quitupo, Nsenga, and Maganja. We know that the section covers the entire village of Quitupo and part of Nsenga, but a doubt still exists whether Maganja is within or outside the section.	In the slide showing the AMA1 site area, the demarcation in yellow is a sketch used by AMA1 as a point of discussion, which matches, more or less, the area being negotiated with the Provincial Services of Geography and Registry, an area of 7,000 hectares. But the official map of the DUAT area held by the Provincial Services of Geography and Registry refers to 6,000 hectares because, on the upper left side of the area, there is a DUAT granted for tourism purposes. AMA1 knows 1,000 ha DUAT area that does not belong to the AMA1 LNG site. We are certain the village of Quitupo is going to suffer direct impacts from the project and, it is likely that there is going to be resettlement from there. Although the village of Nsenga is beyond the area of the DUAT, it is probably that the individuals of this village has farmlands within the AMA1 LNG area. A careful evaluation will be conducted to determine requirements for compensation. Maganja is the village that has raised most concerns. On one hand, we intend to avoid the need for resettling the population of Maganja, and, the location of the yellow line was intended to avoid Maganja. We are aware however that the people of Maganja may also have farms within the area of the DUAT. We are still considering the best strategy to take. We have also considered reducing the DUAT to exclude the village of Maganja to avoid the need for resettlement.

		In the meantime, these discussions arise when looking at the issue of the land from a sociological point of view. But when analyzed from an environmental point of view, within the area of the DUAT, there is a rather sensitive mangrove area that will remain protected in the event that it is incorporated within this area. However, the issues of resettlement of these villages must be considered at the same time together with other components of the project (environmental and engineering). (Mia Couto, Impacto)
***Lina Portugal**, Permanent Secretary, Provincial Ministry*	I would like to know whether the District of Palma has an existing zoning map, to determine where each and every development must be located, both this project as well as others that will come as a result thereof. If not, would it be possible to request AMA1 or Impacto to prepare the zoning map of the entire District of Palma?	At this point in time, only the Urbanization Plan of the District of Palma has been prepared. The spatial development map has already been prepared, whose document is being integrated into the Land Use Plan, with the involvement of the Provincial Services of Geography and Cadastre. However, there is still no detailed zoning map of the entire District of Palma. (Augusto Assane, Technician, Office of the Provincial Director for the Coordination of Environmental Action). In addition to the recommended zone for resettlement, which will be outlined in the EIA, it is suggested that this activity (the development of a zoning map) is promoted/ considered further, with the support of AMA1 or Impacto, in coordination with the Government, (Mia Couto, Impacto)
***Dinó Coutinho**, Provincial Director, Office of the Provincial Director of Public Work and Housing*	In this presentation, no reference was made to intensive use of access roads. Knowing that the project is going to attract a lot of traffic, we recommend that this aspect be studied in the EIA.	During this meeting, we are not presenting results of the EIA study. The meeting only serves to provide some new information regarding the location of the project, while the study is being conducted. Upon completion of the study, the results of all components will be presented, including the use of access roads.

		(Mia Couto, Impacto) What we have presented is work in progress in terms of studies by specialists, but there are many other studies, including a study on traffic and maritime traffic, which will is being undertaken by a team of specialists involved in this project. (Uke Overvest, Impacto)
***Argentina Simão**, Provincial Director, Office of the Provincial Director of Women and Social Action*	During the preparation of the resettlement Plan, the social component must be taken into account because this is going to help identify all cultural, development , etc. factors and determine how women are fundamental to family structures. The lessons learnt from resettlement within provinces that already have experienced this process must also be considered (for example, Tete and Maputo) to reduce the levels of risk.	Suggestion noted. These aspects will be taken into account during the resettlement process. (Mia Couto, Impacto)
***Samuel Buanar**, Provincial Director, Office of the Provincial Director of Transportation and Communications*	In addition to transforming the peasants (subsistence farmers) into farmers, artisanal fishermen must also be transformed or supplied with the best techniques for more sustainable fishing.	As for the majority of the peasants (subsistence farmers), there are also several restrictions for the development of the fishing activity, in terms of type of equipment and non-sustainable practices. There will be an opportunity to improve the equipment, teach new practices, and support the creation of a cooling network for the preservation of fish. However, AMA1 will play a big role in training around new fishing techniques, more effective and more sustainable techniques, in terms of preservation of resources, and opportunities to organize the fishing centers in small cooperatives. Both for the peasants as well for the fishers, the idea of creation of excessive quantities (not only for self-consumption) must be considered with a view to a consumer demand. (Victor Nicolau, Impacto)
***José Domingos**, member, Fisher*	Pollution to the sea or atmosphere is not only going to affect the	These issues regarding pollution will be studied and modeled. The results

Forum	population of Maganja da Costa, but the sea currents may even drag it to Mocímboa da Praia. What measures will be implemented regarding these possible impacts on the communities that live along the coast, mainly for the communities within the project area?	from modeling including dispersion models will be presented during a future meeting with you, once the studies are completed. (Kamal Govender, ERM) We can not assume that we are going to pollute but, yes, we can assume that there will be some emissions caused by the LNG plant, but these are not necessarily polluting. The Impacto/ERM team is going to study the impacts of all effluents and discharges that are generated by the project. (Mário Rassul, Impacto)
Augusto Assane, Office of the Provincial Director for the Coordination of Environmental Action	I must raise attention to the issue of training, since we have received several projects that include commit to this component but training never materializes.	The issue of training will be discussed in a separate forum, between AMA1 and the institutions that are directly related therewith. (Mia Couto, Impacto)
Augusto Assane, Office of the Provincial Director for the Coordination of Environmental Action	What will the resettlement schedule be, since the beginning can not be far off?	At this point in time, it is impossible to answer this question because it depends on other issues to be agreed between AMA1 and the Mozambican Government, regarding the exact location of the project. We need basic agreement on where to resettle, who will be resettled, and the respective limits to start the resettlement. (Mia Couto, Impacto)

Liquefied Natural Gas Project in the Province of Cabo Delgado

Focus Group Meeting – Cabo Delgado Tour Operators (EIS Phase)

Comments and Responses Table
Date: January 30, 2012
Time: 14:30 – 17:30
Local: Pemba Beach Hotel

Participant	Question Posed	Answer
***Isabel Ferreira**, Representative, Kilaguni, Lda and Dawi Safaris, Lda*	We know that the project is important for the country, but as tourism operators we are obviously concerned. I am a member of the CDTUR (Association of Hotel and Tour Operators of Cabo Delgado) management commission, and a number of operators have already asked the same question regarding how the AMA1 project and the dredging activities at the entry of Palma Bay will impact tourism in the Palma area (protected area, considered to be a destination for safaris and various types of tourism). The reason for this concern is that we will not be able to develop the same tourism plans which were initially planned for the Palma area, since our site is located right beside the proposed AMA1 gas processing plant.	Thanks for bringing this to our attentions. There are obvious conflicts between oil and gas developments and tourism. The social impact assessment being undertaken as part of the EIA will examine all business activities and livelihoods in the area. You will be included on our stakeholder database and be informed of progress on the EIA and receive project information. (Kamal Govender, ERM)
***Isabel Ferreira**, Representative, Kilaguni, Lda and Dawi Safaris, Lda*	What will the dredging activities involve? Should we change our vision and proposed services? How can we change our project to accommodate the LNG facility?	The Government has commissioned a Strategic Environmental Assessment of the entire Mozambique coastline, due to the potential conflicts between tourism, fishing, gas and petroleum production, conservation areas, etc. This is currently being undertaken and it is expected that by the end of this year the Government will have a tool which is capable of creating zoning restrictions or land use guidelines based on the most logical outcomes. (Mia Couto, Impacto)

***Isabel Ferreira**, Representative, Kilaguni, Lda and Dawi Safaris, Lda*	I believe the Government's initiative to prepare a Strategic Environmental Assessment of the entire Mozambique coast is important, since, as a member of CDTUR, we would like to know about the future of tourism; will it be traditional tourism or business tourism?	
***Alberto Sanikkela**, Associate Director, D&E Beach Resort*	Although the tourism resorts at the Tecomaji, Rongui and Queramimbi islands are still in the construction phase, their future projects have already been planned/ designed. What will the direct impact on tourism be for those islands with the installation of the gas processing plant, the floating production platform and the gas pipelines which will run near or between the islands?	The potential impacts are being assessed in the scope of the EIA. (Kamal Govender, ERM) A visual impact specialist is currently in the field and she will assess the visual impacts of the project on the islands and on tourism operators. An analysis of this type of impact is included in the EIS and measures will be proposed to mitigate those impacts. (Uke Overvest, Impacto) It is likely that the LNG plant will not be visible from Queramimbi Island however it may be impacted due to vessel traffic from the project, which during the first phase will be one LNG carrier approximately every 10 days, however later it could be as frequent as one vessel per day. Nevertheless it is understood that the concern of the tourism operators of those islands is not just that there will be a direct visual impacts from the plant but also the impact of increased maritime traffic in the zone in the future. (Mário Rassul, AMA1) The EIA will consider the various phasing of the project and the increase in vessels from the initial phases of the project until later phases. (Kamal Govender, ERM)

***Isabel Ferreira**, Representative, Kilaguni, Lda / Dawi Safaris, Lda*	In the first or second phase, the maritime traffic is really irrelevant, since the issue is that we will have a gas plant which will change the entire philosophy of what the tourism product is based on. What was previously known as an unexplored, natural and protected area, will no longer be so. Will the EIA assess impacts to all islands?	The Terms of Reference of the EIA states that all impacts on tourism in general will be assessed, as well as the impacts on the islands or zones directly impacted by the project, including Vamizi Island. (Mia Couto, Impacto)
***Karen Schoeman**, Manager, Tecomagi Island*	Where will the dredging take place and to what extent? Will there be a substantial area of dredging in the bay?	Dredging will take place from the low point to the corner and be approximately 100m wide to allow for 6 pipelines to be laid. AMA1 have done simulations to measure currents in the bay. When dredging we will need some sort of dam, such as a rock dump to prevent trenches filling with sediment but this will be removed when laying each subsequent pipeline. (Neil Summer, AMA1) Most dredge material will be used in the construction of the jetties as landfill. Dredging activities in the bay will take approximately 6 months and will not commence until Q1 of 2014. (Neil Summer, AMA1)
***Karen Schoeman**, Manager, Tecomagi Island*	We have heard that flaring will start soon.	A drill ship will start tesing this month and will involve some flaring over 3-4 days. This will take place approximately 40km offshore at the Barquentine wells as is not expected to be very visible from the islands. The first campaign will involve testing of 4 wells. (Mário Rassul, AMA1)
***Zaide Abubacar**, Miti, Lda / Vumba Island*	Within the scope of the study, have some direct negotiations already occurred with the identified parties who in some way will be impacted by the project, specifically the tourism operators, with respect to the possible compensation, taking	No contact has been made with the tourism operators in terms of negotiations. First we have to await the results of the EIS and the Strategic Environmental Assessment currently being prepared before making any

	into consideration that this is a large and significant project and some tourism operators have already begun their projects?	assumptions regarding any negative impact which may subsequently result in compensation, through the AMA1 compensation team. At this time, we are prepared to discuss with and seek to identify property owners in and around the project area, primarily to listen to their concerns. We request that the consultants thoroughly address these concerns, and provide guidelines and advice based on those findings. In November, 2011, as a private individual I participated in a meeting with the Minister of Tourism and with the Vice-Minister of Mineral Resources, called specifically to talk directly with the tourism operators of Pemba and the islands, to which AMA1 was also invited, for the purpose of understanding the position of the tourism operators on the islands. At that meeting, the Vice-Minister said that most of the *Business Plans* of the current tourism operators were made some time ago (10 or 15 years ago). It was also mentioned that it would be useful to review these plans, for which the trademark images vary from operator to operator, but that may not be impacted. However, based on the concept that each operator perceives that its business has been impacted, the trademark images can be changed, and this decision should be made by each investor to determine if it is preferable to adapt to the new changes or if he/she wishes to continue to invest in the new trademark image. (Mário Rassul, AMA1)
***Zaide Abubacar**, Miti, Lda / Vumba Island*	Has a social study been completed regarding the fishing villages inside the	The social study is currently being undertaken by a team responsible for the socio-

	project area?	economic assessment. (Mia Couto, Impacto) A number of investigations, interviews, etc. were conducted in an attempt to understand the existing situation in the area (for example, what resources are being used, where they are located, how they are used, what quantities, how the population depends on those resources etc.) and these will be used to determine what the socioeconomic impacts of the project are, as well as a basis for the mitigation, compensation and population resettlement factors. We will be presenting these results soon in another meeting of this type. (Uke Overvest, Impacto)
***Isabel Ferreira**, Representative, Kilaguni, Lda / Dawi Safaris, Lda*	When will we be given information about factors which will affect the tourism operators, since all of our projects and the decisions we make will depend on this information?	A project schedule was presented, and it was mentioned that focus group meetings will be held which go beyond the requirements of the Regulations applicable to the Public Participation Process, in order to meet the need to transmit information to the tourist operators and other stakeholders. These meetings will allow the project to share information regarding the progress of the specialist studies, if we have information considered to be important or relevant. I suggest that the consultants organize a meeting with the focus groups after we have the results of the visual impact studies and present the findings of the impacts of the project activities on tourism. (Mário Rassul, AMA1)
***Isabel Ferreira**, Representative, Kilaguni, Lda / Dawi Safaris, Lda*	In a meeting with the Ministry of Tourism and Mineral Resources it was mentioned that it is not yet certain where	AMA1 is currently in negotiations with the Government to obtain a DUAT of 6,000 hectares on the

	the LNG plant will be located, whether in Palma, Mocímboa da Praia or Macomia. However, can it be confirmed that the plant will be constructed in Palma, on the Afungi Peninsula?	Afungi Peninsula, since all of the studies indicate that that is the best area to develop the LNG project. We do not yet know if the Government will approve this, but we have sufficient scientific arguments to convince the Government that it is the best area for the project. (Mário Rassul, AMA1) The tour operators have high expectations regarding the results of the EIS with respect to the quantification of damages (and opportunities) of the project, and the respective balance since they believe they will lose more than they will gain. However, I don't know if the EIA study will identify the impact in a general way or if the level of detail will be reached that they expect, regarding how much they will lose from the project proceeding. It is necessary to clarify these aspects for the tourism operators. (Mia Couto, Impacto) The EIS will not quantify potential losses in monetary terms since this is not included in the current version of the Terms of Reference. The EIA will assess the type of impacts and the significance of these impacts and suggest appropriate mitigation or management measures to minimise the impacts. (Kamal Govender, ERM) While the study is being undertaken, there is no absolute certainty beyond the fact that the EPDA has been approved, meaning that up until that time, based on the available information, it was considered that there is no fatal obstacle which would make the project unfeasible. In addition to the EIS for this

		project, there are also other studies such as the Strategic Environmental Assessment and studies performed by other companies with projects in the same area. As consultants, we confirm that even if the news is not promising for the tourism operators, we will come back and report on the results with transparency. I suggest AMA1 look at previous successful studies to see how best to try and align O&G and tourism. (Mia Couto, Impacto)
***Zaide Abubacar**, Miti, Lda / Vumba Island*	Are the residents of the villages already aware of the project?	Yes. In December, 2011, and again last week, a team of socio-economists and researchers were in the field, working in the project area, meeting with groups of men, women, young people, fishermen, farmers, etc., informing them of the project plans. This team has already collected information regarding their concerns, their lifestyle, land use, etc., and based on this information, a description of the area will be prepared together with an evaluation of the potential impacts the project will have on these communities in order to identify suitable mitigation measures. Studies of factors related to resettlement and compensation will also be undertaken. (Uke Overvest, Impacto) I would like to report that these social studies verified that in Maganja there have been complaints from fishermen that they were previously removed from the islands without any type of compensation or resettlement by a tourism operator, and they don't want to be resettled again. However this still needs to be confirmed. (Mia Couto, Impacto)

***Karen Schoeman**, Manager, Tecomagi Island*	When should we expect to get the results of the marine studies? The marine environment is very important to the tourism operators. This kind of engagement is really useful and really important to us. It keeps us focused on the areas of importance and makes the process more meaningful so thank you.	The marine ecology baseline studies are still being undertaken and will not be completed until later this year. I suggest we present the findings in a similar forum to this in September. We can package specific data for different focus group meetings. As part of the EIA process we will hold public meetings to discuss the findings of all the specialist studies. (Kamal Govender, ERM)

Liquefied Natural Gas Project in the Province of Cabo Delgado

Focus Group Meeting – Central Government

Comments and Responses Table
Date: February 1, 2012
Time: 09:00 – 12:00
Location: Hotel VIP

Participant	Question Posed	Answer
***Gilberto Botas**, National Technical Education Director, Ministry of Education*	First of all, I would like to congratulate this impact assessment team initiative and AMA1 for informing us of the progress within the scope of the environmental assessment of the AMA1 LNG project, with its various costs and benefits. If we take into consideration that at this time the gas is in gaseous form and under pressure, technically I would like to understand, in 5 or 10 years, with the reduction in the volume of gas and pressure of the deposits, how will the empty wells be refilled? What will the tectonic reaction be in that space/hole after modifications due to pressure reduction from the removal of gas? I know that in the case of open air coal mines, the space/hole is filled with earth up to the mine entrance level and the area is revegetated.	There is a big difference between oil and gas. Oil is a liquid and liquids can be compressed easily. After oil is removed, the geological structure resettles because there is a vacuum and phenomena can occur such as subsidence, in other words, settling of the upper layers. In the case of gas, there is no empty space when the gas is removed as the gas is mixed with sand and there is insufficient pressure to form a support or ceiling function for the deposit. In any case, the pressure does decrease and normally this is compensated naturally by water infiltration which tends to occupy the spaces left by the gas. Thus, in gas deposits no subsidence or collapse phenomena occur due to the characteristics of the gas. We are not talking about a big hole full of gas; we are talking about a geological formation basically composed of sand, with the spaces filled with gas mixed with sand. For this reason, the gas goes out but an empty hole is not formed, but rather sand and any possible decreases in pressure are compensated by infiltration of sea water. (Neil Summer, AMA1)
***Gilberto Botas**, National Technical Education Director, Ministry of Education*	Today we are talking about gas discoveries in the AMA1 wells, but there are other wells which have been discovered by other companies such as ENI. AMA1 is now proceeding with plans to install a future plant, with various types of infrastructure, including an airport,	In that regard, we can say that talks between ENI and AMA1 have already begun and that INP has suggested that the facilities and resources be shared. However, I do not have any information about how this would be done, what will be the timing and how the two companies

	hotels, etc., which could probably be useful for other companies operating nearby. Will AMA1 be willing to share this infrastructure with these other companies or will this be a problem? I would like to know if there is any hypothesis in which the various wells can be connected to minimize the negative environmental impact in the area, because the various plants could be subject to various consequences, and we will have a number or resettlements.	will negotiate this. But it does make logical sense that the two companies would share their facilities and a large part of the exploration process. AMA1 has a vice-president who is responsible for commercial issues and he is dealing with this issues. (Mário Rassul, AMA1) Petroleum operations regulations stipulate that, in field unification situations, the two companies will discuss the matter and first enter into an agreement, and if they are unable to reach an agreement, international arbitration and Government level negotiations could occur to define the best course of action. As you are probably aware, one company has started planning and a number of studies have been undertaken and a lot of investment has been made, whereas another company is only starting now. For this reason, there are matters which they should reconcile together. (Natália Camba, National Petroleum Institute)
***Natália Camba**, Technician, National Petroleum Institute*	Many people are probably asking why the gas is to be liquefied and exported and not produced for Mozambique, since we need to develop our own market and we lack energy sources? There are many reasons why the country first exports part of the resources, and later uses resources for domestic purposes, or for doing it both ways at the same time. This is due to the level of investment which this type of industry requires, since it is capital intensive, in the range of approximately 20 billion dollars for projects like this one, including only for exploration and development. Therefore there is a need to recover these investments and there is only a return on the capital beginning in the 7th year of the project. The investments need to be recovered because funds are borrowed from financial institutions and there is a need to export the resource to a location where there is more	Comment noted.

	commercial competitiveness, for example the Asian market which is where the sale prices are high and where a higher and more acceptable return can be obtained. Another reason is that the gas fields are far from the coast and are in deepwater areas. Bringing the product to shore and processing it onshore would imply very high costs.	
***Manuel Taque**, Technician, National Fishing Research Institute*	What is the possibility that AMA1 could provide gas to for cooking purposes from the LNG plant, since this is one of the greatest concerns in the country, even if it only benefits the local population in that region of Cabo Delgado?	The investment costs necessitate an anchor project to make the LNG project feasible, through exports to markets which pay more. The gas for cooking, fertilizer, methanol and methane markets in Mozambique are very small. All of these small projects could be implemented, but within the strategy of the Government, not the investors. (Mário Rassul, AMA1) The composition of natural gas includes certain suitable components from which LPG could be extracted, however at this time, the actual composition of the gas discovered in the Rovuma basin is not yet known. In principle, it could be said that the gas is dry; however INP has not yet received information about its composition. The Government is also waiting to see what the composition of the natural gas is in order to study the possibility of extracting LPG, since there are also concerns about using this gas for domestic purposes. Almost none of the houses in the country are equipped to use direct gas, since this requires a piping infrastructure to houses which was not anticipated when the houses were constructed, and converters are also required to be able to balance the composition of the gas for use in cooking. In Europe, the houses are already built with this type of infrastructure, with this pipe network which can be used for cooking with natural gas. ENH has a project currently in progress to use natural gas for domestic purposes for Marracuene and at some points in Matola.

		(Natália Camba, INP)
***Manuel Taque**, Technician, National Fishing Research Institute*	How will the fishing communities be compensated for the loss of their fishing grounds? What resources will be made available for communities which use fishing as their basis for subsistence?	It is necessary to emphasise that we are not yet ready to present the EIS. We are lacking detailed information about the environmental studies currently being undertaken and new data about the project location, infrastructure and issues related to resettlement. The compensation studies have not yet been initiated. (Mia Couto, Impacto) One of the losses which will occur in the project area, even before the resettlement process begins, is the restriction of access to the beach and the fishing area along the beach for approximately 7km. These areas will be restricted for safety reasons. Therefore, during the EIA study, an assessment will be performed to determine the primary fishing areas in the area to see of any of these fishing areas are or are not impacted by the project. If they are impacted, it will be necessary to see if the project can, without compromising safety, facilitate access to coastal waters in the adjacent areas of the plant. Only after that occurs will we have a specific understanding of what the impact will be in terms of loss of fishing areas and mitigation measures. As is the case with farming, artisanal fishing is not very efficient and it is highly destructive. For this reason, we should promote the development of fishing using better techniques and, through social responsibility programs, create a cold storage network so that the fishermen can preserve their catches. These are ideas which could possibly be implemented by the project, depending on circumstances which will become clearer in the future since this study has not yet been completed. (Victor Nicolau, Impacto) At this time, social teams are on the field conducting surveys of the existing baseline in the area and

		mapping fishing areas. As you know the area is a very complex one because some of the fishermen are not even from there. There are fishermen who come in from Nacala and Tanzania, so it is important for us to have a very clear understanding of who the interested parties are and how each of them may or may not be negatively impacted by the project. Often, the fishermen are not the owners of the boats, therefore it is necessary for us to undertstand the area very well and the Fishing Institute has been collaborating very closely with us. (Mia Couto, Impacto)
***Eulália Macome**, Ministry of Agriculture*	I would like to know if agriculture is also included on the household questionnaires, as is the case with fishing?	All land uses and existing natural resources are included in the household questionnaires. However, the main purpose of these questionnaires is to find out how many people live in the project area, how they earn a living, what resources they use, how they depend on those resources, and how the resources may be impacted by the project, in order to assess the impact and produce information on issues related to resettlement. We already have baseline information and the reports are being prepared. During the next few meetings, more information will be available and we will present this to you. To answer your question, not only questions regarding fishing are included on the questionnaires, but also agricultural and use of forests. (Uke Overvest, Impacto)
***Alcino Dias**, Consultant, Ministry of Labor*	With the implementation of this project there will be a number of challenges to respond to the demands required by these investments. I would like to know what AMA1 is thinking from the point of view of the creation of conditions, capacity building, in the sense of responding to the requirements of this investment on the short, medium and long term?	We are aware of the responsibility and there have been internal discussions at Anadarko regarding the need to provide vocational training for the operational phase, not just the construction phase. We are currently initiating a capability study of suppliers which requires Mozambican suppliers to complete. The study will look at Anadarko's needs and identify ways to meet these needs over time. We will be working with the government throughout the process.

		(Tom Freet, AMA1) The company is aware of this and a number of alternatives are being studied. A study is in progress which seeks to identify service providers and their capacities. However AMA1 has a broader vision and will develop this project from perspectives which extend beyond Liquefied Natural Gas. It is not our obligation, but in order for our business to progress well, we will need a chain of a number of other projects to support us. (Mário Rassul, AMA1)
***Gilberto Botas**, National Technical Education Director, Ministry of Education*	I believe there is a need to train the local population, and Mozambicans in general, in gas technologies, not only so that they can work at the plant, but also in the use of the products, including marketing, transportation, storage, use in domestic installations (installation of piping, filling cylinders, sales, etc). This is the Government's responsibility. There has been mention of turning subsistence farmers into cultivators but I think that AMA1 will take this into consideration. In the meanwhile, we as the Government would like to have a training center where short, medium and long term courses could be offered, near the plant, to train electricians, builders, equipment operators, etc., to work in the storage facilities, hotels, kitchen workers, transportation workers, etc. We understand that it is our responsibility and that we should immediately begin to make plans. As the Government, we are not in a position to impose upon AMA1 the obligation to build a training center so that we can have qualified technicians in this area, because it is in our interest. However, we always count on support from these large projects, because they should be part of the projects social responsibility program.	What has been noted many times in the past is that the representatives of the Government attribute to private investors a role which the Government itself should assume. At least, the Government should direct the private investor with very specific instructions about what is going to happen and what should be done. For this reason, it is necessary to raise the level of local conditions so that in 3 or 4 years time there are people who can meet the needs of this project and other projects. (Mia Couto, Impacto)

***Alcino Dias**, Assessor, Ministry of Labor*	There will be a number of technical and professional qualification requirements which the country is not capable of providing on the short term. The project will require some highly specialized professionals, and the response will not be immediate no matter how much we want it to be. And it is that situation which causes me the most concern.	Concern noted. (Mia Couto, Impacto)
***Eulália Macome**, Ministry of Agriculture*	LNG provides a quick return on large investments, but because it is an export product it may not bring immediate social and economic benefits for the majority of the population of Cabo Delgado and the rest of the country. I understand that this is a decision of the company and in fact the company has to make the project profitable, but I am not very much in agreement when you say that fertilizers cannot be an option, or that it should be an option developed by the Government. I agree that a small amount of fertilizers are used in Mozambique but there is potential. Many fertilizers pass through the ports. For this reason, it is necessary to open space for large fertilizer producers and we cannot miss this opportunity.	The liquefied natural gas project is an anchor project and other small projects should be thought about and encouraged, including fertilizer projects. When mention is made of turning subsistence farmers into cultivators, obviously more training is needed, but the Government cannot be absent from this dialogue and abdicate this duty. Someone needs to establish the rules of the game. (Mário Rassul, AMA1)
***Mário Marques**, Consultant, Ministry of Mineral Resources*	Training is one of the primary concerns of the Ministry and in 2011 the Ministry presented a training strategy to the Council of Ministers in the area of mineral resources, with a projection of what will be the need for graduates from higher, middle and basic level educational institutions, including the coal, oil and gas sectors. Specific to natural gas and oil, we have more than 25 students in Malaysia studying at the University of Petronas, and some have nearly completed the course. We have 10 to 20 middle level graduates in Angola at the Institute connected with SONANGOL. Last week, an article was published in Jornal O País, and other media, scholarships for 200 upper level graduates in	Comment noted. (Mia Couto, Impacto)

	areas specific to natural gas and liquefied natural gas. We are in the process of selecting 30 individuals to work in liquefied natural gas plants in Angola, Nigeria and Italy. Thus, in matters related to training, we are preparing for when the activities begin at the LNG plants; we will have many positions that can be filled by Mozambicans. One or 2 years ago Anadarko was at the Lúrio University and made some contacts because although foreign training is important it is also important to train our educational institutions to teach disciplines connected to the petroleum sector. The University Eduardo Mondlane (UEM) already has curricula for master's degrees in petroleum engineering and it is important for other universities in other provinces to also begin to provide petroleum industry courses. We are not capable of training many people, and we have to do it abroad, but I think that one of the priorities is to provide local training. This has been a concern of the Government and the Ministry of Mineral Resources long before the beginning of this project.	
***Mário Marques**, Consultant, Ministry of Mineral Resources*	In a recent meeting with Anadarko, a question was asked regarding the volume of gas which will be produced. The quantities of natural gas are enormous. Although the quantities of liquids in the gas, components such as propane and butane will be very small; these are enormous volumes and must be separated. I have information that some 1500 barrels per day of production of propane and butane are anticipated, since the gas which comes from the deposits, before being converted to LNG, needs to be separated into liquid components, ethane, propane and butane, However, 1500 barrels per day could meet all the needs of the country. On the other hand I don't want to create any expectations since this production will only begin	Comment noted. (Mia Couto, Impacto)

	in 2018.	
***Mário Marques**, Consultant, Ministry of Mineral Resources*	From our experience with other projects, the phase which causes the most concern from an environmental point of view is the construction phase, since it will be necessary to move tons of equipment, large items, cement, and gravel, and Palma has nothing at the moment. It has no port and the highway between Pemba and Palma is in a very poor condition. How does Anadarko plan to begin the construction process? Will everything be transported by sea? What environmental impact will this imply?	The issue of logistics will be complicated. We already have a preliminary plan, since we already know that we will need to build a network of roads around Palma, connecting Palma with the construction site in Afungi, so that the materials can be transported under good conditions. However clearly building roads also causes impact. At this time, there is a strategy to upgrade the road network from Palma to the site and inside the site. This is also of interest to the population, since a good road network is always important. At this time, we have a plan to develop a road network around Palma and from Palma to the Afungi Peninsula, as well as connections from the mini-port in Palma to the city of Pemba. Transportation of materials is a real challenge, and the preferred option is to transport heavy materials to the area by sea. The issue is that once the materials are offloaded in Palma, the access route from the port to the town is steep. For this reason, we have to prepare a good access route connecting the port to the town of Palma. The scenario also exists of not offloading the materials in Palma but rather offloading them directly near the construction site. However this is an issue which the engineers cannot begin to consider just yet since a DUAT for the land has not be acquired. The authorization needs to be issued and various other elements need to be clarified before they can begin to consider this as an option. The key option being considered at this time is to transport the heavy materials by sea to the port of Palma, create an efficient connection from the port to the town and construct a good road network which

		connects Palma to the site; so that the material can be transported to the site. (Tom Freet, AMA1) We are preparing the EIS which covers all potential project impacts and would give us an environmental permit which would allow us to start construction. However nothing can be done until the study is completed. It is expected that the study will be completed no later than the middle of 2013. It is necessary to find preliminary or early works which can be performed so that Andadarko can get started with the activities. However, in order to define this early works, we have to face another type of problem related to land laws. We requested the DUAT for the selected areas and until we have an authorization from the Ministry of Agriculture we cannot do any work in the Afungi area for the LNG project because the land is not ours. Associated with this, we assume that we will be able to get past this first hurdle and reach an agreement with the Ministry of Agriculture. On the other hand, at the same time we have the Impacto team which is allowing us to make progress, because they are going to be involved with the resettlement process. What we are trying to explain is that it seems like a simple question to answer but there is a whole network of small collateral issues which must be properly addressed and resolved first. For example, for the engineering team, it was very easy to assemble a type of mooring system to offload to the beach. But in order to do this we have to see if it is environmentally possible without an environmental permit. Our latest strategy is to identify all work which environmentally can be classified as Category C, which means activities which do not need an environmental study, but only need the agreement of the Government.

		On the other hand, if we can find a solution which allows us to offload some materials in order to begin construction, we have to construct a base camp for 200 or 400 workers, due to the size of the project, and under the environmental law, this type of construction is considered to be Category B, and is not compatible in terms of time. Therefore, for these particular components, interaction between the Government and Anadarko is useful, so that a middle ground can be reached which allows us to make progress without violating the principles established in the EIS being prepared. Mention was made that there are no construction materials in Palma (gravel, sand, etc.). Assuming that it is possible to find a site with these construction materials, inside or outside the country, we would have to store them somewhere. Also, since the project is so large, the storage area for these materials would be enormous. Would it be possible for the Government to allow us to store these materials? Then, there would be no challenges for the project team. We have to know how to navigate these laws which seem to be contradictory and for this reason the Government has to help us to resolve this so that it is possible for us to move forward. (Mário Rassul, AMA1) Regarding the issue of impact assessment, we are going to take into consideration the various phases, the entire life cycle of the project, beginning with the construction phase. In addition to the specialized studies, we have a ground and marine transportation component. We will also consider these issues of transportation of materials, use of roads and sea transportation during the construction and project operation phases. (Uke Overvest, Impacto)

***Mário Marques**, Assessor, Ministry of Mineral Resources*	Financing has been obtained and the reconditioning of the Pemba-Palma highway has already been approved. I think that, in conjunction with the Environmental Impact Study, the option of using that highway should be considered. This is a matter which should be well planned and discussed and I propose that talks be initiated with the highway authorities.	Thank you. Information noted. (Mia Couto, Impacto)

Liquefied Natural Gas Project in the Province of Cabo Delgado
Public Consultation Meeting – City of Maputo (Phase)

Question and Answer Matrix
Date: September 9, 2013
Site: VIP Hotel
Time: 09:00 – 13:00

ID	Question Raised	Response
1	What is the real area the project infrastructure will require? Will the 7,000ha be occupied? **Alda Salomão - General Director, Centro Terra Viva (CTV)**	We are working on the Front-End Engineering Design (FEED) efforts and will have those answers within the next 4 or 5 months. There are areas that will not be used from an environmental standpoint, and these areas could be used as biodiversity areas. **Cory Weinbel - Project Manager, AMA1**
2	What is the number of affected families or persons living in the project area? **Berta Rafael - Environmental Researcher, Centro Terra Viva (CTV)**	The current estimate we have is that approximately 700 families may potentially be resettled. We have not yet started the detailed census, as we are waiting for government approval. **Cory Weinbel - Project Manager, AMA1** There are about 733 families within the DUAT, corresponding to approximately 2,740 people. However, these numbers were collected some time ago during the EIA and were provided by community leaders. It is therefore necessary to conduct a census to get an exact number. Not all of the 733 families will be resettled. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
3	The gas is filtered for mercury and sulfur. Since these are byproducts, what will they be used for? Are they used to make any other product? **Emanuel Viçoso - Project Coordinator, Consultec**	Our gas is very clean and has very few contaminants. **Alexandre Jossias - Environmental Coordinator, AMA1** The design of the LNG plant includes facilities to remove these components, to protect the facilities downstream. We do not expect to have significant quantities of these contaminants as tests to date do not show these components. If these are present they will be handled by an authorized company in accordance with Waste Management procedures that meet

		international standards. **Cory Weinbel - Project Manager, AMA1**
4	I would like to know if the study presented to us here will be the same as that presented to the population of Palma. **Tomás Vieira Mário - Journalist / Director of the Sekelekani Center for Communications Studies**	It is the same EIA Report that will be presented in Pemba and Palma, but the presentation will be adapted to be understood by the people of Palma. **Mia Couto - Meeting Facilitator, IMPACTO**
5	We understand that the Resettlement Action Plan (RAP) is yet to be completed, but engagement with the population regarding resettlement has begun. Local people are asking "are we being resettled, where are we going?" Apparently this question has not been answered, creating a great deal of anxiety within the population. **Tomás Vieira Mário - Journalist, Director of the Sekelekani Center for Communications Studies**	The resettlement host community (the area where people will be resettled to) has not yet been defined, and cannot be defined at this stage. The process must be aligned with Mozambican legislation and international standards both of which require a participatory process. The process won't be decided in an office in Maputo, at the expense of the people. People will provide their preferences on their preferred resettlement site, and these proposed areas shall be assessed. The resettlement site(s) will only be defined following the consultation process with the people. More than one site may be selected, as it will be hard to put people with different cultural sensitivities and ways of life to live in the same area. The selected site(s) will be defined after a number of technical studies are undertaken to determine factors including the location of good agricultural land, proximity to the sea, etc as well as given consideration to the preferences of the people. The issue of loss of resources will be given consideration. The host community must have access to similar resources. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
6	MICOA must make its final decision on the EIA in late 2013, however a DUAT (Right to Use and Enjoy Land) was assigned to the project in 2012. Was this DUAT awarded to AMA1 by the Ministry of Agriculture? **Tomás Vieira Mário - Journalist, Director of the Sekelekani Center for Communications Studies**	The DUAT of 7000 hectares was initially issued to ENH, one of the partners of Area 1, by the Ministry of Agriculture, taking into account the size of the area required. This DUAT was subsequently conveyed to a company called Rovuma Basin Land Limitada (RBLL), incorporating ENH and AMA1, with the purpose of providing access to the land, ensuring that other operators would have access to the land. RBLL signed a

		transfer of property contract with AMA1 as the operator of Area 1 representing the interests of all of the other partners in the block. The requirement to obtain an Environmental License prior to obtaining a DUAT is not correct according to our understanding. The Environmental Law states that the Environmental License must have precedence over all other licenses required to exercise the activity in question, as they may be required in each case, and not the DUAT. We do not consider the DUAT to be a license. Our understanding is that the Environmental License does not consider the attribution of rights over the land (DUAT) but licenses that would be necessary to undertake a specific activity. Annex IV of the EIA Regulation (consisting in the Pre-Assessment Tool to be submitted by the proponents to kick off the environmental assessment process) states that it is necessary to report the lawful possession of the land.. Therefore, if it is true that the Environmental License must take precedence over the DUAT, it would be contradictory to state in Annex IV of the EIA Regulation that the proponents must gather information on a space that it does not yet possess. The second consideration is that the General Directive for preparing Environmental Impact Statements (EISs) includes in its Annex 1 a Procedures Flowchart for the licensing of activities, and the first step on the flowchart is requesting provisional authorization of the DUAT for land use and development. Submission of the proposal of activity for pre-assessment purposes by MICOA appears as a third step, followed by issuance of the Environmental License and then issuance of the licenses necessary to exercise specific activities, namely an industrial license, when a plant is involved. Moreover, the Environmental License does not appear in the requirements under the Land Law and Regulation for the DUAT.

		Maria João Hunguana - Lawyer, AMA1
7	Did you investigate other options or ways to avoid resettlement? For example, would it be possible to build the plant in an area where no people live? **Issufo Tankar - Project Coordinator, Centro Terra Viva (CTV)**	We considered seven different sites from the Rovuma River to Pemba, from a technical, environmental and socio-economic perspective. The Afungi Site was chosen as the preferred site as a result of a combination of these aspects. All sites were inhabited to some extent. **John Peffer - General Director, AMA1**
8	What compensation will be provided to those with reduced or limited access to resources, for lack of resources or income gained from fishing, agriculture and other activities, not only during the construction phase but also in the medium and long-term? **Issufo Tankar - Project Coordinator, Centro Terra Viva (CTV)**	Regarding the loss of resources such as medicinal plants, building materials, etc the host areas must have similar opportunities and resources as the current areas. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
9	Does the construction project envision a development plan whereby local businesses/ entrepreneurship provide services? If so, was it provided for in the EIA Report? **Romão Xavier - President, Institute for Research, Advocacy and Citizenship (CARA)**	We want to incorporate local partners in the project focusing initially at local level (in the affected communities) and then move further afield from a regional to national level eg from Mocímboa da Praia, to Pemba to Mozambique. We are currently in discussions with the government about this. Once we have completed the design phase we will appoint an Engineering, Procurement and Construction (EPC) company to work with local companies to maximize local content and procurement as much as possible. There is still a limited skill set in Mozambique for a project of this nature but we are working to develop this over time. **John Peffer - General Director, AMA1** The socio-economic impact assessment in the EIA Report considered the benefits of using local goods and services See *Section 13.6.3* of the EIA Report. **Kamal Govender - Project Manager, ERM**
10	I see that the process has been taken very seriously and would like to	The project is committed to make sure that monitoring and mitigation measures

	congratulate IMPACTO for this. I want to raise the concept of sustainability. This evaluation seeks to make the project a sustainable one, but it isn't enough just to have a well done ecological evaluation. It is much more important to be careful in the implementation phase of the project. Experiences within the country have shown that although an environmental impact study may be good, the implementation phase is not undertaken by those who undertook the study. We have cases such as Matema in Tete, where the concept of sustainability has not achieved. However there are case studies from elsewhere that we could learn from (eg from Nigeria). It is fundamental that the local population feel involved in the project. Compensation without this involvement is not appropriate. It is important for the local population to feel represented or it could damage the sustainability of the development. **Américo Ubisse - General Secretary, Red Cross of Mozambique (CVM)**	are included in the contractor's contracts eg in the form of Contractor Management Plans (CMPs). There will be internal audits and checks undertaken by the project. In addition there will be external audits conducted. The findings of the audits will be submitted to MICOA. The projects management system will allow for the ability to deal with change ie update the CMPs, to ensure for continuous improvement throughout the lifecycle of the project. In this way, there is a commitment to implementing the measures described in the EIA Report. **Kamal Govender - Project Manager, ERM**
11	The gas itself is overlooked as an alternative in mitigating Greenhouse Gases (GHG). The gas can be used for various activities, instead of using solar panels, which are very expensive. The EIA Report should discuss the plant's carbon footprint. The project may result in long-term effects from GHG and these effects could be global. **Genito Maure - Teacher/Researcher, Eduardo Mondlane University (UEM)**	The power consumption of these plants is very high. They require hundreds of megawatts of power per day and the use of solar panels therefore is not practical for the LNG plant. The gas turbines will be driven by natural gas, which is a clean energy source and has the lowest carbon footprint. Diesel will be used initially when we are using approximately 40-70 MW/day. *(See Chapter 4 of the EIA Report, Project Description).* **Al Kaplan - LNG Plant Project Manager, AMA1** ***Additional response after the meeting:*** *The Project's carbon footprint is discussed in the EIA Report. Please refer to Section 12.3.* ***Kamal Govender - Project Manager,***

		ERM
12	Page 12-88 of the EIA Report states that groundwater is not likely to be impacted from groundwater abstraction. I think that ERM must further substantiate this outcome based on the degree of confidence in the model. Taking into consideration the number of meteorological stations in and the quality of the data, what data did you use in the model? From memory, there aren't many weather stations in Palma. Is there a degree of confidence in where the data used for the calculations has come from? The weather station equipment in Palma is not reliable enough to use confidently. Regarding the impact of groundwater abstraction, the EIA Report must consider the impact of how SO_2 in gas can impact aquifers. Models that consider both chemical and physical parameters should be used. **Genito Maure - Teacher/Researcher, Eduardo Mondlane University (UEM)**	We anticipate 5,000 barrels per day (bpd) of condensate per LNG Train as a by-product of gas processing. This will be stabilized, removing the water and the condensate will be exported. All water produced on site, whether from the wells or the gas itself, will be treated and disposed of in accordance with WHO guidelines. Regarding the emissions model and the data sources used, we have had our own weather station in Palma for two years now and have used data from that weather station. We have also used regional data as well as data available from the U.S. National Oceanic and Atmospheric Administration. We believe that these data sources used in the model, are the most reliable available. **Al Kaplan - LNG Plant Project Manager, AMA1** Studies were carried out over a significant period of time. The studies were not just desk based; we went into the field and collected data. This data was input into the model. The reason why we state a medium level of confidence in our assessment is because the findings are in fact based on a model and it is necessary to monitor to see if what we have predicted is in fact what occurs. The model considers physical parameters to find out, for example, if a certain volume of water is to be abstracted over a given time period, what will happen to the water level, would people who depend on the water be affected, etc. We also collected groundwater samples to determine existing chemical parameters. In general, the quality is very good. Another matter assessed was the project's impact on the quality and quantity of groundwater. We modeled to find out what would happen to the groundwater volumes if we were to abstract a given volume over a given period of time. We found that no issues would be expected with the proposed abstraction rates. Water quality would be managed through the implementation of

		appropriate management plans. Unplanned events such as a hydrocarbons or oil spill may affect the groundwater, but the project's design has considered and implemented containment mechanisms, bunding to prevent impacts to groundwater. **Kamal Govender - Project Manager, ERM** We will have full containment of the LNG tanks and there will be no groundwater contamination from the LNG. LNG is not like oil, which seeps into the surface. The majority of water used with be from a desalination plant and we will not be taking large volumes form groundwater sources. **John Peffer - General Director, AMA1**
13	MICOA will not grant the Environmental License, which by law precedes all other remaining licenses or any activity inherent to the project until 2013. But activity is already underway in Quitupo. Did the EIA Report take such activities into account to quantify the impact they could have? **Lino Manuel - Coordinator of the Environmental Information Program, Centro Terra Viva (CTV)**	Some activities are currently underway, such as the construction of the pioneer camp, the drilling of water wells and other site characterization studies. We have employed nearly 1,000 people to understand the site conditions and prepare the site for future activity. **Cory Weinbel - Project Manager, AMA1** There is activity under way in areas of Afungi much of which is providing information for the EIA Report, For example it is necessary to carry out geotechnical studies to understand the type of substrate present. AMA1 has previously secured several environmental licenses. Approximately six EIA studies and addendums to these have been undertaken which authorize us to clear some vegetation, undertake demining activities and seismic activities, etc. At present we are applying for a license to develop the LNG plant. We have already obtained several environmental licenses that allow us to complete the work undertaken to date. If we didn't have such licenses, we would not have the camps at Palma, Mocimboa da Praia, or the current pioneer camp in Afungi, etc. **Alexandre Jossias - Environmental Coordinator, AMA1**

14	There was response on resettlement tied to access to natural resources, the possibility of resettling people to different areas, etc. Why is it that the impact of resettlement is considered to be a moderate impact? **Nilza Chipe - Coordinator on Gender Economics, Fórum Mulher**	The impact of displacement is classified as major without mitigation. Displacement can be physical (when people must physically move from the areas), or it can be economical, such as where people lose access to natural resources. One mitigation measure for displacement of people is to carry out the Resettlement Action Plan (RAP), in accordance with Mozambican legislation and international standards, eg from the IFC. If the RAP is correctly executed and meets international standards, we believe there is the possibility of mitigating this impact, to an impact of moderate significance. *See Section 13.2 of the EIA Report for further information.* **Kamal Govender - Project Manager, ERM** If resettlement is undertaken appropriately, the impact will be reduced to moderate. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
15	There were several instances in the presentation when there was talk of international guidelines and standards. What are these guidelines and standards, and who developed them? I am asking because it is a citizen's right to know and it is good to inform the people of Palma. **Nilza Chipe - Coordinator on Gender Economics, Fórum Mulher**	We are referring to the IFC guideline for resettlement (*see IFC Performance Standard 5 as listed in Section 13.3.2 of the EIA Report*), include that from the World Bank and the Equator Principles. These were drafted taking international learnings into consideration. All of these guidelines have been developed with the objective of protecting the interests of affected populations. The guidelines state that resettlement must be participatory process, must be minimized, and pay attention to vulnerable groups, etc. All of these are available on the internet, but we can make ourselves available to provide more information. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO** ***Additional response after the meeting:*** *Mozambican and International standards to be followed are listed in Section 2.6.* ***Kamal Govender – Project Manager,***

		ERM
16	I have a series of comments to submit but here, I'll focus on four suggestions for the EIA Report. There is a need to make public the monitoring reports on the environmental management programme aside from sending it to the competent authorities. It will help seeing what measures were taken. While there is no legal obligation to do so, it constitutes a good practice to be followed. **Sean Nazerali - Independent Consultant**	In response to your request for making the information public – the Project is committed to ongoing effective communication with members of the public. **Kamal Govender - Project Manager, ERM**
17	For confidence in the EIA process and in the quality of the study itself, subjecting the EIA Report to independent peer review is becoming a good international practice from a technical standpoint. This is highly important to increase confidence in the study. **Sean Nazerali - Independent Consultant**	In terms of a peer review – there has been no external specialist peer review the EIA report, however we have had several experts (within ERM/ Impacto as well as from other companies) undertake independent reviews. **Kamal Govender - Project Manager, ERM**
18	During the implementation phase, there is a need to create a specialized technical committee (or council) to audit the EMP from time to time. For example, during drilling, who will be there to ensure that the measures have been implemented. It is important to have an independent entity carry out this role to support MICOA. **Sean Nazerali - Independent Consultant**	Regarding the technical committee, this is a good suggestion although I cannot commit to this, but can certainly discuss it with the proponents. **Kamal Govender - Project Manager, ERM**
19	We are international guidelines, such as IFC procedures, however there is no mention of implementing biodiversity offsets, specified in IFC Performance Standard 6 – I request the project proponents to publically commit to "no net loss" in terms of biodiversity. **Sean Nazerali - Independent Consultant**	The project has commenced a field work campaign to better understand where critical habitats are located in order to avoid and minimize impacts to these habitats or offset where if necessary. The Project has committed to comply with the IFC performance standards, including PS6. **Kamal Govender - Project Manager, ERM**
20	I fully agree with everything that Mr. Sean has said, but I would like to expand upon a point related to the socioeconomic	Comment recorded.

	problem. This project is huge, and the concern should not only be about compensating 733 families. Rather, the impact can be seen at the regional and national level. Take Cabinda (in Angola) for example – it started with the population and then gave rise to an organization to separate Cabinda from the rest of Angola. The socio-economic impact of this project must be considered not only in the immediate term, but also in the long-term, when the project is fully implemented. **Domenico Liuzzi - Director, Kulima**	
21	I have several questions, but not all of them are necessarily addressed to IMPACTO or the proponents. At this time in which we are creating an overall legal framework, we are discussing matters that are relevant for ensuring that this project, and others, are conducted in the most appropriate manner. We are still in the project licensing phase, which is a good opportunity to raise matters with greater transparency and detail. One of the issues causing major confusion is the legal framework of this project. At which stage of the licensing process are we? In terms of the subsequent or previous licenses, where do these public consultations fit, within the context of the Environmental License? We see that the project has already received several licenses and it is good that we have information about this. We also received an explanation from AMA1's lawyer on the order of precedence in terms of the Environmental License, which raises a few questions. Can someone explain where we are from the perspective of licensing, the legal framework of this consultation, the framework of the resettlement decision (whether it was already taken or not). Our understanding of the resettlement regulations is that the development of the Resettlement Plan is a requirement for the issuance of the Environmental License. Therefore, the suggestion that the Environmental License will be issued by MICOA later	On large projects, it is common to have provisional licenses granted for preparatory activities required for the development while waiting for the Environmental License (for example, the support studies, opening of a road, the construction of a camp, geotechnical drilling and water collection). These activities are presented to MICOA for assessment as independent activities. **Mia Couto - Meeting Facilitator, IMPACTO** There are two stages of public consultation in the EIA Process. The first occurs at the Environmental Pre-Feasibility and Scoping Study (EPDA) and Terms of Reference (TdR) process for EIA. We are currently at the second stage of public consultation. At this stage it is mandatory to hold public consultation meetings, not only in the countries capital but also in the area of the project site. Afterwards, the proponents submits the EIA Report to MICOA who will approve or reject it. Following approval of the EIA Report, an Environmental License will be issued. Unfortunately, in legislation, issuing of an Environmental License is not done in phases. This is one of the issues that we have still not resolved due to the amount of projects that we have in our portfolio. The Environmental License for this project will be issued following submission of the Initial Resettlement Plan (IRP). After the population census

	this year or in early 2014 raises a few questions, as the process for drafting the Resettlement Plan is a long process, one that has several stages and various consultations. It could be that I am not up to date on the current legislation in the country, but we should have the same understanding of the requirements, the basis upon which this project must be approved and conducted. As you know, the communities in the project area were already informed that they are to be resettled. In other words, information on the decision taken has already been conveyed to the communities, but the conditions under which this decision is to be made have not yet been agreed, since we are still in the initial phases of the decision making. **Alda Salomão - General Director, Centro Terra Viva (CTV)**	and all the socio-economic studies in the area, we will then assess and issue the license. Having an approved EIA Report does not mean that we will automatically issue the license. Being that this is a new process for us, we are all still learning, and Anadarko is aware of this, and they know they must make the IRP in order for us to take the next step. **Rosa Cesaltina Benedito - National Director, National Environmental Impact Assessment Directorate (DNAIA)**
22	There is the principle of precedence of the Environmental License, and there is logic behind this. No license can be issued before the Environmental License, as this initiates the principle of prevention – assessing beforehand all positive or negative impacts before other steps, and we are changing the sequence. I ask for clarification of all these standards. **Alda Salomão - General Director, Centro Terra Viva (CTV)**	Regarding the environmental license precedence: The Environmental Law dates back to 1997 and there are aspects that are now out of date. Law 01/97 of October 1 states that the proponents must first have obtain a DUAT because it is not possible to grant an environmental license in the absence of such. The location where activities will take place must be known. It is therefore necessary to first obtain the DUAT and then follow the subsequent steps. **Rosa Cesaltina Benedito - National Director, National Environmental Impact Assessment Directorate (DNAIA)**
23	This is a question for all of us, but mainly directed at government attendees. On Saturday afternoon, the chief of police in Quitupo gathered the community to intimidate them into not opposing resettlement. In the end, what is going on with this project? What is the issue regarding the occupation of land that is causing disorientation/confusion? We all know that the project needs land, and that's not the problem, but there are details that we must all be aware of. For example, my first question, what is the exact area required by the project's	We have discovered resources that will in time be profitable. We are speaking of very large volumes. This will require the involvement of Mozambicans in various phases of the project. This is a project that will involve thousands of people, in the construction phase alone, when referring to 4 trains. We are all concerned due to the size of the project. At ENH, we created ENH Logistics to manage such situations. There was the issue of the DUAT, which should have been directly given to AMA1, but due to certain circumstances, had to be given to ENH to

	infrastructure received the response that it has not yet been defined. Then, what was the basis for the 7000 hectare area requested, by ENH which was then transferred to AMA1? If the extent of the area is not well-defined, how was the DUAT issued? What is the legal basis for the transfer of property contract awarded to AMA1? I would like to ask IMPACTO to make sure that the communities in the project area have exactly the same rights to access documents and information. I understand that the people of Palma do not know that a public consultation meeting will be held there. They have not received the documents and the meeting is due to take place this Wednesday. **Alda Salomão - General Director, Centro Terra Viva (CTV)**	accommodate all of the concessionaires. ENH is leading the process and all companies involved in gas or petroleum exploration will join this group. I see this project as a chance for all Mozambicans to actively participate, and not intervene to hinder the project or its development. **Tavares Martinho - ENH** Based on what was presented here, we need to have a development plan with the purpose of building an LNG plant. The government understood that all resources to be discovered there would be processed in a single area, rather than having several LNG plants. The Petroleum Law states that all concessionaires which make discoveries have the right to develop infrastructure for its processing and production. From this standpoint, ENH, as a public company and a partner of the two companies, AMA1 and eni, decided that it should be the trustee of the site where the plant is to be developed. ENH followed the correct legal process to assign a DUAT. In parallel to this process, the DUAT process had already been set in motion by AMA1. The EPDA Report defines whether there are issues or concerns that should prevent the project being undertaken ie fatal flaws. MICOA approved the EPDA, in view that there were no fatal issues. It was based on those premises that the government authorized the DUAT. How can we guarantee that all those companies who are not here today but make discoveries have equal access to this land to exploit resources they have found? It was because of this perspective that the RBLL company was created. Other organizations that make discoveries will be able to participate in this company (ie RBLL) with the authorization of the Ministry of Mineral Resources, becoming partners of this company, with the same terms as those already involved. The only precept we have in the Land Law to “alienate” the right of use and development of the land is the exploration concession, duly authorized by the government. Currently, eni is planning on joining the organization, as their gas

		reserves are found in the area of the boundary between both blocks (*ie Area 1 and Area 4*). If Statoil or another company discovers gas, it may also join the organization. **André da Silva - ENH Logistics** Let it be clear that the purpose of this meeting is to discuss the EIA. Moreover, there are matters of a legal nature related to the government and not with this proponents or group of consultants. There are questions about how these processes work and how they were applied. It must be clear that we did not wish to discuss this matter here, and it should be steered toward a government-level session that can be open to legal experts. We cannot comment on the matter of the Quitupo Police. Errors were made in the handling of this process at the local level. Information was transmitted to the communities in an unprepared manner. This information must be conveyed as part of the public consultations associated with the resettlement process, and must be relevant to the process. We can investigate whether this matter should be looked into by local NGOs, by the press, etc. I think that this is a commitment the consultants can make, and AMA1 is open to it. **Mia Couto - Meeting Facilitator, IMPACTO**
24	This is also what we propose, as we believe that it is worthwhile to carefully look at this matter together, because none of us know everything. The government is under obligation to provide clarifications and make sure that everything is done correctly. Therefore, I agree with the suggestion to make sure that a specific opportunity will be created to evaluate these issues. With regard to the actions of the police, I believe this must be a matter of widespread concern, because people are being intimidated. I think the proponents themselves should be concerned over this event.	Comment recorded.

	Alda Salomão - General Director, Centro Terra Viva (CTV)	
25	With regard to the EIA process, I would like to know from Director Rosa Cesaltina whether you thought that Anadarko is acting correctly or if there was something invalid in the process that was followed? **Mia Couto - Meeting Facilitator, IMPACTO**	I did not see anything that wasn't valid. Anadarko is abiding by all of the steps regarding the EIA process. **Rosa Cesaltina Benedito - National Director, National Environmental Impact Assessment Directorate (DNAIA)**
26	In my opinion, and regarding the legal standpoint, this question should not have been asked of the Director of DNAIA or answered by her, as she will have to make the final decision on the study. In a public consultation meeting, her function is simply to attend with the consultants, the proponents and the public. In the end, her office will approve this process (or project) or not. **André Calengo - Director, Lexterra, Lda**	The decision that the Director will have to make is dependent on the quality of the study and the EIA process that we are discussing. I do not want MICOA to say now whether the EIA process has been carried out well or not. We are presenting a report and must gather comments from stakeholders, which will be evaluated and will or won't be granted approval by MICOA. Issues emerged that may or may not legitimize the process being carried out, as, if the process has not be undertaken appropriately according to applicable Mozambican law, it should emerge in this meeting. **Mia Couto - Meeting Facilitator, IMPACTO**
27	Dr. Rosa confirmed that the Environmental Law of 1997 has some discrepancies with the present situation and I agree. For example, the matter of the DUAT being received prior to the Environmental License - perhaps this is a current situation in which we must rule under the terms currently prescribed by law. There may be a need to amend the legislation, but until we do so, what has been legislated will prevail. CTV is convinced that there was an irregularity in the approval of the DUAT before the Environmental License. It could be that we are wrong, and for this reason we believe it is a matter worth clarifying. **Alda Salomão - General Director, Centro Terra Viva (CTV)**	The issues raised, both of a technical and legal nature, must be discussed in detail and depth at an appropriate time. Any doubts that may delay this process must be clarified. I therefore suggest that outside of this public consultation meeting on the EIA Report, the proponents should be open engagement in a transparent and open manner, involving everything from national institution to local communities. **Mia Couto - Meeting Facilitator, IMPACTO** AMA1 and eni want a transparent process. We open to further dialogue and meet with civil society to discuss the process and explain all of the technical concerns raised. This is an extremely large and important project in Mozambique and we want it to benefit the country and the communities in the project area. It is therefore necessary to

		have open and transparent communication to ensure that everyone understands what is going to take place and why. So, yes, we are open to further dialogue. **John Peffer - General Director, AMA1**
28	My question is in regard to IFC Performance Standard 6 which speaks of "no net loss" and "biodiversity offsets" and residual impact. It has been determined that even after implementation of mitigation, there will still a residual impact that is often considered moderate. I suggest that the EIA Report includes more mitigation measures to avoid such impact. Page 6 refers to a "critical habitat analysis" that was a requirement of Performance Standard 6 – was this methodology included in the EIA Report or not? **Bruno Nhancale - Project Manager, International Flora and Fauna**	The EIA Report is fully compliant with Mozambican regulations and IFC Performance Standard 1. The next phase of work will address Performance Standard 6. For example, we are currently investigating if there are critical habitats in the project area, and if so, where they are – the study is already underway. It will not be included in the EIA Report now, but it will be included in the report to be submitted for review to the (financial) lenders. **Kamal Govender - Project Manager, ERM**
29	It was said that seven areas were considered as alternatives. In the site selection decision process, was consideration given to other locations or alternatives such as floating production storage and offloading vessels to export LNG, based offshore? This aspect is not considered in the EIA Report. **Bruno Nhancale - Project Manager, International Flora and Fauna**	We looked at Floating LNG (FLNG) as an alternative prior to the EIA process. There are two or three FLNGs projects in the FEED stage but none have been developed further before. AMA1 wants to use proven technology. The gas volumes found by AMA1 and eni are world-class, comprising approximately 100 TCF. Onshore we can have many LNG trains on one site. It is more cost effective onshore than offshore, as the more we build, the cheaper it gets. Government and civil society want to benefit from the project, and it is more beneficial to have an onshore than FLNG. **John Peffer - General Director, AMA1**

30	What is the estimated area of the habitats, namely seagrass and coral reef that will be affected by the activities? This is raised because of the suggestion of depositing gravel and concrete blocks for rehabilitation was mentioned. Rehabilitation and translocation of tropical ecosystems is not easy, as it is not simply a matter of removing gravel to ensure coral can grow again. I also saw the suggestion of translocating *Acropora aspera*. Translocation is much more than a word. What is being considered in terms of translocation, the area affected, the impact, linked to the "offsets" mentioned earlier and also tied to some fishing areas? **Marcos Pereira - Director of the Studies Division, Centro Terra Viva (CTV)**	There are two types of seagrass, the subtidal and intertidal components, In the subtidal, probably 10% of seagrass present will be affected. The intertidal area is affected by longshore transport and it is not known how much seagrass will be affected. There may be chronic effects. There will be major effects on coral within the pipeline corridor covering an area of approximately 150m wide by 2km in length through fringing reef. Effects will extend outside of the immediate pipeline corridor to an area of about 2km wide and 3km long, affecting 8% of the existing coral structure. The coral fringing reef comprises both live coral and a lot of coral debris (dead coral). AMA1 and eni have committed to undertake studies to transplant corals and understand better the recovery of coral communities when using materials like ecoblocks. *(See details of the proposed mitigation measures in Section 11.13.2 of the EIA Report).* **Robin Carter - Marine Ecology Specialist, Lwandle**
31	Which fishing areas will be restricted and what are the mitigation measures envisioned? **Marcos Pereira - Director of the Studies Division, Centro Terra Viva (CTV)**	***Response after the meeting:*** *During construction, fishing within a 500m radius around activities (eg dredging, construction of jetties, etc) will be restricted. During operations fishing will within a 500m radius of structures will restricted. For LNG vessels – a safe distance of 500m behind, and to the sides, and 1km in front will be restricted to fishing activities. While LNG vessels are being loaded, a 1km radius around them will be restricted.* *Mitigation entails compensation for loss of access and/ or resettlement (refer to the IRP in Annex I).* ***Kamal Govender – Project Manager, ERM***
32	I would like to know if the study considered impacts to specific fisheries,	***Response after the meeting:*** *Section 13.2.4 assesses the potential*

	for example, tuna fishing, which is a highly migratory fishery. No numbers were presented concerning artisanal fishing, and it is known that there is a large seasonal migratory movement of fisherman. It isn't only done by locals, migration occurs between districts and provinces. **Lídia Abiba - Advisor to the Minister, Ministry of Fisheries**	*impacts on fisheries and marine-based livelihoods in general.* ***Kamal Govender – Project Manager, ERM***
33	Was the impact to aquaculture studied? There are strategic plans, approved by the government, both for the development of aquaculture and tuna fishing. Were these taken into consideration for the study? What impacts or studies were undertaken? **Lídia Abiba - Advisor to the Minister, Ministry of Fisheries**	During early engagement activities we met with several district and provincial-level government institutions, as well as fishermen, and there was no mention of aquaculture proposed for the Palma Bay itself. We certainly did not discover any aquaculture project within the Palma Bay during field studies. There are some aquaculture projects outside the Palma bay but there is no implication of this project on those. This is something we can discuss after the meeting if we need to. **Kamal Govender - Project Manager, ERM** ***Response after the meeting:*** *Areas in Palma Bay have been considered as having the potential for aquaculture and seaweed production and have been declared as Marine Reserves by Decree no. 71/2011 of 30 December. Marine reserve is defined by the Decree as an area for the development of marine aquaculture. Management of these marine reserves is the responsibility of the Ministry of Fisheries. As per this Decree "other socioeconomic projects are allowed to be undertaken within these reserves, if they present comparative advantages or are a complement to aquaculture activities, subject to approval by the Minister of Fisheries". To date, there has been no objection to the project from the Ministry of Fisheries. The Ministry of Fisheries have sent ERM/ Impacto comments on the EIA Report – they have asked that the potential for aquaculture be considered in the EIA Report. We have responded by including Section…. The*

		Ministry of Fisheries will also provide their comments to MICOA who will consider them when reviewing the EIA Report and making a decision. *The Tuna Fishing Strategic Plan was published in 2013 and was not taken into account in the EIA as all the baseline studies were conducted between 2011 and 2012. We have included an update on the Tuna Fishing Strategy in Section 9.7.6 of the EIA Report and Section G1.3 in Annex G.* ***Kamal Govender – Project Manager, ERM***
34	I didn't understand the cumulative impacts discussion, and would like a better explanation. The presentation did not discuss the most important issues. The EIA Report contained much more information than what was presented here (*in at public meeting*), and it makes analyzing the report more difficult. The presentation gave us made me understand that the impacts appear to be more local, but I don't know if this is the case. Regarding sulfur dioxide, it would be easier to have it presented in terms of numbers, as they provide a better understanding of the impact and its intensity. **Chey Carlino - Student, Eduardo Mondlane University (UEM)**	In terms of local and cumulative impacts, I recognize that reading the EIA Report, a document of this dimension, cannot be easy. But this isn't the last chance. There is a process for exchanging information that may continue, and we would be pleased to contribute to have the report distributed through various means, so as to have greater input from the public. There is a deadline for the submission of comments, which can be extended so that people have the right to read and consider the report in its entirety, and that is where we can discuss the cumulative and local impacts. **Mia Couto - Meeting Facilitator, IMPACTO** ***Response after the meeting:*** *Cumulative impacts are discussed in Chapter 15 of the EIA Report. Because it is difficult to present the entire EIA Report in a 30 minute presentation, we provided an overview during the public meeting and allow time before and after the public meeting for people to read the report and ask any questions.* *The EIA Report assesses impacts at local, regional and national levels. Naturally, the bulk of the impacts are at the local level where the project is situated.* *Section 12.2.4 of the EIA Report notes the potential sulphur dioxide emissions as being:*

		• *7.54µg/m³ for two trains (under normal operating conditions); and* • *11.7µg/m³ for six trains (under normal operating conditions).* *The predicted emissions are less than the Mozambican standard.* ***Kamal Govender – Project Manager, ERM***
35	To help understand the process, difficulties arise when the study or the presentation is made in a generic way, for example details of the international guidelines. The problem is not getting access to these guidelines, but the reference should be made in the report to the guidelines to be followed eg on certain gas emissions by means of limits or scales. In terms of resettlement, the national regulations dictate that the population should not be resettled more than 200-300km away, and the project says that it may resettle up to 100km away. We could assess the project's social responsibility. I was hoping to see this type of information presented in order to reach my own conclusions. **André Calengo - Director, Lexterra, Lda**	The standards and guidelines mentioned here were given in a generic manner. Some items from the EIA Report have been omitted from the presentation because of the limited time to present. Nevertheless, those guidelines that were not mentioned here appear specifically in the text of the EIA Report. **Mia Couto - Meeting Facilitator, IMPACTO**
36	A comment to MICOA: a lesson we may learned from Decree 03/2012 is that the Resettlement Plan must precede the Environmental License. I think that those two documents should have been presented in this meeting, because if MICOA is only just going to issue the Environmental License after evaluating the Resettlement Plan, we would also have the chance to comment on the Resettlement Plan before the Environmental License is granted, as it forms part of the Environmental License. The government must impose and set rules on this matter, as this situation arises in other projects as well, not just this one. **André Calengo - Director, Lexterra, Lda**	In response to the comment of Decree 03/2012, we, as consultants, also require clarity from MICOA about how these procedures are to be consolidated. To refer to Dr. Rosa, the government is willing to make efforts to accommodate this issue. Government is learning from and using this case to consolidate procedures that might be of use in other projects. **Mia Couto - Meeting Facilitator, IMPACTO** ***Response after the meeting:*** *The approach being followed by the project has been agreed with MICOA. Given that the EIA process began (and*

		the EPDA Report was approved) before the new resettlement decree was enacted, it was agreed with MICOA that a modified approach could be followed for this EIA. The modified approach allows for an Initial Resettlement Plan (IRP), instead of the Resettlement Action Plan (RAP), to be compiled and included in the EIA Report. The IRP is in Annex I of the EIA Report and outlines the principles and process to be followed. The RAP process has just begun and will entail public consultation with local communities. ***Kamal Govender – Project Manager, ERM***

Liquified Natural Gas Project for the Cabo Delgado Province

Focus Meeting with the Tourism and Fishing Group – Pemba (EIS Phase)

Questions and Answers Matrix
Date: September 10, 2013
Place: Conference Room, Hotel Kauri
Time: 11:00 – 12:30

ID	Question Raised	Response
1	Artisanal fishing contributes toward guaranteeing food security for the population, particularly the coastal community and fishing communities. The Afungi area contains over 25 fishing areas (places where fishermen carry out their fishing activity). These fishermen will have restricted or limited access to these areas during the construction and operational phases of the project. I propose that the planning phase of the resettlement plan recognizes that this area provides important fishing resources and is significant to the fishermen. The fishermen have licenses to work in these areas. Should people be relocated from this area to another area, efforts should be made to identify an area at the host site that has the same resources, in order to avoid affecting the current market chains of the product at the provincial level. **Manuel Daniel - Provincial Delegate, the Instituto de Desenvolvimento de Pesca de Pequena Escala (IDPPE – Small Scale Fishery Development Institute)**	When resettlement begins, one of the main priorities will be to ensure that the current livelihood strategies employed by the population can be replicated at the host location. Therefore, consideration must be given not only to the fishing areas, but also to the migratory movement of seasonal fishermen coming from places like Nacala and Tanzania, etc. It is a very dynamic area in terms of fisheries and for this reason, this will be taken into consideration early in the resettlement process. Currently we are undertaking a fishery study to obtain data on identified fishing areas, types of vessels and gear uses, and catch type, etc to understand the current situation. Mozambican and foreign fisheries specialists are involved in the study. Fishing is a priority as part of the resettlement process within the project's general framework of activities. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
2	Will this study involve participation by IDPPE? **Manuel Daniel - Provincial Delegate, the Instituto de Desenvolvimento de Pesca de Pequena Escala (IDPPE – Small Scale Fishery Development Institute)**	I imagine that there will be coordination with IDPPE. The fishery specialist team has strong ties with the government agencies linked to fishing. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
3	The EIA Report is well written and presents all of the necessary elements. Nonetheless, I would like to appeal to the people who are leading this study and the investors to involve experts from	We will consider how the data collected from these remaining studies can be used to support the region. **Mia Couto - Meeting Facilitator, IMPACTO**

	the Fisheries Research Institute at a provincial level, both in the identification of new fishing areas (in the resettlement plan) and in the fisheries studies performed by AMA1 and Mozambican institutions. Some studies did not involve the provincial level; our experts have not been involved. I think that some information is missing and I suggest that this should start at ground level, here in the province, for the project to reach a successful outcome. I would also be grateful if the investors would provide the findings of their studies to our national agencies, in order for those agencies to have a database of information collected. **Henriques Bustani - Provincial Delegate, Instituto de Investigação Pesqueira (IIP – Fisheries Research Institute)**	
4	Palma District is like a sanctuary for fisheries. It represents a potential for Cabo Delgado Province. In terms of resettlement, it is likely that the new areas identified as having fishing potential may be far to get to. We must think of ways to stimulate or incentivize the fishermen into accepting these new areas for example, providing them with new, more modern vessels. The fishermen of Palma, Maganja and Afungi only have vessels made from hollowed-out tree trunks. **Henriques Bustani**	We have a resettlement team that will work on the ground, and all of these recommendations must be channeled to AMA1 who will give consideration them. **Alexandre Jossias - Environmental Coordinator, AMA1** Access to some traditional fishing locations will inevitably become more difficult as a result of the imposed safety and navigation restrictions, or due to the physical resettlement of populations to places somewhat further from the coast. It is hard to quantify and mitigate the losses in terms of fisheries. In any event, available options will be considered in terms of possible compensation eg the upgrade of the fishing fleet in order to increase the range of access for these vessels. This will compensate to a certain extent. Another idea being explored within the scope of the fisheries study is to determine whether fish farming is viable or not, and any other practices aimed at ensuring that the sea remains a major resource in supplying the people's dietary requirements, despite the development of the project.

		Victor Hugo Nicolau - Resettlement Specialist, IMPACTO
5	In terms of the resettlement of communities including fishing communities to other areas, will similar and economically beneficial conditions be created for these communities? For example, what thought has been given to markets? It is known that these populations fish for their own consumption as well as for sale. Will markets be created? Where will these be located? Will fishermen be able to sell their product? **Isabel Ferreira - Coordinator of the Local Initiative for the Development of Sustainable Fisheries in Baia de Penba, and a member of the Management Commission, the Cabo Delgado Hotel and Tourism Association**	We have already instructed our camps to purchase products locally. In the future, with the LNG project, acquisition of products from local communities must be encouraged. Our main concern is to ensure that we are not increasing the prices of products that communities also purchase and consume. We want to avoid creating such problems. **John Peffer - General Director, AMA1** It is known that the majority of the population visits Palma market frequently. Depending on the resettlement site or sites selected (not all people affected will necessarily be relocated to the same resettlement location), the resettlement process will be carried out in a participatory manner with the affected communities. Access to markets is also a matter that will be given careful consideration. The ideal situation would be to maintain access to Palma market. Olumbe is located south of Maganja, but it is not known, yet, to what extent this is an important market or not. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
6	Within the resettlement plan, what alternative activities to fishing have been considered? Are you considering providing engines for boats? Could some of the fish be consumed by the companies at the project site, helping to improve the quality of life in the area's fishing communities? **Isabel Ferreira**	We will ensure the study looks at how to mitigate such impacts on fishing activity in the area. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO** There are matters that fall within the scope of the Resettlement Action Plan, which has not yet been drafted. The EIA Report includes the Initial Resettlement Plan (IRP), a sort of policy document on resettlement. The Resettlement Plan has its own participatory process, which includes at least four public consultations sessions required by law. The affected and interested parties will be involved in the process to developing solutions. **Mia Couto - Meeting Facilitator, IMPACTO**
7	The presentation did not address	To understand the impacts associated with

	impacts to air quality. What is the impact of gas emissions into the atmosphere and the impact on the Palma and Afungi area? **Isabel Ferreira**	air emissions, we undertook air quality modeling that took into account various emission sources associated with the project to determine whether emission levels met with Mozambican legislation, etc. The project is not expected to exceed the legislated Mozambican emission limits or those of the World Health Organization (WHO). **Kamal Govender - Project Manager, ERM**
8	As a representative for the Sustainable Fisheries Project in Pemba Bay, I would like to know what is the indirect impact of the project on Pemba Bay, as well as the communities that depend on fishing within the bay, as a result of increased vessel traffic? For example, several scuba divers who dive in Jímpia, in the Londo area on the other side of the bay, say that it's an area with very well-preserved coral that is resistant to climate change. Can it be that increased vessel traffic will have an impact on these areas, and should this be taken into consideration? **Isabel Ferreira**	During the site selection process, we recognized that there is sensitive biodiversity around Pemba, and it was one of the reasons for which that area was not selected for the LNG plant. We are trying to make the Afungi area self-sufficient in such a way that all construction activities will take place there, and vessels visiting the site do not necessarily need to stop at Pemba (but will be able to do so). The traffic and the amount of activity associated with construction, and probably the traffic associated with LNG operations, should not constitute a significant increase of traffic in Pemba. **Cory Weinbel - Project Manager, AMA1** ***Additional response after the meeting:*** *While significant increases in vessel traffic is not expected in Pemba, we have added in a qualitative assessment of potential indirect impacts at Pemba to adequately address the issue. Please refer to Sections 12.14 and 13.10.* ***Kamal Govender - Project Manager, ERM***
9	All of these mega-projects to be developed in Cabo Delgado Province must be considered independently, however they all use Pemba as the point of disposal for their products. They all speak about having to transiting or bringing merchandise through the Port of Pemba, implying an increase in ship traffic in the Pemba Bay, an increase in heavy goods vehicle traffic within the city of Pemba and the increase in emissions into the atmosphere. Although the project will be implemented in Palma, it will also have a cumulative impact in Pemba, and despite the fact	The term "cumulative impact" is defined by IFC as impacts from any reasonably defined future projects that could, in conjunction with the proposed project, result in impacts on a common resource or receptor. In this case, there are several projects currently underway in Palma and adjacent areas. An assessment of the cumulative impacts, eg considering future projects such as an industrial zone, is presented in the EIA Report. As Cory (Weinbel) has said, we expected the bulk of the activities to be based in Palma, which is why we did not consider impacts on Pemba in the scope of

	that these are different projects, their impact will be widespread. What will the overall impact of all the mega-projects be on the biodiversity of the Pemba Bay, as well as the Palma area itself? **Isabel Ferreira**	this EIA Report. *See Chapter 15 for an assessment of the Cumulative Impacts.* In terms of the development of Mozambique, the projects will lead to growth in the country. The Government should probably look into this in terms of strategic planning, in which all operators work jointly with the Government to see how cumulative impacts could be minimized. **Kamal Govender - Project Manager, ERM** Your concern will be noted, but I suggest that it not be directed at a private investor, but rather to a government agency in charge of planning the overall regional plan for the entire of Pemba Bay. What the Government normally does is request support from the users of an area, where all investors may participate equally, supporting the development of a strategic plan in such a way that the cumulative impacts located in a certain geographic areas can be addressed. Several projects are coming about which directly or indirectly affect the bay area of Pemba . There must be someone who can develop a strategic plan of what is going to take place. For this reason, such an individual cannot be a private investor, but rather a government agency. **Mia Couto - Meeting Facilitator, IMPACTO** Pemba may also experience positive social and economic impacts arising from these projects. For this reason, the agency responsible for land use management must also try to quantify the positive impacts. **Alexandre Jossias - Environmental Coordinator, AMA1** ***Additional response after the meeting:*** *As noted above, we have added in a qualitative assessment of potential indirect impacts at Pemba to adequately address the issue. Please refer to Sections 12.14*

		and 13.10. ***Kamal Govender - Project Manager, ERM***
10	Does the EIA study include recommendations on the indirect impacts of the project on Pemba, and mitigation measures? **Isabel Ferreira**	With regard to our activities here in Pemba, they were assessed beforehand within the context of the drilling activities. We undertook EIAs for deep-water drilling which took into consideration the increase in maritime traffic in Pemba, our camps, etc. We do not expect that our activities in Pemba will increase as a result of this project (LNG Project). For example, we do not plan to use more than the one or two drilling platforms that we are currently already using. Construction vessels and others vessels will not go to Pemba. All activities will be focused in the Palma area. I know that the Government is looking into long-term regional and local planning, but we have not given consideration to this matter in the current EIA Report. **John Peffer - General Director, AMA1** ***Additional response after the meeting:*** *As noted above, we have added in a qualitative assessment of potential indirect impacts at Pemba to adequately address the issue. Please refer to Sections 12.14 and 13.10.* ***Kamal Govender - Project Manager, ERM***
11	Many tourism operators say they are not aware of what is going to happen (in relation to the project), the current status of the project, or who to talk to. I would like to know if there is a department or a person here in Pemba or Cabo Delgado Province who is in a position to provide information and clarify any questions that tourism operators have or may have? **Isabel Ferreira**	We plan to have a person in Pemba as a specific point of contact for tourism operators. They will hold regular meetings on matters such as proposed scheduled activities, and explain activities that will have a potential impact on tourism. We hope to establish this position by the end of the year. **Marliza Ellof - Stakeholder and Affected Party Relations, RS2**
12	How will communities be involved in the resettlement process, in terms of involvement, communication and decision making? There is little information available about the process. It isn't enough to show up and report what's going to happen, since they too	***Response after the meeting:*** The process for resettlement is described in the Initial Resettlement Plan (Annex I). The process will follow guidelines provided by the International Finance Corporation (part of the World Bank) to make sure that

	must feel part of the process, in order to avoid major conflicts in the future with people coming from outside, as well as those who are already there. **Isabel Ferreira**	communities are adequately engaged in the resettlement process. ***Kamal Govender - Project Manager, ERM***
13	Regarding training, how many people are involved in training, and what are the lines of employment that this training will provide for them? **Isabel Ferreira**	We have opened a Training Center focusing on providing basic training eg educating people on how they must go to work, how to use personal protective equipment (PPE), and how to interact with others. Nearly 400 people have already received training. Training will be offered continuously and will allow us to identify those who need additional training and those that can progress to the next stage. It also teaches people how to interact with our contractors. As we progress toward the Final Investment Decision (FID) and as the project progresses, there will be more construction work and we will hire an Engineering and Procurement for Construction (EPC) Contractor, who will bring workers and their own training programs. We may have a training center in Pemba, in line with the government's plans, but only once we are certain that the project will go ahead. **Cory Weinbel - Project Manager, AMA1**

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Palma District (EIA Phase)

Question and Answer Matrix
Date: September 11, 2013
Location: Clube de Palma
Time: 10:00 – 13:00

ID	Question	Answer
1	I have heard that infrastructure will be built such as a hospital, school and highway. Will these be built here in Palma District or in another location? **Sufiane Momade - Member of the Consulting Council of Palma District, Pundanhar Administrative Post**	For the people who will be resettled, the living conditions will be better than those they currently experience. For example, the resettlement decree (see *Decree 30/2012 of 8 August)* states that the smallest house required will be Type 3, constructed of concrete block and cement. Thus, those who currently do not have a concrete block and cement built house now or who have small house with few rooms will have better conditions than they currently have. It is anticipated that roads will be built in areas where people will be resettled. Schools and a hospital will be built and we are going to try to drill water wells so that the water is cleaner. This will be carried out first for the people who are resettled. Everybody knows that we are now just beginning to work on community investment initiatives; we are beginning to work with the district government, to improve some roads here in Palma, and solve the serious water problem at the Palma health center. Some communities in Palma District have already benefited from water wells. We already have a training center, and some jobs will be created. Within the host communities those resettled will also be consulted around the possible locations of the infrastructure projects. This will take place through a process involving the government, the community and the proponents. **Alcídio Maússe - Social Affairs and Government Liaison Manager, AMA1** The project will work together with the Government, in terms of the location of the

		infrastructure projects. There are some district development plans, and the government has completed some studies to determine where a school or hospital is needed. These locations will not be selected by the project, but will be aligned with the district development plans. This infrastructure will be built where the government and the community decide it is needed most. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
2	A reference was made to the fact that those who will be resettled will have better living conditions and will be compensated. We will be the ones to provide this information to the communities. However if this does not occur, we will be seen in bad as being poor representatives of the people in these communities. Therefore we request that AMA1 fulfill its promise that when the people are moved from where they live to another place, that it will be better than current conditions, as if this does not happen they will never be content with either the company or with the district representatives. **Assumane Amade - Member of the Consulting Council of Palma District, Pundanhar Administrative Post**	Comment noted.
3	I am grateful to the AMA1 for being willing to work with us from the beginning and for supporting us in many things. I was pleased to hear that the government, the companies and the people who are to be resettled will be involved in the resettlement process. If this happens, the process will be a smooth one. Although people will lose some aspects by being moved, they will be compensated, and we are happy about that. This satisfaction is based on the hope that their lives will improve once they have been resettled. I would like to take this opportunity to ask AMA1 to provide support to resolve some problems Palma District is facing, namely, supporting the district government in the process of building the road.	Comment noted.

	Aleixo Magnós - Member of the Consulting Council of Palma District, Pundanhar Administrative Post	
4	AMA1 came to explore for oil, but they have undertaken a lot of drilling. Is it possible that they are only looking for gas and oil? Has the onshore exploration work not yet provided any results? **Talamanda Amisse - Member of the Consulting Council of the District of Palma, Pundanhar Administrative Post**	Regarding the wells we have already drilled, the project has a number of offshore wells, and we were looking for gas or oil. We only found gas. Onshore we have not yet drilled any exploration wells, except for the wells in Mecupa. The wells we plan to drill in Afungi are not exploration wells to look for gas. We are drilling those to determine what type of soil is in that area. In order to construct, we need to understand the soil characteristics because we need to install piles. This work is not yet complete. Over the next year, we plan to drill wells in Palma and Mocímboa da Praia to look for gas. Our community liaison teams have already held meetings with the communities in the vicinity of this new program, and everything was explained to them in those meetings. If there are any problems or questions regarding any activities in the area, they can talk to our community liaison officers to get clarifications. **Alexandre Jossias - Environmental Coordinator, AMA1**
5	I would like to congratulate Mr. Victor Hugo for the wise and understanding manner in which he made his presentation to help the general understanding of the participants. He acknowledged that the resettlement process is delicate and that it requires involvement from the government as well as the communities, civil society and local businesses. I suggest that the public and community consultations follow the applicable legal requirements of the country. According to the law, any consultation of this type must be announced fifteen days beforehand. Invitations should be sent to the participants, and any documents to be discussed should be distributed; this did not occur. **Roberto Mussa Abdala - Member of the Paralegal Association of Palma District**	Thank you very much for your contributions. We apologize that the EIA Report was 1 to 2 days late and didn't meet the requirement to be made available 15 days beforehand the meeting. However, this is not the last opportunity to send your comments on the report. The comment period began two weeks before the meeting and extends to September 27. At the end of the meeting, we will provide you with contact details to where you may send your comments. **Kamal Govender - Project Manager, ERM** ***Additional response after the meeting:*** *The public comment period was subsequently extended to 31 October 2013 and all stakeholders were notified of the extension.* ***Kamal Govender - Project Manager, ERM***
6	I suggest that written minutes of the meetings be prepared, as I believe that	We will ensure that comprehensive minutes are prepared of the public meetings and that

	these documents will guide us in the future. This is because we have had difficulties finding the minutes of previous meetings. Even the commitments agreed upon have not been captured in the minutes, and this could complicate the situation in the future. **Roberto Mussa Abdala**	a public participation report is included as an attachment to the final EIA Report. After the EIA Report is finalized, it will be sent to MICOA for approval. The whole EIA Report will be available to all interested parties, and will include minutes of the meetings and a description of the process. **Kamal Govender - Project Manager, ERM** Regarding the minutes of previous meetings, nothing has been hidden or concealed. These minutes are publically available. Perhaps what has not been clear is the access process. The minutes were included in the EPDA Report which was submitted to the government. All should have access to this report and we are responsible to provide access. This report was filed with the DPCA in Cabo Delgado. So we promise that the minutes of this meeting, together with the report will be filed with the district administration to make it easier to access. I confirm that what is said here will be included in the minutes. **Mia Couto - Meeting facilitator, IMPACTO**
7	What is the area which the LNG plant infrastructure will occupy? **Roberto Mussa Abdala**	The total area of the DUAT obtained for the LNG facility is 7,000 hectares. However, at this time it is anticipated that only about 4,000 hectares will be used to build the infrastructure, though this may change in the future after the various studies we are undertaking are complete, and depending on whether or not there are high ecological sensitive systems or sensitive areas. However this gives an idea of the best area required for building the plant. Inside the DUAT area, sites will be reserved for agriculture and other ecological sites. **Cory Weinbel - Project Manager, AMA1**
8	I would like to understand how it was possible for AMA1 to obtain the DUAT before the Environmental License? I had the opportunity to read the AMA1 documents which refer to resettlement and in those documents AMA1 categorically states that it obtained the DUAT for 7,000 hectares in 2012. However, during the meeting in Maputo, Mr. Mia Couto said that the purpose of the public meeting was to present the EIA Report for the purpose of obtaining	There is no clear provision in Mozambican law which indicates that the Environmental License must be issued before the DUAT. Conversely, there are legal provisions which clearly suggest that the DUAT should precede any permit process, including the Environmental License. For example the Land Law (*Law 19/97 of 1 October*) states that the approval of an application for the DUAT does not exempt the owner from the obligation to obtain other permits, including environmental permits. The registration

	the Environmental License. **Roberto Mussa Abdala**	forms submitted for the purpose of beginning the EIA process to obtain the Environmental License requires that the proponents provides the corresponding information to the owners of the land where it intends to exercise any activity which could possibly result in environmental damages. These requirements are in effect in the country and AMA1 complies with applicable law and with the principle of respect for the law. In the first public meeting, the government representative confirmed that the steps taken to obtain an Environmental License takes place after securing the rights to the land. **Emerson Lopes - Legal Department, AMA1** The legal issues related to the DUAT and the process for obtaining the Environmental License, in the scope of the environmental licensing process was discussed in the Maputo meeting, and because it is a very technical legal matter, we made a decision which was accepted and agreed to by all of the participants, that a working group would be created, involving attorneys who are familiar with the laws, to discuss and clarify this issue. **Mia Couto - Meeting facilitator, IMPACTO**
9	In the presentation, reference was made to the first step in the resettlement process being a census. I recommend that the first step should be to hold community meetings. This is because community meetings are necessary for our community to understand the initial activities of AMA1. **Albino Rodrigues Mahaba - Member of the Association of Paralegals of the District of Palma**	We will hold more meetings, above all with the parties who are directly affected in the project area (Afungi, Quitupo, etc.). After this meeting, we will define the schedule for holding meetings at a community level to make the process more open and transparent. **Mia Couto - Meeting facilitator, IMPACTO** I completely agree with you. The resettlement team is ready to go to the residents of the communities in Afungi to discuss resettlement. The proponents and the consultants can go and introduce themselves and explain the process. However, we need be know in advance if the communities want to receive us, so that we can understand their intentions. If the communities are willing to work with us, we will organize the meetings with the leaders and we will do this work this coming week. **Victor Hugo Nicolau - Resettlement**

		Specialist, IMPACTO We are open to holding community meetings in the affected areas, in the Afungi area, and we believe that these may take place within the next week. **John Peffer - Director General, AMA1**
10	I am grateful that Palma was selected as the location for this project. In Quionga there was a very steep hill and AMA1 fixed the problem, and people are now going about their business without any problems. We ask that AMA1 never stop helping the people. On the road to Quionga there is an area that is impassable. Can AMA1 fill it in with gravel to improve the road? **Sabina Miguel Valombe - Member of the Consulting Council, Quionga Administrative Post**	Comment noted.
11	In projects like this, there may be people who are against it and people who are for it, and the government is responsible to clarify things. Since we live in a democracy, many things have to be discussed, but people attempt to ignore it. We are grateful for the arrival of this project because Palma was unknown previously, but now everybody is talking about Palma. Today people come to Palma from all over the world. I am grateful and I ask AMA1 to continue working closely with people. People have come from other places to put wrong ideas in peoples' heads, trying to persuade them to never agree with the resettlement process. I have talked with other people in the community and asked why these people come here to put things in our heads? Could it be that resettlement never happened in Maputo? People in the community believe anything they are told because they are not educated. There are people who don't participate in these meetings but afterwards, interpret things their way and in their communities they distort what the participants said in the meetings. I ask that the government continues to help AMA1 plan for the	We should be ready to accept all opinions, even if they don't agree with us because that's exactly what democracy means. It should be an open process, where others are heard even if you don't agree with them. Nobody should be left out, we should discuss things together out in the open, like Mozambicans. **Mia Couto - Meeting Facilitator, IMPACTO**

	development. We also request that AMA1 does not take advantage of the people living in the project area. **Luís Salimo - Community Leader, F. Ncularino**	
12	There is an area known as Malamba where AMA1 has dumped rubbish. People say that AMA1 has even scattered rubbish on the highways. Now this part of the highway is narrow and impassible because of this rubbish. **Luís Salimo**	We don't believe that AMA1 is responsible for the rubbish dumped in the Malamba area. **Alexandre Jossias - Environmental Coordinator, AMA1** *It was later confirmed by the District Administrator that AMA1 was not responsible for the dumping*
13	During the resettlement process, will the people who live in the area selected for the construction of the plant be the only people compensated, or will compensation also be paid to those who live outside the area, but who own property within the area? **Luís Salimo**	Regarding what will happen to people who do not live in the project area, but who have agricultural plots, businesses, etc. there, these people will be compensated for their losses. When we talk about resettlement, we are really talking about two things: physical resettlement – which is where a person loses their house and has to go and live in another place; and economic resettlement – which is where people can continue living where they live, but they lose assets (agricultural plot, coconut plantation, etc.). An agricultural plot lost will need to be replaced with another plot in another place, compensation will be paid for the coconut plantations, etc.; all of the people who suffer losses will have to be compensated. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
14	Regarding Mr. Mahaba's proposal about holding community meetings before beginning the resettlement process, I'd like to say that people (*of Quitupo*) are ready to receive the project team to hear about the resettlement process. However, it is important for these meetings to be requested ahead of time, at least three days beforehand, so that they can be ready to receive the teams. The people are anxious to hear about it and if the notice period is too short, some people may not participate in the meetings. **Luís Abdala Salimo - Community Leader from Quitupo**	We are happy to hear this (*about Quitupo being ready to receive us*) and we will start work if people want it. We will respect the need to give at least three days' advance notice. This is a very big project. This gas will bring wealth for both Palma and for Cabo Delgado and for the country. This is a matter of interest to all Mozambicans and everybody has the right to express their opinion and to be part of this process. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
15	Has the government and the companies	Regarding the partnership with the NGOs,

	already considered how to best collaborate with the NGOs to allow them to contribute to this process, to ensure that the project is implemented with the participation of and for the benefit of all? Have you got thoughts of how the NGOs should collaborate with the government and the companies to make sure the process is successful? Are our contributions of no use? **Júlia Wachave - Representative of the Natural Resources and Environmental Focus Group**	AMA1 and eni are both open to a transparent process and to working with everybody. Consultation meetings have been held with NGOs in Maputo, Pemba and Palma. We have developed a plan to involve all of the participants. I think that we can continue to work with civil society, with the communications and civil society organizations. This engagement plan we have developed will continue with engagement with the communities as well as with the NGOs. So, we are open to working with civil society and legal organizations to clarify issues related to acquisition of the DUAT. **John Peffer - Director General, AMA1**
16	AMA1 has been working with the consulting council, but is it possible that it never thought about supporting the district consulting council? The design of the infrastructure promised by AMA1 can't just be something on paper. Here in Palma a television room was built but it has never been used for that. For this reason, the construction process announced by AMA1 should really happen and should start in Palma and only afterwards be expanded to other sites. We request support from AMA1 to supply medicine to treat sick and disadvantaged people in Palma. The other job opportunities provided in Palma should not just benefit those who come from outside of Palma. Priority should be given to people from Palma. **Issa Abdala - Member of the Consulting Council from the Palma Office**	Comment noted. ***Additional response after the meeting:*** AMA1 will work with all existing government and community structures, including the District Consultative Council, so as not to result in duplication of structures and organisations. In terms of support, AMA1 is assessing a range of support and development activities through the Project's Community Investment Programs. AMA1 will through its Community Health initiatives endeavor to support the Palma District Health Services in its provision of health care to the communities of the Palma district.
17	AMA1 will employ nearly 1000 workers. It is known that 400 workers have already been hired. We request that the other positions be distributed throughout the Palma administrative posts. For example, if 100 positions go to Olumbi, another 100 should be for Pundanhar, and so on. **Augusto Chande - Member of the**	Comment noted.

	Consulting Council from Mute	
18	Why is AMA1 discriminating against women in the hiring process here in Palma? When women go to AMA1 to apply for a job, the company sometimes requests a payment in exchange. Could it be that the company itself requires women to pay to get a job? Or is it a group of people organized to keep women from working? **Saifa Adinane - Member of the Association of Paralegals of the District of Palma**	Regarding discrimination against women in the recruitment process, the Minster of Women and Social Action highlighted the issue that women and children in the affected areas should not be discriminated against. In our development plan, we have paid specific attention to women in the affected areas. Our project has already hired women and we intend to hire more women for our project, and we believe that this will continue because it is part of our recruiting policy. **John Peffer - Director General, AMA1** ***Additional response after the meeting:*** AMA1 has not and will not request any job applicant to make any form of payment in order to secure employment. The project is an equal opportunity employer which include the employment of women.
19	I have heard that there is a company called ZAGOPE, which is doing the road from Mocímboa da Praia to Namoto. Is this true or not? I'm asking this because the latest information I've received is that the road will only go from Palma to Mocímboa da Praia. Isn't Namoto part of the Palma District? **Agostinho Silvestre Nkavyanga - Member of the Consulting Council from Mute**	The project also includes Namoto, and the objective is to reach that point, but at this time resources are being instructed to complete the highway between Palma and Mueda. The focus now is on Bacia do Rovuma, and I think that the road to Namoto will happen soon after. **Guilherme Carvalho -Civil and Technical Engineering, ZAGOPE**
20	Firstly, I would like to thank Mr. Victor Hugo for his efforts in creating a way for everybody interested in contributing to the project to be able to participate. I think that the most important thing in a process such as this, a project of this size and in a democratic country, is not the difference of opinions. Our concern would be if we were to have different objectives; some people wanting development in the country, and others not wanting it. This is what I think should be the biggest concern of people. If we have different ideas but if we have a common goal, I think that we are okay. Sometimes we might not like what we are hearing from our partners, but if we understand that the goal of our partners is to reach the common goal,	I would be happy if in this meeting, a platform of understanding is established with the NGOs. I think that this would provide an opportunity for constructive participation by all of us. Speaking not as a facilitator but as a citizen, I would like to request that the NGOs also reflect on this, since they ask to be involved, but you also need to include others. Thus, when you hold your meetings and plan your work programs with the communities, invite us too. We would participate in an open and frank manner, without hiding anything, and if you do this with us, it would be another form of communication. When you make comments in the newspapers, etc., invite us to get involved, because there is a feeling that we are quickly building two sides. And two sides do not exist because we are on the same side of the battle. I think that

	then I think we have to have patience and pay attention and try to understand that these people have ideas that seem different to us. In the end, they might not be so different after all. The question needs to be answered with regards to the role and contribution of civil society? There could be other local private institutions, business people in Palma, who could have different positions or opinions regarding certain aspect, and this does not need to necessarily mean that we are against the project. So, Mr. Victor Hugo's clarification that we are all part of this process and that we all have a role to play, that we are all important - this was a good clarification for this stage of the process. However, going forward, we are all going to have to collaborate, since this is a complicated process, it takes a lot of time, there are a lot of questions, there are things which have not yet been clarified - we all have to collaborate in the process. The consultations about resettlement are going to continue to be difficult. There will be a lot of different opinions, contradictory opinions, different interpretations, for example, of legislation. The most important thing is that any concerns can be expressed. It's not a problem that different lawyers have different interpretations of the law. The essential thing is that all of us, at some point, reach an agreement on our understanding of the law, and that is what we are trying to do. **Alda Salomão - Director General, Centro Terra Viva (CTV)**	this is the same communication strategy suggested by Ms. Alda Salomão. **Mia Couto - Meeting Facilitator, IMPACTO** ***Additional response after the meeting:*** *With respect to the comment about availability of meeting notes or minutes, all the consultations held as part of the EIA process have been recorded and are available. A record of the EPDA Phase meetings were included in the EPDA Report which was made publically available. A record of all meetings held during the Impact Assessment Phase are included in this EIA Report (please refer to Annex A).* ***Kamal Govender - Project Manager, ERM***
21	Because I think that this project has all of the components required to be a good project for everybody, I would like to propose a few suggestions: With regard to our project partners, AMA1 and eni – perhaps we should refer to them as "Enidarko"- we need a communication strategy. We have to get organized so that we have a database and mechanisms for communicating between ourselves and	***Additional response after the meeting:*** The Project recognizes the important role of on-going, meaningful, transparent dialogue with a wide range of stakeholders, including directly and indirectly affected communities, civil society, the Government of Mozambique at different levels, the media, business and industry, development agencies, and other interested parties, about the Project and the various components, impacts, opportunities and challenges it contains. The Project has

	with the communities. This will allow all of us to know exactly what and how things are going to happen, who is going to do what, and how and when. Some of the difficulties the project is facing at this time could be resolved by a communications strategy. More specifically, I would like to ask that for Palma and primarily the communities potentially affected by the resettlement, that a specific meeting is organized for those communities, and that an extension is provided to the commenting period, if possible just for Palma. **Alda Salomão - Director General, Centro Terra Viva (CTV)**	developed a Stakeholder Engagement Plan (SEP), implemented by the Project Stakeholder Engagement team and various other Project functions (Government Affairs, External Affairs, Commercial Affairs, Management teams, Community Relations team, etc). The SEP sets out the goals and vision for long-term constructive Project-stakeholder relationships, mapping and providing analysis of the various stakeholders and their interests, as well as methods and tools for facilitating constructive dialogue with each of the various interested and affected stakeholders. The Project Stakeholder Engagement Team is aware that a responsive, multi-level and multi-layered engagement strategy, supported by a robust information-sharing system, is vital to ensure transparent, culturally appropriate and reciprocal Project-stakeholder relationships throughout the life of the Project. With specific reference to meaningful and participatory community engagement, the Project Community Relations team maintains on-going consultation with communities, using culturally appropriate engagement mechanisms. In addition to establishing project-specific dialogue forums for the duration of the Project, the Project is pro-actively participating in the already established civil society platform for the extractive industry, as well as with several other sector-specific forums and platforms.
22	Request the collaboration of the government and the company so that we can have access to the minutes of the public meetings, not only these but all of the consultation processes that have taken place. I think that they will provide information about the decisions that are going to be made, and this will be important so that we can understand what the most important issues are for the communities, for the government, for the company and for other partners. Based on this, we are going to compile a complete set of information to provide guidelines for future activities. **Alda Salomão - Director General, Centro Terra Viva (CTV)**	***Additional response after the meeting:*** *A record of the meetings held to date available to the public. Notes from the EPDA Phase meetings were published in the EPDA Report which is a public document. Notes from meetings during the Impact Assessment Phase are included in Annex A of this report.* ***Additional response after the meeting:*** *The EIA process is distinct from the DUAT process hence the public consultations from the EIA shall be focused on the EIA and are not meant to address matters on the DUAT process.*

23	On the side of the NGOs, and because CTV represents a very extensive group of NGOs, I will say to the government, the companies, and the representatives of the communities, that none of the civil society organizations are against the project. There are questions, and concerns, but absolutely nobody is against the project and we would like to, and we will continue to collaborate and contribute. **Alda Salomão - Director General, Centro Terra Viva (CTV)**	Comment noted.
24	I would also like to congratulate the leader of Quitupo for clarifying in this meeting that there is no impediment, to the contrary, that the company and its teams, as well as the government and its teams, can continue to go to that community (Quitupo) and other communities to do the work that needs to be done. **Alda Salomão - Director General, Centro Terra Viva (CTV)**	Comment noted.
25	I thank and congratulate AMA1 for its collaborative work since it arrived at Palma. I have been able to understand everything that AMA1 has conveyed up until now regarding construction and the proposed development. I understand that, in addition to AMA1 another company, eni, also exists. But I have only ever heard about AMA1 in these types of discussions. Are there reasons why people in Palma only talk about AMA1; is it because this is the only company they have worked with? This is the second meeting where I have heard about eni, since all of the projects only talk about AMA1. Isn't eni concerned because the company is never talked about? I recommend that eni follow what AMA1 is doing. Eni - you shouldn't be jealous of AMA1 because you are guests. We don't know what eni is planning; we only know that it is going to contribute to the maintenance of the Palma highway. We were not informed when they arrived and joined up with AMA1. Even so, you are welcome.	Regarding the partnership of AMA1 with eni, AMA1 has been working in Palma since 2007; we discovered gas offshore in 2010 and eni did the same in 2012. Since AMA1 was the first to discover gas, it is assuming the leadership in the process. We have previously worked with eni in other parts of the world and we have been successful in this, and I believe that we will also be successful in Mozambique. **John Peffer - Director General, AMA1** Eni is not a timid company. Eni discovered gas one year after AMA1. Mozambique has a law related to the issue of gas discovery in the same reserve by two companies, this requires unification (forming a sole entity to do the work), creating a single entity when there is overlap in the areas where the gas is found. Therefore, under this law, AMA1 and eni signed an agreement in December, 2012 to work together at that reserve. We have been working together since January 2013 with the same approach and management methodology. In June, eni also built its camp in Palma. At the end of next month, we will

	Saide Arubeia - Member of the Consulting Council from Quelimane	start with the social investment activities through the construction of a mother´s waiting house next to the hospital. We are very pleased with the work AMA1 has already completed in moving forward with the environmental assessment and the resettlement, and it is our intention to contribute and assist with this process with all of our efforts. At the same time, eni will be involved in other projects, for example, the construction of the highway from Pemba to Mocímboa da Praia and we will also be active in other social initiatives. **Concetto Fischetti -Development Manager, eni East AFrica**
26	I would like to begin by thanking everyone in this room for their involvement – members of the consulting council, AMA1 and eni, the consultants. We, the government, have been working with AMA1 since 2007, and it was also then that we became familiar with Impacto. From that point forward, we have been monitoring all of the process and its phases. Since then, and throughout the process, we have been informed that the project would bring many people with it. In fact, now we have a lot more people from outside participating in the consulting council meetings and the public hearings. This project provides a lot of opportunities for the people of Palma. But there is room for everyone; we are going to work together. We are made up of various companies, various NGOs, and this means that we have to follow the rules. Companies have rules about how they need to work; the NGOs which are getting involved and want to be part of this process also need to follow these rules. None of these parties are authorized to assume the work of the government. This is because the government has been working with the communities which are now going to be the focus of the work that is going to be carried out now. There are a lot of things which were done in the communities which are the result of the efforts of the government and not of the people arriving now. Therefore there cannot be a better consultant or	Comment noted.

	advocate for the communities, since this role has always been assumed by the government. There are opportunities for everybody, but this can also be a way of getting something. This cannot be used to distance the population from the government – this we cannot allow. When we talk about discrimination against women, there have been studies and research which undertaken to understand how to include women in this process. Three days ago a team from the Ministry of Women and Social Action was here to present the results of this research, of how to involve women. AMA1 also had a team conducting a social survey and the results of this survey will also be presented. We have projects underway with involve surveys and research, and they will provide answers about how women can be involved. From surveys conducted previously, for example, for the seismic survey, nearly 40% of the jobs were provided to women. Regarding the issues in Quitupo, these discussions should not be transferred to other communities because this will only create problems for those communities. Each community should have its own forum for discussing certain issues. There are people who want the minutes of the DUAT acquisition meetings at the district government level; however we don't have these minutes because there are central institutions which hold this information. The structure of the central, provincial and district government is valid and should be respected. This meeting was satisfactory because it provided an understanding of certain issues under discussion. **Romão Jemusse, Administrator of the District of Palma**	

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – City of Pemba (EIA Phase)

Comments and Response Matrix
Date: September 12, 2013
Site: Conference Room of the Pemba Beach Hotel
Time: 09:00 – 13:00

ID	Question Raised	Response
1	When discussing activities currently underway, it was mentioned that progress towards safety is being made eg the local people are being employed as flagsmen. In terms of emergency responses, are we considering emergencies related to the project in a wider sense, such as from natural disasters. In terms of safety and emergency, what is the level of cooperation with the government, specifically, with the INGC (National Institute for Disaster Management) and the National Institute of Meteorology? What level of engagement is there between the proponents and these institutions? **Paulino Timana Junior - Member of the Advocacy Association Network and the Uthende (Ruth) Social Lobby / Natural Resources Platform**	Emergency response is discussed in relation to the project and not in the broader context of natural disasters. The project will bring infrastructure to the area, and its presence will help the capacity for government institutions to respond to natural disasters. For example, there will be a paved airstrip, improved roads, water, electricity, etc. We have used data from the National Institute of Meteorology for some of our studies, but have yet to provide our data to them but we are open to it. In the event of an emergency, we would initiate our emergency response plan and procedures, and liaise with local, district, provincial and national authorities, as we have been doing throughout the project. **John Peffer - General Director, AMA1**
2	I noticed that during the exploration activities there were certainly impacts on the fisheries sector. Given that fishing is one of the most important activities for the people of Palma and the region, was attention given to the impact the project will have on fishing and the fishermen themselves? Are there alternative activities to fishing planned? Have specific measures been developed to reduce the impact to the sector? **Zito Machona - Representative of Local Initiatives, The Development of Sustainable Fishing in the Bay of Pemba**	Yes, the EIA Report considers impacts to fish from a biological standpoint, but also to fishing activity. The project will implement exclusion areas for the construction of infrastructure, and therefore there would be no fishing in these areas. As a result of the exclusion zones, there could be an increase in fishing in other areas. The main mitigation in terms of impacts to fisheries will be investigated within the scope of the Resettlement Action Plan (RAP). *See Section 13.2.4 of the EIA Report for the assessment of impacts to fisheries.* **Kamal Govender - Project Manager,**

		ERM Exploration drilling was preceded by the seismic survey. EIA studies were undertaken for these exploration activities. The studies considered impacts not only on fishing resources, but protected marine species as well, such as whales, for example, and also impacts to fishermen. Mitigation measures are also implemented during drilling. The EIA Reports for seismic activity and drilling offshore are still available. **Alexandre Jossias - Environmental Coordinator, AMA1** The technical engineering teams are working closely with the environmental and social teams to ensure that the results of the fisheries study are taken into consideration in design. For example, we are going to look into the impact of marine structures such as the LNG jetties on fishing, and take this into consideration in design. **Cory Weinbel - Project Manager, AMA1**
3	Considering that the Non-Technical Summary (NTS) is the base document for this meeting, I got the impression that this EIA study considers fisheries in a superficial manner. As the 1st speaker said, fishing is extremely important in the region and cannot be treated generically or integrated with other issues. We are talking about subsistence, artisanal, sports and commercial fishing, and each type of fishing has characteristics that must not be analyzed in a generic manner. I suggest that the consultants approach the issue in as much detail as possible. In the summary of environmental impacts, there is a discussion of all impacts, but not fishing, the activity itself and the fishermen. The EIA Report should take into account the existing strategic plans, - for example Palma Bay was declared an aquaculture reserve by Decree No. 71/2011 of 30 December and at no time does the document consider impacts that the project may have on aquaculture.	Before moving on to the responses, I would like to ask if Director Carvalho has access to the full EIA Report, because many of his concerns would have been addressed if he had access. The invitation to the public meetings details where the copies of the report were distributed for consultation. The announcement of this meeting was published in the newspaper and it states where copies of the EIA Report are available for consultation, as well as the link to where it is available on the internet. **Mia Couto - Meeting Facilitator, IMPACTO** Thank you for your questions, as they speak to the size and complexity of our study. I would like to call on two specialists who are here with us to elaborate further on how the studies examined fisheries, marine-based

	The concern wasn't whether the EIA Report was received. I simply said that I took the NTS as the basis for this meeting, as it summarizes the study, but it doesn't discuss fishing issues in the way other issues are approached, despite the fact that fisheries are a critical issue for this project and EIA study. **Carvalho António**	livelihoods and marine ecology. Robin Carter of Lwandle Technologies, can elaborate on the project's impact on marine ecology, and Victor Hugo, can elaborate on how people could be affected, and what the potential mitigation measures are. **Kamal Govender - Project Manager, ERM** The objective of our study was to look at the project's impacts on the different substrates present in the bay, such as seagrass beds, coral and sand coastlines. The impacts to fish were predicted based on the total area of affected habitat. Impacts were assessed in relation to construction activities at a local scale, particularly in the area of the bay adjacent to Afungi Peninsula. In terms of size, this area corresponds to nearly 10% of the total area. This area comprises seagrass that is also dispersed throughout the bay, along with coral communities. The construction activities will result in disturbance, and in some cases loss of coral, with the exception of areas where coral will be indirectly affected by the activities. In our study, we did not try to look at the distribution of fish throughout the area, as this is technically difficult. Therefore, we focused on the substrate component rather than on the fish themselves. The socioeconomic team will start studies, looking into the fish component, including the type of fish and location of fishing taking place. **Robin Carter - Marine Ecology Specialist, Lwandle Technologies** Fishing is highly important in an area such as Palma, where the greater number of households having a diversity of activities, with fishing being one of them. The matter is so important that beyond what was covered in the EIA Report, a specialist study on fisheries is currently taking place, carried out by a team of international and Mozambican specialists, James Wilson and Alfredo Massinga, respectively. This study will consider everything that may be relevant

		in terms of fishing activity. In Palma Bay and its surroundings there are nearly 25 fishing centers. This gives us an idea of the importance of fishing activity there, in such a small area. There are seasonal fisheries of economically important species, such as tuna. The project will exclude access to some fishing areas between Nsemo (eastern end of the Afungi Peninsula) and Palma for safety *and security* reasons. As part of the RAP process the project is currently determining the extent of permanent exclusions. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO** ***Response after the meeting:*** *Based on comments received, we have included a consideration of the potential implications for future aquaculture in Section 13.6.* ***Kamal Govender – Project Manager, ERM***
4	I wanted to comment upon some of the mitigation measures put forward for fishing. One suggested measure is to allow fishing in the bay for the longest time possible. This is nothing new – it is what is going on right now. It is important to maintain it. We need real measures. The question is, how? Other measures suggested were to do with dredging, and transplanting the *Acropora*, however I did not see mention of seagrass beds, which are the main existing habitat in sandy areas. It is important that this study details bibliographical references to assist in an in-depth, up-to-date understanding of the data presented. **Carvalho António**	We looked at several methods used to rehabilitate seagrass beds, reaching the conclusion that the most expensive processes, used in Australia, were not considered the most successful. For this reason we suggested a more basic approach, whereby the seagrass beds are re-gritted to provide a substrate for seagrass seedlings so that the plants can restore themselves naturally. Interventions involving seagrass sods did not appear to be successful. Other options, such as placing seagrass in hessian cloth nets on the seabed, also showed some constraints. The selected option has other benefits, such as it could transfer resources to the community, since it requires manpower, organization, etc. There is, therefore, a greater benefit than merely replacing seagrass, but for this issue, we choose to restore the seagrass beds in a natural way rather than an artificial one. **Robin Carter - Marine Ecology**

		Specialist, Lwandle Technologies There will have to be mitigation measures to minimize the restrictions on fishing in that area. Measures will be negotiated with the fishing communities in the area. Possible measures could include modernization of the traditional fishing fleet, motorization of some vessels, to increase the geographical extent of traditional fishermen to areas that are not disturbed by the project. We will also investigate alternatives for the use of marine resources, since impacts will extend beyond fishing to the collection of molluscs and bivalves in the extensive intertidal area. These provide an important source of protein for the people. This fisheries study is not yet complete, but has been given high priority by the project. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
5	There certainly was a small communication problem. We, the DPCA, often receive copies of these documents. In future, we will do everything possible to improve and ensure that the information is distributed appropriately, depending on the topic to be discussed. We are committed to this. **Policarpo Napica - Provincial Director, Provincial Office for Environmental Action Coordination (DPCA)**	We took great care tracking the delivery of the invitations and the EIA Report. Each of the institutions signed on the day they received the invitation, so that this information pursuant to the main report could be distributed. There could be things in that report that were not reflected in the NTS. Dr. Carvalho would be completely right in that case, but it doesn't mean that it wasn't in the main report. **Mia Couto - Meeting Facilitator, IMPACTO**
6	I participated in the Maputo meeting and then made sure to read the report a bit more. It is rather extensive, and I didn't have enough time to read it all. I have some comments and suggestions that may contribute towards improving the report. On page 7 the report says: "Project footprint..." I do not know what the term footprint means, "...will be built in a total area of 3,600 hectares, yet the DUAT was issued for an area of 7000 hectares. I would like to know why the DUAT is for an area of 7,000 hectares while the project is to be built in an area of 3,600	The volume of gas discovered in Areas 1 and 4 is world-class. We expect to generate 50 million tons / year of LNG based on these resources. The initial project is to generate 20 million tons / year, but we can double that volume. When we planned the project with the government, with us as the investors, we wanted a single site. It is for AMA1 and eni, but also any other operators who find gas can make use of the plant. So it is the long-term plan that requires 7000 hectares. We do not plan to use the entire area. For example, there are wetlands in the area and it is not our intention to build in those areas. The

	hectares. What was the area occupied by the LNG plant in Australia, to give us an idea of the amount of space needed? I ask this question because the size of the area occupied by the project is important in relation to environmental, social and economic impacts, and may influence the entire study being presented here. **Issufo Tankar - Centro Terra Viva (CTV)**	wetlands are also used by local communities living outside the DUAT area for agricultural production, and we will do whatever is possible to allow them to keep practicing agriculture in these areas. This is part of our commitment to minimize the social and economic impact on the communities living in the Afungi Peninsula. There are similar plants in the world that occupy nearly 3500 hectares, such as the one in Qatar and the Tangguh plant in Indonesia. **John Peffer - General Director, AMA1**
7	Another aspect that may have implications for the government is the manner in which the DUAT was obtained. It was explained in Maputo that the government awarded the DUAT to ENH through a transfer of property contract, transferring the DUAT to AMA1. First, I understand that the transfer of property contract must be regulated, and this is a process that must be discussed at the level of a land consultation forum. However, despite pending discussions, the government decided to go that route, using the transfer of property contract to convey the DUAT to AMA1. I would then like to know why the mechanism that communities themselves transfer their DUAT using the transfer of property contract to AMA1 wasn't used. Why wasn't this approach chosen instead of the DUAT being awarded to a company to then engage in an transfer of property contract? **Issufo Tankar**	The issue of the DUAT has been raised in Maputo, in Palma and now in Pemba, by CTV in a rather systematic manner. We made a proposal, which was well accepted in other meetings. It must be made clear that the proponents did what was recommended by the government. That is, when we started the EIA, MICOA required that for registration (the first step taken in the Process Instructions) the project should have a DUAT. Therefore, the proponents began seeking the DUAT. In fact, what is outlined in the regulations is that the investor must show proof that it is handling the legal issues pursuant to the rights to use the land. Then highly specific and technical questions were raised by lawyers on the exploration concession, etc. and the legitimacy of the process, what must come first, whether the DUAT comes first and the EIA Report later. That debate can be had here. Therefore, we proposed in both meetings that there should be a working session to clarify the issues, since this issue is somewhat separate to what we are discussing, the EIA Report. However, we are open to questions being raised about what is to be done, or what was recommended by Mozambican institutions. **Mia Couto - Meeting Facilitator, IMPACTO** I would like to add something about the DUAT and resettlement. MICOA made it very clear in the Maputo meeting that a DUAT is required before the EIA. It was clear the processes followed were

		according to the law. We, the proponents, are open to further clarification meetings eni and AMA1, and for the regulating authority. **John Peffer - General Director, AMA1** With regard to the exploration concession, for which CTV could not find a legal provision; it is regulated, in Mozambican legislation, under the Land Law Regulations, Article 15. This outlines the exploration concession as a legal method for the transmission of a DUAT. To ensure that the process is lawful and transparent, all exploration concessions are made by public deed, meaning that they are duly recorded in the Land Registry and are therefore subject to consultation by interested parties. **Emerson Lopes - Legal Department, AMA1**
8	The study mentions the issue of resettlement. From what I understand, from our legislation, and what is required to secure an Environmental License, the Resettlement Action Plan (RAP) must be presented in the EIA. But the Resettlement Plan isn't disclosed here. When will this plan be disclosed and discussed so that the interested and affected parties have a chance to raise their questions and contribute towards ensuring the plan impacts the smallest amount of people in the project area? **Issufo Tankar**	With regard to the RAP and the EIA Report, this is another point that requires clarification between the government, the investors and the requirements. Some of these requirements are not very clear, in fact. When the government saw that there were some mistakes in the past in relation to resettlement, some things that should not be repeated, it took a somewhat more defensive attitude and decreed that the RAP must be available prior to approval of the EIA Report. This matter was discussed by NGOs and consulting firms, who stated that adherence to this, was against the nation's best interests. It was discussed in the government of former Prime Minister Aires Aly. The conclusion reached was that the arguments being presented against first having a RAP, followed by an EIA Report were appropriate. The objections are as follows: we do not know if this project will be carried out, but it is necessary for the proponents to have an EIA Report, an authorization to perform a project, with financing ready. Is a RAP created before what is going to occur? Communities will be informed, agreed, etc. The RAP is a study that

		takes two years to undertake. It's possible that if the RAP was undertaken first, people will be resettled and the EIA would be rejected, which means there was no reason for people to move. This creates disturbance and unmet expectations. These were the concerns that were highlighted. For this reason, the government decided to reconsider the process and find a middle ground, because the decree could not be immediately annulled. Then the Initial Resettlement Plan (IRP) was adopted instead. This stipulates the most important principles and issues that a project must abide by for resettlement. **Mia Couto - Meeting Facilitator, IMPACTO** This EIA Report includes an Initial Resettlement Plan (IRP) as an annex, as MICOA asked us to do. The IRP is a policy document that sets the structure and guidelines for a future RAP to be carried out should the project be approved. It is clear that a RAP must address, prior to anything else, the losses suffered by the communities affected by the project. Obviously, and for reasons already explained, the resettlement process has not yet started. Any resettlement project has a preliminary phase that consists of a census, because a project needs to know who is living in the area, an asset survey and an extensive list of all the assets held by each of the affected families. With this, the project tries to determine who needs to be compensated or what needs to be compensated. These steps shall begin soon. The only activity undertaken to date related to resettlement by the government is making information available to the affected communities, stating that some communities may have to be relocated should the project go ahead. Yesterday we had a meeting in Palma, and we were invited by the community of Quitupo to visit them next week to explain the process. As soon as possible, or when the community feels

		comfortable, we can commence the preparatory phase of resettlement, which consists of a census and the asset survey. It is evident that one of the major safeguards regarding the preservation of personal rights is in the participatory nature of the process itself. Nobody will decide for the communities where they will go. The communities have the right to make themselves heard regarding the host area or areas they prefer. These host areas will have to be studied in terms of agricultural suitability, etc. But the entire process is negotiable and participatory, and involves the communities. The same will be done in regards to compensation. Nobody is going to impose already determined solutions on the communities. During this process, we are relying on the input of civil society, including CTV, as constructive partners in terms of guaranteeing that our work with the communities is robust, in the sense of determining whether the explanations given to the communities are truly understood. We acknowledge that resettlement will be a challenge, because people do not necessarily want to move, as it represents a disturbance to their way of life. We are transparent, we want to share the solutions and approach we are proposing, involve communities, the government and civil society. We want civil society to aid us in finding solutions, and we also hope for openness and transparency from civil society. As for EIAs, the resettlement processes will have public meetings, like this, an innovation introduced by the new law, which is welcomed. The objective is to guarantee that development projects can be implemented without detrimentally affecting the life of the communities. For this reason, the recent obligation to hold public meetings is welcomed by us and we count on you to discuss not only the EIA but the progress of the resettlement activities as well. Regulations state that at least four public meetings must be undertaken during the resettlement process. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**

		Regarding resettlement and the RAP, the project EPDA was approved by MICOA before the new resettlement decree came into effect. As far as I know, the government does not apply laws retroactively, and it did not do so in this case. We provided an IRP with the EIA Report as required. The census, etc. will be done now and a RAP will be based upon it, taking into consideration Mozambican law and international good practice. **John Peffer - General Director, AMA1**
9	With regard to the economic benefits mentioned, the study clearly shows that there will be physical displacement, and as a mitigation measure, people will be compensated for their temporary losses. What will be done in terms of permanent losses? There will be situations where a person has a house, and it currently takes him ten minutes to go get to fishing grounds. It could be that resettlement results in the relocation of this household and rather than taking him ten minutes, it will now take him an hour to reach the fishing grounds. I would like to ask that the type of compensation that these people receive is clearly conveyed. I don't know how this would work, but we could take Mozal as an example. There a foundation was set up that received an amount (of money) that was used to assist in reducing the losses suffered by communities as a result of that project. Then, a scheme could possibly be established in which the communities themselves can decide how to use this money. The project could allocate a percentage of the profits to the community. **Issufo Tankar**	There are two types of displacement that can result from any development project: 1) physical displacement: which means removing the people from the inhabited areas and relocating them to a different area – and 2) economic displacement: individuals that do not live in the project area but have assets within the project area, such as land, *machambas*, businesses etc are affected. Both situations have been addressed by the resettlement plan. There are several principles that govern the requirement for compensation and the definition of compensation. The prevailing principle in Mozambique is that essential assets, productive ones and real estate must be compensated in kind. In other words, the loss of land is compensated with new land, the loss of housing is compensated with new housing, and this is what will be done by this project. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
10	I'm not sure what the capacity of the Cabo Delgado DPCA is, taking into account that this type of project is new to our country. It would be useful to think of how best to build up MICOA´s capacity, including the, DPCA, to participate in the monitoring and auditing of the project, and the implementation of the recommendations that will emerge from this EIA Report. We have an EIA Report	Our Ministry is responsible for coordination and not execution. If doubts arise, we know to whom we can address our concerns. In that sense we have absolute certainty. **Policarpo Napica - Provincial Director, Provincial Office for the Coordination of Environmental Action (DPCA)**

	that produces very nice recommendations, but we run the risk of it becoming a document forgotten in a drawer somewhere. **Issufo Tankar**	Regarding monitoring, the project is committed to the implementation of mitigation and management measures. Reports on internal and external monitoring results, as well as audits, will be submitted to various institutions, including MICOA, so that there is awareness that the mitigation measures in this report are in fact implemented throughout the project. **Kamal Govender - Project Manager, ERM**
11	The area of Palma and Mocímboa da Praia has a large influx of migratory fishermen. These migratory populations on the Afungi Peninsula, will be affected by resettlement. The resettlement process must align with the fisheries study, to ensure that neighbouring host communities will not be affected, and have the capacity to receive the resettled fishermen - there could be problems with those fishermen. **Isabel Marques da Silva - Marine Ecologist, University of Lurio**	You are completely right when you expressed concern regarding the migratory fishing movements. We are aware of the seasonal migratory movements of fishermen, some coming from Tanzania and others as far as Nacala. One of the specialist studies to be carried out which is beyond the scope of the EIA, is about in-migration, since we know it its highly complex situation. In terms of compensation, we cannot only think about the people facing resettlement, but also the host communities. Those who must be resettled will be resettled somewhere - that place may be uninhabited or may have a community established there. The host communities, (those that will receive resettled households), will be impacted by an increase in pressure for available resources. The RAP also covers compensation measures for the host communities. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
12	Regarding marine ecology, I would like to congratulate the consultants on the study of seagrass. However, I have questions about corals, which I believe to have been scarcely studied, mainly based on the year of the studies upon which the study was based. In 2012, articles appeared in international peer-reviewed magazines on the importance of coral biodiversity in Northern Mozambique. Basically, Northern Mozambique has the greatest coral biodiversity in the Indian Ocean, a fact that is overlooked in this	When we study the effect of the project on seagrass and coral, we first try to look at the amount of habitat that will be affected, and the level to which it will be affected, and to what in fact happens after the event. Do we allow the environment to recover on its own, or can recovery be optimized? We spoke about seagrass previously, and I think we agreed that it is an important biodiversity resource in the area, and that it also supports fishing, by acting as a fish hatchery.

	report. A concern about the recovery of corals between the two islands - after the gas pipeline is installed. The corals in that area are at imminent risk due to overfishing. Secondly, the indicated mitigation, placing a substrate for coral to recolonize, doesn't seem enough without a fisheries management plan that looks at the area at risk, and the quantity of fish that could be recovered if there were a sustainable management of fishing in the affected area. **Isabel Marques da Silva**	In terms of the corals that may be affected, there are two approaches. One is to ensure that after major dredging, there is a sufficient substrate to enable natural recovery; the second is to transport corals to a temporary area and then replace them at their location of origin, or allow them to be placed in a different area from the area affected. This is somewhat controversial, because the performance history of the methods used isn't particularly good. Some example, good results are available over a moderate time period, of nearly 3 years, but we are uncertain about the degree of success after this time. In terms of seagrass, we have good recovery stories, but after 3-5 years, seagrass tends to die. Due to the uncertainties and the cost of investment, we decided to optimize natural recovery. The gas pipeline route is different, as it will have dug through a calcium carbonate stratum with coral on top of it. This area is already damaged by fishing, as seen by the evidence from towed nets. We see that large coral communities are overturned, but still alive. This suggests there is a possibility to transplant coral without having to remove the viable coral. AMA1 agreed to investigate these options further, which will start within a month with assessments of the community types that may be successfully transplanted, the substrates and then the locations. **Robin Carter - Marine Ecologist, Lwandle Technologies**
13	A study undertaken by local researchers from the University of Lurio on reptiles and coral reefs was not utilized. There is much talk of cooperating with communities, but these world-class researchers should cooperate with local researchers from the University of Lurio and the Eduardo Mondlane University, because considerable recent research has been conducted, and it was missing from the EIA Report. **Isabel Marques da Silva**	About cooperation with local researchers, our reply is an enthusiastic yes, particularly regarding the work mentioned, which was carried out in Rongui and Vamizi by Mozambicans. This work is highly valuable, because it gives us a point of comparison with the current situation at Rongui and Tecomaji. **Robin Carter - Marine Ecologist, Lwandle Technologies**

14	The mitigation measures for impacts to community health have not been detailed. I was confused when I read that the improvement measures, to be implemented, will benefit the health of the community. What kind of mitigation is implied here? Could it be that training will be provided, or there will be improvements to the hospital? **Imamo Mussa - Paralegal, Natural Resources Area, Environment and Development**	We have nine different impacts related to various aspects of community health and associated mitigation measures. Aside from this, a Health Impact Assessment (HIA) is being carried out to understand the main issues and how the project can support the government in solving them. *See Section 13.5 of the EIA Report.* **Kamal Govender - Project Manager, ERM**
15	Two clarification requests related with the impacts presented in the EIA Report: It was said that the project will employ local people, yet also, states that there are high levels of illiteracy in Palma. It is known that a training center has been built in Afungi. Given the complexity of this project, I would like to understand what opportunities for jobs there will be for the local community. Who will receive training? What type of training? Is there a plan for future training initiatives – such as a high school, or bringing in specialists for long-term training initiatives at the local level, as we are talking about a long term project? How can we capitalize on these local resources? **Énia de Sousa - Centro Terra Viva (CTV)**	It is true that by national characteristics, Palma District with the highest illiteracy. This concerns us when it comes to making use of the existing resources (*or manpower*). Four hundred people have been trained already at our training center in Palma, people who did not know how to read or write. These people will now take up some jobs in accordance with their qualifications. We are also working with the National Institute of Employment and Professional Training (INEF), where more people will be trained for medium-level skilled professions. We began working in Maputo but they said that there is an INEFP school in Pemba and we are making our best effort for it to be utilized. Since we are speaking of a local and regional level, we are also thinking about building a training centre in Palma for all levels of qualification or academic education, so people can be well educated and trained to work at the plant. At the Eduardo Mondlane University, we opened a faculty, the first faculty of petroleum engineering, where we are currently training professors to specialize in the subject of petroleum. These professors will then educate Mozambican graduates through bachelors of honors degree or masters in petroleum. More Mozambicans can then benefit from the presence of the LNG plant in Mozambique. **Alcídio Maússe - Officer-in-Charge of Social Affairs and Government Liaison, AMA1** The project is looking at the type of personnel and skills needed. In the

		project area, the level of skills is low and training is required. We are providing training in the USA, as well as sponsoring courses at Eduardo Mondlane University in Maputo. We have ongoing training at various levels at this time, but as we move forward, we'll have a better understanding of the type of skills we need and when we'll need them, and this will form part of our training plan **Cory Weinbel - Project Manager, AMA1**
16	It was shown, that an unplanned event could result in the dispersion of gas into the water and subsequently into the atmosphere. This impact was classified as unlikely because of all the safety measures implemented in the design process, but at the same time, this impact has great significance. As a mitigation measure, appropriate design, maintenance and operating procedures was raised. In my view, this is not a mitigation measure for this impact **Énia de Sousa**	On the issue of a pipeline rupture and the release of large quantities of gas is considered as an unplanned event. When evaluating the impact of such an event, we employ a risk based methodology which considers the likelihood of the event occurring and the consequences of it happening during the construction and operation of the gas pipeline. The likelihood of an accident occurring, for example failure of the subsea infrastructure and the release of large volumes of gas, is low. So when evaluating consequence, we consider what would happen if the gas entered the water column. The gas would bubble up and disperse into the atmosphere; it won't dissolve in the water. For this reason the consequence of such an event is considered minor. This is why we did consider the impact to be significant. **Kamal Govender - Project Manager, ERM** Adding to what Kamal has said, these gas pipelines are built on proven engineering designs. There are tens of thousands of pipelines like this all over the world, both underwater and on land. These gas pipelines are protected by sophisticated systems that measure differences in pressure and volume, which are capable of reacting quickly, shutting down portions of the pipeline and isolating the problem if necessary. The design helps to minimize the chance of a pipeline rupture, protecting the pipeline. The system is capable of sophisticated detection of any gas leaks in the pipeline.

		Cory Weinbel - Project Manager, AMA1
17	I'm having trouble understanding the institutional relationship between AMA1 and eni. What is the area of influence of the plant's construction – 10km, 20km or does the area extend to Pemba? I raise this question because in recent times we have had a number of consultants and companies that go around the communities – eg AMA1, eni, Statoil, Petronas, etc. All of them present their projects. I would like to understand better what is the structure and collaboration between the companies? For example, eni undertook a study in Palma and Pemba to investigate types of projects related to social responsibility. I haven't seen AMA1 doing the same. It is quite possible that AMA1 is about to do the same thing in our area. Are the responsible government sectors plans coordinated with the project plans, within and outside the area of influence of the LNG plant, in terms of district plans? Mozambique has been working with district plans for ten years. I suppose that the companies' actions must be incorporated into these district plans. At this time I cannot see who bears the responsibility for coordination. **Mark Hoekstra - Technical Advisor, WWF**	Regarding the relationship between eni and AMA1, these two companies signed an agreement in December 2012 to collaborate in the development of a 20 million tons, 4 LNG train facility in Afungi. The government has encouraged collaboration between our companies. One of the gas fields we share overlaps the areas operated by AMA1 and eni. We're going to share this offshore field. On land will have a joint venture, sharing infrastructure, and we will have workers from AMA1 and eni on the project. Outside Afungi, both companies continue to develop other activities. We are both committed to social investment in the context of our social responsibility strategies in Mozambique, and for this reason you'll see both companies doing things individually. We are collaborating, and there is dialogue between the companies to avoid duplication or overlap. **John Peffer - General Director, AMA1** As John Peffer has said, eni is committed to developing its own Community Investment Program. In January 2012, we undertook a pre-feasibility study for short-and-long-term investment projects. Each company has its own investment program, but we work closely together to avoid duplication, and in some cases we collaborate on specific projects. We (eni) have other projects, such as the road from Pemba to Palma, in which eni is the lead but in which AMA1 also participates. Public consultations were held in June for that particular project. **Chiara Cerruti - HSE and Community Investment Manager, eni East Africa**
18	When we speak of illiteracy, I am not sure if the consultants who are making the rounds checked whether there are people teaching the children something or another. The word "illiterate" cannot be applied to people who have learned something, especially when local	Comment recorded.

	traditions are handed down. This must be respected and we should not use this term. **Imamo Mussa - Paralegal, Natural Resources Area, Environment and Development**	
19	I still don't see any indication that the area required for the LNG plant is similar for LNG projects in other countries (there was talk of Qatar, Niger, Australia, etc.). **Issufo Tankar - Centro Terra Viva (CTV)**	I have previously answered this, providing Indonesia's Tannguh LNG plant as an example. It has a footprint of 200 hectares, smaller than that of our area in Mozambique. Out LNG plant will be the third largest in the world, requiring an area similar in extent to the LNG plants in Qatar and Australia, where they have several projects scattered throughout the country. We'll have one facility, and it will be a big one, because everything will be concentrated on one site. **John Peffer - General Director, AMA1**
20	It was explained that there are two types of compensation, but I would like to draw your attention to certain situations where compensation is not easily measured. People living in communities may be five minutes from the local administration. When they need to attend to paperwork, they can take five minutes to get there or spend five meticais on transport. However, if they are moved elsewhere, they might have to spend 50 meticais, having more expenses than they did before. I'm drawing your attention to this; look out for these situations when dealing with resettlement. It is important to make sure that such situations do not arise, as is the case in Tete, where people have homes, but don't have food. **Issufo Tankar**	Regarding the comment on resettlement, indirect impacts must be taken into account, since in certain cases, these may be as important as the direct impact of moving people. The resettlement team is investigating these aspects, such as the implication of removing people from their workplaces or recreation areas, and how this affects them economically. **Cory Weinbel - Project Manager, AMA1**
21	Director Napica clearly explained MICOA's role, but I am still concerned about the institution's capacity. Looking at the examples we have had in our country, sometimes MICOA itself, particularly in Maputo, tries to interact with other Ministries (Agriculture, Fishing), and sometime it is difficult. It is therefore important that MICOA builds capacity now, because there will be situations	Thank you. Some of your comments merit clarification, and others have been recorded as we obviously cannot speak for the government, or commit to work with you in terms of monitoring. **Mia Couto - Meeting Facilitator, IMPACTO**

	requiring urgent action, and it is difficult to ensure those from other institutions are able to respond to MICOA's requests. In terms of communication, I am pleased to say that CTV is lucky to have a detailed explanation, from AMA1. I don't know if other institutions have had the same fortune. This is because this year we organized a debate here in Cabo Delgado, inviting various institutions / NGOs and asked someone from the Provincial Office of Agriculture and the Environment to present status of the project, the challenges and constraints in the process. Unfortunately, we weren't able to find someone to make that presentation. It's true that they sent people to participate in the session, but they weren't authorized to share that information. This gave rise to many doubts and goes against the requests made here about transparency. I would like to ask, that the government, and the provincial offices, are able to share information are free to present it when asked to do so when asked by any organization. Lack of information sometimes creates misinterpretations that do not align with what is really going to happen. **Issufo Tankar**	
22	Regarding collaboration between the companies, somewhat different responses have been provided, but I don't want to go into details. I would only like to highlight that more petroleum companies will be appearing, and there is the risk of contradictory information about the things you do, and other areas occupied, which isn't clear to me. In the long-term, over the next 30-40-50 years of the development, I think that there will be a risk of a proliferation of initiatives by eni in Pemba and by AMA1 in another area, Statoil and Petronas in other areas, and we'll be hearing about them. We hope the government always plays the role of coordinator, but I have my doubts. **Mark Hoekstra - Technical Advisor, WWF**	All of these initiatives are carried out in collaboration and with the support of the authorities. Nothing is done without local government (district level) involvement. **Chiara Cerruti - HSE and Community Investment Manager, eni East Africa** I understand your concern, and as consultants, we are also concerned about having a certain amount of saturation. We visit communities once, presenting one project, and sometimes another project. Communities are starting to get confused with who's who, who is doing what, etc. Unfortunately, each project must be treated individually, as an EIA is needed for each project. Your comment makes a great deal of sense and I think it is up to the government to correct it in a way that there's a certain

		degree of coordination. The government started a Strategic Environmental Assessment (SEA) two years ago which has just been completed, for the entire Mozambican coast, centered mainly on hydrocarbon issues. This SEA already outlines the key strategic issues a little, which require coordination. This SEA was approved 3-4 months ago by the Council of Ministers, and I imagine that MICOA will soon announce this strategy. **Mia Couto - Meeting Facilitator, IMPACTO**
23	As we know, all communities living along the coast are considered fishing communities. As such, I would like to know, for those people who are going to be resettled, what measures or projects will be taken for neighboring communities, residents of the project buffer zones? Will we have the same rights or not? **José Domingos - Fisherman, Forum of Bay Fishermen**	"Neighboring communities" is a rather loose term. The rights of neighboring communities will be covered under economic displacement, because any community not residing in the project area – a community that will not be physically resettled, but which may be subject to economic displacement – yet having economic interests that may be jeopardized by the project, will also have to be covered by the RAP. The project's impact are not limited to people who must be physically relocated, but any individual suffering economic impacts, as a result of the project must also be consulted and compensated. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
24	It is impossible to avoid all impacts that the project will bring, and we must therefore try to minimize those impacts. We are facing a paradox: we have an investment, but on the other hand, there are people who do not want the investment. What is the way out? We know that it will result in impacts, so will the project be approved or not? **Chitti Irache - Member of the Provincial Forum to Fight AIDS**	R***esponse after the meeting:*** *This is correct, Any project brings with it positive and negative impacts. Some people may desire the project for the benefits it brings and some may object because of the changes that a project brings. The purpose of the EIA is to assess the range of positive and negative impacts, and develop enhancement or mitigation measures as required. The government then looks at the information and makes a decision on whether the project goes ahead or not, and if so, under what conditions.* ***Kamal Govender - Project Manager, ERM***
25	I was astonished to hear that our gas is sweet. I would like to know why it is	The term "sweet gas" means that the gas does not have H_2S (sulfuric acid) or CO_2

	sweet? Is it because the project is going to be sweet or is it sweet because it is a good gas?! **Chitti Irache - Member of the Provincial Forum to Fight AIDS**	(carbon dioxide) in large quantities. H_2S can be a fatal gas, or can cause the corrosion of the respiratory system. **John Peffer - General Director, AMA1**
26	It was said that there is a parallel study on social impacts in the resettlement area. I would like to know if these studies yielded negative results, and if these results will influence whether the project goes ahead or not? **Leandro Sitóe - Member of civil society**	The resettlement process involves the government, the communities and the company itself. It is a continuous process that is being developed by those three entities. **Mia Couto - Meeting Facilitator, IMPACTO** ***Additional response after the meeting:*** *As Mia points out, the additional studies will inform the resettlement process. The socio-economic studies that have already been done for the EIA are sufficient to inform government's decision on whether the project goes ahead or not.* ***Kamal Govender - Project Manager, ERM***
27	If the DUAT was already issued, and the constitution says that the land belongs to the State, then the communities have no way of refusing to leave their areas of residence. Could it be that the project proponents has a Plan B that will avoid such a situation, or to avoid experiences that have been witnessed elsewhere, such as in the Great Lakes area, where there are conflicts between companies and communities due to the projects? **Leandro Sitóe - Member of civil society**	Concerning the DUAT, I would like to say that it is not an issue linked to the EIA Report but a issue to be approached and discussed later in its own forums, in order to be clarified. **Mia Couto - Meeting Facilitator, IMPACTO** ***Additional response after the meeting:*** *With respect to the issue of avoiding conflicts, the project is committed to maintaining regular communications with communities prior to, during, and after the resettlement process. The project will also undertake a resettlement process that meets both Mozambican as well as international good practice in order to avoid or minimise conflicts.* ***Kamal Govender - Project Manager, ERM***
28	The Initial Resettlement Plan (IRP) was	In relation to gender and the effective

	mentioned in the presentation made. Will gender be taken into account, being that we are dealing with communities who have a low level of education and where women have no negotiating power? **Tayob Sacoor Arune - Member of the Women, Law and Development Association**	participation of women in the process, one of the first steps to guarantee effective participation in the resettlement process, is for the communities to organize and choose their representatives. These communities, of course, already have their normal representatives – their community leaders – but these aren't enough. It is necessary to ensure a voice for all segments of the community, such as women, youth, fishermen, farmers, vulnerable groups, etc. The matter of gender is extremely important to us, and as such, one of the groups to be represented in community consultations must be the women. They will also have to choose their representatives. Resettlement can be a difficult process. We know that it is a process that will always be the target of criticism, given that it is nearly impossible to satisfy the expectations of multiple people involved in the process. The key to success is to create a plan that is balanced from the perspective of preserving community rights, as it isn't about building prettier and better houses. There is going to be change, in some cases for better and in others for worse, not all people will be able to live exactly as they lived before. There will be greater contribution to the economy and changes in ways of life. There are no perfect solutions, but what we need are balanced solutions that result in an improvement of the people's living conditions. **Victor Hugo Nicolau - Resettlement Specialist, IMPACTO**
29	In a meeting on this project in which I took part, all the activities that would take place in Palma were discussed. Traffic will be heavier both in the sea and on land. I would like to know whether these projects are in direct coordination with the government and with the provincial office responsible for transportation, to determine traffic accident prevention measures because the people are still not quite aware of the project, and the heavy vehicles. **Afonso Weremo - Specialist, Provincial**	Regarding transportation, we have been meeting with the Ministry of Transportation and Communications regarding the project since 2011 and were visited by the Minister in Pemba and Palma in early 2012. We have an ongoing dialogue about our infrastructural needs, such as ports, airports and roads. In this context, we had a meeting in Pemba last week, at which the Minister was present. It is important that the Ministry of Transportation and Communication understand what we are trying to do in

	Office of Transportation and Communication There should be concern not only for accidents, but mobility as well. What will be done on site to ensure efficient and safe mobility to avoid disruptions? **Paulino Timana Junior - Member of the Advocacy Association Network and the Uthende (Ruth) Social Lobby / Natural Resources Platform**	terms of infrastructure and that our plans be integrated into district, regional and national plans. On how this project fits into the plans for Palma, we are working with ENH and other companies to ensure that our plans fit into the regional and national development plans. Regarding the issue of traffic, in the majority of places where we work around the world, the number one hazard is road safety. For this reason, we take these matters very seriously. All of our vehicles are equipped tracking systems that send information on speed to our headquarters, and the EHS team and others receive immediate notice if someone exceeds the speed limit. In several cases, our speed limits are well below the national speed limits so as to avoid accidents. We acknowledge that having accidents with local communities, who are not accustomed to vehicular traffic, may cause serious problems that we want to avoid this. In the town of Palma, which we consider the highest-risk area for accidents, we have a speed limit of 20 km/hour. **John Peffer - General Director, AMA1**
30	To what degree are eni and AMA1 prepared in the event that MICOA does not approve the EIA Report for this project? **Paulino Timana Junior**	There is the possibility that the government won't approve the EIA. The EIA process followed several phases. One of the phases is the EPDA. The objective of the EPDA study is to identify fatal flaws. If a project has a fatal flaw, it does not go beyond that phase. There could be issues identified at this phase that could prevent the project from being located in a proposed area, and an alternative site is required. I don't believe that there is anyone in this room who wants the amounts of gas discovered to remain underground forever. Since we are part of the team, we are playing to win fairly, respecting the environment and the communities. We do not want the communities to resist the project, and if they do, we won't have the financing to carry out the project. **Alexandre Jossias - Environmental Coordinator for AMA1**

31	I would like to hear from eni when work will commence on the Pemba – Mocímboa da Praia road? **Imamo Mussa - Paralegal, Natural Resources Area, Environment and Development**	We are still in the pre-feasibility and initial engineering design phase. We have started the tender process to select an engineering firm. I believe that construction will commence in 2014. **Chiara Cerruti - HSE and Community Investment Manager, eni East Africa**

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Maganja Community

Comments and Responses Table
Date: October 17, 2013
Site: Maganja
Time: 14:00 – 16:30

ID	Question Raised	Response
1	Stated that they had received a table with the compensation rates to be paid for the crops but that they did not agree with the rates stated in the tables. They wanted to negotiate the rates themselves, and didn't want the government to decide anything on behalf of the people of Maganja. **Mr. Cássimo Chá**	Stated that whoever lost his machamba inside the DUAT would be compensated with a machamba. The reason why the committees were created in the villages was to enable liaison with people in Maganja who had their machambas inside the DUAT. The census that was being done at that moment was to collect information about the number of houses and machambas inside the DUAT, as well as to learn who the people were and what their current situation was. Before final compensation rates are determined, communities would be consulted and everyone would have the opportunity to voice their concerns and make suggestions. The decision about compensation rates would be a joint one between the Community, Project and Government. **Victor Hugo Nicolau – Resettlement Specialist, IMPACTO**
2	Stated that the main economic activity of people living in Maganja was fishing. They had heard about the exclusion zone, and wanted to know how they would survive if certain fishing areas would be restricted. He also enquired about the type of assistance and benefits they would be eligible for as a result of the impact of the exclusion zone on their fishing activities. **Mr. Cássimo Chá**	***Response after the meeting:*** *Currently, there is a fisheries team gathering data on fishing zones. The information would be presented to the resettlement team to work out how people losing access to fishing zones should be compensated. The team would also identify alternative fishing areas so people could continue fishing. In addition, recommendations would be made on how fishermen could improve fishing. The fisheries team was still in the field and the resettlement team is awaiting the results of their surveys.*

		Victor Hugo Nicolau – Resettlement Specialist, IMPACTO
3	Stated that he doubted that the government would assist communities. He used the compensation table as an example. He asked how it could be possible to pay 1000 Meticais for a coconut tree that was planted by his grandmother? He stated that negotiation about compensation should be done between Anadarko and the crop owner. **Mr. Sualé Abudo**	Also refer to answer to question # 1 above. **Victor Hugo Nicolau – Resettlement Specialist, IMPACTO** Stated that the Project would bring many benefits to communities, such as improved roads and other social infrastructure. **Roberto Abib - Director of Stakeholder Engagement, AMA1** Commented that the role of the government during the resettlement process was to ensure that the interest of the communities would be safeguarded. He reiterated that the Government was not harming anyone. The village committees were created to represent the communities during the resettlement process. The government was open to work with all people and entities interested in the process, including NGOs and civil society organisations. **Policarpo Napika – Provincial Director, DPCA/MICOA**
4	Indicated that he didn't want to see new maps that showed an extended DUAT area. **Mr. Sualé Abudo**	Comment Noted.
5	Reiterated that fishing was the main economic activity in Maganja, and enquired about specific details of the Exclusion Zone in relation to the loss of access to natural resources. **Mr. Assumane Imide**	Refer to answer to question # 2 above.
6	He also referred to the pollution of sea water and damage to agricultural lands (machambas) that were mentioned during the presentations. He wanted to know how communities would be compensated, considering they would not be allowed to practice fishing in the areas where they used to practice it, and the same situation was true for their agricultural lands that would also be impacted by the Project.	Refer to answer to question # 1 and 2 above.

	Mr. Assumane Imide	
7	Stated that the government was blocking development in Maganja and that people in Maganja were dying because of government's neglect. He also complained that compensation rates were too low. **Mr. Omar Liaça**	Comment noted.
8	He indicated that they wanted to know the exact boundaries of the DUAT area, but not as indicated on maps, rather by walking the area and having the government and Anadarko clearly indicate the DUAT boundaries and the area where the LNG Plant would be built. **Mr. Omar Liaça**	Stated that the Project area was the 7,000ha area, as indicated on the map that showed the DUAT. All construction would be done inside this 7,000ha DUAT area. However, it was unsafe for people to live in close vicinity of the LNG Plant, as this area would be transformed into an industrial zone. **Roberto Abib - Director of Stakeholder Engagement, AMA1**
9	Stated that the proponents should rather explore gas somewhere else – such as Nacala, and that they didn't want Anadarko to explore gas in the Maganja area. **Mr. Omar Liaça**	Comment noted.
10	Responded to Mr Liaça by stating that the community was blessed because the gas was found in the area and that the gas should be explored in the area as it was discovered there. **Mr. Mussa Amade**	Comment noted.
11	Stated that there had been DUAT meetings in Maganja community before, when the border of the DUAT area had been discussed. He indicated that now there seemed to be another meeting discussing another DUAT border. According to the map that was used the day of the meeting, it seemed that the construction of the LNG Plant would block all access to Maganja. He wanted to know whether new access would be created. **Mr. Mansur Saide**	Refer to answer to questions # 3 & 8 above. ***Response after the meeting:*** *Access routes would be created to ensure Maganja retained access to the rest of the district.* ***Kamal Govender: EIA Project Manager***
12	Asked if people from Maganja (outside of the DUAT), had crops in Tchi (inside the DUAT), would they be compensated for their machambas and crops inside the DUAT?	Refer to answer to question # 1 above.

	Mr. Mansur Saide	
13	Advised that the government should only monitor the relationship between the Project and the community, but should not decide anything on their behalf. The people of Maganja and other villages that would be affected by the Project wanted to make decisions by and for themselves. **Mr. Abdala Mussa**	Refer to answer to question # 3 above.

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Quitupo Community

Comments and Responses Table Date: October 17, 2013
Site: Quitupo
Time: 09:30 – 12:30

ID	Question Raised	Response
1	What was the real objective of the meeting? **Mr Assane Mussangaja Assane**	The aim of the meeting was to present the EIA and to get comments and input from the people from Quitupo. **Herberto Nhampanze – Meeting Facilitator, Impacto**
2	Who awarded their land – Quitupo - to Anadarko? **Mr Assane Mussangaja Assane**	The land was never sold and that is why the community was still living on the land, but that land in Mozambique belonged to the State. Anadarko was awarded the right to explore the area, but nobody from Quitupo would be forced to leave the area. The EIA its results showed the commitment of the government to its people. They would not like to see such a big project proceed without an environmental assessment. All community members were welcomed to provide input to the meeting in order to enrich the EIA document. Stated that Mozambique was not the only country with gas resources. In fact, many other countries, such as Tanzania, also had a lot of gas in the Rovuma Basin and that these other countries were also selling their gas to develop the country. Mozambique is trying to compete with these other countries to get to an agreement to be one of the biggest sellers of gas in the world. He urged the people of Mozambique to stand together and to work together for the benefit of the country. He also emphasized that the LNG Project should be seen as a development booster

		for Quitupo, Palma and the country as whole. He made it clear that the Government of Mozambique had always showed openness to discuss any issue and that people had come to the community before to freely convene discussions. This included NGOs, the media, etc. Explained that the land still belonged to Quitupo, but that part of the land would be set aside for the construction of the LNG Plant. **Tavares Martinho – Director, ENH**
3	Why did the Project want to resettle the people from Quitupo? **Mr Assane Mussangaja Assane**	It is not safe for communities to live in the vicinity of such industrial installations because it was noisy and big. People and resources cannot live in the same place. He added that development posed many challenges and people had to prepare for change in order to accommodate development. He stated that it was a matter of choice, and that people had to get ready to leave their land, as this was a prerequisite for the resources to be extracted and developed, which would in turn allow benefits for the community. **Victor Hugo Nicolau – Resettlement Specialist, Impacto**
4	Why did the government send secret people to spy on them regarding resettlement related issues, while not allowing other organisations to operate in the community? **Mr Assane Mussangaja Assane**	The Government is open to work with anyone who is interested to contribute for the process goes in the right way, the government is working with the company to ensure that the interest of the communities will be safeguarded during the process, the Civil society organizations, the NGO's exist and are operating in the country because the government allowed them to work, Mozambique is a democratic country, we are not against whoever want to work with the Communities. **Abdul Piconês – Permanent District Secretary, Palma**
5	In the case of displacement, where would	This is not yet known, as the census still

	people be moved to? **Mr Assane Mussangaja Assane**	needed to be conducted. However, the LNG Project would abide by international standards and norms that stated that communities should be resettled not far from their original village. **Victor Hugo Nicolau – Resettlement Specialist, Impacto**
6	Why did the government get involved in business with the LNG Project without informing the community, i.e. making deals without informing the people of Quitupo? **Mr Assane Mussangaja Assane**	Refer to answer to question # 2 above.
7	Quitupo's forest and farms were being destroyed; yet, people did not have any kind of development support. **Mr Assane Mussangaja Assane**	Comment noted.
8	Explained that the community viewed the government as their guardian. They complained before to the government because they believed it was the government's mandate to protect and safeguards people's rights and not to allow anyone to grab their land. He always pointed out to the Government that the people of Quitupo were not ignorant and that they read the laws of the country, including the resettlement laws. Especially with regard to resettlement, it was the government's responsibility to support, protect and inform communities what would happen to Quitupo. **Mr Andurabe Issa**	Comment noted. Refer to answer to question # 2 above.
9	Mr Andurabe Issa stated that since the LNG Project came, there have been complaints by the community. It seems the government has not found solutions and answers to the community's concerns. Whenever they try to find out where exactly the LNG Plant would be constructed, they were not given any answer.	Roberto indicated the build zone on a map, and pointed out the three major building area: jetties, multipurpose dock, and the area where the trains would be located. He reiterated that that is where the LNG Plant would be – inside the DUAT area. **Roberto Abib - Director of Stakeholder**

	Mr Andurabe Issa (During Roberto's response, community members indicated they did not want to see a map, since they were unable to interpret it. They insisted that all they wanted was to be taken around and showed the real area for LNG Plant construction, the demarcated area)	**Engagement, AMA1** . All the community concerns will be registered and the Government and LNG Project will act on them and revert back to the communities. He also indicated that it wouldn't be feasible to walk around with the whole community to indicate the area and the boundaries of the building zone. However, what he would advise, was that the community needed to have their representative community committees up and running to allow better liaison with the Government and the LNG Project, and that these committees could be taken to see the DUAT and building zone boundaries. **Herberto Nhampanze – Meeting Facilitator, Impacto**
10	Mr Andurabe Issa also queried the area to be occupied by the LNG Plant as well as the timeframe for the construction of the plant. He added by questioning why the LNG Plant needed to be built in Quitupo, and why it couldn't rather be built in Pemba. **Mr Andurabe Issa**	***Response after the meeting:*** *The site was selected after a comprehensive site selection process that integrated technical, financial, environmental and social criteria. More information can be found in Chapter 5 of the EIA Report. The Afungi Project Site was preferred as it had less environmental sensitivities, similar social sensitivities and less technical constraints to construction than other sites.* ***Kamal Govender: EIA Project Manager***
11	Furthermore, he indicated that the DUAT was a document that confirmed land had been awarded to someone else. In previous meetings with the government, they showed the DUAT area. Today, it was just stated that people wouldn't leave. People from Quitupo were not satisfied with these contradictions. **Mr Andurabe Issa**	***Response after the meeting:*** *A DUAT was awarded but the project also needs the Environmental License before it can proceed. The resettlement process also needs to be completed before there is confirmation of who will move and where to. This will be done in consultation with communities. All affected communities will be kept updated through regular communications to avoid confusion and contradictions.* ***Kamal Govender: EIA Project Manager***
12	He warned the Government and the LNG	The current trend of meetings showed

	Project if adequate responses were not given, the community would not accept more meetings in their village. **Mr Andurabe Issa**	there is willingness, commitment and agreement to see the Project proceed. It is important to have functioning committees, as it is easier to work with smaller groups representing the community than with the whole community. The government is ready to receive the representative Quitupo community committee that has been created. In order to benefit from the opportunities that will be brought about by the Project, the community needs to prepare future skilled people for employment by sending the children to school. **Tavares Martinho – Director, ENH** Victor Hugo would be around until the end of October and all resettlement related matters can be forwarded to him for response. All concerns and comments made during the meeting, related to the EIA, have been registered and will be incorporated in the final EIA report. **Herberto Nhampanze – Meeting Facilitator, Impacto**
13	Mr Andurabe Issa exhibited one of the LNG brochures indicating the DUAT area. And in his understanding the delimitation of the DUAT was the first phase of the DUAT process. He sought explanation about the second phase. **Mr Andurabe Issa**	***Response after the meeting:*** *As noted above, the DUAT process is complete.* ***Kamal Govender: EIA Project Manager***
14	Furthermore, the speaker inquired about the role played by the "secret" teams, at times dispatched to the village by the District Government to spy on people coming to help the community in DUAT related issues. He complained about the fact that the police commander visited	Refer to answer to question # 4 above.

	the village to find out where the community supporters would apparently 'put up' the CTV personnel while they were in the community. He wanted to know why the government was prohibiting organisations to work in Quitupo. **Mr Andurabe Issa**	
15	Mr Andurabe Issa indicated the community would like to engage directly in conversations with the LNG Project, and not through the government. **Mr Andurabe Issa**	Comment noted.
16	Mr. Andurabe Issa pointed out that in the first resettlement related public meetings the community members felt they were not capable to engage with the government and LNG Project, therefore they invited the CTV representative to act as their advocate. He requested Mrs Alda Salomão from CTV who was sitting among the community women, to introduce herself. **Mr Andurabe Issa**	Comment noted.
17	Pointed out that the EIA was an important milestone towards obtaining an environmental licence for the Project. **Alda Salomão – Director, CTV**	Comment noted.
18	Furthermore, using Roberto Abib's words that LNG Project should be seen as a great opportunity for the people of Quitupo. Alda Salomão explained that the LNG Project would be a great opportunity for Quitupo only if capacity building of local communities was considered earnestly, providing them with important technical and organizational know-how, strengthening their capacity to act with initiative and accountability. **Alda Salomão – Director, CTV**	Comment noted.

19	Alda Salomão also expressed her doubts about the capacity of the Government of Mozambique, at all levels, to deal with such a big and complex project. The government needed some time as to get ready for such an industry. She made an appeal to all interested parties to slow down the pace as to ensure that all parties, the communities and the government, were on board. Communities needed to understand what was going on and there should not be pressure on them while they were developing this understanding. **Alda Salomão – Director, CTV**	Comment noted
20	Alda Salomão inquired about where communities would be resettled to and why they had to be resettled if the area to be occupied by LNG Plant was not yet known. She pointed out that there was a communication breakdown between the government, the proponents and communities. **Alda Salomão – Director, CTV**	Refer to answer to question # 5 above.
21	Alda Salomão reminded all the attendees that the DUAT issue remained unresolved, since all community concerns around this matter were never responded to. **Alda Salomão – Director, CTV**	Comment noted. ***Response after the meeting:*** *The Project has consistently responded to all queries related to the DUAT process. The DUAT of 7000 hectares was initially issued to ENH, one of the partners of Area 1, by the Ministry of Agriculture, taking into account the size of the area required. This DUAT was subsequently conveyed to a company called Rovuma Basin Land Limitada (RBLL), incorporating ENH and AMA1, with the purpose of providing access to the land, ensuring that other operators would have access to the land. RBLL signed a transfer of property contract with AMA1 as the operator of Area 1 representing the interests of all of the other partners in the block.* *The process followed is in compliance with Mozambican law.*

		Kamal Govender: EIA Project Manager
22	Alda Salomão made it clear that if there was a government enemy, CTV was not the enemy. All CTV was doing was to help equip the communities to respond to LNG Project related matters in an appropriate manner. As a civil society NGO, CTV didn't want to jeopardize the implementation of the Project, but wanted to facilitate it. **Alda Salomão – Director, CTV**	Comment noted
23	Alda Salomão challenged the government to play its role: that of protecting the vulnerable communities and responding to their ignorance, but at the very same time, to listen sympathetically to their concerns. She added that the communities and civil society wanted to see the Project implemented in Afungi, but the challenge would be to ensure it was done the correct way. **Alda Salomão – Director, CTV**	Comment noted
24	Alda Salomão thanked all for the opportunity she had been given to deliver her speech on behalf of the local communities. **Alda Salomão – Director, CTV**	Comment noted
25	The District Permanent Secretary made closing remarks and thanked the attendees, the work done by the consultants for the EIA public meeting, and the efforts by the LNG Project team to progress the development of the LNG Project up. He advised all interested parties to work hand in hand to ensure that common objectives were attained. He urged all – including civil society and other organizations - to keep dialogue open. He also took the opportunity to convey sincere words of encouragement to all community members of Quitupo, Senga and Maganja and confirmed that the government was doing all they could to ensure that their rights were	Comment noted

	safeguarded. **Abdul Piconês – Permanent District Secretary, Palma**	

Liquefied Natural Gas Project in the Province of Cabo Delgado

Public Consultation Meeting – Senga Community

Question and Answer Matrix
Date: October 18, 2013
Site: Senga
Time: 09:00 – 12:05

ID	Question Raised	Response
1	Commented that in the presentations it was made clear that all people affected by the Project would be compensated. Senga people lived outside of the DUAT area, but they had their machambas inside the DUAT area. Would they be compensated? **Mr. Leonardo Paume**	Senga would not be resettled by the LNG Project, because Senga was outside the DUAT area. However, the Project resettlement team was aware that there were people from Senga with machambas inside the DUAT area. That was why a census was currently being undertaken to determine who had machambas inside the DUAT area to be able to estimate how many people had to be compensated for their losses. The census team will work with asset owners to determine where machambas were. Those people that lose a plot of land would be compensated with a plot of land. The census teams will also work with village teams to determine appropriate compensation. For the transference of graves and sacred sites – the decision regarding these needed to come from communities, in line with community procedures and recommendations. **Victor Hugo Nicolau – Resettlement Specialist, Impacto**
2	Commented that the basis of Senga people's subsistence livelihoods was fishing. Now that Project activities would result in some areas being restricted for the practice of this activity, what would the impact be on people's lives and livelihoods? **Mr. Daniel Ernesto**	Currently, there is a fisheries team gathering data on fishing zones. The information would be presented to the resettlement team to work out how people losing access to fishing zones should be compensated. The team would also identify alternative fishing areas so people could continue fishing. In addition, recommendations would be made on how fishermen could improve fishing. The fisheries team was still in the field and the resettlement team is awaiting the results of their surveys. **Victor Hugo Nicolau – Resettlement Specialist, Impacto**
3	He heard that a city would be built in	Commented that the city would be close

	Afungi. He enquired whether this city would be close to Senga or not. **Mr. Daniel Ernesto**	to the LNG Plant, far away from communities. **Roberto Abib - Director of Stakeholder Engagement, AMA1**
4	Stated that in the last meeting that was convened in Senga, it was said that Senga was outside of the DUAT area and would not be resettled. Now, it was said that they would be affected. He wanted to know whether Senga and Patacua would be resettled or not. **Mr. Omar Saide**	Refer to answer to question # 1 above.
5	Enquired whether the government would ask communities on how they would like to be compensated. He also asked about cemeteries. What will be the procedure? **Mr. Alberto Anssumane**	Refer to answer to question # 1 above.
6	Announced that he was the leader of Quitunda. He wanted to know whether new houses would be built for them if they had to be resettled. **Mr. Mohamed Sumail**	Indicated that new houses would most definitely be constructed for those people that lost their houses due to the Project. **Victor Hugo Nicolau – Resettlement Specialist, Impacto**
7	Mr. Hassan Francisco asked for better conditions at the local school (two more classrooms), due to the fact that if Quitupo is going to be resettled, some families with children may move to Senga and the number of children at school will increase. **Mr. Hassan Francisco**	The aim of the Project was to develop the area around the LNG Plant. That is why the Project had developed the Training Centre, in order to train people from the area so they could qualify for jobs. Regarding the building of hospitals and schools, Anadarko had a Community Investment Plan. The Project would work together with the government to understand what community needs were in terms of health and other social infrastructure, to provide these services. **Roberto Abib - Director of Stakeholder Engagement, AMA1**
8	Stated that he understood that he wouldn't be resettled, but enquired what would happen if another company came and wanted to develop the area, would they then need to be resettled? **Mr. Saíde Momade**	What we are presenting here is related with Anadarko' Project and the people from Senga will not be transferred as a result of this Project. I do not know if the plans of other companies and whether resettlement will be required for them or not. **Victor Hugo Nicolau – Resettlement Specialist, Impacto**

9	Commented that they knew Senga would not be resettled but they would still like to be considered for more job opportunities. He also commented that there was discrimination among the workforce and that labourers didn't work under the same conditions. Some labourers, for instance, got transport while others didn't. **Mr. Nfaume Issa**	Stated that it was still the beginning of the Project. As the Project developed, there would be more opportunities and people would be considered for these opportunities. **Roberto Abib - Director of Stakeholder Engagement, AMA1** Response to the labourer issue?
10	Commented that one of the biggest concerns for the community was that there was no healthcare facility in Senga. Often, people from Senga, Mangala, Macala and Patacua have to cross mangrove areas to reach Palma hospital for treatment. In the case of serious illnesses, this was problematic. On behalf of the community, he requested Anadarko and the government to assist with a healthcare centre, well equipped with a doctor and medicine. **Mr. Tomás Pessa**	Refer to answer to question # 7 above.
11	Inquired what the area of restriction would be, onshore and offshore, as it was stated that the gas was 50 kilometres from the coast. Also, where would communities be resettled to? **Mr. Macote Nfaume**	We cannot provide an answer, as the resettlement team has to work with communities to gather ideas and proposals about areas they would prefer. These preferences have to be presented to the government to evaluate the possibilities of transferring the people to these preferred location(s). **Victor Hugo Nicolau – Resettlement Specialist, Impacto**
12	Stated that job opportunities were only extended to people close to the road, and people from the villages were not considered for opportunities. She requested that in the next phase, she should also be considered for employment. **Namalile Saide**	Comment noted.
13	Stated that during the presentation she heard that the area for resettlement had not yet been decided. She asked when the proponents would have this information. She also asked when information about the exact location of the LNG Plant, and the extent of the area that it would cover, would be available. Dr. Salomão enquired whether there	Refer to answer to question # 11 above.

	would be public consultations conducted as part of construction for the LNG Plant. **Dr. Alda Salomão – Director, CTV**	
14	Dr. Salomão , wanted to know whether there were already teams in the field implementing the Urbanization plan. **Dr. Alda Salomão – Director, CTV**	Policarpo Napika reiterated that, as was mentioned during the presentation, the total area of the DUAT was 7000 ha. He added that the DUAT for this Project existed and those interested could obtain information from the District Government. He emphasized that there was no secret plan and that there would be public consultations with communities about the urbanization plan when it was the right time. The Government was open to share and discuss any questions related with to the process with anyone interested. **Policarpo Napika – Provincial Director, DPCA/MICOA**
15	Stated that he had participated in the EIA community meetings the day before in Quitupo and Maganja, and now in Senga. He asked whether the Project had been awarded a DUAT to operate in the area, or not. He also asked what would be the total area inside the DUAT that will be occupied by the LNG Plant. **Mr. Camilo Nhancale - UCAJDA**	Refer to answer question # 14 above. ***Response after the meeting:*** *The Mozambique Gas Development Project has a DUAT for 7,000ha as noted in #14. The Project will not use all of the 7,000ha – some areas are delineated as "no-build" zones. The no-build zones are areas identified as having high ecological sensitivities. From a social perspective the resettlement process will identify ways to minimize the numbers of people who need to be resettled.* ***Kamal Govender – EIA Project Manager***.
16	Stated that there were contradictions in the information shared: the previous day in Quitupo, it was said that no DUAT had been awarded, but today the proponents said that there was a DUAT. He wanted to know the truth. The previous day, it was indicated that there was a 7,000ha DUAT area, and today the area of land in question was 18,000ha. If there was a plan of building a city in Afungi, why had the communities not been informed of this plan. He asked why the Government had acted in secrecy. **Mr. Roberto Mussa**	Refer to answer question # 14 above. ***Response after the meeting:*** *The Mozambique Gas Development Project has a DUAT for 7,000ha as noted in #14. The 18,000ha refers to and area identified by ENH for a potential future industrial zone. No studies or firm plans have been made yet regarding the industrial zone. When such plans are developed and/ or future projects planned – there will be communication with local communities.* ***Kamal Govender – EIA Project Manager***

APPENDIX F

RECEIVED COMMENTS

EPDA PHASE

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

FICHA DE REGISTO DE COMENTÁRIOS, SETEMBRO 2011

Por favor, complete e devolva no final da reunião ou até Sexta-feira, dia 14 de Outubro de 2011, para o seguinte endereço:

Sra. Sandra Fernandes *E-mail: sfernandes@impacto.co.mz*
IMPACTO, Lda. *Internet: www.impacto.co.mz*
Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Hermes Taculo				
ORGANIZAÇÃO:	CEPAM - Centro de Pesquisa do Ambiente Marinho e Costeiro				
ENDEREÇO:	Chuiba - Pemba			CAIXA POSTAL:	
TEL Nº:		FAX Nº:		CEL Nº:	
E-MAIL:	hermespaculo2004@yahoo.com.br				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários:

   .....

   .....

   .....

   .....

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários:

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   .....

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   .....

3. Outros comentários:

   .....

   .....

   .....

   .....

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

FICHA DE REGISTO DE COMENTÁRIOS, SETEMBRO 2011

Por favor, complete e devolva no final da reunião ou até Sexta-feira, dia 14 de Outubro de 2011, para o seguinte endereço:

Sra. Sandra Fernandes — *E-mail: sfernandes@impacto.co.mz*

IMPACTO, Lda. — *Internet: www.impacto.co.mz*

Maputo, Moçambique — *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Eudósio Valdo Tiago				
ORGANIZAÇÃO:	Serviço Distrital de Saúde, Mulher e acção Social				
ENDEREÇO:	Rua 25 de Junho			**CAIXA POSTAL:**	
TEL Nº:		**FAX Nº:**		**CEL Nº:**	
E-MAIL:					

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários: Foram acautelados.

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: Com certeza visto que é tão abrangente desde a base é de conhecimento de toda a gente sobre este processo e a medida do possível em cada ponto que é dada dá a conhecer

3. Outros comentários:

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

FICHA DE REGISTO DE COMENTÁRIOS, SETEMBRO 2011

Por favor, complete e devolva no final da reunião ou até Sexta-feira, dia 14 de Outubro de 2011, para o seguinte endereço:

Sra. Sandra Fernandes *E-mail: sfernandes@impacto.co.mz*

IMPACTO, Lda. *Internet: www.impacto.co.mz*

Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Gilberto Tiago Muanarata				
ORGANIZAÇÃO:					
ENDEREÇO:				**CAIXA POSTAL:**	
TEL Nº:		**FAX Nº:**		**CEL Nº:**	827746855
E-MAIL:					

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários: Sem mais observações

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: É de considerar positiva relevante de forma em progressão do processo de Avaliação de impacto ambiental e por se revelarem as actividades do público residente nesta parcela da Província, do processo para seu conhecimento.

3. Outros comentários:

   Nos planos previstos, constituir actividades de carácter permanente. É de considerar que deverão ser levados a cabos as preocupações da comunidade no âmbito das consultas comunitárias em todos níveis.

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Faustino Gilberto				
ORGANIZAÇÃO:	Funcionário do Aparelho do Estado				
ENDEREÇO:	SDEJT			**CAIXA POSTAL:**	
TEL Nº:	—	**FAX Nº:**	—	**CEL Nº:**	840575226 823187101
E-MAIL:	—				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários: Não de antes nenhum esquecimento, visto que todas socio economicas já este referidas no Relatorio, a outro caso e se contribuir que no caso de sociedade humanas, queria sugerir que na Educação ainda o distrito não tem um centro de acolhimento de crianças com Necessidade Educativas Especiais.

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: Já houvera uma ou melhor haveria um controlo ambiental devido que a ecologia e ambiente ecologico no País e deja pempre a desenvolver, porque o animais, Plantas e outros recursos faz também parte para o Desenvolvimento do nosso País em particular no Distrito de Palma.

3. Outros comentários:
   Para outro queria pedir ou sugerir que no acto ou no caso de ouver um empreso no projecto pela parte da população, sugeria que houve-se mecanismo de combater o malfalidismo, visto que a maior parte da sociedade de Palma são analfabetas, e quando há um tipo de piscado a Lancenam nos seus centros de estudo.

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	ANTÓNIO VALÉRIO KANTIKE				
ORGANIZAÇÃO:	FRELIMO				
ENDEREÇO:	COMITÉ DISTRITAL - PALMA			**CAIXA POSTAL:**	—
TEL Nº:	—	**FAX Nº:**	—	**CEL Nº:**	825640115
E-MAIL:	—				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários: Ao nível não foram bem referidas no relatório

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: Até esta fase se encarregue ter sido uma maneira global de envolvido junto a comunidade informativa fase Importante pelo que haja barulho neste processo de participação pública.

3. Outros comentários:

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	PEDRO VARELA CHACA MENDES				
ORGANIZAÇÃO:					
ENDEREÇO:	SDAE – PESCAS – PALMA			**CAIXA POSTAL:**	
TEL Nº:		**FAX Nº:**		**CEL Nº:**	82842862O
E-MAIL:					

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários:

   SEM COMENTÁRIO

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: ESTOU SATISFEITO COM O PROCESSO DE AVALIAÇÃO DO IMPACTO AMBIENTAL, PORQUE A COMUNIDADE ESTÁ ENVOLVIDA NESTES ESTUDOS, E JUNTOS PARA ESPERAR UM RESULTADO POSETIVO.

3. Outros comentários:

   O PROCESSO DE AVALIAÇÃO DO IMPACTO AMBIENTAL DEVE REALIZAR INQUERITOS NAS COMUNIDADES PESQUEIRAS, AGRICOLAS, COMERCIANTES E OUTROS SIMBULARES NAS ALDEIAS QUITUPO, FUNZI E NAS ALDEIAS ADJACENTES.

MUITO OBRIGADO PELA CONTRIBUIÇÃO! ANEXAS A ESTAS

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

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IMPACTO, Lda. *Internet: www.impacto.co.mz*

Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	SALVADOR VASCO				
ORGANIZAÇÃO:					
ENDEREÇO:	DISTRITO DE PALMA - SECRETARIA			**CAIXA POSTAL:**	
TEL Nº:		**FAX Nº:**		**CEL Nº:**	840508781 ou 825276577
E-MAIL:					

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários: PORQUE ESTE PROCESSO FOI BEM PREPARADO E ESPERO QUE NÃO VAI CRIAR DANOS NENHUM NO MEIO AMBIENTE OBRIGADO.

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: ACHO QUE COM ESTE TRABALHO QUE ESTA EMPRESA ESTÁ LEVAR A CABO VAI MELHORA A VIDA NO MEIO AMBIENTE E DA POPULAÇÃO.

3. Outros comentários:

   ESPERO QUE COM ESTE PROJECTO SIGA SORRIO DOS MOÇAMBICANOS MELHORE A NOSSA FORMA DE VIVER E O MEIO AMBIENTE, DIMINUIA O DESEMPREGO

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	CONSTANTINO AUGUSTO				
ORGANIZAÇÃO:	FORUM TERRA - CABO DELGADO				
ENDEREÇO:				CAIXA POSTAL:	
TEL Nº:		FAX Nº:		CEL Nº:	82794786O
E-MAIL:					

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários:

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: PARA A PARTICIPAÇÃO DAS ONG SUGERIA QUE EXISTISSE UM SISTEMA DE COMUNICAÇÃO DE FORMA A DIVULGAÇÃO DAS LEIS DO AMBIENTE E MINAS NAS COMUNIDADES DESTES DISTRITOS. MOCIMBOA E PALMA.

3. Outros comentários:

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	SÓNIA MACIEL				
ORGANIZAÇÃO:	AGA KHAN FOUNDATION (AKF)				
ENDEREÇO:	PEMBA			CAIXA POSTAL:	
TEL Nº:		FAX Nº:		CEL Nº:	
E-MAIL:	sonia.maciel@akdn.org; soniaamaciel@gmail.com				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   (SIM) NÃO (assinale a resposta correta)

   Comentários: Gostava de ver qual o envolvimento do Parque Nacional das Quirimbas e WWF (caso já não estivessem presentes)

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   (SIM) NÃO (assinale a resposta correta)

   Comentários: Foi muito bom. Penso já o estudo de avaliação dos impacto ambiental serão com certeza mto bem vindos à discussão pública.

3. Outros comentários:

   Qual o papel de parceria da AKF connosco (Impacto & Anadarko)?

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique — *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Inês Adeça da Sacto				
ORGANIZAÇÃO:	DNAPOT/MICOA				
ENDEREÇO:	Av. Acordos de Lusaka			**CAIXA POSTAL:**	
TEL Nº:		**FAX Nº:**		**CEL Nº:**	826229210
E-MAIL:	Iintje@hotmail.com				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   [X] SIM [ ] NÃO (assinale a resposta correta)

   Comentários: Qual a número da população desta primeira fase foi identificada com mais afectada?
   Quais as medidas que serão tomadas para preservar as infraestruturas históricas e património cultural

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   [X] SIM [ ] NÃO (assinale a resposta correta)

   Comentários:

3. Outros comentários:

   Existe para Nacitamba da Praia e Palma planos estratégicos de desenvolvimento que podem ser consultados a nível da direcção provincial para coordenação da Acção ambiental em Cabo Delgado no âmbito do projecto biodiversidade marinha e costeira

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Luis Francisco TEMBE				
ORGANIZAÇÃO:	DINET – Direcção Nacional do Ensino Técnico (MINED)				
ENDEREÇO:	Av. 24 de Julho, 167, 7º ander			**CAIXA POSTAL:**	
TEL Nº:		**FAX Nº:**		**CEL Nº:**	824773680
E-MAIL:	Luis.tembe@mec.gov.mz				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   SIM | NÃO (assinale a resposta correta)

   Comentários: Não pude ler na íntegra e com a devida concentração e conhecimento da área. Por isso não posso avaliar.

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM ✓ | NÃO (assinale a resposta correta)

   Comentários: Tem sido abrangidas todas as camadas da sociedade Moç com particular ênfase às populações de Cabo Delgado.

3. Outros comentários:

   Muito obrigado

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique

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Internet: www.impacto.co.mz
Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019

NOME:	Armando Lumbane				
ORGANIZAÇÃO:	Administração Nacional das Pescas				
ENDEREÇO:	Rua Conselheiro Pedroso			**CAIXA POSTAL:**	
TEL Nº:	21358000	**FAX Nº:**	21320335	**CEL Nº:**	822526000
E-MAIL:	ajocu@hotmail.com				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   SIM ✓ NÃO (assinale a resposta correta)

   Comentários: Tem sido pratica na fase de consultas publicas com as comunidades pesqueiras ser feita apenas com o representantes destes grupos o que não é correcto. É de recomendar que seja ouvidas as comunidades sem olhar a posição que o entrevistado representa nessa comunidade

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM ✓ NÃO (assinale a resposta correta)

   Comentários:

3. Outros comentários:

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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NOME:	Armando Lumbane				
ORGANIZAÇÃO:	Administração Nacional das Pescas				
ENDEREÇO:	Rua Conselheiro Pedroso			**CAIXA POSTAL:**	
TEL Nº:	21358000	**FAX Nº:**	21320335	**CEL Nº:**	822526000
E-MAIL:	ajocu@hotmail.com				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   SIM ☑ NÃO (assinale a resposta correcta)

   Comentários: Tem sido pratica na fase de consultas publicas com as comunidades pesqueiras ser feita apenas com o representantes destes grupos o que não é correcto. É de recomendar que seja ouvidas as comunidades sem olhar a posição que o entrevistado representa nessa comunidade

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM ☑ NÃO (assinale a resposta correcta)

   Comentários:

3. Outros comentários:

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	Hélio Bambo				
ORGANIZAÇÃO:	INGC				
ENDEREÇO:				**CAIXA POSTAL:**	
TEL Nº:	826946900	**FAX Nº:**		**CEL Nº:**	826946900
E-MAIL:	heliobambo@hotmail.com				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários:

   Em termos socioeconómicos não vi nenhuma evidência de investimentos em áreas de formação de quadros nacionais que se possam enquadrar na ANADARKO.

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários:

3. Outros comentários:

   Propondo investimento na área de formação educação geral técnica, especificamente na área de actividades desempenhadas pela ANADARKO, e que as instituições estejam baseadas em Moçambique.

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

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Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	P/ Orlando Sebastião Esteves Felisberto Junior.				
ORGANIZAÇÃO:					
ENDEREÇO:	Rua Salinas Nº 201			**CAIXA POSTAL:**	
TEL Nº:	21722372	**FAX Nº:**	82321570	**CEL Nº:**	
E-MAIL:	HPeres@YGM-Co.MZ.				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: Aumento de emprego e Actividades Económicas identificação de Áreas de preservação da Maturezza Preservação do Habitate natural ex: Corais e Ervas Marinhas Aves marinhas e Cordeiros tartarugas etc.

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários: Pois o aparecimento do futuro recebe está sendo acompanhado não só pelos empresários mas também as Comunidades locais, Autoridades locais organizações Ambientais e o publico etc

3. Outros comentários:

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

FICHA DE REGISTO DE COMENTÁRIOS, SETEMBRO 2011

Por favor, complete e devolva no final da reunião ou até Sexta-feira, dia 14 de Outubro de 2011, para o seguint endereço:

Sra. Sandra Fernandes
IMPACTO, Lda.
Maputo, Moçambique

E-mail: sfernandes@impacto.co.mz
Internet: www.impacto.co.mz
Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019

NOME:	ARMINDO FRANCISCO MANHIÇA				
ORGANIZAÇÃO:	AGÊNCIA DO ZAMBEZE				
ENDEREÇO:	AV. 24 DE JULHO Predio do INSS - 2º andar			**CAIXA POSTAL:**	
TEL Nº:	823298170	**FAX Nº:**		**CEL Nº:**	843298170
E-MAIL:	AMANHIC2000@YAHOO.COM				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de Gás Natural Liquefeito na Província de Cabo Delgado e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários:

   .....

   .....

   .....

   .....

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários:

   .....

   .....

   .....

   .....

3. Outros comentários:

   .....

   .....

   .....

   .....

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

PROJECTO DE GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO

FICHA DE REGISTO DE COMENTÁRIOS, SETEMBRO 2011

Por favor, complete e devolva no final da reunião ou até Sexta-feira, dia 14 de Outubro de 2011, para o seguinte endereço:

Sra. Sandra Fernandes *E-mail: sfernandes@impacto.co.mz*
IMPACTO, Lda. *Internet: www.impacto.co.mz*
Maputo, Moçambique *Tel: +258 21 499 636 Cel:+258 82 304 6650 Fax:+258 21 493 019*

NOME:	KAREN SCHOEMAN				
ORGANIZAÇÃO:	TECOMAJI, LDA.				
ENDEREÇO:	EN 106, NUMARA, PEMBA			CAIXA POSTAL:	
TEL Nº:	825529826.	FAX Nº:		CEL Nº:	
E-MAIL:	jkgtimbess@gmail.com.				

COMENTÁRIOS (Use folhas adicionais, se necessário)

1. Há questões ambientais e/ou socioeconómicas que considera que não estão devidamente referidas no relatório de EPDA do Projecto de GÁS NATURAL LIQUEFEITO NA PROVÍNCIA DE CABO DELGADO e nos Termos de Referência para o respectivo EIA?

   SIM [ ] NÃO [X] (assinale a resposta correta)

   Comentários:

2. Está satisfeito com a forma como o Processo de Avaliação de Impacto Ambiental e nomeadamente o Processo de Participação Pública estão a ser conduzidos?

   SIM [X] NÃO [ ] (assinale a resposta correta)

   Comentários:

3. Outros comentários:

   Do you interview the affected parties at any stage of your assessment to get their input with regards to their concerns?

MUITO OBRIGADO PELA CONTRIBUIÇÃO!

EDPA – Anadarko – GNL

Comments

WWF

With the goal of contributing to enhance the scope of the proposed study (EIA), we would like to offer below a few suggestions of items that should be included in the study's terms of reference. Our institution is fully prepared to support this work with additional inputs on this and other topics, as required by the company and/or the consulting team.

Suggestions for inclusion in the Terms of Reference for the EIA:

Social and Environmental Issues

1. Include the estimated amount of carbon emission that will be caused by the project and propose steps to mitigate it (in accordance with the legal obligations of Mozambique within the Baseline Convention of the United Nations on Climate Change, ratified by Resolution no. 1/94, of August 24, 1994)

2. Expand the scope of the study, particularly in the marine area so as to be able to cover all areas affected by the project, including gas exports and transportation (whale migratory routes, fisheries, etc.), and more specifically the area that may be directly affect by the dredging (coral reefs, seaweed, fisheries, etc.)

3. The EPDA only indicates one single route for the gas pipeline (page xxx). We would like to suggest alternative routes should include the following: between Tecomaji Rongui and between Delgado Cape and Tecomaji.

4. Include studies on climate changes on two levels:

    a. At the project level (i.e. the impact of rising sea levels, extreme events, such as hurricanes, storms and floods, on the site selected for the project).

    b. At the level of PGA contribution to increasing knowledge of climate change in the country–installing sensors to monitor sea levels, a meteorological station. (It should be noted at this time the lack of data on this topic could hinder the preparation of estimates and projections, as well as steps that could be taken). We suggest contacting the INGC on this topic.

5. The study should identify major gaps in know-how that will require long term studies to correct them. Studies should be conducted on biodiversity, such as for instance marine mammals (their numbers, migratory routes, feeding grounds, etc.), and social aspects (capturing fish species and other marine resources on which there is a lack of knowledge and research). The PGA should propose that

studies be implemented gradually, with results affecting developments in the PGA itself and providing for adjustment plans, if necessary.

6. Social studies should include the estimated impact of the project on the economy, from a local, provincial and national perspective, and the existing opportunities for local development that could be levered by the project. This will allow for an assessment of social impacts and the prospects for mitigation.

7. At the end, the AIA should assess the residual impact of the project so as to estimate offsets in terms of biodiversity, in accordance with the regulations in the Equator Principles and IFC Performance Standards (PS6).

8. The creation of an ongoing mechanism should be considered for the purpose of monitoring the implementation of social and environmental commitments assumed. National experiences have demonstrated that the creation of social foundations by companies has been successful. Their funding and capital are independent from the companies' and they ensure that the commitments assumed by the company with the community are implemented.

9. Assess the socioeconomic and environmental impact of increased ground and air transit in the area, including an increased amount of people in the site.

10. Include in the Terms of Reference a review of the impact of permanent resettling people in the area of the project, including its impact on neighboring islands on the path of fishermen and how the project will affect temporary settlements (3 to 6 months) of those fishermen. The area has three major temporary settlements for fishermen – Milamba, Salama and Nsemo.

    Review the PGA and include clear recommendations on how to handle species on endangered lists that are present in the Community Sanctuary of Vamizi Island - Bumphead parrotfish (*Bolbometon muricatum*) and Napoleon Wrasse (*Cheilinus undulatus*). Species observed between Vamizi and Metundo include, greyreef shark (*Carcharhinus ambyrhynchus*) and (*Epinephlus lanceolatus* and *Epinephlus tukula*), which are present in Rongui.

Issues regarding the Process

11. All specialized studies should be made public, so that they could be used by pertinent stakeholders and academia, even outside the scope of the EIA, contributing to enhance information available on the area.

    It is worth noting that this PGA will cover a long period of time. As such it must allow for both complexity and flexibility. Therefore, many of suggestions below will require **legal** review before they are implemented.

12. The PGA should offer proposed mechanisms for an ongoing dialogue with the community and civil society for the duration of the project (20-40 years!).

a. NB: This is a long term project. Therefore the mechanism provided for in the AIA process will not be enough to ensure continuous consultation with the community, local authority and civil society.

b. Thus, the mechanism should be flexible with a permanent leadership structure. The format of a permanent committee with management participation should be considered, to ensure not only the availability of an ombudsman and the flow of information, but also to provide ideas and suggestions for social actions. It could also have many levels (district, provincial, national) with various stakeholders so as to maximize their participation.

13. A social mechanism should also be proposed for corporate social responsibility (CSR) and social actions carried out in the context of social funds currently channeled through the INP. The foundations provided for under number 8 above could help in this sense. Making suggestions for INP in the AIA process constitutes an opportunity to improve the process for all operators in the country.

14. As always, it is essential to include in the PGA a mechanism to assess and evaluate real impacts, in real time, during the project's implementation. A team should be in the field (the best multisectoral team) to inspect these aspects. This team should also be accountable to the foundation provided for under number 8 above. Inspection, information sharing and dialogue on this topic should be conducted with transparency, ongoing dialogue and responsibility *vis-à-vis* the business supported by the company.

15. The various studies conducted within the AIA should be published and discussed as they become available, perhaps at technical meetings so as to gather contributions from the PIAs that could help and improve the final version of the study.

These issues should be included as much as possible in the PGA, as it is a binding document for the project, regardless of who wins the project or controls the company. Unfortunately there are many instances of commitments for a certain project made by the original bidding companies that are not honored by the new entities, once the project is sold or transferred.

With our best wishes

Maputo, October 12, 2011

Subject: Forwarding contributions for the terms of reference in the EIA of the Anadarko project for developing and operating several gas fields in the Area of Bacia do Rovuma and a Liquefied Natural Gas Factory

Name: Nathalie Grimoud

Organizations in Cabo Delgado: AgaKhan Foundation, ACRIDEME, ADBG, Karibo, Activa, Forum Terra – Cabo Delgado, GMD – Cabo Delgado, CAICADE, KEPA, Helvetas, and **national organizations** Kuwuka-JDA, MUGEDE, IMPROG, and Plataforma para Recursos Naturais e Indústrias Extractivas.

Address: Plataforma para Recursos Naturais e Indústrias Extractivas – c/o WWF – Mozambique
Rua Macombe Macossa 213 P.O. Box 4560-Maputo
Tel + 258 21483121- +258 82 36 34 566
email: nathaliegrimoud@gmail.com

Our suggestions were collected at a meeting held in Cabo Delgado, in which Anadarko participated.

1. Include in the terms of reference for the EIA a study of the means of communication and dissemination of information on several topics (i.e. health, elections, etc.) that are used in the area of the project for the purpose of making recommendations to the PGA. This will serve to increase efficiency in the communication process associated with the project throughout its life. This study should consider engaging other grassroots organizations (such as CCPs, CGRN, and other OCBs).

2. Include in the terms of reference for the EIA a study of the best way to institutionalize an ongoing dialogue among civil society, the communities, the government, and companies, and include recommendations in the PGA.

    - For instance, create a community communication forum, with the participation of OCBs and other community players.

3. Include in the terms of reference for the socioeconomic study local economic opportunities that could be pursued and developed. The resulting information may be useful not only for the company, but also for the government, as to how to best ensure and facilitate the establishment of local economic links with the project.

Other suggestions pertaining to both the consultation and communication processes.

4. Tailor messages and presentations to the various publics and audiences (we refer here to messages about the project – during the consultation phase and during the PGA's implementation).

CABO DELGADO INVESTMENTS Ltd ("CDIL")

Dr. Michael H. Gera
Chief Executive Officer
Cabo Delgado Investments Ltd.

Registered office:
CDIL (Jersey)
15 Esplanade
St Helier
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14-16 Bruton Place
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By email and fax:
Felicidade Munguambe
Impacto
Av. Mártires da Machava, 968 - Maputo
E-mail: fmunguambe@impacto.co.mz
Fax: +258 21 493019

13th October, 2011

COMMENTS ON:

Estudo de Pré-viabilidade Ambiental e Definição de Âmbito (EPDA) dated September 2011 compiled by ERM and Impacto.

Dear Ms. Munguambe:

Cabo Delgado Investments Ltd. ("CDIL") via its Mozambican Subsidiary Cabo Delgado Biodiversity & Tourism Lda. holds the concessions to Vamizi Island and Rongui Island in Cabo Delgado Province. I attended the presentation facilitated by Impacto in Pemba on 28 September and subsequently examined the EPDA Report (the "Report"). On page vi of the Report, you invite comments. I hereby submit CDIL's comments.

Would you be so kind as to acknowledge receipt of this email and fax.

Kind Regards

Vamizi Island

- The Report made no mention of Vamizi as a potentially impacted tourist destination. This needs to be corrected and we ask that this be noted. Please refer to www.vamizi.com as a first step.
- Vamizi is one of the top three ultra-high end destinations in the Indian Ocean. It is very prominent worldwide and is considered a showcase destination by the Mozambican authorities.
- A very significant amount of investment by shareholders and villa owners ($tens of millions) has gone into developing Vamizi
- Vamizi could be impacted by Anadarko's development as follows:
    - The LNG plant – if visible – will render Vamizi uninteresting to its clientele
    - The sight of floating platforms, associated flaring, LNG carriers and support vessels will render Vamizi uninteresting to its clientele
    - Light pollution at night could severely damage/destroy Vamizi's appeal
    - Aircraft and helicopters flying in sight of Vamizi will greatly damage business
    - Environment: damage to the reef and marine life generally will very significantly negatively impact Vamizi's appeal (see environment section below)
    - Security: as a result of the LNG plant's presence, there will be more traffic in the area making it harder to know who is who
    - The above relates to permanent potential damage. On top of that, one should consider potential loss of business whilst Anadarko's facility is being built. In particular, pipeline laying – if visible – will cause our lodge to have to shut down for the duration.

Rongui Island

- Rongui is much closer to Anadarko's onshore site
- Rongui is being developed as another high-end luxury resort and has also received significant investment
- The more suitable location for tourism activity on Rongui on that island's North side. Unfortunately, that will be approximately 4km from the Afungi site (if that is the location chosen).
- All comments for Vamizi apply – but with even more potential for fatal impact on Rongui's prospects

Other resorts

- The surrounding resorts of Tecomaji and Metundo could be severely impacted (Tecomaji plainly so). In theory they are competitors to us, but in reality we cater to very different markets and instead collaborate on many aspects of business (eg. aviation). If one or both of these resorts are driven out of business by Anadarko's presence, that will be net negative for us.

We request that the following happen:

1. Clarity to be given on the exact location of the LNG onshore facility. The Afungi site, if chosen, is obviously much more problematic to Vamizi and Rongui

2. Clarity to be given on the maximum height of the onshore facility and what options exist for lower buildings
3. Clarity to be given on the floating platforms locations.
4. Clarity to be given on exactly where LNG carriers will load. Will they be below the horizon from Vamizi and Rongui. What is their expected frequency? Can they load at night alone?
5. A complete visual study to be carried out explaining what will be seen of the onshore and offshore facilities as well as the LNG carriers from various points around Vamizi and Rongui's coast – both by day and night
6. How much by way of floodlighting is generally needed for an onshore facility? How much scope is there to reduce this? We request a study be commissioned on this
7. Has the final routes for undersea pipes been decided?
8. Security: what is the estimated increase in sea traffic in the area
9. How many employees (including contractors) are likely during the build phase and beyond?

Environmental concerns and requests

1. Shipping lanes should be well away from coral reefs / shallow sea grass beds to avoid collision.
2. The pipeline should be laid and routed through deep water and only as a last resort in shallow water to avoid reefs / sea grass beds. The EPDA only proposes one route in page 57. We believe two other routes should be studied: (i) between Tecomaji and Rongui; and (ii) between Cabo Delgado and Tecomaji.
3. Studies need to be conducted to understand the effect of all the development on whale migratory routes.
4. The effect on fishing needs to be studied
5. The effect of significant nighttime artificial light on turtle nesting needs to be understood.
6. Construction of the rig and land facilities to abide by Mozambique environmental and health and safety regulations and legislation as well as international best practices.
7. Dredging of shallow marine environments to be avoided as much as possible. If it must take place, it should avoid damage to valuable marine benthic environments such as sea grass beds, mangrove and coral reefs. Harbour structures designs should seek to minimize dredging
8. Waste management - cleaning of vessel tanks and refuse disposal / sewage / other noxious liquid substances to controlled appropriately
9. A study is needed on the potential impact of increased boat traffic and the construction of the offshore rig on marine mammals and their local migration routes. The area between Tecomaji and Rongui is considered to be a priority area for marine mammals by the Transmap Project – i.e. one which requires conservation effort and one of significant tourism (sightseeing) potential
10. Clear rules and regulations needed on anchoring. No anchoring zones also needed.
11. A study should be made on the impact of not only moving the permanent population from the area of the construction but also the impact on the nearby islands. Large numbers of itinerant fishermen from Nacala use the area for 3-6 months every year.

12. The EPDA did not make reference to the existence of several IUCN red list species that exist in the area and are present in the Community sanctuary of Vamizi: the Bumphead parrotfish (*Bolbometon muricatum*) and Napoleon Wrasse (*Cheilinus undulatus*). Also, the following have been observed between Vamizi and Metundo island: the greyreef shark (*Carcharhinus ambyrhynchus*) and the giant and potato grouper (*Epinephlus lanceolatus* and *Epinephlus tukula*). The reef of Tecomaji and Rongui are also likely to be home to these species.

Notes:

- All studies referred to above should of course be carried by a body that both agree will be impartial
- The above comments and requests do not constitute the entirely of CDIL's comments and requests. CDIL may have further such comments and requests at a later date.

VERDEMAR, LDA

Av.Marginal Praia do Wimbe, Bairro Eduardo Mondlane

Cidade de Pemba – Cabo Delgado

matteo@metundo.com

A

ANADARKO MOCAMBIQUE

Cidade de Pemba

Assunto: Observação

N/Ref90/VML/2011

A VERDEMAR, LDA propietaria da Metundo Lodje sita no distrito de Palma Provincia de Cabo Delgado representado pelo seu Adiministrador Matteo Vaghi, de nacionalidade Italiana, vindo se na obrigação de expor as suas lamentações sobretudo pelos efeitos que as obras e implementação do projecto de gás que o mega projecto Anadarko Moçambique vai lançar.

De lamentar que a consulta publica promovida pelo seu consultor **IMPACTO** no mes de Setembro ano corrente que teve lugar na sala de conferencia do Pemba Beach Hotel em Cabo Delgado que no nosso entender não foi claro e transparente dado que certos investidores do Distrito de Palma que operam nas ilhas circunvizinhas e nas aguas que este projecto ambicioso terá como seu campo de operação neste distrito.

Classificamos assim como falta de comunicação dado que até quando nos apercebemos que iria ocorrer esta consulta publica ca em Pemba solicitamos por meio de uma carta a Anardarko Moçambique, onde não tivemos nenhuma resposta e nem convinte da ultima hora tanto da **Anadarko** como do seu consultor **Impacto** (alegado 1).



Actividade principal no sector hoteleiro e de mergulho e pesca é o patrimonio principal do investidor hoteleiro é o ambiente, natureza.

Sugerimos que no proximo estudo e consulta do impacto ambiental que seja mais profunda e profissional nos seguintes argumentos:

- Projecto aprofundado do porto industrial a ser instalado na cidade de Palma, em particular nos serviços da dragagem e tratamento da areia proveniente desta dragagem. Os cuidados a ser tomado nesta dragagem o que conserna a conservação do habitate das especies marinhas e curais.
- Rotas e atracagem de toda frota maritima envolvidos neste projecto.
- Clarificação do tubo e o equipamento proprio de pescagem de gás, visto que o posso tubarão esta localizado muito proximo da ilha de Metundo
- Clarificação de tubos de caregamento do deposito para o navio de carga
- Definição de area de investimento
- Definição de area restrita da navegação normal dos barcos ao uso turistico, transporte de pessoal , logistica e pesca artezenal.
- O impacto da visibilidade do barco de investimento com o litoral no periodo nocturno e diurno e a claridade produzida pela plataforma.
- Proteção aerea dentro da area turistica (helicopter e avionetas)
- Cordenar junto com operadores hoteleiros quando a faze do trabalho a ser desenvolvimento no periodo possa afectar ou provocar danos evidentes em caso de (navios e barcos parados em frete das ilhas, teste de pressão de gás etc.).

Esperamos que a nossa explanação das preocupações não seja intendida e interpretada como vontade de barrar a implemenção do projecto de gás, mas sim como forma de lhes lembrar certos elementos que achamos merecer muita celeridade.

Pemba, 13 de Outubro de 2011

CC/

Ministerio do Turismo e Direcão Provincial de Cabo Delgado

Ministerio de Pescas e Direcão Provincial de Cabo Delgado

Ministerio de Energia e Minerais e Direcão Provincial de Cabo Delgado

Ministerio do Ambiente e Direcão Provincial de Cabo Delgado

WWF

Ilha deVamize

Ilha de Tamogodje

Adiministrador

(Matteo Vaghi)

EPDA Phase: A summary of comments received following the meetings is found in the table below, as well as respective responses.

Name, Organisation	Received	Comment	Response
Nathalie Grimoud Plataforma para Recursos Naturais e Indústrias Extractivas. Member Organizations - in Cabo Delgado: AgaKhan Foundation, ACRIDEME, ADBG, Karibo, Activa, Forum Terra – Cabo Delgado, GMD – Cabo Delgado, CAICADE, KEPA, Helvetas, and national organizations Kuwuka-JDA, MUGEDE, IMPROG, and Plataforma para Recursos Naturais e Indústrias Extractivas.	By letter, dated 12 October 2011	Include in the terms of reference for the EIA a study that outlines the strategy of how the project will communicate and deliver various information (i.e. health, elections, etc.) that are used in the area of the project for the purpose of making recommendations to the EMP with regards to a communication strategy. This will serve to increase efficiency in the communication process associated with the project throughout its life. This study should consider engaging other grassroots organizations (such as CCPs – Conselho Comunitário de Pesca (Community Fisheries Council), CGRN – Comité de Gestão de Recursos Naturais (Natural Resources Mamanagement Committee), and other OCBs – Community Based Organizations).	The TOR describes the public consultation process to be followed for the duration of the EIA process. In addition, it has been decided to augment the stated consultation process through further engagement with identified key stakeholder groups (eg fishermen, tourist operators, vulnerable groups, etc). The augmented process will be shared during the impact assessment phase of the EIA.
Nathalie Grimoud	By letter, dated 12 October 2011	Include in the terms of reference for the EIA a study of the best way to institutionalize an ongoing dialogue among civil society, the communities, the government, and companies, and include recommendations in the EMP. For instance, create a community communication forum, with the participation of OCBs and other community players.	Consultation as part of the EIA process is described in the above response and follow up the relevant legislations. Anadarko is planning as part of their commitment to ongoing, open communications to keep regular dialogue with civil society in Pemba. Anadarko will initiate and manage these communications separately but in parallel to the EIA process. .
Nathalie Grimoud	By letter, dated 12 October 2011	Include in the terms of reference for the socioeconomic study, local economic opportunities that could be pursued and developed. The resulting information may be useful not only for the company, but also for the government, as to how to best ensure and facilitate the establishment of local economic links with the project.	The socioeconomic study will consider employment opportunities and the project will work to ensure clear information is provided on the local recruitment process and criteria for local recruitment.
Nathalie Grimoud	By letter, dated 12 October 2011	Tailor messages and presentations to the various public bodies and audiences (we refer here to messages about the project – during the consultation phase and during the implementation of the EMP).	The response is acknowledged and noted. The EIA will hold focus groups with various groups to provide a forum for these groups to voice their concerns. Messages and presentations will be tailored to the target audience.
Sean Nazerali, WWF	By letter, dated 10 October 2011	With the goal of contributing to better the scope of the proposed study (EIA), below we provide a few suggestions that should be included in the	The response is welcomed and noted.

Name, Organisation	Received	Comment	Response
		study's Terms of Reference (ToR). WWF is fully prepared to support this work with additional inputs on this and other topics, as required by the company and/or the consulting team.	
Sean Nazerali, WWF	By letter, dated 10 October 2011	Include the estimated amount of carbon emissions that will result from the project and propose steps to mitigate these (in accordance with the legal obligations of Mozambique within the Baseline Convention of the United Nations on Climate Change, ratified by Resolution no. 1/94, of August 24, 1994)	The response is welcomed and noted. The project will undertake a study to determine the project's contribution to Mozambique carbon emissions. This study will comply with the conventions ratified in Mozambique and international standards.
Sean Nazerali, WWF	By letter, dated 10 October 2011	Expand the scope of the study area, particularly the marine area so as to include all areas that are going to be affected by the project, including gas transportation and export routes of gas and transportation (whale migratory routes, fisheries, etc.), and more specifically the area that may be directly affect by the dredging (coral reefs, seaweed, fisheries, etc.).	The EIA will assess both direct and indirect impacts of project related activities and the study area will be extended to incorporate all potentially affected areas. This includes the pipeline route from the well field to the LNG facility, near shore infrastructure (including the export jetty and the marine offloading facility), any marine areas that may be impacted on by the construction of operation on the project. International transport routes lies outside the scope of the EIA.
Sean Nazerali, WWF	By letter, dated 10 October 2011	The EPDA only indicates one single option for the gas pipeline route. We would like to suggest alternative routes should include the following: between Tecomaji Rongui and between Cabo Delgado and Tecomaji.	We welcome your suggestions. The final pipeline route has not yet been selected. Technical studies are currently underway to understand the various options. Three alternative pipeline routes are being considered. See Section 4.12 of the EPDA.
Sean Nazerali, WWF	By letter, dated 10 October 2011	Include studies on climate changes on two levels: a. At the project level (i.e. the impact of rising sea levels, extreme events, such as hurricanes, storms and floods, on the site selected for the project). b. At the level of Environmental Management Plans (EMP) contribution to increasing knowledge of climate change in the country–installing sensors to monitor sea levels, a meteorological station. (It should be noted at this time the lack of data on this topic could hinder the preparation of estimates and projections, as well as steps that could be taken). We suggest contacting the INGC (Instituto Nacional de Gestão de Calamidades/National Institute for Disasters Management) on this topic.	a. Climate change is a global phenomenon and it is not possible to relate any one project to site-specific impacts (like sea level rise) with any degree of confidence. What the climate change study will do is provide a better understanding of the Project's contribution to increasing greenhouse gas emissions. b. The request is noted and the possibility of installing monitoring stations will be discussed with AMA1. c. INGC will be included in our stakeholders' database.

Name, Organisation	Received	Comment	Response
Sean Nazerali, WWF	By letter, dated 10 October 2011	The study (EIA) should identify major information gaps that will require long term studies. Studies should be conducted on biodiversity, such as for instance marine mammals (their numbers, migratory routes, feeding grounds, etc.), and social aspects (capturing fish species and other marine resources on which there is a lack of knowledge and research). The EMP should specify that studies be implemented gradually, with results being fed back into the EMP itself and providing for adjustment plans, if necessary.	The EIA will identify information gaps and the EMP will include a monitoring programme for key areas of focus that need to be monitored during the life of the Project. .
Sean Nazerali, WWF	By letter, dated 10 October 2011	Social studies should include the estimated impact of the project on the economy, from a local, provincial and national perspective, and the existing opportunities for local development that could be levered by the project. This will allow for an assessment of social impacts and the prospects for mitigation.	Comment is acknowledged and noted.
Sean Nazerali, WWF	By letter, dated 10 October 2011	At the end, the EIA should assess the residual impact of the project so as to estimate offsets in terms of biodiversity, in accordance with the regulations in the Equator Principles and IFC Performance Standards (PS6).	The EIA will assess impacts and residual impacts after mitigation measures have been implemented. Ongoing monitoring will be implemented to confirm residual impacts and make any changes to management measures where required. Biodiversity offsets will be considered in the EIA.
Sean Nazerali, WWF	By letter, dated 10 October 2011	The creation of an ongoing mechanism should be considered for the purpose of monitoring the implementation of social and environmental commitments assumed. National experiences have demonstrated that the creation of social foundations by companies has been successful. Their funding and capital are independent from the companies' and they ensure that the commitments assumed by the company with the community are implemented.	AMA1 will ensure that environmental and socioeconomic performance commitments are achieved. This will be done by monitoring the implementation of commitments and also by monitoring their success. When appropriate AMA1 will consider the best way to manage the social funds.

Name, Organisation	Received	Comment	Response
Sean Nazerali, WWF	By letter, dated 10 October 2011	Assess the socioeconomic and environmental impact of increased ground and air transit in the area, including an increased amount of people at the site.	Potential impacts resulting from increased vehicles and aircraft will be considered in the EIA.
Sean Nazerali, WWF	By letter, dated 10 October 2011	Include in the ToR a review of the impact of permanent resettlement of people in the area of the project, including its impact on neighbouring islands on the access routes of fishermen and how the project will affect temporary settlements (3 to 6 months) of those fishermen. The area has three major temporary settlements for fishermen – Milamba, Salama and Nsemo.	A socioeconomic study will be undertaken to determine the baseline characteristics of the area, including access routes, population of the local communities etc. A resettlement action plan will be undertaken in parallel to the EIA and will address issues concerning resettlement.
Sean Nazerali, WWF	By letter, dated 10 October 2011	Review the EMP and include clear recommendations on how to handle species on endangered lists that are present in the Community Sanctuary of Vamizi Island - Bumphead parrotfish (*Bolbometon muricatum*) and Napoleon Wrasse (*Cheilinus undulatus*). Species observed between Vamizi and Metundo include, greyreef shark (*Carcharhinus ambyrhynchus*) and (*Epinephlus lanceolatus* and *Epinephlus tukula*), which are present in Rongui.	Species of conservation importance that may be impacted from project activities will be considered in the EIA.
Sean Nazerali, WWF	By letter, dated 10 October 2011	All specialized studies should be made public, so that they could be used by pertinent stakeholders and academia, even outside the scope of the EIA, contributing to enhance information available on the area.	The specialist studies undertaken for this project will be made publically available.
Sean Nazerali, WWF	By letter, dated 10 October 2011	It is worth noting that this EMP will cover a long period of time. As such it must allow for both complexity and flexibility. Therefore, many of suggestions below will require legal review before they are implemented.	The response is acknowledged and noted. The EMPs will be made available for public comment.

Name, Organisation	Received	Comment	Response
Sean Nazerali, WWF	By letter, dated 10 October 2011	The EMP should offer proposed mechanisms for an ongoing dialogue with the community and civil society for the duration of the project (20-40 years!). a. NB: This is a long term project. Therefore the mechanism provided for in the EIA process will not be enough to ensure continuous consultation with the community, local authority and civil society. b. Thus, the mechanism should be flexible with a permanent leadership structure. The format of a permanent committee with management participation should be considered, to ensure not only the availability of an ombudsman and the flow of information, but also to provide ideas and suggestions for social actions. It could also have many levels (district, provincial, national) with various stakeholders so as to maximize their participation.	The response is acknowledged and noted. A stakeholder engagement plan will define consultation activities that engage all sections of the local community and affected parties through the pre-construction, construction and operation phases.
Sean Nazerali, WWF	By letter, dated 10 October 2011	A social mechanism should also be proposed for corporate social responsibility (CSR) and social actions carried out in the context of social funds currently channeled through the INP. The foundations provided for under previous comment regarding ongoing mechanisms above could help in this sense. Involving INP in the EIA process constitutes an opportunity to improve the process for all operators in the country.	AMA1 will follow the environmental regulations to complete the EIA. In additional AMA1 will define the best strategy for use of the social funds for each step of the project.
Sean Nazerali, WWF	By letter, dated 10 October 2011	As always, it is essential to include in the EMP a mechanism to assess and evaluate real impacts, in real time, during the project's implementation. A team should be in the field (the best multi-disciplinary team) to inspect these aspects. This team should also be accountable to the foundation identified above. Inspection, information sharing and dialogue on this topic should be conducted with transparency, ongoing dialogue and responsibility vis-à-vis the business supported by the company.	AMA1 will ensure that environmental and socioeconomic performance commitments are achieved. This will be done by monitoring the implementation of commitments and also by monitoring their success. Where defined management measures are not achieving desired results, new or modified management measures will be proposed. AMA1 will ensure continued engagement with the local community throughout the projects lifespan

Name, Organisation	Received	Comment	Response
Sean Nazerali, WWF	By letter, dated 10 October 2011	The various studies conducted within the EIA should be published and discussed as they become available, perhaps at technical meetings so as to gather contributions from the I&APs that could help and improve the final version of the study. These issues should be included as much as possible in the EMP, as it is a binding document for the project, regardless of who wins the project or controls the company. Unfortunately there are many instances of commitments for a certain project made by the original bidding companies that are not honored by the new entities, once the project is sold or transferred.	Comments are acknowledged and noted.
Matteo Vaghi, Verdemar Lda	By letter, dated 13 October 2011	It is unfortunate that the public hearing conducted by your consultant IMPACTO, during the month of September this year, which took place in the conference room of the Pemba Beach Hotel in Cabo Delgado was, in our opinion, not clear and transparent, since certain investors in the Palma District who operate on the adjacent islands and in the waters impacted by this ambitious project will have this district as their field of operation were not invited. Thus, we consider this as a lack of communication. When we realized that this public hearing was to be held in Pemba, we sent a request in a letter to Anadarko Mocambique; however we received no response and not even a last minute invitation from Anadarko or its consultant Impacto.	The EIA team should have identified all potential stakeholders and invited them to the meeting. It is also acknowledged that the process of identifying and registering stakeholders is an iterative process. In order to ensure that stakeholders are not accidentally excluded from participation invitations to the meeting were broadcast widely. In this regard the public meeting in Pemba was advertised on the radio in Cabo Delgado and on Notícias and Diário de Moçambique Newspapers on 12 September 2011 and on 23 September 2011. Please note that Matteo Vaghi's has been added to the database of Interested and Affected Parties (I&AP) and will receive future public consultation notifications and EIA updates.
Matteo Vaghi, Verdemar Lda	By letter, dated 13 October 2011	The main activities in which the hotel sector is involved are diving and fishing and the primary assets of the hotel investors in the area are the environment and nature.	Comment is noted.

Name, Organisation	Received	Comment	Response
Matteo Vaghi, Verdemar Lda	By letter, dated 13 October 2011	We suggest that the next phase of the environmental impact assessment process and consultations are more exhaustive and professional, and include the following considerations: • The project to deepen the industrial port in Palma, particularly the dredging activities and disposal of sand from the dredging. Care should be taken during dredging to protect the habitats of marine and coral species	The next phase of engagement will consider a range of groups of stakeholders and have more frequent interactions with them. At this stage of the EIA., the primary purpose is to notify stakeholders of the project and elicit any comments and concerns to inform the scope of our studies. Potential impacts of dredging will be assessed.
		• Routes and mooring areas for the entire maritime fleet involved in this project	This will be better defined in the EIA.
		• Clarification of the type of pipe and equipment to be used for the gas exploration and production, since the Tubarao Well is located very near Metundo Island	Noted.
		• Clarification regarding the pipe to be used to transport the gas from the deposit to the cargo vessels	Noted.
		• Clear definition of the investment area	The study area is defined in Section 2.2. The EIA will assess both direct and indirect impacts of project related activities and the study area will be extended to incorporate all potentially affected areas.
		• Clear definition of the area to be restricted to normal navigation of tourist boats, transportation of personnel, logistics and artisanal fishing	The exclusion zones will be defined in the EIS.
		• The impact of the visibility of the vessel on the coast during the night and day time hours, and the light produced by the platform	Potential light impacts will be assessed in the EIS.

Name, Organisation	Received	Comment	Response
		• Aerial restrictions in tourist areas (helicopters and small planes)	This will be defined in the EIS.
		• Coordination with the hotel operators regarding when particular phases of the work may impact or cause obvious damage (such as ships and vessels anchored off the islands, gas pressure tests, etc.)	Noted – this will be done as part of Anadarko's ongoing communications.
Matteo Vaghi, Verdemar Lda	By letter, dated 13 October 2011	We hope that this explanation of our concerns is not understood or interpreted as an attempt to try and prevent or prohibit the implementation of the gas project, but rather as a reminder of certain aspects which we believe merit your prompt attention.	The response is welcomed and noted.
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	Vamizi Island The Report made no mention of Vamizi as a potentially impacted tourist destination. This needs to be corrected and we ask that this be noted. Please refer to www.vamizi.com as a first step.	Noted. All tourist areas that may be affected by the project will be considered and included in the specialist study that addressed impacts on tourism. Vamizi will not be excluded if it is found that it will be impacted by the project.

Name, Organisation	Received	Comment	Response
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	Vamizi is one of the top three ultra-high end destinations in the Indian Ocean. It is very prominent worldwide and is considered a showcase destination by the Mozambican authorities. A very significant amount of investment by shareholders and villa owners ($tens of millions) has gone into developing Vamizi. Vamizi could be impacted by Anadarko's development as follows: • The LNG plant - if visible - will render Vamizi uninteresting to its clientele • The sight of floating platforms, associated flaring, LNG carriers and support vessels will render Vamizi uninteresting to its clientele • Light pollution at night could severely damage/destroy Vamizi's appeal • Aircraft and helicopters flying in sight of Vamizi will greatly damage business • Environment: damage to the reef and marine life generally will very significantly negatively impact Vamizi's appeal (see environment section below) • Security: as a result of the LNG plant's presence, there will be more traffic in the area making it harder to know who is who • The above relates to permanent potential damage. On top of that, one should consider potential loss of business whilst Anadarko's facility is being built. In particular, pipeline laying - if visible - will cause our lodge to have to shut down for the duration.	Comments are acknowledged and noted. The response is welcomed and specialist studies will be undertaken during the EIA phase to assess all the potential impacts identified here. The specialists involved will propose mitigation measures to avoid or minimize identified impacts.
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	<u>Rongui Island</u> • Rongui is much closer to Anadarko's onshore site • Rongui is being developed as another high-end luxury resort and has also received significant investment • The more suitable location for tourism activity on Rongui on that island's north side. • Unfortunately, that will be approximately 4km from the Afungi site (if that is the location chosen). • All comments for Vamizi apply - but with even more potential for fatal impact on Rongui's prospects	Comments are acknowledged and noted.

Name, Organisation	Received	Comment	Response
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	<u>Other Islands</u> The surrounding resorts of Tecomaji and Metundo could be severely impacted (Tecomaji plainly so). In theory they are competitors to us, but in reality we cater to very different markets and instead collaborate on many aspects of business (eg. aviation). If one or both of these resorts are driven out of business by Anadarko's presence, that will be net negative for us.	Comments are acknowledged and noted.
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	*We request that the following happen:* 1. Clarity to be given on the exact location of the LNG onshore facility. The Afungi site, if chosen, is obviously much more problematic to Vamizi and Rongui 2. Clarity to be given on the maximum height of the onshore facility and what options exist for lower buildings 3. Clarity to be given on the floating platforms locations. 4. Clarity to be given on exactly where LNG carriers will load. Will they be below the horizon from Vamizi and Rongui. What is their expected frequency? Can they load at night alone? 5. A complete visual study to be carried out explaining what will be seen of the onshore and offshore facilities as well as the LNG carriers from various points around Vamizi and Rongui's coast - both by day and night 6. How much by way of floodlighting is generally needed for an onshore facility? How much scope is there to reduce this? We request a study be commissioned on this 7. Has the final routes for undersea pipes been decided? 8. Security: what is the estimated increase in sea traffic in the area 9. How many employees (including contractors) are likely during the build phase and beyond?	1. The results of the site selection process have indicated that Afungi is the preferred site. Section 4.6 of the Final EPDA describes the entire process and outcomes. 2. Further details will be provided in the EIA Phase 3. Section 4.2 mentions that the requirement for a Floating Production Unit (FPU) has not yet been confirmed. Should the project require an FPU, details will be provided in the EIA Phase. 4. Further details regarding marine vessels will be provided in the EIA Phase. 5. A specialist landscape and visual study will be undertaken as part of the EIA to assess potential impacts on landscape and visual amenity as a result of the proposed development. The visibility of offshore and offshore infrastructure during the day and night will be considered in this study. 6. Further details regarding lighting requirements will be provided in the EIA Phase. The sources of light on construction sites and at the operational facility will be managed to reduce light trespass while ensuring levels required for safe working. The EIA will ensure that appropriate mitigation measures (shades, timers etc) are utilized as needed. 7. See Section 4.1.2, the exact route of this pipeline has not yet been determined. 8. Further details regarding increased vessel presence will be provided in the EIA Phase. 9. Further details regarding employee numbers will be provided in the EIA Phase.

Name, Organisation	Received	Comment	Response
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	<u>Environmental concerns and requests</u> 1. Shipping lanes should be well away from coral reefs / shallow sea grass beds to avoid collision. 2. The pipeline should be laid and routed through deep water and only as a last resort in shallow water to avoid reefs / sea grass beds. The EPDA only proposes one route in page 57. We believe two other routes should be studied: (i) between Tecomaji and Rongui; and (ii) between Cabo Delgado and Tecomaji. 3. Studies need to be conducted to understand the effect of all the development on whale migratory routes. 4. The effect on fishing needs to be studied 5. The effect of significant nighttime artificial light on turtle nesting needs to be understood. 6. Construction of the rig and land facilities to abide by Mozambique environmental and health and safety regulations and legislation as well as international best practices. 7. Dredging of shallow marine environments to be avoided as much as possible. If it must take place, it should avoid damage to valuable marine benthic environments such as sea grass beds, mangrove and coral reefs. Harbour structures designs should seek to minimize dredging 8. Waste management - cleaning of vessel tanks and refuse disposal/sewage / other noxious liquid substances to controlled appropriately 9. A study is needed on the potential impact of increased boat traffic and the construction of the offshore rig on marine mammals and their local migration routes. The area between Tecomaji and Rongui is considered to be a priority area for marine mammals by the Transmap Project - i.e. one which requires conservation effort and one of significant tourism (sightseeing) potential 10. Clear rules and regulations needed on anchoring. No anchoring zones also needed. 11. A study should be made on the impact of not only moving the permanent population from the area of the construction but also the impact on the nearby islands. Large numbers of itinerant fishermen from Nacala use the area for 3-6 months every year. 12. The EPDA did not make reference to the existence of several IUCN red list species that exist in the area and are present in the Community sanctuary of Vamizi: the Bumphead parrotfish	1. Comment noted. 2. The three alternative pipeline routes mentioned here are being considered. See Section 4.12. 3. A marine ecology study will be undertaken and will consider potential impacts of the project on marine mammals. See Terms of Reference of the EIA, Annex B of the EPDA Report. 4. A fisheries study will be undertaken and will consider potential impacts of the project on fishing and fisheries. See Terms of Reference of the EIA, Annex B of the EPDA Report. 5. A marine ecology study will be undertaken and will consider potential impacts of the project on sea turtles. See Terms of Reference of the EIA, Annex B of the EPDA Report. 6. Agreed. See Section 2.1 of EPDA Report. 7. Dredging will be minimised wherever possible. 8. The Project will develop a Waste Management Plan (WMP) that identifies all wastes likely to be produced. All wastes will be handled, stored and disposed of in accordance with the requirements of the WMP and the relevant regulations. 9. Noted – this will be considered in the Marine Ecology Study. 10. Further details regarding anchoring will be provided in the EIA Phase. 11. A resettlement study will be undertaken and this and the EIA will assess the impacts related to physical and economic displacement. 12. Species of conservation importance that may be impacted from project activities will be considered in the EIA.

Name, Organisation	Received	Comment	Response
		(*Bolbometon muricatum*) and Napoleon Wrasse (*Cheilinus undulatus*). Also, the following have been observed between Vamizi and Metundo island: the greyreef shark (*Carcharhinus ambyrhynchus*) and the giant and potato grouper (*Epinephlus lanceolatus* and *Epinephlus tukula*). The reef of Tecomaji and Rongui are also likely to be home to these species.	
Dr. Michael H. Gera, Cabo Delgado Investments Ltd ("CDIL")	By letter, dated 13 October 2011	All studies referred to above should of course be carried by a body that both agree will be impartial. The above comments and requests do not constitute the entirely of CDIL's comments and requests. CDIL may have further such comments and requests at a later date.	As outlined in Section 1.2 ERM and Impacto are independent consultants. The EIA Team will independently evaluate the environmental and socioeconomic impacts that may result from the AMA1 LNG project. Comment is acknowledged and noted.

EIS PHASE

COMMENTS TO THE DRAFT OF THE ENVIRONMENTAL IMPACT STUDY (EIS) FOR THE LIQUEFIED NATURAL GAS PROJECT IN THE PROVINCE OF CABO DELGADO

Project Reference: 0133576

August 2013

OVERALL

1. The Ministry of Fisheries would like to convey to the supervising sector an objective assurance that whenever possible, any Project activity will cause a minimum of disturbance to fishing resources and habitats. In order for this to happen, the report must address the impact on fishing in greater depth, as well as the respective projections, within a reasonable amount of time and not in the present generic manner.

2. Without any absolute certainty about the real aspects associated with the Project, due to the current absence of detailed information, it would be important that in addition to describing the fishing resources, all fisheries should also be described by the type of fishing that exists in the area for proper evaluation, monitoring and establishment of impact mitigation programs where necessary. The vessel monitoring system via satellite, currently used by the National Fisheries Administration (ADNAP) is an element to consider for this purpose.

3. For the evaluation of impact on commercial fishing, we suggest taking into consideration the Strategic Development Plan for Tuna Fisheries, approved on July 2013 in the 22nd Ordinary Session of the Council of Ministers.

4. Decree 71/2011 of September 30, which determine those areas which are potentially conducive toward the development of marine aquaculture and the increase of fish production, delineates a part of the Palma District (Annex A.1 of the Decree) as a Marine Aquacultural Area for the cultivation of seaweed, yet the report makes no reference at any time to this fact, or to the impact in that scope.

5. The resettlement of artisanal fishermen in other fishing areas must represent an integrated, long-term strategy that takes annual migrations into consideration.

6. Interaction between the Project and the different participants/agencies of the Fishing sector's institutions is sidelined. The Project must finance specific monitoring programs of marine fishermen and the unloading of fish where the Fishing sector must perform part of the process. This extends to environmental education projects that involve fishermen. To this end, the actions to be undertaken must be framed within the sectorial strategies and policies defined for the planning of fisheries, fishing infrastructures and the development of aquaculture.

7. In mitigation measures for commercial fishing (damage of fishing gear), the Project must also interact with the National Fisheries Administration

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Ministry of Fisheries

(agency responsible for implementing the commercial and licensing agreements of the fleet)

SPECIFICS

1. *Mitigation measures*: For commercial fishing (damages to fishing gear), the Project must interact with the National Fisheries Administration (agency responsible for the implementation of the commercial and licensing agreements of the fleet).

2. *Evaluation of Socioeconomic Impact and Mitigation*: It must be apparent that the Project will cooperate with the National Fisheries Administration toward establishing Claim Procedures (claims related to fishing activities)

   Dealing with highly migratory resources that occur seasonally, what guarantee is there that the residual impact will be negligible?

   Social responsibility – Conditions must be created to allow the introduction of specific support programs for affected/resettled fishermen during the course of the Project, for example: literacy for fishermen, motorizing of vessels that engage in offshore fishing, creation of water parks in the development of aquaculture, introduction of fish-aggregating devices, cultivation of aquatic species such as fish, algae and crustaceans, among others.

3. *Annex G* – Supporting Material for Defining the Situation of Reference: Include description of the fisheries.
   Legal Framework and Strategies of the Fisheries Sector – The classification of fishing is incorrect and other categories are missing (Article 3 of Law Number 3/90 of September 26, Fisheries Law)

4. *Annex H* – Emergency Response Plan: As concerns agencies to be notified in emergency situations, include Fisheries (ADNAM) when interruptions to fishing operations are necessary.

MAPUTO, SEPTEMBER 2013

Ministry of Fisheries

ADDENDUM TO THE COMMENTS OF THE DRAFT OF THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF THE LIQUIFIED NATURAL GAS PROJECT IN THE PROVINCE OF CABO DELGADO

Project Reference: 0133576

August 2013

THE SPECIFICS

The LNG project, as discussed in the REIA, will bring social and economic impacts to the area where it is introduced. As far as the Fisheries sector is concerned, the project will affect local fishing communities, commercial fisheries in the high seas as well as the development of any aquaculture activity, more specifically:

a. Disruption of the survival strategies of the communities that depend on fishing and maritime transport due to the establishment of the project and the safety zones surrounding the infrastructure;
b. Physical disruption of fishermen and fishing centers;
c. Loss of a part of the mangrove and estuary of the Afungi region;
d. Considerable loss of a portion of sandy beach due to port construction in the intertidal area;
e. Temporary loss of water clarity and permanent burial of part of the areas covered by sea-grass beds, corals and mangroves due to trench dredging operations;
f. Potential infiltration of exotic and invasive species;
g. Potential reduction in the abundance of fish due to the noise caused by pile-driving operations;
h. Disposal of drilling mud and clippings into the sea with potential impact on the burial and toxicity of benthic organisms, and
i. Potential impact over water quality and marine ecology due to discharges of water from hydrotesting, formation water, rainwater from the LNG plant and ballast water from the LNG carriers, from wastewater treatment stations and the desalination plant.

1. The REIA does not report any fatal aspects for the project's implementation. Nonetheless, reducing the fishing communities' access to the fishing areas due to the creation of safety zones, and the need to resettle these communities, are key and sensitive matters that merit proper treatment, because this will reduce or eliminate the yield and affect the survival strategies of communities as a whole, and fishermen in particular.

2. Considering that the solution to these matters depends significantly on the resettlement

Blueprints and the management of safety areas to be established, we must stress the importance of the proper presentation of mitigation solutions, making reference to fisheries and the type of fishing.

3. The potential for contamination of the aquatic environment by chemical agents to be handled during operations constitutes another concern for the sector. In addition to the measures and recommendations put forth in the REIA, it would important to evaluate the “fish for human consumption and the filtering organisms” aspect.

MAPUTO, OCTOBER 2013

EIA – Anadarko – GNL

Comments

Sean Nazerali, Environmental Consultant

With the aim of contributing toward improving the scope of the study, I am presenting below suggestion on aspects to be included in the report on the study. Please contact me for any clarifications.

Suggestions for inclusion in the AIA:

Environmental and Social Issues

1. Include, along with the calculation of the project's carbon emissions, measures to compensate them (in accordance with the legal obligations of the Mozambican state, according to the United Nations Treaty on Climate Change, ratified by Resolution No. 1/94 of 24 August). The EIS does not mention compensation measures for these emissions, whose impact will be considered Major, even after all of the recommended mitigation measures.

2. Include monitoring studies on climate change in the EIS at three levels:

a. Project Level (impact from rising sea levels, extreme events (cyclones, storms, *cheios*, etc.) in the area chosen for the project. I did not find these scenarios in the project.
b. Community Level – Likely and envisioned impacts from climate change in the areas selected for community resettlement must be taken into consideration.
c. EMP contribution level to basic science on climate change in the country – installation of sensors to measure sea level, weather stations, etc. (Note that at this time there is a paucity of data on this subject, limiting possible projections as well as measures that could potentially be taken). I suggest getting in touch with the INGC on this matter.

3. Must identify large gaps in knowledge that will require long-term studies to be closed, following the obligations in Chapter VIII of Ministerial Statute (MICOA) No. 129/2006 of 19 July, the General Directive for Environmental Impact Studies (Note that this Statute is not mentioned in Chapter 2 on the Legal Framework in Mozambique...). These studies could be on biodiversity, for example, marine mammals (numbers, migratory routes, feeding areas, etc.) as well as social aspects (fish catches and other marine resources that are poorly studied and little-known at this time). The EMP should propose the implementation of these long-term studies, with the results to

influence the development of the EMP itself, as well as the compensation plans, if needed. There appears to have been no compliance with the statute.

Note: Chapter VIII of Ministerial Statute (MICOA) No. 129/2006 of 19 July indicates: "Gaps in knowledge encountered during preparation of the EIS must be defined at the following levels:

a. Stress the impacts that are not susceptible to mitigation due to technical-economic inadequacy in the current state of knowledge;
b. Identify determining impacts whose quantification and characterization is scarce or insufficient – whether for non-existence or due to a lack of information;
c. Define areas of priority for scientific and technological investigation, based on the gaps identified in the foregoing lines;
d. Evaluate the information circuits and the ease or difficulty with which information reaches the users; indicate ways of improving the administrative and information system;
e. Propose terms of reference for studies and additional work with a view toward solving the most critical shortcomings among those mentioned above."

4. Evaluate the residual impact of the project at the end of the AIA in order to facilitate calculation of the counterweight or "Offset" of biodiversity, following the standards of the Ecuador Principles and the IFC Performance Standards (specifically PS6). The residual impact at this point of the AIA is not quantified. If there are still scientific doubts or studies required to quantify the impact, these should be expressly identified in the collection plan, and publication of this information must form part of the EMP. The commitment of insuring "no liquid loss of biodiversity" (no net loss) must be assumed in writing by EMP.

5. On the social side, national experiences show that creation of social foundations by the company is practical and assists in the implementation of social programs and commitments. These are endowed with capital that is independent of the company, but guaranteeing the implementation of the company's commitments toward the community. The mechanisms for social commitments should be identified by EMP if possible.

6. It should insure that all specialized studies are made public, in order that they may be used by all participants and relevant academics, even beyond the scope of the EIS, as a contribution to the availability of information on the area studied.

Recommendations on the Process

7. A permanent mechanism for monitoring the implementation of the commitments made – whether social or environmental, including publication of all documentation on compliance and adopted by EMP – should be created. This commitment should be in writing and included in the EMP to be approved.

a. I suggest that a Technical Follow-Up Council be created, and it will later select a professional company that will come to audit the implementation of the EMP with the national authorities, whenever possible. The reports of this audit must be public, regardless of the results.
b. The tenderer must assume the burden of the Council's operation and the auditors.
c. Note: Ecuador Principle 7 (allegedly to be followed by the tenderer) stipulates the need for independent review.

8. The tenderer promises in its public consultations that it will have external audits based on the Ecuador Principles and on the IFC Performance Guidelines, and that the reports of these audits will be public. This commitment must also be made by the tenderer in writing and included in the EMP to be approved, so that MICOA and other national entities will have a national legal base for demanding compliance, even if in the future the project should find other sources of finance without these requirements, or departed, selling its entirety to a third party that does not share the same values.

9. It should propose permanent mechanism for dialogue with communities and civil society throughout the duration of the project (20-40 years!)

    a. Note: This is not a short-term project, and the mechanisms forecasted in the AIA process will not suffice for continuous consultation with the communities, local authorities and civil society.
    b. Therefore, it must be a flexible mechanism with a permanent leadership structure. One could think perhaps in a sort of standing committee with participatory management that could help not only in listening to the flow of information, but could also contribute ideas and suggestions for social action, etc. Committees and several levels may possibly be required (district, provincial, national) with various participants, in order to maximize participation.

10. At the same time, a social mechanism should be proposed for CSR (corporate social responsibility) and the social actions developed in the context of social funds currently channeled through the NPOs. The committees envisioned above could help in that. This is an opportunity to improve the process for all operators in the country.

11. As always, it will be essential that the EMP includes a mechanism to appreciate and evaluate real impact in real time throughout the implementation of the project. There will have to be a team on the ground (preferably a multi-disciplinary team) to audit these aspects. This team could possibly report to the committee proposed in number 7 above in regard to auditing, availability of information on the results and dialogue on matters to be framed within the perspective of transparency, permanent dialogue and responsibility in regard to the business defended by the Company.

12. It was suggested in the EPDA process that the various studies made within the scope of the AIA should be published and discussed as they are completed, in order to gather contributions from PIAs that may contribute toward enriching the final version of the study. I do not know why this was not done.

In general, these matters should be included as much as possible within the EMP, given that it is a **binding** document for the project, regardless of who the owner of the project is or who leads the company. Unfortunately, there are many examples of commitments made by the original proponents of a given project which after its sale, or their transfer to another company, are no longer honored by the new owners.

With my best regards,
Sean Nazerali
Environmental Consultant
sean.nazerali@gmail.com
82 397 2000, 84 013 5594

Maluane Moçambique

VAMIZI ISLAND
MOZAMBIQUE

25th September 2013

Sandra Fernandes
Impacto Lda - Public Participation Office
Av. Mártires da Machava, 968
Maputo, Mozambique

Dear Madam,

Ref: AMA1 LNG Project. ERM/ Impacto Ref: 0133576

This letter is a formal response to the EIA prepared by Impacto dated August 2013 for AMA1 and ENI regarding the Mozambique LNG Project in Palma Bay, Cabo Delgado.

Company Background

Cabo Delgado Biodiversity and Tourism (CDBT) established the Maluane Concession in 2001. The concession includes, but is not limited to, the development rights to both Vamizi Island and Rongui Island, both of which are in close proximity to the proposed Project. The primary aim of the Maluane Concession was, and continues to be, to forge an important inter-relationship between tourism, wildlife conservation and community development to sustainably protect and conserve this unspoilt area of the Indian Ocean.

In 2005 CDBT opened The Vamizi Island Lodge which was soon after visited by such luminaries as Nelson Mandela and Graca Machel. Vamizi Island Lodge is today an international award winning luxury resort and the most recognised tourism resort in Northern Mozambique. There are now also 6 privately owned homes on the island, managed by CDBT, with more currently being designed. CDBT has built up a strong, recognisable 'Vamizi' brand, through the investment of tens of millions of dollars in infrastructure and tourism assets in the region since 2001, creating jobs for the local population, and in advertising through the international media. This PR has served to place the Quirimbas Archipelago and Mozambique on the global tourism map. Vamizi has over 1,000 high-paying guests every year, some of whom have gone on to invest in mining and agricultural operations within Mozambique.

CDBT has developed the only private/community/government partnership in Mozambique to co-manage the fisheries resource. The protected waters have been deemed to have one of the most diverse reef eco-systems in the world (David Obura, CORDIO) and provide a much needed refuge for marine biodiversity. The area is an important habitat for a significant number of cetacean species, both resident and migratory. It is also the location for mass-spawning of coral, where on one or two nights each year, countless corals from a variety of species simultaneously release their eggs. Mass spawning is rare, occurring in only around 20 locations in the world but never before seen along the East African coast.

Results from the EIA

CDBT would like to formally state its concerns about the likely impact that the proposed Project will have upon its conservation assets and the region.

Rongui Island will suffer a negative visual impact from the shipping activity in Palma Bay and from light and visual pollution produced by the mainland facilities. CDBT has serious concerns about the level of coral reef destruction expected during the laying of the pipeline between Rongui and Tecomaji islands and the effects of the silt plume on the surrounding reefs. CDBT also has serious concerns about the effects of an increased amount of sewage from the village of Palma and water, warmed by its use to cool the gas in the cooling system, being ejected into the sea. The combined effects will jeopardise the future of Rongui as a tourism-driven community and conservation project. The result for CDBT will be a loss of real estate revenue derived from the development and sale of private houses as per the business model and a loss of future tourism caused by potential coral depletion, disruption to the marine environment and visual pollution.

Cetacean habit and behaviour will inevitably be adversely affected by noise disruption. This will manifest itself in social disruption, stress-related physiological damage, loss of hearing and, ultimately, a decreased population caused by disorientation, area avoidance, cessation of feeding and higher mortality rates.

Vamizi Island Lodge and Private Villas will suffer a negative visual impact from the Project, predominantly through light pollution. There will be socio-economic impacts upon the island's community as the movement of people, displaced by the Project and moved from the Afungi Peninsula to Olumbe, will result in an increased island population and increased fishing in the vicinity of Vamizi. This will have a direct impact upon the reefs through overfishing. It is also expected that the price of fish will rise due to a greater demand in Palma. The cumulative effect could be a strain on the natural resources that attract tourists to this region. Vamizi's image as a remote wilderness will be put into question and the sustainability of the business model will be at risk. The Project effects, among other things, CDBT's ability to sell private houses to international investors, many of whom are reluctant to invest until the real impact of the Project is understood. This is already delaying the execution of CDBT's business plan.

The overall investment of the Project must benefit the region as a whole. There must be wide-reaching positive benefits from the short term extraction of gas to protect the assets that will ensure long term tourism interest in the region. This is what CDBT has been instrumental in building and CDBT would urge the government and the partners in the Project to recognise the importance of this approach.

The EIA does not make clear the cumulative effects of the noise and disruption around Palma Bay on the marine mammal population. Similarly, the plans for the mitigation of coral

damage are neither complete nor clear. A marine conservation plan for the coral reefs, seagrass beds and marine mammal population of the entire area does not exist and is urgently needed. It is also not clear from the EIA whether the Project will be extended to the southern side of the Afungi Peninsula.

Mitigation

CDBT is of the opinion that more work and further analysis is urgently required. It remains committed to working with the partners of the proposed Project in order to develop coordinated and effective mitigation strategies for the long term benefit of all concerned stakeholders.

In order for CDBT to be in a position to further its conservation and tourism interests on Rongui and Vamizi Islands it would recommend a mechanism for greater engagement with the Project partners.

This could be achieved by a jointly formulated detailed plan of mitigation measures for the region, along with quarterly meetings during the preliminary phase and monthly meetings during the construction phase. CDBT, along with other key stakeholders, would also ask for advanced warning of any activities taking place.

Yours faithfully,

Duarte Almeida

On Behalf of the Board of CDBT

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

OF THE MOZAMBIQUE LNG PROJECT



IUCN CONSTITUTED REVIEW TEAM

SEPTEMBER 27th 2013

1. SUMMARY:

Following the publication of the Draft Environmental Impact Assessment (EIA) of the LNG Project in Mozambique (August 27th) IUCN, with the support of Irish Aid, constituted a multi-disciplinary team of international and national experts to review and provide comments and feedback on the Draft EIA.

The main purpose of the IUCN facilitated review of the Draft EIA was to help facilitate the use of the EIA as a tool for sustainable development in the LNG sector in Mozambique: providing effective mechanisms for anticipating and minimizing negative impacts as well as anticipating and maximizing potential positive impacts. Some of mechanisms and measures needed to achieve these objectives can be addressed in the final EIA while others can be addressed in follow up and related instruments including but not limited to: Environmental Management Systems; Social Management Systems; Biodiversity Management Systems; Community Investment Plans, etc.

This report provides the initial feedback of the Review Team and is submitted to the Project proponents and the EIA Team on this 27th

Day of September 2013. A comprehensive review of the EIA shall be completed within the next 1 to 2 months.

The EIA review team consisted of the following: Carl Lundin (IUCN, Global Marine and Polar Programme); Joao Sousa (IUCN, Global Marine and Polar Programme); Cosmas Ochieng (IUCN, Eastern and Southern Africa Regional Office, Business and Biodiversity) Regina Cruz (IUCN Mozambique Country Office); Richard Dixon (IUCN Mozambique Country Office); David Obura (CORDIO, East Africa); Melita Samoilys (CORDIO, East Africa); Salomao Bandeira (University of Eduardo Mondlane); Isabel Ferreira (independent consultant, Cabo Delgado); Isabel Da Silva (University Lurio, Cabo Delgado). The team used national Mozambican legislation and international best practices (e.g. IFC Performance Standards) as benchmarks for evaluating the quality and integrity of the Draft EIA. No site visit was undertaken and no stakeholder was consulted during this initial review.

Overall, the EIA is very comprehensive and was professionally executed. Its key strengths lie in tremendous investments in investigate studies; detailed and clear description of the project; a comprehensive administrative framework dealing with all relevant and applicable legislation, policy and planning frameworks; a good description of the biophysical and socio-economic receiving

environments as well as identification of potential impacts and mitigation measures.

Notwithstanding this overall picture, the completeness and quality of the EIA, and its utility as a tool in sustainable development planning and monitoring, could be enhanced through a number of in-depth studies, analysis and clarifications in some areas including most notably:

I. The EIA largely avoids an appropriate and accurate assessment of currents and how they affect all potential impacts. The Draft EIA tends to report average levels over inappropriately long times (e.g. a year so that zero levels during most of the time reduce the averages to acceptable numbers), rather than short term or maximum levels over biologically appropriate times (of weeks to 2 or 3 months). The Draft EIA ignores variability and the importance of extreme events (spring tides, storms, peak monsoon winds) in favour of average conditions.

II. In other words, although the area of implementation is not a bay, like it was proposed as alternative site (area F and G in Palma Bay), the near shore area surrounding the Afungi Peninsula is relatively shallow and will have to endure discharges like : Residues from MEG process (2.200 ton of

salt/day+1600 barrels of hot salty water/day), brine and brackish water, hot water from the LNG process, wastewater from the personnel facilities, run-off waters, biocides, dredged waste among others. The off-shore area will receive mud (oil, water and synthetic based), drill cuttings (these ones will be deposited in the vicinity of canyons, preferable habitat for the coelacanth), among others. How this marine area will respond to these type and quantity of discharges is highly dependent on the ocean currents dynamic of the area related with the weather (by season).

III. There is no quantitative data on coral reef cover, or a species list of key species such as corals and fish. Thus, the information in the EIA cannot be used as a baseline for assessing change in relation to impacts. The coral reef sections are very descriptive, which is good for setting the context, but not for understanding the state and changes in the system. Quantitative baseline data on key habitats and species is needed to detect impacts. (Limiting quantitative assessment to small areas around the gas site does not provide a measure of the relative potential impacts at a Province wide scale). Additionally, there are few key reference locations for returning to investigate specific changes (just the two bommie sites, the other locations are general surveys). To rectify this, the EIA/ESMP might establish

some permanent monitoring stations, adding some stations on either side of the pipeline route particularly on the outer reefs of the two islands. At these sites and the bommie sites, quantitative transects for benthic cover, invertebrates and fish should be run (compatible with surveys in the Mozambique National. Monitoring system, but with additional variables relevant to impact assessment), as well as species lists for key taxa (corals, fish).

IV. The Draft EIA largely avoids assessing hydrocarbon risks: what happens if there is a blowout in the wells/pipelines (perhaps this is not a major threat, but is there an oil fraction? if it is minor, then this should be stated clearly), and b) what happens in case of maritime accidents, oil spills, etc? There is also a need to have a clear waste management fluxogram- where from, what type of waste, how much, for how long? Similarly, there is a clear need of a monitoring programme for dissolved oxygen, salinity, pH, turbidity, pH and other parameters relevant to follow during all the stages of the project.

2. MORE TECHNICAL COMMENTS

Non-Technical Summary

- offshore, no mention of Maritime traffic/pollution/accident impacts
- nearshore, for mangrove/estuary woodland be good to estuarine area to be more specific about what is lot, but its small size relative to overall system
- unplanned events, maritime accidents not considered

2-24 – **Note that the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage,** mentioned on 2/25 under "Archaeology and Cultural Heritage" is also relevant to Natural Heritage, ie. under the heading "Habitats and Biological Diversity"

3-16 – impact magnitude is a function of three variables, but its not clearly stated how these are considered together – is the highest one used? An average across the three? May be important in some impacts.

4-48 and subsequent – this section describes the shipping lanes, turning circles etc that are important for maritime operations, but these are not refered to in subsequent pages of the EIA considering impacts.

4-48 last para "the MPD will be used 'only occasionally' ... for fuelling ..." ... what does this mean? Presumably it will be in continuous use. What frequency of use and size/types of vessels, and what potential impacts associated with refueling and accidents are possible?

4-49 – "providing fire fighting, rescue services and spill response as required" – this is the only mention of spills that I have found so far in the entire document. The only mention of spills in Chapter 11 is with respect to cement spills (11.8.1, 11.8.2), none in relation to fuel/oils/gas.

5-1 and subsequent pages. This alternative section is very important but suffers from lack of quantitative detail for transparency. For example, when were these various exercses and assessments done, and would they. Be any different if done by other specialists? This is not to dispute the findings but a vast amount of subsequent work and the development itself are totally impacted by these findings.

6-7 areas of influence. Thse are very nonspecific descriptions. Are there standards that define the boundary between direct and indirect. Is relatively clear on land, but in the sea the influence of currents are very important. The ADI could extend many 10s of km in downstream directions depending on the issue, eg dredge spoil settlement, oil spills, etc. need quotations of industry standards or if these do not exist specify what is being used in the study.

6-27 and subsequent pages. None of these seascape unit descriptions present any biophysical mechanistic description of these units, nor anything seaward of the beach, though they are shown in the maps to extend into deep waters and include coral reef, sea grasses and other habitats. As a result, the study evades any assessment of the influence of biophysical processes, such as currents, and their importance on assessing environmental impacts. For example, (6-35) states that the western tip of vamizi island is "visually associated with the adjacent headland. If the study acknowledged the hydro-geological process that form the coastline, it would acknowledge a MECHANISTIC association between these two features which would also force it to assess the influence of these same mechanisms (currents and landforms) on environmental impacts of the project. By ignoring these mechanistic processes, the study risks completely missing an entire set of potential impacts that MUST be addressed (downstream risks and impacts).

6-36 - this emphasis sits on Zone of Theoretical Visibility (ZTV) asks why a greater attention is not paid to a similar treatment of downstream effects on the environment, which carry higher impacts

6-41 within the context of the EAME, should also relate findings of the Quirimbass archipelago n the center of diversity for the W and N Indian Ocean (see Obura 2012 PLOS one)

7-1 to 7-2. No description of the oceanography/currents of the region, so the environmental description is not complete. THIS IS FUNDAMENTALLY NECESSARY TO ASSESSING ENVIRONMENTAL IMPACTS.

7-2 the coral reef description is biased towards describing the more stress resistant/hardy Porites dominant reefs close to Palma and not the more diverse and sensitive reefs around and offshore of Rongui and Tecomaji. Why? By contrast, descriptions of the coral reef areas and surveys are quite detailed later in this chapter. Reference to turtles is to their regional scope but in contrast reference to reefs is very locally/inshore biased.

7-3 section 7.3.2 - it would be good to define the nearshore/offshore boundary by approximate depth as well

7-3 last para. Also use Spalding et al 2007 (marine Ecoregions of the world) and Obura 2012 (pos one) to define the regional contet. The coral genera and species numbers are long outdated, use Obura 2012.

7-4 this section on general oceanography is good but needs to inform prior sections (see notes above) and later sections, and needs major subsequent exploration on the currents/oceanography at the project site – ie. the ADI and AII.

7-5 last para. Fig reference should be to fig 7.5. Fig 7.5 presents model results not in situ measurements, so it should be stressed that this does not represent ACTUAL conditions, but a simplified rendition of what MAY occur at the selected point.

7-5 - a section detailing the local hydrography/currents is entirely missing, and it should include both deep (seabed) and shallow inshore components.. This is important for engineering works during construction as well as transport and dispersal of any lighter elements (silt, oil/gas fractions etc)

7-30 "Mesopelagic fish ..." biomass of 5600 tonnes in what unit area/volume?

7-41 – 7-42 – tides and currents may be strongly seasonally impacted by monsoon conditions, currents offshore and the location of the bifurcation of the EACC and MC (see page 7-4) – measurements MUST be done in the principal wind seasons (May – September; Dec – Mar – this was done for waves in 7.7.4, and is even more important to be done for currents) and perhaps associated with tidal ranges following interactions between annual and lunar cycles. No detail is given on what time period the current modeling was done over – the same weeks as the tidal cycles? An annual compilation? What?

7-42, fig. 7.29 – an entire EIA CANNOT be based on a single timepoint/single day without ANY contextual information on how

this day compares with a typical or extreme northeast or southeast monsoon day, tidal level, etc. What happens when the significant wave height offshore is 4 m, as opposed to the selected >1.2 m maximum shown? Or if this occurs at spring high tide vs. spring low tide?

7-43 – discussion on temperature/salinity characteristics is more informatively defined by monsoon (NE vs SE), or summer/winter, not by wet/dry season, which is not so relevant to marine variables (except salinity).

7-45 – 1st para – this mention of the potential for upwellings should be part of the oceanographic presentation earlier, both at the larger level for the N Mozambique coast, and specific oceanography of the study site. These are known to be important farther south on the coast and in relation to eddy dynamics and continental slope topography.

7-57 – sediment transport – the surface morphology of island chains such as the Quirimbas archipelago are partly a result of longshore sediment transport – in this case apparently capping continental

landforms that drop sharply down the continental slope at the outer edges of the islands, and with complex topography cut by the canyons such as in Palma Bay. Thus, the statement that sediment transport is 'small', and that it is predominantly east-west (along the Afungi peninsula) evades the bigger picture. If the data used for this study corresponds to the tidal, current and wave dynamics presented earlier, then it is just a snapshot of what may occur throughout the year, and a full annual cycle for sediment transport on the larger scale of the land- and 3 seascapes needs to be considered. Sediment transport at this scale is indicative of pollutant/hydrocarbon transport, and this MUST be effectively studied and modeled at the project site to assess potential impacts. Without this, the assessment of impacts is fundamentally incomplete (in this sense, it is not even worth reviewing the assessment of impacts).

7-75 – last para - this level of crown of thorns observation is entirely normal. The other features of the sites – low fish density, few branching corals, silty layers no rocks, rubble fields, are more indicative of degradation.

11-0 – the list of impacts considered does not include shipping/maritime incidents such as oil spills and groundings, nor of gas leakage/blowouts.

11-3, fig. 11.2– the baseline needs to be shown in relation to the extents of the fringing reefs and bathymetry, so it is clear where it is exactly

11-4 fig. 11.3, Table 11.1 – it is not clear where the boundary between local and regional is – make this explicit. As is, these descriptions are not explicit enough.

11-7 – 1st para – this HYCOM model is not in fact explained in Chapter 7, the name of the model is only listed in the caption to a figure (7-10). This represents an area of work conducted by the team that has NOT been adequately explained and needs to be for full assessment of the EIA. It appears that modeling was done on dispersal near the seabed, but no use is made of modeling/dispersal assessments at other levels in the water column, nor at the surface (important for oil spills).

11-10 – what are the percentages of the Prosperidade/Mamba and Golfinho Gas Fields do these numbers represent?

11-24 – the offshore assessment does not include any discussion of accidents during operations – ie. blowouts of gas and associated liquid hydrocarbons. Is this not a risk at all? At the same time, it does not assess any impacts from maritime accidents such as collisions, sinking, oil spills, etc.

11-29 – the mean turbidity levels over the period of a year are not very meaningful, as the dredgers will be moving over the extended project site during this time, so low turbidity levels when they are at another point draw down the mean. The important consideration is the maximum turbidity experienced when the dredgers are at a particular location, as well as the instantaneous plume dispersal over e.g. a tidal cycle during the period of operation of the dredger. Analysis should be shown of these events – plume dispersal during neap and spring tides, and during the NE and SE monsoons. This analysis should be informed by HOW LONG can a sensitive receptor (e.g. seagrass, coral reef) be exposed to elevated levels (HOW MUCH) of TSS ... is this on the order of 1 week for xx mg/l, or 1 month. A

frequency distribution of how much of the area fall above/below these thresholds will give a much clearer view of impact.

11-31 – fig. 11.9 is IRRELEVANT to the impact assessment.

11-32 – the graphs for maximum levels should be shown for the same reasons as explained above

11-35 – "Within the ZOMI ..." – this paragraph more accurately depicts what should be presented in this entire section (from 11-29 onwards) – that TSS levels occur for short durations of time (days) that are likely to cause damage to corals/seagrasses. The average graphs over one year are not meaningful for informing the mitigation responses discussed from this point on.

11-36 – top paras – where do these standards over 60 days come from? This response time might be far too slow to have any positive effect on sensitive receptors. Also, the thresholds used – 30 mg TSS for 40/60 days and 100 mg TSS for 40/60 days are not operationally distinguishable (ie. the latter cannot be distinguished from the former until the former is irrelevant) – suggesting confusion in this

part of the EIA. 100 mg TSS for 10/60 days is operationally distinguishable, but then these components on mitigation should be consistent with data presented in figs. 11.9 and 11.10, etc.

11-36, last para – its not clear where this arbitrary recovery time of 7 years is from, and on the next page, it is questionable that impacts from maintenance dredging are so negligible that they may not delay/extend the recovery period. This part of the assessment appears arbitrary.

11-73 – section 11.1.10 – the displayed image shows an extensive sediment plume. So without specific knowledge of how much cutting will be needed at the project site, and without running the current model during different tidal and current phases, this impact cannot be assessed. As above, the recovery time appears arbitrary, and with all these uncertainties reducing a Major to Minor impact appears implausible. Impact should reman major until the speculated studies/measures are tested and shown to work.

11-46 – last para – this focus on Acropora aspera is not sensible, as several species of higher conservation status might be found here of

the > 350 spp that may be found in the ADI. Have a coral taxonomist/marine biologist, but their remit should be much broader than this.

11-48, section 11.13 – 4.1 million m3 of discharge over 1 km2 (1 million m2) is equivalent to 4 m vertical height of sediment deposited within this location. The impact of this will be major and total smothering/mortality of benthic organisms!! This may be acceptable, but it is misleading to claim that the impact is not major, or that it can be mitigated somehow.

11-50 to 11-72 - Sections 11.15-11.23 not yet reviewed.

11-73 – if controls are put in place, these impacts can be reduced as stated. But no consideration is given to fuel/oil spills, and this MUST be assessed across the entire nearshore/offshore project area in relation to modeling of currents, wind and sea conditions.

- Decomissioning/ end of life cycle: could be addressed in more detail than presently.

- Time frame and phasing – there is a clear need to understand the time frame for the project, commissioning, construction, operation, maintenance, shipping, will occur most of the times simultaneously, although it makes sense to separate them into individual categories to address them it's the cumulative impacts that matter. Construction will be phased during the operation and maintenance and "shut-down" will happen every 2 years at least.

- Methanol usage for hydrate formation: how long? how much? Recycled/re-used? Disposal?
- Hidrotesting of pipelines is done with saltwater and anti-corrosion agents, they mention that a plan for disposal of the water will be developed but after they say that the water will be discharged at a depth of 1500 mt. It is also mentioned that the water might be re-used either for hidrotesting the LNG thanks, dust control (salt water being sprayed on land might not be a good idea) or used for making concrete (not a good idea either as the salt crystals will weaken the cement structure and corrode the metal from the structures). Hydrotest is supposed to release contaminated salt water during 11-12 days continuously with a flux of 9500litres/min .

- CO2, H2S and mercury (possible) after being removed by the Acid Gas Removal Unit go to?
- Predicted quantity of gas to be burnt in the flare system?
- Dredged material to be used in construction?
- Abandonment of pipelines after decommissioning?

- There are references like " limited to the short term duration of construction or commissioning", knowing that wells we be drilled either to increase capacity of extraction or to pressurize almost depleted fields during the next years, that the trains will be built along the project and also that the docking platforms will have to be transformed to be able to receive more LNG vessels, we don't understand the concept of "short term duration".
- "reducing speeds if animals are encountered"??? an oil tanker takes 4 to 5,7 miles to stop, we believe that it would make a sense to create a buffer zone for all maritime traffic with really reduced speeds.

From: Peter Bechtel [mailto:bechtelpeterh@yahoo.co.uk]
Sent: Tuesday, September 17, 2013 11:01 PM
To: Kamal Govender
Cc: cosmos.ochieng@iucn.org; Regina.CRUZ@iucn.org
Subject: Follow up to meeting this morning

Dear Kamal,

Thanks much for your attendance at the meeting this morning. It was good to see some willingness to deal with environmental and social issues on the part of an extractive industry and I hope this will translate into real reaction and response and not be just lip service.

In the spirit of the meeting this morning, and in response you your request, I would like to repeat in writing some of the concerns that were raised in the meeting this morning.

1. The time that civil society has to reply to the EIA is very short. An estimated ninety staff were paid to work since 2011 on this EIA, which runs to hundreds of pages. Is it really reasonable to expect Mozambican civil society, who is volunteering their time to give expert opinions on this EIA, to read, absorb, and reply to this massive work in one month? When the 90 plus preparers were paid over many years to write it? I don't think so.

2. The second concern was about the process of resettlement. What mechanisms, safeguards, and processes are in place so that communities to be resettled will have real choices and will not be railroaded nor bullied into agreeing to conditions that will not allow them to continue to maintain or (as the law--Regulamento do Reassentamento-- mandates, improve) their livelihoods status? We discussed various aspects of this today, including prior examples of other companies as well as the importance of process and creating real choices. While I do agree that the IFC guidelines are a good starting point, it is also important for Anadarko to put its commitments in legally binding form within the national legislative framework; there are many precedents of companies being sold and then the buyers do not feel bound by committments made by prior owners. this must be safeguarded against as well.

3. Lastly, why is it that the first thing we must do when investments are made is deprive communities of their land rights? Why not co-opt them into the process by giving shares to the communities and creating a joint venture? Then communities would have an ongoing stake in the venture. The arguement that all the land belongs to the state and so the state becomes the shareholder on their behalf is specious in that according to the IFC guidelines that Anadarko states that it wants to adhere to, the communities are rights holders and additionally their access to resources (land and natural resources) will change under the influence of the project. So please let's have a shareholding for local communities.

Ok thank you, lets hope something good comes of this.

Abracos,

Peter H Bechtel

Comments on the Environmental Impact Assessment of the Mozambique LNG project
Submitted by the United Nations in Mozambique
31 October 2013

The following comments on the draft Environmental Impact Assessment of the Mozambique LNG project were compiled from expertise across UN resident agencies.

Background

In 2013, the United Nations in Mozambique published its "*United Nations Policy Note: Natural Resource Management and Extractive Industries in Mozambique: The Role of the United Nations."* This framework proposes a twofold approach to guide policy and programmatic interventions of the UN system in Mozambique to address the complex issue of natural resource management and the extractive industries. Within the context of the United Nations Development Assistance Framework 2012-2015, (UNDAF), the UN, through its ten resident and twelve non-resident UN agencies, seeks "to reduce poverty and disparities to improve the lives of the most vulnerable people in Mozambique by 2015." As ongoing efforts to achieve this goal in collaboration with Government institutions, civil society and other development partners in the areas of economic and social development and governance continue, the emergence of the extractive industries in Mozambique raises a number of complex and highly interlinked challenges. In applying a human-rights based approach to these challenges, two overarching policy themes emerge: the necessity to (1) minimise social harms and (2) maximise human development through social investments.

A policy priority identified with regard to the reduction of social harms and protection of vulnerable groups is to support the Government to identify, prevent and mitigate social harms, during initial stages and throughout extractive industry presence in Mozambique.[1] Two immediate programmatic interventions directly correlate to this review of the draft EIA: (a) conduct comprehensive vulnerability studies in all provinces to establish a baseline for monitoring the emerging and potential impact of exploration and production activities, with priority focus on Tete and Cabo Delgado and (b) strengthen Government capacity to monitor exploration and production activities, including clear standards for review and ongoing monitoring of social and environmental impact studies.

While the current EIA does refer to social impacts in Chapter 13, Socio-economic Impact Assessment and Mitigation, the United Nations recommends the Mozambican Government consider provisions which require Social Impact Assessments (SIAs) be submitted to Government prior to the granting of any exploration license or concession. Mozambican legislation should specify criteria for undertaking SIAs, particularly with regard to the process of community consultation to ensure they address all relevant rights of affected communities. When undertaken in a participatory manner, SIAs can be

[1] 1 U.N. General Assembly, 17th Session. Human Rights Council. Guiding Principles on Business and Human Rights:Implementi ng the United Nati ons "Protect, Respect and Remedy" Framework (hereinaft er "UN Guiding Principles"). 21 March 2011 (A/HRC/17/31).

valuable tools for community engagement and consultation, especially if community participation in the assessment process can effectively lead to the shaping or re-shaping of community development projects.[2]

General comments

The EIA lacks statistical evidence to substantiate its analyses. The lack of concrete data, projections and estimates, for example, no clear indication of the projected population affected or how assumptions were reached, limits the document to its classifying broad risks into categorical variables (negligible, moderate, medium, high) that disallow an objective evaluation.

Community engagement is not cited in Chapter 13 of the EIA. Given recent experiences from Tete province where meetings with potentially affected communities took place after initial prospecting and exploration licenses were granted to the companies, the EIA displays no evidence of consultations or opinions of affected persons and communities. While the EIA states that the socio-economic impacts associated with the project have been "identified based on research, including the gathering of primary and secondary data, observation and professional judgement,[3]"no references to views of opinion leaders or community members are referenced in the document.

The EIA can be a timely tool to provide community members the opportunity to voice their concerns and recommendations about the government awarding the land to the LNG project. In addition, a process that fully respects human rights should ensure public consultation and participation at all stages of the process, including in the design and implementation of the project, including resettlement. Participation should not be restricted to public hearings, but coupled with other forms of dialogue, including individual and small group consultations, with dedicated measures that facilitate the participation of groups that may face specific impacts or that are marginalized such as women, children, the elderly, people with disabilities, and minorities.
The EIA neither gives adequate attention to vulnerable groups, such as women, children, the elderly, migrants, among others, who will likely be disproportionately affected by social harms nor to special measures required to reduce this disproportionate effect. The mainstreaming of gender equality, for example, could be illustrated by highlighting the equality of opportunity for both women and men during recruitment and training for employment opportunities, including those generated by the LNG project and affiliated businesses.

The Government of Mozambique's draft Corporate Social responsibility Policy for Mineral Resource Extraction Industry in Mozambique includes issues of consultation and community engagement, gender mainstreaming, attention to vulnerable groups and transparency. Cross-referencing these elements to the current draft EIA would strengthen coherence between the two documents.

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[2] SOCIAL IMPACT ASSSESSMENT: A Manual for Mining Projects, Resource Management in Asia-Pacific Program, Australian National University, 2008

[3] Anadarko draft EIA, Chapter 13, Socio-economic Impact Assessment and Mitigation, page 13-1.

For the purposes of this comment, we will not address resettlement specifically as we understand that comments on the draft resettlement plan are not linked to the 31 October deadline of the EIA as resettlement will be reviewed separately.

Sector specific comments

Project-Induced In-Migration (PIIM)

While the EIA contains good qualitative/theoretical data linked to PIIM, it fails to provide an estimate of the predicted scale (numbers and type) of in-migration or detail of what is actually planned. For example, estimates of: the number of formal labour migrants needed to support LNG operations and its direct contractors (construction/ engineering /transportation/catering,et al), especially if third-country nationals, at the different stages of roll-out and of other in-migrants, informal and formal, is required.

The EIA does not address the demographics of these potential labour migrants and related potential impacts. While it mentions how demographic changes may increase the pressures on already scarcely available public infrastructure and services, it fails to mention impacts on communities, particularly as kin groups are dispersed and cultural identity and traditional authority systems are diminished or lost. Given this expected impact on public services, the EIA does not present a plan to mitigate this impact on public services through additional service provision.

The EIA lacks information on plans for accommodation, social services, other 'soft' services e.g. entertainment and provides no information on the contractual status or the possibility of migrants living with their families.

For expatriate in-migrants, a pre-departure cultural orientation programme should be considered.

The EIA lacks a plan for community stabilization to mitigate potential tensions linked to formal and informal in-migration. As seen in Tete and other rapid industrialization and extractives sites in the region, stabilization plans and programmes when developed with participation from host communities may help mitigate tensions including xenophobia /violence.

In section 13.4, Project Design and Facilities Access, four recommendations relate to operating "closed camps" in an attempt to limit the movement of employees and contractors and prevent direct interaction between the communities and the project workforce. This is extremely problematic and unlikely to be effective in that: it is essentially impossible to prevent interaction with local communities; limiting such interaction risks making any interaction more clandestine and thus potentially more dangerous; and it is likely to increase tensions with the community.

Working with communities to implement Social Change Communications programmes to discuss changes that are happening/are likely to happen/are perceived to be happening is

critical. The key to managing this change is working from the community side to determine emerging concerns and how those could be mitigated (e.g. though community support programmes, opportunities for employment from the community, establishing better services for community members, etc).

The EIA does not reference the project site as a mixed migration route of Ethiopians and Somalis from the Horn of Africa. In 2011, thousands of stranded migrants arrived to this area by boat from Kenya. A contingency plan to address this is required.

Water

Number of users per water source has to follow GoM minimum service levels.
Levels of service envisaged in host sites unclear "at least the same access to basic services" (p.13-30). has to be minimum GoM levels.

Drainage is not mentioned and is critical to include as stagnant water increases the risk of vector-based diseasees. (13-30)

Water management programmes mentioned as project mitigation do not adequately describe responsibilities/plans for the decommisioning phase, specifically to ensure the entire site clean-up process. (13-31)

Sanitation facilities are not mentioned with regard to the worker accommodation camp. (13-31)

Nutrition

Consultations and mitigation measures with affected communities (resettled communities, neighboring communities as well as communities hosting resettled communities) should be ongoing and not a one-off activity (as suggested by chapter 13, page 8 on compensation of crops which might be extended to the ´near-term crop cycles´).

The proposed nutritional baseline study should focus on the nutritional impact in the first 1000 days of life, consequently, the target groups should be adolescent girls, women of reproductive age, pregnant and lactating women and children younger than two years. This study should be coordinated with other on-going and planned studies in the province (e.g. the WFP and World Bank nutrition programmes)

Mitigation measures for food security and nutrition should incorporate nutrition in the agricultural specific interventions, such as promoting production and consumption of nutritious crops instead of focusing on increasing yields.

With regard to the RHMIS, mentioned in chapter 13 page 43 is presumably the Regional Health Management Information System. It is critical to ensure capacity building support

to existing systems rather than the creation of a parallel system where government health staff is used to collect additional data for the Project.

Social health determinants

While the population potentially affected by the "project" is indicated as approximately 2.700 residents, the EIA does not present any clear projection on the expected influx of migrants to the area. In absence of clear population and epidemiological data of the area, it is difficult to assess the potential impact of this "project" on population health.

Any investment envisaged to enhance health service delivery in the area must be based on population needs, and designed according to the government policies and protocols, with a view of strengthening the local health system that is in place to provide access to an essential package of health services for the population.

Instead, the document does not clarify whether the intention of the investors is to set up a (semi) parallel, private system and to which extent. This should be made clear, since a first class ad hoc system in the area may create inequities and attract demand from the neighboring areas.

We may expect that migration and occupational hazards will be risk factors that may require particular attention as they will create direct (eg. injuries) and indirect (eg. HIV/AIDS) additional burdens on the health system. The mitigation plan should spell more clearly how these risks will be tackled.

The EIA refers to the risk of introducing new diseases in the project area, such as dengue, without any supporting evidence of the actual risks. As this may potentially have a large scale public health impact, it requires further investigation.

Government Revenue

In relation to the economic and revenues impact of the LNG project, the study identifies most of the possible source of revenues and the multifaceted/interlinked economic opportunities that are likely to rise at the local/regional and national level. This analysis is rather candid and clearly states that the overall impact on employment and the economy (revenues apart) will depend very much on the enhancing measures and policies needed to put in place to spur employment and local economic development. Failure to do so will translate in a very limited impact.

Whereas the EIA provides an exhaustive list of possible sources of revenues and correctly identifies the different economic impacts/links that this project can create/trigger, it does not say how the project intends to address and maximize these impacts but for two forthcoming studies: (i) a revenue management study that, besides providing a more comprehensive understanding of the Mozambican economy, will encourage accountability and revenue distribution at provincial/district level using the EITI as a starting point and working alongside government, NGO and donors

community; and (ii) a national content strategy which will detail employment, training and supplier development initiatives (local content/procurement) and set the objectives as well as the concrete activities planned by the project in these critical areas.

The following principles stated in the study are worth underlining:

- all project initiatives/activities will be done on the basis of provincial and district-level development plans.
- The strategy on National Content Strategy is expected to be aligned with the government economic development/education and employment objectives.
- The project will discourage any use of local recruitment office/agency and instead will work directly with the district-level government to develop a local workforce database for training and employment opportunities to prioritize local communities.
- The project will create a "Grievance Mechanism" to address community grievances around local employment and procurement. The study does not say yet how this mechanism would function.

Supply chain

The chapter is well structured and addresses relevant issues and challenges but without tangible proportions or substantive mitigation considerations.

Reference is made (13.6.2) to the challenging situation of about 80% of the population not having any level of formal education. In spite of that the project expects to gradually train and absorb local low skilled labor, but does not indicate in which proportion.

With respect to the procurement of local goods and services (13.6.3) the project acknowledges the national local content strategy as a framework to abide by, but does not provide substantive clues as to where in the LNG value chain, or which other value chains could become the entry points for that.

Upon considering the unmet community expectations for employment and procurement opportunities (13.6.4), this document overlooks the scale, impact and risk of this reality. i.e. not addressing such expectations, particularly with respect to employment creation, can become a permanent source of unrest and criminality.

While the EIA acknowledges economic diversification as a potential result of the project operations in the district, it does not indicate how this investment could actively exert its catalytic role as an incentive or magnet for making viable (subsequent) infrastructure and business development projects.

EIS Phase: A summary of comments received following the meetings is found in the table below, as well as respective responses.

ID	Name, Organisation	Received	Comment	Response
1	Peter Bechtel (Civil Society)	By email, dated 17 September 2013	The time that civil society has to respond to the EIA is very short.	The comment period has been extended to 31 October 2013.
2	Peter Bechtel (Civil Society)	By email, dated 17 September 2013	What mechanisms, safeguards, and processes are in place so that communities to be resettled will have real choices and will not be railroaded nor bullied into agreeing to conditions that will not allow them to continue to maintain or (as the Resettlement Regulations mandates, improve) their livelihoods status? We discussed various aspects of this today, including previous examples of other companies, the importance of process and creating real choices. While I do agree that the IFC guidelines are a good starting point, it is also important that AMA1 makes its commitments legally binding within the national legislative framework. There are many precedents of companies being sold and then the buyers do not feel bound by commitments made by prior owners. This must be safeguarded against as well.	The resettlement process will be closely monitored and approved by Government and will be compliant with International Finance Corporation (IFC) Performance Standard 5. As such, the process will include a number of safeguards that will ensure an adequate level of protection for the interests of economically and physically displaced people. As to the selection of the host area, the process (like all of the resettlement-related processes) will be consultative, and communities will be able to express their preferences. Once approved by Government, the Resettlement Action Plan (RAP) will become a legally binding document, which will be enforced by the Government.
3	Peter Bechtel (Civil Society)	By email, dated 17 September 2013	Why is it that the first thing we must do when investments are made is deprive communities of their land rights? Why not co-opt them into the process by giving shares to the communities and creating a joint venture? Then communities would have an ongoing stake in the project. The argument that all the land belongs to the state and therefore the state becomes the shareholder on their behalf is specious. According to the IFC guidelines that AMA1 states that it wants to adhere to, the communities hold rights and additionally their access to resources (land and natural resources) will change as a result of the project. So please let's create a share hold for local communities.	The Project is adhering Mozambique legal requirements on issues related to land concession titles and project licensing (eg the Petroleum Law and Environmental Impact assessment Regulations). Similarly, the Project is aware of the potential impacts of the project on communities, particularly of the changes on access to land and natural resources. These impacts will be thoroughly assessed during the Resettlement Process. Appropriate measures to restore and uplift communities' economic, social and environmental conditions will be devised, agreed with communities and sanctioned by the Government and by the Civil Society.

ID	Name, Organisation	Received	Comment	Response
4	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	Include, along with the calculation of the project's carbon emissions, measures to compensate them (in accordance with the legal obligations of the Mozambican state, according to the United Nations Treaty on Climate Change, ratified by Resolution No. 1/94 of 24 August). The EIA Report does not mention compensation measures for these emissions, an impact considered Major, even after all of the recommended mitigation measures.	There is no methodology or appropriate good international industry practice that provides for compensation of GHG emissions nor does .Mozambique currently impose a carbon tax on developments. Rather the focus is on appropriate mitigation. In this case, the project's proposed mitigation is listed in Chapter 12 of the EIA Report. In addition.
5	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	Include monitoring studies on climate change in the EIA Report at three levels: a. Project Level (impact from rising sea levels, extreme events (cyclones, storms, floods, etc.) in the area chosen for the project. I did not find these scenarios in the project. b. Community Level – Likely and envisioned impacts from climate change in the areas selected for community resettlement must be taken into consideration. c. EMP contribution level to basic science on climate change in the country – installation of sensors to measure sea level, weather stations, etc. (Note that at this time there is a paucity of data on this subject, limiting possible projections as well as measures that could potentially be taken). I suggest getting in touch with the National Institute for Disaster Management (INGC) on this matter.	a. The project has been designed to accommodate potential future sea level rise and impacts from extreme events (eg cyclones, storms, floods, etc.) Extreme events will be monitored and recorded as these have implications for the safety of the Project. b. A variety of factors will influence the location of the host site(s) and safety/ security of the site will be one of the key factors considered. c. Data from meteorological and oceanographic stations can be shared with government.
6	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	Must identify large gaps in knowledge that will require long-term studies to be closed, following the obligations in Chapter VIII of Ministerial Diploma (MICOA) No. 129/2006 of 19 July, the General Directive for Environmental Impact Studies (Note that this Diploma is not mentioned in Chapter 2 on the Legal Framework in Mozambique...). These studies could be on biodiversity, for example, marine mammals (numbers, migratory routes, feeding areas, etc.) as well as social aspects (fish catches and other marine resources that are poorly studied and little-known at this time). The Environmental Management Plan (EMP) should propose the implementation of these long-term studies, with the results to influence the development of the EMP itself, as well as the	The ESMP does indeed refer to additional plans that will be developed. These plans will be informed by studies undertaken in the EIA as well as studies that will further elaborate on the EIA studies. For example, a biodiversity study is ongoing that builds on the ecological baseline in the EIA. The outcome of this biodiversity study will be a biodiversity strategy and action plan. Reference to the biodiversity studies and further fisheries studies have been added to the ESMP table in Annex D. Assumptions and/ or limitations of the various studies have been included in Annex C which describes the specialist study methodologies.

ID	Name, Organisation	Received	Comment	Response
			compensation plans, if needed. There appears to have been no compliance with the diploma. Note: Chapter VIII of Ministerial Diploma (MICOA) No. 129/2006 of 19 July indicates: "Gaps in knowledge encountered during preparation of the EIS must be defined at the following levels: a. Stress the impacts that are not susceptible to mitigation due to technical-economic inadequacy in the current state of knowledge; b. Identify determining impacts whose quantification and characterization is scarce or insufficient – whether for non-existence or due to a lack of information; c. Define areas of priority for scientific and technological investigation, based on the gaps identified in the foregoing lines; d. Evaluate the information circuits and the ease or difficulty with which information reaches the users; indicate ways of improving the administrative and information system; e. Propose terms of reference for studies and additional work with a view toward solving the most critical shortcomings among those mentioned above."	It should be noted that the EIA did not identify any significant gap in knowledge that would hinder decision-making. The level of information in the EIA Report meets the requirements for sound decision-making in accordance with the Mozambican law and Environmental Regulations. a. There were no impacts that could not be mitigated due to inadequacy of knowledge. b. By and large, there were no impacts that could not be adequately characterized. The cumulative impact assessment section (Chapter 15) is by nature based on little information on future projects – this is made explicit in Chapter 15. c. No significant gaps were identified that prevent decision-making. However further studies will be undertaken by the project in order to proactively manage their environmental and social responsibilities (eg biodiversity studies, resettlement studies). d. The primary mechanism for communicating information during the EIA was via public meetings. This format has worked well. e. None required for this EIA. Furthermore, Section 3.8 of the EIA Report identified gaps and uncertainties encountered during the EIA process.
7	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	Assess the residual impact of the project at the end of the EIA in order to facilitate calculation of the biodiversity offset, in line with the Equator Principles and the IFC Performance Standards (specifically Performance Standard 6). The residual impact at this point of the EIA is not quantified. If there are still scientific doubts or studies required to quantify the impact, these should be identified in the survey plan, and publication of this information must form part of the EMP. The commitment of ensuring no net loss of biodiversity must be committed to in the EMP.	In line with the IFC Performance Standard 6, further biodiversity studies are ongoing to clarify the need for, and/ or the development of a biodiversity offset. Reference to this has been included in the ESMP in Annex D. A Biodiversity Strategy and Action Plan will be the outcome of the current biodiversity studies.

ID	Name, Organisation	Received	Comment	Response
8	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	On the social side, national experiences show that creation of social foundations by the company is practical and assists in the implementation of social programs and commitments. These are endowed with capital that is independent of the company, but guaranteeing the implementation of the company's commitments toward the community. The mechanisms for social commitments should be identified in the EMP if possible.	The Project will describe and commit to the mechanisms through which it will develop and implement social programmes in a Community Investment Plan (CIP) and a Community Health Management Plan (CHMP). These plans will form part of the Project's Environmental and Social Management System (ESMS). Refer to Chapter 17. Beneficiary communities of the CIP include both directly and indirectly affected communities in the project area, who will participate in defining, developing and implementing the best community investment programs to address their needs. The CIP will be comprised of projects that are collectively based on best practice implementation and aimed at sustainable community development. Specific programmes will be aligned with Government strategies and development objectives, and consistent with the Project's business objectives. While not working through a 'foundation', the CIP's will be designed and implemented by international and national NGO's and organizations in collaboration with the Project's Community Investment team. The CIP complements the Project's Social Investment Strategy that has three investment themes: health, education and environment. The Social Investment Strategy provides the vehicle for AMA1 to implement Corporate Social Responsibility (CSR) initiatives for the Mozambique Gas Development Project. The Social Investment Strategy will focus on identifying opportunities for Project related benefits outside of Palma District, in Cabo Delgado Province and more generally in Mozambique.

ID	Name, Organisation	Received	Comment	Response
9	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	Ensure that all specialist studies are made public, so that they can be used by all participants and relevant academics, beyond the scope of the EIA, to contribute to the availability of information in the area studied.	Key findings and/or summaries of specialist studies have been integrated directly into the EIA Report (refer to Chapters 6 to 9, 10 to 13, and Annexes C and G). In addition, standalone specialist studies are available on request. These reports are available in English.
10	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	A permanent mechanism for monitoring the implementation of the commitments made – whether social or environmental, including publication of all documentation on compliance and adopted by the EMP – should be created. This commitment should be in writing and included in the EMP to be approved. a. I suggest that a Technical Follow-Up Council be created, and it will later select a professional company that will come to audit the implementation of the EMP with the national authorities, whenever possible. The reports of this audit must be public, regardless of the results. b. The Proponent must assume the burden of the Council's operation and the auditors. c. Note: Equator Principle 7 (allegedly to be followed by the Proponent) stipulates the need for independent review.	The Project will plan, implement, assess, and improve the various management measures as part of an ESMS. Refer to Chapter 17. This system will be the mechanism for monitoring compliance and updating the management measures wherever required. The results of auditing undertaken by the independent external auditors will be regularly communicated to stakeholders. a. Implementation of the ESMP will be audited by independent external auditors (for the duration of the loan) and by the Project during the life of the project. b. The project will follow MICOA's guidance on the need for such a council. c. As per point (a) noted above, there will be independent auditing of compliance.
11	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	The Proponent promises in its public consultations that it will have external audits based on the Equator Principles and on the IFC Performance Guidelines, and that the reports of these audits will be public. This commitment must also be made by the Proponent in writing and included in the EMP to be approved, so that MICOA and other national entities will have a national legal base for demanding compliance, even if in the future the project should find other sources of finance without these requirements, or departed, selling its entirety to a third party that does not share the same values.	Reports from the external, independent audits will be made publically available. This commitment has been added; please refer to Section 17.4 of the EIA Report.

ID	Name, Organisation	Received	Comment	Response
12	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	A permanent mechanism for dialogue with communities and civil society throughout the duration of the project (20-40 years!) should be proposed: a. This is not a short-term project, and the mechanisms forecasted in the EIA process will not suffice for continuous consultation with the communities, local authorities and civil society. b. Therefore, it must be a flexible mechanism with a permanent leadership structure. One could think perhaps in a sort of standing committee with participatory management that could help not only in listening to the flow of information, but could also contribute ideas and suggestions for social action, etc. Committees and several levels may possibly be required (district, provincial, national) with various participants, in order to maximize participation.	The Project recognizes the important role of on-going, meaningful, transparent dialogue with a wide range of stakeholders, including directly and indirectly affected communities, civil society, the Government of Mozambique at different levels, the media, business and industry, development agencies, and other interested parties, about the Project and the various components, impacts, opportunities and challenges it contains. Therefore, as part of the ESMS, the Project has developed a Stakeholder Engagement Plan (SEP), implemented by the Project Stakeholder Engagement team and various other Project functions (Government Affairs, External Affairs, Commercial Affairs, Management teams, Community Relations team, etc). The SEP sets out the goals and vision for long-term constructive Project-stakeholder relationships, mapping and providing analysis of the various stakeholders and their interests, as well as methods and tools for facilitating constructive dialogue with each of the various interested and affected stakeholders. While the SEP provides strategic objectives for on-going engagement, the Project realizes that stakeholder interests, information and consultation needs change over time. In that regard, the SEP is considered a dynamic document that will be updated during the various stages of the Project. The Project Stakeholder Engagement Team is aware that a responsive, multi-level and multi-layered engagement strategy, supported by a robust information-sharing system, is vital to ensure transparent, culturally appropriate and reciprocal Project-stakeholder relationships throughout the life of the Project. As part of implementing the SEP, the Project has already established various project-specific mechanisms of engagement with different stakeholder groups at National, Provincial and District level. Please refer to the Project SEP for more detail regarding the various mechanisms. With specific reference to meaningful and participatory community

ID	Name, Organisation	Received	Comment	Response
				engagement, the Project Community Relations team maintains on-going consultation with communities, using culturally appropriate engagement mechanisms. In addition to establishing project-specific dialogue forums for the duration of the Project, the Project is pro-actively participating in the already established civil society platform for the extractive industry, as well as with several other sector-specific forums and platforms.
13	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	At the same time, a social mechanism should be proposed for corporate social responsibility (CSR) and the social actions developed in the context of social funds currently channeled through the NPOs. The committees envisioned above could help in that. This is an opportunity to improve the process for all operators in the country.	The Project recognizes the importance of coordination among operators and donor and development agencies regarding the focus, development and implementation mechanisms of CSR initiatives, and that these should collectively be aligned with Government of Mozambique's development strategies and plans at various levels (eg National, Provincial and District), as well as with the newly drafted MIREM CSR policy.
14	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	As always, it will be essential that the EMP includes a mechanism to appreciate and evaluate real impact in real time throughout the implementation of the project. There will have to be a team on the ground (preferably a multi-disciplinary team) to audit these aspects. This team could possibly report to the committee proposed above in regard to auditing, availability of information on the results and dialogue on matters to be framed within the perspective of transparency, permanent dialogue and responsibility in regard to the business defended by the Company.	This will be done as part of the ESMS for the project. Where the proposed mitigation measure does not achieve the desired outcome (in terms of reducing or managing impacts) then new measures may be required. Results of independent audits will be reported to the project, to MICOA and will be included in the quarterly communications to stakeholders.

ID	Name, Organisation	Received	Comment	Response
15	Sean Nazerali (Independent Consultant)	By email, dated 20 September 2013	It was suggested during the EPDA process (Scoping Phase) that the various studies made within the scope of the EIA should be published and discussed as they are completed, in order to gather contributions from Interested and Affected Parties (I&APs) that may contribute toward enriching the final version of the study. I do not know why this was not done. In general, these issues should be included as much as possible within the EMP, given that it is a binding document for the project, regardless of who the owner of the project is or who leads the company. Unfortunately, there are many examples of commitments made by the original proponents of a given project which after its sale, or their transfer to another company, are no longer honoured by the new owners.	The studies within the scope of the EIA are all integrated into the EIA Report. No study undertaken as part of the EIA has been excluded. Also refer to Response ID9 above. The issue of complying with commitments made in the EIA is taken seriously. The ESMS described in Chapter 17 provides the framework within which planning, implementation, assessment, and improvement will occur.
16	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	CDBT would like to formally state its concerns about the likely impact that the proposed Project will have upon its conservation assets and the region. Rongui Island will suffer a negative visual impact from the shipping activity in Palma Bay and from light and visual pollution produced by the mainland facilities. CDBT has serious concerns about the level of coral reef destruction expected during the laying of pipeline between Rongui and Tecomaji islands and the effects of the silt plume on the surrounding reefs. CDBT also has serious concerns about the effects of an increased amount of sewage from the Village of Palma and water, warmed by its use to cool the gas in the cooling system, being ejected into the sea. The combined effects will jeopardize the future of Rongui as a tourism-driven community and conservation project. The result for CDBT will be a loss of real estate revenue derived from the development and sale of private houses as per the business model and a loss of future tourism caused by potential coral depletion, disruption to the marine environment and visual pollution.	These concerns are noted. Visual impacts, impacts on coral, and impacts of discharges into the bay are addressed in the EIA (Chapter 11 and 12 respectively). It should be noted however that there will be no hot water discharge into the bay from the Project. The gas generators will be air-cooled and as such there will be no heated water. Impacts on tourism are discussed in Section 13.3.

ID	Name, Organisation	Received	Comment	Response
17	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	Cetacean habit and behavior will inevitably be adversely affected by noise disruption. This will manifest itself in social disruption, stress related physiological damage, loss of hearing and, ultimately, a decreased population caused by disorientation, area avoidance, cessation of feeding and higher mortality rates.	Noise impacts on whales, dolphins and other marine organisms are assessed in Section 11.17. It was noted that without mitigation there could be Moderate significant impacts to these species (for example: from pile driving). Effects of this activity may be felt in the vicinity (within 100m of pile driving) of the noise source. The mitigation entails a "soft start" to allow whales and dolphins (should they be in the area) to move safely away. Physiological damage, loss of hearing, and decreased population due to disorientation, cessation of feeding and higher mortality have not been predicted by the marine specialist. There will be monitoring of marine mammals through the construction and operational phases of the project.
18	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	Vamizi Island Lodge and Private Villas will suffer a negative visual impact from the project, predominantly through light pollution. There will be socioeconomic impacts upon the island´s community as the movement of people, displaced by the Project and moved from the Afungi Peninsula to Olumbe, will result in an increased island population and increased fishing in the vicinity of Vamizi. This will have a direct impact upon the reefs through overfishing. It is also expected that the price of fish will rise due to a greater demand in Palma. The cumulative effect could be a strain on the natural resources that attract tourists to this region. Vamizi´s image as a remote wilderness will be put into question and the sustainability of the business model will be at risk. The Project´s effects, among other things, CDBT´s ability to sell private houses to international investors, many of whom are reluctant to invest until the real impact of the Project is understood. This is already delaying the execution of CDBT´s plan.	The visual impact from Vamizi is expected to be Negligible to Minor due to the distance from the project site (refer to Section 12.5.7). The host site for resettled communities has not yet been determined and hence the prediction of impacts at Olumbe is premature at this stage. The host site will be subject to a separate Simplified Environmental Impact Assessment process. From the marine baseline studies undertaken it is apparent that over fishing is already taking place. This is evident from the type of catch recorded and observations in the field. There is already a strain on natural resources. The project will be monitoring purchases for signs of increasing fish prices – the project wants to avoid making it too difficult or expensive for local communities to purchase fish. The comment regarding the CDBT business plan is noted. Impacts on potential future tourism are assessed in Section 13.3. The EIA provides relevant information on positive and negative, biophysical and socio-economic, direct, indirect, cumulative, and unplanned/ non-routine

ID	Name, Organisation	Received	Comment	Response
				impacts.
19	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	The overall investment of the Project must benefit the region as a whole. There must be wide-reaching positive benefits from the short-term extraction of gas to protect the assets that will ensure long term tourism interest in the region. This is what CDBT has been instrumental in building and CDBT urge the government and the partners in the Project to recognize the importance of this approach.	Benefits are expected from the local level (infrastructure, training, employment, etc) to the national level (contribution to GDP, taxes, etc).
20	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	The EIA does not make clear the cumulative effects of the noise and disruption around Palma Bay on the marine mammal population. Similarly, the plans for the mitigation of coral damage are neither complete nor clear. A marine conservation plan for the coral reefs, seagrass beds and marine mammal population of the entire area does not exist and is urgently needed.	Section 11.17 of the EIA describes the impacts of noise on marine mammals in Palma Bay. Impacts of noise and other general disturbances in the deep water offshore are also assessed –see Section 11.7. There are biodiversity studies currently being undertaken which include additional quantitative marine baseline surveys. The outcomes of the biodiversity studies will be a Biodiversity Strategy and Action Plan and detailed, comprehensive biodiversity monitoring plans.
21	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	It is also not clear from the EIA whether the Project will be extended to the southern side of the Afungi Peninsula.	To date, the Project has only been granted access to the area defined in the EIA, which does not include the south side of Afungi Peninsula.

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22	Duarte Almeida (CDBT – Cabo Delgado Biodiversity and Tourism)	By email, dated 25 September 2013	CDBT is of the opinion that more work and further analysis is urgently required. It remains committed to working with the partners of the proposed Project in order to develop coordinated and effective mitigation strategies for the long term benefit of all concerned stakeholders. In order for CDBT to be in a position to further its conservation and tourism interests on Rongui and Vamizi Islands it would recommend a mechanism for greater engagement with the Project partners. This could be achieved by a jointly formulated detailed plan of mitigation measures for the region, along with quarterly meetings during the preliminary phase and monthly meetings during the construction phase. CDBT, along with other key stakeholders, would also ask for advanced warning of any activities taking place.	The Project, like the CDBT, is committed to collaborate in order to develop coordinated and effective mitigation strategies for the long-term benefit of all concerned stakeholders. In early 2014, the Project will have a dedicated focal point to maintain weekly contact with CDBT and CDTUR (Association of Hotel and Tour Operators of Cabo Delgado) and other tourism operators in the Project area. The dedicated tourism-and-biodiversity sector focal point will convene quarterly scheduled focus group meetings during which updated information from the offshore Engineering Procurement and Construction (EPC) about its activities and scheduling of these activities will be communicated. In the periods between the quarterly meetings, the Stakeholder Engagement team, in collaboration with the EPC contractor and sub-contractors, will make sure information on construction activities that may impact biodiversity and tourist activities in Cabo Delgado is communicated through the dedicated tourism-and-biodiversity sector focal point.
23	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	The Ministry of Fisheries would like to convey to the supervising sector an objective assurance that whenever possible, any project activity will cause a minimum of disturbance to fishing resources and habitats. In order for this to happen, the report must address the impact on fishing in greater depth, as well as the respective projections, within a reasonable amount of time and not in the present generic manner. Without any absolute certainty about the real aspects associated with the project, due to the current absence of detailed information, it would be important that in addition to describing the fishing resources, all fisheries should also be described by the type of fishing that exists in the area for proper evaluation, monitoring and establishment of impact mitigation programs where necessary. The vessel monitoring system via satellite, currently used by the National Fisheries Administration (ADNAP) is an element to consider for this purpose.	The impacts to fish were predicted based on the total area of habitat affected. Impacts were assessed in relation to construction activities at a local scale, particularly in the area of Palma Bay adjacent to Afungi Peninsula. The affected area corresponds to nearly 10% of the total area of the bay. This area comprises seagrass which is also dispersed throughout the bay, along with coral communities. The construction activities will result in disturbance where coral will be indirectly affected by the activities, and in some cases loss of coral habitat. The study did not establish the distribution of fish throughout the area, but focused on the substrate component rather than on the fish themselves. Impacts on marine ecology are assessed in details in Chapter 11 and Section 13.2.4 addresses impact on fishing.

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				Fishing practices are described on Section 9.7.6 (Cabo Delgado Province) and 9.14.3 (Palma District, Afungi Project Site and surrounds). However, it is acknowledged that there is a need to understand fishing practices and impacts in greater detail – this is being done as part of the resettlement process. Studies are being undertaken to understand the catches, where people fish, and to determine how best to mitigate impacts arising from resettlement. Even where people are not being physically resettled, they may be economically resettled due to loss or access or restricted access to fishing areas. These impacts and mitigation measures will also be included in the resettlement study. The recommendation to use the National Fisheries Administration's vessel monitoring system will be passed on to the Project resettlement team.
24	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	For the evaluation of impact on commercial fishing, we suggest taking into consideration the Strategic Development Plan for Tuna Fisheries, approved on July 2013 in the 22nd Ordinary Session of the Council of Ministers.	The referenced plan has been reviewed and taken into consideration. Refer to Section 13.7.2.
25	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	Decree 71/2011 of 30 December, which determine those areas which are potentially conducive toward the development of marine aquaculture and the increase of fish production, delineates a part of the Palma District (Annex A.1 of the Decree) as a Marine Aquaculture Area for the cultivation of seaweed, yet the report makes no reference at any time to this fact, or to the impact in that scope.	The referenced decree has been included in Chapters 2 and 9 and the potential impact has been addressed in Section 13.
26	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	The resettlement of artisanal fishermen in other fishing areas must represent an integrated, long-term strategy that takes annual migrations into consideration.	This will be taken into consideration during the resettlement process.

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27	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	Interaction between the Project and the different participants/agencies of the Fishing sector's institutions is sidelined. The Project must finance specific monitoring programs of marine fishermen and the unloading of fish where the Fishing sector must perform part of the process. This extends to environmental education projects that involve fishermen. To this end, the actions to be undertaken must be framed within the sectorial strategies and policies defined for the planning of fisheries, fishing infrastructures and the development of aquaculture.	Impacts on fisheries are still being studied and mitigation measures will be included as part of the RAP. In addition, this comment will be considered by AMA1 and eni for inclusion in the Project's Social Investment Strategy.
28	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	In mitigation measures for commercial fishing (damage of fishing gear), the project must also interact with the National Fisheries Administration (agency responsible for implementing the commercial and licensing agreements of the fleet).	A paragraph has been added to Section 13.7.2 to address this concern.
29	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	In the *Evaluation of Socioeconomic Impact and Mitigation*: It must be apparent that the Project will cooperate with the National Fisheries Administration toward establishing Claim Procedures (claims related to fishing activities)	The necessary changes to Chapter 13 to address this comment, where relevant, have been made.
30	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	Dealing with highly migratory resources that occur seasonally, what guarantee is there that the residual impact will be negligible?	The impact on marine-based livelihoods (which includes impact on fishing) is Moderate, after mitigation. All impact assessments are based on field studies, professional expertise, and experience from other similar projects. To verify the results of the impact assessment, the project will monitor to ascertain whether the mitigation measures are achieving the desired outcome. If not, the mitigation measures will be improved or corrected in agreement with MICOA to achieve the desired outcome, wherever possible.
31	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	Social responsibility – Conditions must be created to allow the introduction of specific support programs for affected/resettled fishermen during the course of the project, for example: literacy for fishermen, motorizing of vessels that engage in offshore fishing, creation of water parks in the development of aquaculture, introduction of fish-aggregating devices, cultivation of aquatic species such as fish, algae and	The Project is currently undertaking a fisheries study. The survey includes data collection of fish catches, fishing areas, vessel types, vessel movement data, value chain studies and gender studies. The results from these surveys will be used to inform a detailed Fisheries Livelihood Restoration Programme (FLRP), which will be integrated into the RAP when this is submitted to the Government of Mozambique for

ID	Name, Organisation	Received	Comment	Response
			crustaceans, among others.	approval. The FLRP will set out proposals for support programmes, aimed specifically at directly affected communities. The Community Investment Programme (CIP) will also identify and provide support for local communities over a broader base, which will include those communities reliant on fishing as their primary livelihood strategy.
32	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	In *Annex G* – Supporting Material for Defining the Situation of Reference: Include description of the fisheries.	The fisheries baseline is described in various sections in Chapter 9 and in Annex G of the EIA Report. In addition, the strategy for tuna fisheries has been included in Annex G and included text on the strategy for tuna fisheries and the aquaculture reserves in Chapter 9.
33	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	In Annex G - Legal Framework and Strategies of the Fisheries Sector – The classification of fishing is incorrect and other categories are missing (Article 3 of Law Number 3/90 of September 26, Fisheries Law)	The classification has been revised.
34	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 26th September 2013	*Annex H* – Emergency Response Plan: With regards to agencies to be notified in emergency situations, include Fisheries (ADNAP) when interruptions to fishing operations are necessary.	The plan has been amended to address this comment.
35	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 24th October 2013	The LNG project, as discussed in the EIA Report will bring social and economic impacts to the area where it is introduced. As far as the Fisheries sector is concerned, the project will affect local fishing communities, deepwater commercial fisheries as well as the development of any water-based activity, more specifically: a. Disruption of the livelihoods of the communities that depend on fishing and maritime transport due to the establishment of the project and the safety zones surrounding the infrastructure; b. Physical disruption of fishermen and fishing centers; c. Loss of part of the mangrove and estuary of the Afungi region; d. Considerable loss of a portion of sandy beach due to port;	The Project will result in impacts to people who depend on fishing for their livelihoods. As such, a study is currently underway as part of the resettlement process to identify exactly who might be impacted. These will be considered in the resettlement process. The resettlement process will be undertaken in accordance with the IFC Performance Standard 5 and in consultation with affected communities. The impacts noted here and identified mitigation measures have been addressed in the EIA Report.

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			construction in the intertidal area; e. Temporary loss of water transparency and permanent burial of part of the areas covered by sea-grass beds, corals and mangroves due to trench dredging operations; f. Potential infiltration of exotic and invasive species; g. Potential reduction in the abundance of fish due to the noise caused by pile-driving operations; h. Disposal of drilling mud and cuttings into the sea with potential impact on the burial and toxicity of benthic organisms, and i. Potential impact over water quality and marine ecology due to discharges of water from hydrotesting, formation water, rainwater from the LNG plant and ballast water from the LNG carriers, from wastewater treatment stations and the desalination plant. The EIA Report does not report any fatal aspects for the project's implementation. Nonetheless, reducing the fishing communities' access to the fishing areas due to the creation of safety zones, and the need to resettle these communities, are key and sensitive matters that merit proper treatment, because this will reduce or eliminate the yield and affect the livelihoods of communities as a whole, and fishermen in particular.	
36	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 24th October 2013	Considering that the solution to these matters depends significantly on the resettlement plans and management of safety zones to be established, we must stress the importance of presenting proper mitigation solutions, making reference to fisheries and the type of fishing.	This comment will be passed along to the resettlement team.

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37	Francisca Sanduane (Ministry of Fisheries)	By email and letter, dated 24th October 2013	The potential for contamination of the aquatic environment by chemical agents to be handled during operations constitutes another concern for the sector. In addition to the measures and recommendations put forth in the EIA Report, it would be important to evaluate the "fish for human consumption and the filtering organisms" aspect.	Section 11.5 has been amended to include this issue.
38	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	The EIA largely avoids an appropriate and accurate assessment of currents and how they affect all potential impacts. The Draft EIA tends to report average levels over inappropriately long times (e.g. a year so that zero levels during most of the time reduce the averages to acceptable numbers), rather than short term or maximum levels over biologically appropriate times (of weeks to 2 or 3 months). The Draft EIA ignores variability and the importance of extreme events (spring tides, storms, peak monsoon winds) in favour of average conditions.	The statement regarding the use of an average as opposed to extreme events is largely incorrect. Offshore circulation and variability is described in Section 7.5.2 of the EIA Report, at the regional scale and temporal variability of current vectors through the water column is demonstrated with HYCOM data. In Palma Bay currents are derived via simulation modeling and the plot in Figure 7.2.8 shows the maximum predicted flows in each of the individual model cells in the bay. Averaged flows are not shown although they have been simulated. The behavior of drill cuttings discharged offshore is simulated over a drilling period (approximately 70 days) using HYCOM data to estimate dispersal. Impacts within Palma Bay from from dredge plumes or effluent discharges for example, are generalized from mean and worst case conditions incorporating simulated flows over the applicable modeling periods.
39	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Although the area of implementation is not a bay, like it was proposed as alternative site (area F and G in Palma Bay), the near shore area surrounding the Afungi Peninsula is relatively shallow and will have to endure salt / day+1600 barrels of hot salty water/day), brine and brackish water, hot water from the LNG process, wastewater from the personnel facilities, run-off waters, biocides, dredged waste among others. The offshore area will receive mud (oil, water and synthetic based), drill cuttings (these ones will be deposited in the vicinity of canyons, preferable habitat for the coelacanth), among others. How this marine area will respond to these type and quantity of discharges is	This is a general statement with which there is general agreement. At short time scales, dispersal of effluents and/or discharges will be governed by short term variability in the current field. These are difficult to predict in time or space and therefore worst case distributions extractable from models have been used. Cumulative effects such as these may be predicted from drill cuttings deposition model estimates. The predictions of associated impacts are considered to be conservative. It should be noted that the project will not generate hot water discharges

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			highly dependent on the ocean currents dynamic of the area related with the weather (by season).	into the bay.
40	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	There is no quantitative data on coral reef cover, or a species list of key species such as corals and fish. Thus, the information in the EIA cannot be used as a baseline for assessing change in relation to impacts. The coral reef sections are very descriptive, which is good for setting the context, but not for understanding the state and changes in the system. Quantitative baseline data on key habitats and species is needed to detect impacts (limiting quantitative assessment to small areas around the gas site does not provide a measure of the relative potential impacts at a Province wide scale). Additionally, there are few key reference locations for returning to investigate specific changes (just the two bommie sites, the other locations are general surveys). To rectify this, the EIA / ESMP might establish some permanent monitoring stations, adding some stations on either side of the pipeline route particularly on the outer reefs of the two islands. At these sites and the bommie sites, quantitative transects for benthic cover, invertebrates and fish should be run (compatible with surveys in the Mozambique National. Monitoring system, but with additional variables relevant to impact assessment), as well as species lists for key taxa (corals, fish).	Agreed. The descriptive baselines used in the EIA were to inform the impact assessment and development of mitigation measures. It is recognized that a more detailed quantitative baseline is required for monitoring change over time. In this regard, additional marine surveys for quantitative baseline development are currently underway. These additional surveys are focused on intertidal shores, subtidal seagrass, coral biotopes, sand seafloors, and water quality etc. Appropriate reference sites have been identified and the Project is currently trying to incorporate previous and current work being undertaken around Vamizi Island and other sites to the south. The baselines include permanently marked reference and test sites and the selection of these have been guided by current best practice in site and gradient analyses.
41	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	The Draft EIA largely avoids assessing hydrocarbon risks: what happens if there is a blowout in the wells/pipelines (perhaps this is not a major threat, but is there an oil fraction? If it is minor, then this should be stated clearly), and b) what happens in case of maritime accidents, oil spills, etc? There is also a need to have a clear waste management fluxogram- where from, what type of waste, how much, for how long? Similarly, there is a clear need of a monitoring programme for dissolved oxygen, salinity, pH, turbidity, pH and other parameters relevant to follow during all the stages of the project.	The risk of a hydrocarbon spill, a blow out, and of maritime accidents (collisions) is assessed in Chapter 14 of the EIA Report. Details on waste management (including expected volumes, categories, differentiation between the phases of the project, and waste management strategies for the different wastes) are described in Chapter 4 of the EIA Report and in the Waste Management Plan in Annex E. A monitoring programme is currently being developed for the bay. It will

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				detail monitoring requirements for various physical / chemical parameters, such as pH, turbidity, etc, as well as biological parameters and sea grass rehabilitation.
42	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Non-Technical Summary: • offshore, no mention of Maritime traffic / pollution / accident impacts • nearshore, for mangrove/estuary woodland it would be good to to be more specific about its small size relative to overall system • unplanned events, maritime accidents not considered	• The NTS summarises the key impacts, thus not all impacts are captured in the summary. • This concern is addressed in detail in Section 11.2. • Maritime accidents are considered in Section 14.3.3 and the safety record of LNG carriers is considered in Section 14.5.
43	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 2-24 – Note that the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, mentioned on 2 / 25 under “Archaeology and Cultural Heritage” is also relevant to Natural Heritage, ie. under the heading “Habitats and Biological Diversity”	Comment noted.
44	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 3-16 – impact magnitude is a function of three variables, but it’s not clearly stated how these are considered together – is the highest one used? An average across the three? May be important in some impacts.	This is an element of subjectivity that is purposefully noted and acknowledged in the impact assessment methodology– see Chapter 3.. Professional expertise and experience is used by the impact assessment professionals or specialists to combine the three aspects to determine magnitude.
45	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 4-48 and subsequent – this section describes the shipping lanes, turning circles etc that are important for maritime operations, but these are not referred to in subsequent pages of the EIA considering impacts.	The impacts of light, noise, and vessel movement on marine ecology were considered as part of the EIA. Also considered were impacts on fishermen and impacts on people who use the marine environment for transport. Refer to Chapters 10 to 15 for further detail.

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46	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 4-48 last para "the MPD will be used 'only occasionally' … for fuelling …" … what does this mean? Presumably it will be in continuous use. What frequency of use and size/types of vessels, and what potential impacts associated with refuelling and accidents are possible?	The paragraph reads "*During operation of the LNG Facility, the MPD will be used only occasionally to unload equipment and materials for maintenance activities and construction of new LNG Trains".* The "only occasionally" refers to unloading of equipment and materials during the operational phase. Fuelling at the Multi-Purpose Dock (MPD) will occur throughout operations. Potential risks (eg fuel spills or accidents) are addressed in Chapter 14 of the EIA Report.
47	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 4-49 – "providing fire fighting, rescue services and spill response as required" – this is the only mention of spills that I have found so far in the entire document. The only mention of spills in Chapter 11 is with respect to cement spills (11.8.1, 11.8.2), none in relation to fuel/oils/gas.	Chapter 14 of the EIA Report addresses potential impacts with from accidental spills since they are considered to be non-routine, unplanned events. Chapter 10 to 13 deal with known impacts (both direct and indirect).
48	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 5-1 and subsequent pages. This alternative section is very important but suffers from lack of quantitative detail for transparency. For example, when were these various exercises and assessments done, and would they. Be any different if done by other specialists? This is not to dispute the findings but a vast amount of subsequent work and the development itself are totally impacted by these findings.	The site selection process described in Chapter 5 is quantitative. Text has been added to note when the site selection process was undertaken. Other specialists using this methodology may have generated slightly different scores, but the integrated (environmental, social and technical) result is unlikely to change.
49	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 6-7 areas of influence. These are very nonspecific descriptions. Are there standards that define the boundary between direct and indirect? Is relatively clear on land, but in the sea the influence of currents are very important. The Area of Direct Influence (ADI) could extend many 10s of km in downstream directions depending on the issue, such as dredge spoil settlement, oil spills, etc. need quotations of industry standards or if these do not exist specify what is being used in the study.	While there are clear definitions for these terms, there are no standards that define the boundary between Area of Direct Influence (ADI) and Area of Indirect Influence (AII). To varying degrees the ADI and AII is defined by a particular specialist study. The important thing was to make sure the main impacts important for decision-making were identified and assessed. With regard to how far an impact extends – this is captured in the assessment methodology by the "extent" component of magnitude. Extent is defined as follows:

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				On-site – impacts that are limited to the direct area of disturbance and immediate surrounds. Local – impacts that affect an area in a radius of up to 10km around the site. Regional – impacts that affect regionally important environmental resources or are experienced at a regional scale as determined by administrative boundaries, habitat type/ecosystem. National – impacts that affect nationally important environmental resources or affect an area that is nationally important/ or have macro-economic consequences. Transboundary /International – impacts that affect internationally important resources such as areas protected by international conventions.
50	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 6-27 and subsequent pages. None of these seascape unit descriptions present any biophysical mechanistic description of these units or anything seaward of the beach, though they are shown in the maps to extend into deep waters and include coral reef, sea grasses and other habitats. As a result, the study evades any assessment of the influence of biophysical processes, such as currents, and their importance on assessing environmental impacts. For example, (6-35) states that the western tip of Vamizi Island is "visually associated with the adjacent headland. If the study acknowledged the hydro-geological process that form the coastline, it would acknowledge a mechanistic association between these two features which would also force it to assess the influence of these same mechanisms (currents and landforms) on environmental impacts of the project. By ignoring these mechanistic processes, the study risks completely missing an entire set of potential impacts that MUST be addressed (downstream risks and impacts).	This comment appears to combine the two concepts of visual impact assessment with marine ecological impacts. As discussed in response ID38 above, currents have indeed been included in the marine ecology impact assessments detailed in Chapter 11. The direct and indirect impacts, cumulative impacts and potential risks (such as an accidental hydrocarbon spill) have all been included in the EIA Report.

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51	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 6-36 - this emphasis sits on Zone of Theoretical Visibility (ZTV) asks why a greater attention is not paid to a similar treatment of downstream effects on the environment, which carry higher impacts	The ZTV applies only to visual impacts – it defines areas from where the project infrastructure or activities would theoretically be visible to receptors. Other impact assessments undertaken did indeed consider effects further afield from just the project site. The extent of a potential impact is considered in the impact assessment methodology and ranges from site specific, to international.
52	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 6-41 within the context of the EAME, should also relate findings of the Quirimbas archipelago in the center of diversity for the W and N Indian Ocean (see Obura 2012 PLOS one).	Findings from the Obura 2012 study have been considered and included in Final EIA Report. Please see Section 7.4.
53	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-1 to 7-2. No description of the oceanography / currents of the region, so the environmental description is not complete. This is fundamentally necessary to assessing environmental impacts.	The current regime is dealt with later in Chapter 7 (see Section 7.5.2).
54	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-2 the coral reef description is biased towards describing the more stress resistant / hardy Porites dominant reefs close to Palma and not the more diverse and sensitive reefs around and offshore of Rongui and Tecomaji. Why? By contrast, descriptions of the coral reef areas and surveys are quite detailed later in this chapter. Reference to turtles is to their regional scope but in contrast reference to reefs is very locally / inshore biased.	The *summary* section is intended to present an overview of the marine baseline chapter. The detailed descriptions are included in the main body of the chapter (e.g. Sections 7.8.5 & 7.8.6). Focus has been placed on resources most likely to be impacted by the project.
55	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-3 section 7.3.2 - it would be good to define the nearshore / offshore Boundary by approximate depth as well.	In a regular bathymetric gradient this would be valid, however the continental shelf is heavily incised by canyons with deep water nearshore so the value of doing this is moot. Note that the boundary is used for defining the extent of impacts and has no oceanographic importance.

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56	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-3 last para. Also use Spalding et al., 2007 (marine ecoregions of the world) and Obura 2012 (pos one) to define the regional context. The coral genera and species numbers are long outdated, use Obura 2012.	Findings from these studies have been considered and included in Final EIA Report in Chapter 7.
57	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-4 this section on general oceanography is good but needs to inform prior sections (see notes above) and later sections, and needs major subsequent exploration on the currents/oceanography at the project site – ie. the ADI and Area of Indirect Influence (AII).	Simulated model results are provided for both deep and shallow water (Palma Bay) environments with both models (HYCOM and DHI) being calibrated. There is a current measurement campaign underway in the offshore gas field, along the pipeline corridor and within Palma Bay but data is not yet available for inclusion in the EIA. However, due to the calibrations the model results used are considered to be adequate for the purposes of predicting behaviours of discharges and assessing likely environmental risks therefrom.
58	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-5 last para. Fig reference should be to fig 7.5. Fig 7.5 presents model results not in situ measurements, so it should be stressed that this does not represent actual conditions, but a simplified rendition of what may occur at the selected point.	It appears as though this comment was directed at Pages 7-9 and these pages of the EIA Report have been revised to address this comment. The data were generated from the HYCOM model. It is undertood that the comment or concern is whether this data are suitable for predicting drill cuttings dispersion and sedimentation. The HYCOM model is used extensively in ocean forecasting globally and, as such, has been rigorously calibrated against other models and field measurements. It is reliable and suitable for providing descriptions of circulation patterns and for use in predicting 3D behaviour of discharged cuttings in deep water environments.
59	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-5 - a section detailing the local hydrography / currents is entirely missing, and it should include both deep (seabed) and shallow inshore components. This is important for engineering works during construction as well as transport and dispersal of any lighter elements (silt, oil/gas fractions etc).	Simulated model results are provided for both deep and shallow water (Palma Bay) environments with both models (HYCOM and DHI) being calibrated. There is a current measurement campaign underway in the offshore gas field, along the pipeline corridor and within Palma Bay but data is not yet available for inclusion in the EIA. However, due to the calibrations the model results used are considered to be adequate for

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				the purposes of predicting behaviours of discharges and assessing likely environmental risks therefrom.
60	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-30 "Mesopelagic fish …" biomass of 5600 tonnes in what unit area / volume?	The estimate is for the region (Northern Mozambique offshore).
61	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Pages 7-41 – 7-42 – tides and currents may be strongly seasonally impacted by monsoon conditions, currents offshore and the location of the bifurcation of the EACC and MC (see page 7-4) – measurements must be done in the principal wind seasons (May – September; Dec–Mar – this was done for waves in 7.7.4, and is even more important to be done for currents) and perhaps associated with tidal ranges following interactions between annual and lunar cycles. No detail is given on what time period the current modeling was done over – the same weeks as the tidal cycles? An annual compilation? What?	The current measurement programme underway is programmed to run for three years and will likely be extended through the construction period. At the end of this period of data collection, there is likely to be sufficient data to fully characterise seasonal and other variability, such as inter-annual, in the study area. It should be noted that the wave data are also drawn from a prediction service (NCEP), similar to HYCOM for currents. NCEP is also extensively calibrated and considered in the industry to be reliable. The time period for the offshore drill cuttings dispersion modelling was that of a typical well completion cycle (approximately 70 days). The current modelling within Palma Bay was run for 12 months and this took into consideration a time step of1 hour capturing all but the shortest term (<1 hour) variability.
62	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-42, fig. 7.29 – an entire EIA cannot be based on a single timepoint/single day without any contextual information on how this day compares with a typical or extreme northeast or southeast monsoon day, tidal level, etc. What happens when the significant wave height offshore is 4 m, as opposed to the selected >1.2 m maximum shown? Or if this occurs at spring high tide vs. spring low tide?	The purpose of Figure 7.29 is to illustrate that Palma Bay is protected from large waves. It is not the basis for the entire impact assessment. The basis for the marine impact assessment has been primary data collected in the field, secondary data collected from existing sources and marine models that have been extensively tested and calibrated- this is detailed in Chapter 7 of the EIA Report.

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63	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-43 – discussion on temperature/salinity characteristics is more informatively defined by monsoon (NE vs SE), or summer/winter, not by wet/dry season, which is not so relevant to marine variables (except salinity).	Wet and dry seasons at the project site are linked to monsoonal changes in the wind regime. This is described in Chapter 6 of the EIA Report.
64	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-45 – 1st para – this mention of the potential for upwellings should be part of the oceanographic presentation earlier, both at the larger level for the N Mozambique coast, and specific oceanography of the study site. These are known to be important farther south on the coast and in relation to eddy dynamics and continental slope topography.	There are no observational data for coastal upwelling in the northern Mozambique region that was available. Observations within Palma Bay of an apparently residual effect indicate that such processes occur. The importance of upwelling in overall productivity is acknowledged.
65	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-57 – sediment transport – the surface morphology of island chains such as the Quirimbas archipelago are partly a result of longshore sediment transport – in this case apparently capping continental landforms that drop sharply down the continental slope at the outer edges of the islands, and with complex topography cut by the canyons such as in Palma Bay. Thus, the statement that sediment transport is 'small', and that it is predominantly east-west (along the Afungi peninsula) evades the bigger picture. If the data used for this study corresponds to the tidal, current and wave dynamics presented earlier, then it is just a snapshot of what may occur throughout the year, and a full annual cycle for sediment transport on the larger scale of the land- and 3 seascapes needs to be considered. Sediment transport at this scale is indicative of pollutant/hydrocarbon transport, and this MUST be effectively studied and modeled at the project site to assess potential impacts. Without this, the assessment of impacts is fundamentally incomplete (in this sense, it is not even worth reviewing the assessment of impacts).	The statement made refers to sediment transport along the north shore of the Afungi Peninsula as predicted by modelling. Similar to the current modelling the simulation periods were acceptably long to include tidal and seasonal variations.

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66	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 7-75 – last para - this level of crown of thorns observation is entirely normal. The other features of the sites – low fish density, few branching corals, silty layers no rocks, rubble fields, are more indicative of degradation.	The intent was to describe the main components of the system and predation effects by Crown of Thorns are one of these.
67	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-0 – the list of impacts does not include shipping/maritime incidents such as oil spills and groundings, nor of gas leakage/blowouts.	These unplanned events are evaluated in Chapter 14 of the EIA Report.
68	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-3, fig. 11.2– the baseline needs to be shown in relation to the extents of the fringing reefs and bathymetry, so it is clear where it is exactly	Please refer to Figure 7.48 of the EIA Report.
69	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-4 fig. 11.3, Table 11.1 – it is not clear where the boundary between local and regional is – make this explicit. As is, these descriptions are not explicit enough.	The referenced figure has been updated.
70	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-7 – 1st para – this HYCOM model is not in fact explained in Chapter 7, the name of the model is only listed in the caption to a figure (7-10). This represents an area of work conducted by the team that has NOT been adequately explained and needs to be for full assessment of the EIA. It appears that modeling was done on dispersal near the seabed, but no use is made of modeling/dispersal assessments at other levels in the water column, nor at the surface (important for oil spills).	See comment on ID58. Technical details on the model are available at http://hycom.org. As shown by Figure 7.5, HYCOM allows predictions of flow through the water column and it is these that are used to simulate behaviours of discharges (e.g. drill cuttings) and eventual sedimentation on the seabed.
71	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-10 – what are the percentages of the Prosperidade / Mamba and Golfinho Gas Fields do these numbers represent?	The purpose of the referenced figures in terms of a percentage is to predict the area of seabed that will be impacted by the deposition of drill cuttings. The relation to the size of the gas fields is not relevant to the impact being assessed.
72	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-24 – the offshore assessment does not include any discussion of accidents during operations – ie. blowouts of gas and associated	The risk of such unplanned events is evaluated in Chapter 14 of the EIA Report.

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			liquid hydrocarbons. Is this not a risk at all? At the same time, it does not assess any impacts from maritime accidents such as collisions, sinking, oil spills, etc.	
73	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-29 – the mean turbidity levels over the period of a year are not very meaningful, as the dredgers will be moving over the extended project site during this time, so low turbidity levels when they are at another point draw down the mean. The important consideration is the maximum turbidity experienced when the dredgers are at a particular location, as well as the instantaneous plume dispersal over e.g. a tidal cycle during the period of operation of the dredger. Analysis should be shown of these events – plume dispersal during neap and spring tides, and during the NE and SE monsoons. This analysis should be informed by how long can a sensitive receptor (e.g. seagrass, coral reef) be exposed to elevated levels (how much) of Total Suspended Solids (TSS) … is this on the order of 1 week for xx mg/l, or 1 month. A frequency distribution of how much of the area fall above/below these thresholds will give a much clearer view of impact.	The focus of the impact assessment is the maximum turbidity levels that may be attained. Note that the representation of these is the maximum level that was recorded in each model cell over the period of the year modelled. Therefore the distribution shown is non-synoptic. However, impacts were generalised from this but moderated by the time series data extracted for various points with Palma Bay (Figure 11.12).
74	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-31 – fig. 11.9 is irrelevant to the impact assessment.	The intent of figure 11.9 is to inform the reader of the predicted ranges of TSS that may be encountered on the surface and seabed and in this context it is relevant.
75	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-32 – the graphs for maximum levels should be shown for the same reasons as explained above	The figures do actually show the maximum levels.
76	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-35 – "Within the ZOMI …" – this paragraph more accurately depicts what should be presented in this entire section (from 11-29 onwards) – that TSS levels occur for short durations of time (days) that are likely to cause damage to corals/seagrasses. The average graphs over one year are not meaningful for informing the mitigation responses discussed from this point on.	This comment comes from the basic misunderstanding of the use of mean distributions in the assessment. It must be noted that the zonation concept is introduced here in terms of mitigation measures and not as a basic descriptor for the environment.

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77	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-36 – top paras – where do these standards over 60 days come from? This response time might be far too slow to have any positive effect on sensitive receptors. Also, the thresholds used – 30 mg TSS for 40/60 days and 100 mg TSS for 40/60 days are not operationally distinguishable (ie. the latter cannot be distinguished from the former until the former is irrelevant) – suggesting confusion in this part of the EIA. 100 mg TSS for 10/60 days is operationally distinguishable, but then these components on mitigation should be consistent with data presented in figs. 11.9 and 11.10, etc.	The lead-in to the section (last paragraph on page 11-34) states that the thresholds and management interventions are an example. The response times given are similar to those applied in Western Australia coral and seagrass (benthic primary producer) habitats and have their bases in the quoted reviews of dredging in seagrass and coral. The concern on operational measurement issues is at odds with the measurement processes that should be applied. There are measurement processes available that can meet the requirements.
78	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page11-36, last para – its not clear where this arbitrary recovery time of 7 years is from, and on the next page, it is questionable that impacts from maintenance dredging are so negligible that they may not delay/extend the recovery period. This part of the assessment appears arbitrary.	The 7 year duration is derived from conservative recovery rates quoted in the Erftemeijer *et al* review, bearing in mind that only non-lethal effects are being addressed here, and the definition of '*medium term'* as per the impact assessment methodology detailed in Chapter 3 of the EIA Report. Given the apparent low sediment transport rates in the dredging areas, the need for maintenance dredging is moot, and subsequently impacts associated with this are considered negligible.
79	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-73 – section 11.1.10 – the displayed image shows an extensive sediment plume. So without specific knowledge of how much cutting will be needed at the project site, and without running the current model during different tidal and current phases, this impact cannot be assessed. As above, the recovery time appears arbitrary, and with all these uncertainties reducing a Major to Minor impact appears implausible. Impact should remain major until the speculated	The recommended mitigation aims at reducing risks to coral communities (and seagrass) outside of the immediate dredging areas. It is acknowledged throughout the EIA report that coral and seagrass communities will be lost where dredging takes place. The mitigation measures can be interpreted as performance criteria which should be contractually binding for entities undertaking work in,

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			studies/measures are tested and shown to work.	eg, the construction phase of the project. Should the measures applied not meet the performance criteria then they would have to be modified or new measures be adopted to ensure compliance to the performance criteria. Thus the residual impact is based on the performance criteria being met. The performance criteria are based on reported experiences in other jurisdictions and information available in the scientific press.
80	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-46 – last para – this focus on *Acropora aspera* is not sensible, as several species of higher conservation status might be found here of the > 350 spp that may be found in the ADI. Have a coral Taxonomist / marine biologist, but their remit should be much broader than this.	It is agreed that the focus on *A. aspera* is subjective but this is a consequence of IFC focus on IUCN evaluated rare and endangered species (red data listings). Given the lack of formal definitions of high conservation status at the species level for scleractinian corals in the East African region, we have considered coral reefs as a whole as being such.
81	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-48, section 11.13 – 4.1 million m^3 of discharge over 1 km^2 (1 million m^2) is equivalent to 4m vertical height of sediment deposited within this location. The impact of this will be major and total smothering / mortality of benthic organisms!! This may be acceptable, but it is misleading to claim that the impact is not major, or that it can be mitigated somehow.	There is a formal definition of impact significance rating that is used throughout the assessment (as defined in Chapter 3). Constraining the effect to within the designated dredge spoil disposal area, and taking account of benthos recolonisation rates established by observation in inner continental shelf sediments following disturbance by dredging through the recommended controls (mitigation in this case), this drives the change in significance rating.
82	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Page 11-73 – if controls are put in place, these impacts can be reduced as stated. But no consideration is given to fuel/oil spills, and this MUST be assessed across the entire nearshore / offshore project area in relation to modeling of currents, wind and sea conditions.	The potential risk of accidents and spills in the marine environment are evaluated in Chapter 14 of the EIA Report. Any fuel spill within Palma Bay will place the entire system at a level of risk and, given the spatial scales of the system, oil spill modelling will not help in guiding response measures. The objective of the mitigation is to reduce risks and potential volumes of fuel that may be lost operationally through, eg, pipe rupture, and ensure that booms and skimmers are available to deal with these and possibly larger spills linked to shipping accidents.

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83	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Decommissioning/ end of life cycle: could be addressed in more detail than presently.	The decommissioning of the project will take place in at least 30 years' time. It would be difficult to address decommissioning impacts with a high level of confidence. A draft Decommissioning and Rehabilitation Plan (Annex F) has been prepared which will be updated through the course of the project's lifespan and finalised and submitted to MICOA not later than two years before closure in accordance with the Petroleum Law (Law no. 3/2001 of 21 February) and the Regulation of Petroleum Operations (Decree no. 24/2004 of 24 August).
84	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Time frame and phasing – there is a clear need to understand the time frame for the project, commissioning, construction, operation, maintenance, shipping, will occur most of the times simultaneously, although it makes sense to separate them into individual categories to address them it's the cumulative impacts that matter. Construction will be phased during the operation and maintenance and "shut-down" will happen every 2 years at least.	The timing of the construction activities of the Project are discussed in Chapter 4 of the EIA Report. While future expansion of the Project will result in simultaneous construction and operation, the combined impacts of these activities will be limited. This is due to the fact that most of the construction-related impacts are associated with the initial site preparation activities. During expansion, such activities will be very limited.
85	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Methanol usage for hydrate formation: how long? how much? Recycled/re-used? Disposal?	Chemicals used to reduce the risk of interrupted gas flow due to hydrate formation (such as monoethylene glycol and methanol) will be in use during the operational phase of the Project. These chemicals will be is delivered to the subsea wellhead via a dedicated pipeline through a closed-loop system. All chemicals will be re-used, recycled or disposed of in accordance with the project waste management plan (WMP- see Annex E).
86	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Hydrotesting of pipelines is done with saltwater and anti- corrosion agents, they mention that a plan for disposal of the water will be developed but after they say that the water will be discharged at a depth of 1500m. It is also mentioned that the water might be re-used either for	The options for reuse of hydrotest water will depend on the timing of the various construction activities. If the hydrotest water is to be discharged, it will be done so in accordance with a hydrotest discharge procedure in the Water Resources and Wastewater Management Plan being

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			hydrotesting the LNG thanks, dust control (salt water being sprayed on land might not be a good idea) or used for making concrete (not a good idea either as the salt crystals will weaken the cement structure and corrode the metal from the structures). Hydrotest is supposed to release contaminated salt water during 11-12 days continuously with a flux of 9500litres/min	developed by the Project.
87	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	CO_2, H_2S and mercury (possible) after being removed by the acid Gas Removal Unit go to?	Mercury will be removed in a separate filter process. The filter will be periodically replaced. The used filter will be handled as a solid waste in accordance with the project WMP. MEG unit vapours, including CO_2 and H_2S, will be directed to the flare.
88	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Predicted quantity of gas to be burnt in the flare system?	A limited amount of flaring will be inevitable during the commissioning phase. The largest flare volumes will occur during the start-up period. The amount of flaring will be confirmed during the on-going FEED process. Anecdotal evidence from similar projects indicates flaring during commissioning and start-up may initially occur for roughly 50 hours per week, falling to 30 hours per week by the end of the first month and 10 hours per week by the end of the second month.
89	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Dredged material to be used in construction?	Some of the dredge material will be used in the development of the MPD and site levelling activities.
90	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	Abandonment of pipelines after decommissioning?	Decommissioning of the subsea system would typically encompass flushing the pipelines and umbilical tubes clean, removing subsea manifolds and plugging the wells, and retrieving the subsea trees and jumpers. The pipeline and umbilical's are likely to be capped and abandoned in place. Removing the pipelines would result in impacts associated with dredging, sea grass and coral removal. Leaving decommissioned pipelines in situ is an accepted practice.

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91	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	There are references like " limited to the short term duration of construction or commissioning", knowing that wells we be drilled either to increase capacity of extraction or to pressurize almost depleted fields during the next years, that the trains will be built along the project and also that the docking platforms will have to be transformed to be able to receive more LNG vessels, we don't understand the concept of "short term duration".	Short term refers to impacts that are predicted to last between 1 and 5 years – see definitions in Chapter 3 of the EIA Report. "Duration" refers to the duration of the impact – not the duration of the activity causing the impact.
92	Cosmas Ochieng (IUCN)	By email, dated 27 September 2013	"reducing speeds if animals are encountered"??? an oil tanker takes 4 to 5,7 miles to stop, we believe that it would make sense to create a buffer zone for all maritime traffic with really reduced speeds.	There will be an exclusion zone around the LNG vessels (500m to the rear and sides, 1km in front). LNG vessels will be brought in to the jetties by tug and hence speed within the bay will be reduced. . Offshore, trained marine mammal observers (MMOs) may be able to spot marine mammals early enough such that a reduction is speed is feasible. While it may take an LNG vessel some time to stop – we are suggesting a reduction in speed as a mitigation measure, not a full stop.
93	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	While the current EIA does refer to social impacts in Chapter 13, Socio-economic Impact Assessment and Mitigation, the United Nations (UN) recommends the Mozambican Government consider provisions which require Social Impact Assessments (SIAs) be submitted to Government prior to the granting of any exploration license or concession. Mozambican legislation should specify criteria for undertaking SIAs, particularly with regard to the process of community consultation to ensure they address all relevant rights of affected communities. When undertaken in a participatory manner, SIAs can be valuable tools for community engagement and consultation, especially if community participation in the assessment process can effectively lead to the shaping or re-shaping of community development projects (1).	The SIA in Chapter 13 and the consultation process undertaken during the EIA process complies with Good International Industry Practice. Also, the SIA did indeed include community engagement and consultation. These processes are also fully compliant with the Mozambican EIA Regulations.

(1) (1) SOCIAL IMPACT ASSSESSMENT: A Manual for Mining Projects, Resource Management in Asia-Pacific Program, Australian National University, 2008.

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94	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA lacks statistical evidence to substantiate its analyses. The lack of concrete data, projections and estimates, for example, no clear indication of the projected population affected or how assumptions were reached, limits the document to its classifying broad risks into categorical variables (negligible, moderate, medium, high) that disallow an objective evaluation.	The EIA follows the Terms of Reference (ToR) that was approved by MICOA, and is aligned with Good International Industry Practice. Available data as well as primary data collection (through scientifically defendable methods) are the bases for the baseline development for impact assessment purposes. The impact assessment methodology (Chapter 3) is also aligned with Good International Industry Practice and uses both quantitative and qualitative means to assess the significance of potential impacts. The significance classifications (negligible to major) are designed to allow interested and affected parties (I&APs) as well as MICOA, to easily understand the relative significance of impacts and to inform decision-making. The data provided in the socio-economic study came from a baseline survey that combined quantitative and qualitative methods with the objective to describe the social baseline, and identify potential impacts resulting from the project. The number of households involved in the baseline survey can be considered a good sample (140 households interviewed out of 1,379 reported to live in the Afungi Project Site, plus Maganja and Senga). The data captured and presented in the baseline report is thus a good representation of the baseline social conditions. However, more detailed information of the affected population will be assessed in the Census and Asset surveys that will be implemented as part of the Resettlement activities.
95	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Community engagement is not cited in Chapter 13 of the EIA. Given recent experiences from Tete Province where meetings with potentially affected communities took place after initial prospecting and exploration licenses were granted to the companies, the EIA displays no evidence of consultations or opinions of affected persons and communities. While the EIA states that the socio-economic impacts associated with the project have been “identified based on research, including the gathering of primary and secondary data, observation and professional	Please refer to Annex C (Section C16.4) of the EIA Report for a detailed description of the surveys and interviews undertaken as part of the SIA. Please refer to Annex A for a detailed report on the public participation process (and results thereof) that was undertaken as part of the EIA process. The public participation process goes beyond the minimum requirements of Mozambican EIA regulations, and aligns with good international industry practice.

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			judgment,1"no references to views of opinion leaders or community members are referenced in the document.	
96	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA can be a timely tool to provide community members the opportunity to voice their concerns and recommendations about the government awarding the land to the LNG project. In addition, a process that fully respects human rights should ensure public consultation and participation at all stages of the process, including in the design and implementation of the project, including resettlement. Participation should not be restricted to public hearings, but coupled with other forms of dialogue, including individual and small group consultations, with dedicated measures that facilitate the participation of groups that may face specific impacts or that are marginalized such as women, children, the elderly, people with disabilities, and minorities.	Government award of the land occurred as part of the acquisition of rights to land use and benefit (DUAT) process. This is separate process to the EIA process. An EIA can only commence once land has been granted. Dialogue with communities began before the EIA process (during site selection) and continued during the EIA process (see Annex A). Dialogues with all stakeholders at various levels (including the community level) occurred. Requirements for community consultation for the DUAT process, including consultation processes and action steps to ensure representation of vulnerable and minority groups' views, are described in the following national laws and regulations: • Land Law 19/97 of 1 October; • Land Law Regulations, Decree 66/98 of 8 December; (authorized by Article 33 of the Land Law); • Schedules to Land Law Regulations; • Amendments to Articles 20 and 39 of the Land Law Regulations, Decree 1/2003 of 18 February; and • Technical Annex to the Land Law Regulations. The consultation undertaken as part of the DUAT process to obtain

(1) AMA1 LNG Draft EIA Report, Chapter 13, Socio-economic Impact Assessment and Mitigation, page 13-1.

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				community views, concerns and recommendations, was recorded in a descriptive report that was signed by representatives of the local and neighboring communities and submitted to the Provincial Government as part of the DUAT application process. The consultation process included members of District and Provincial Government and the proponents. The project acknowledges the importance of multi-level, comprehensive and on-going consultation with all relevant stakeholders, including and with a dedicated focus on directly and indirectly affected communities in the greater project-impact area, specifically related to community views and rights to land and land use. While some of the EIA public participation and DUAT community consultation processes were conducted over the same period, the EIA public participation process was not used as the mechanism to solicit community input on the DUAT, as the DUAT community consultation process and the EIA processes are governed by different sets of objectives and focus on different outcomes. As part of recognising the importance of on-going, relevant, meaningful, appropriate and accessible consultation that informs Project decisions on design and impact mitigation, the Project is taking a strategic view on building long-term, constructive stakeholder relationships. Some of the mechanisms to ensure participatory community consultation are the mobilisation of Village Liaison Officers (VLO's), elected by villages, linking communities directly with the Project through daily communication; and the community relations team's nkutano system, whereby each affected village has a space dedicated to Project-community communication, where community members can freely interact and share views with the community relations team. The nkunato (meeting) system allows community relations personnel to gauge community perceptions, gather issues and grievances and

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				provide information on Project opportunities on an on-going and daily basis. The dedicated Project resettlement engagement team, working with village-elected community representative committees, also engage in training community members on their rights, which includes the right to voice concerns and the right to demand feedback on the way the concerns were considered and are addressed. In addition, the Community Investment Plan (CIP) has a focus area specifically dedicated to community cohesion, vulnerable groups and capacity building aimed at developing and enriching the existing cultural diversity of communities and supporting vulnerable groups including women, youth, elderly and the disabled. Furthermore, as part of project-wide stakeholder engagement, the Project has developed a SEP, based on internationally accepted stakeholder engagement principles as set out by the IFC, aligned with the Equator Principles and good industry practice, such as IPIECA (the global oil and gas industry association for environmental and social issues).
97	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA neither gives adequate attention to vulnerable groups, such as women, children, the elderly, migrants, among others, who will likely be disproportionately affected by social harms nor to special measures required to reduce this disproportionate effect. The mainstreaming of gender equality, for example, could be illustrated by highlighting the equality of opportunity for both women and men during recruitment and training for employment opportunities, including those generated by the LNG project and affiliated businesses.	Vulnerable groups are addressed in the social baseline description (Chapter 9) concerning inequalities in women, children and low income groups. In addition, the impact assessment and mitigation measures (Chapter 13) propose important measures concerning community development and community livelihoods improvement focusing, where required, on women and low income groups. The heath baseline survey and impact assessment undertaken also focussed on vulnerable groups. Gender equality and mainstreaming of vulnerable groups has been considered in the Company and Contractor Management Plans (CMPs)

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				that form part of project's ESMS. The way in which equal opportunities are promoted across a wide spectrum of project activities, including job opportunities, CIPs and capacity building and skills training, will regularly be reported on by the project.
98	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The Government of Mozambique's draft Corporate Social responsibility Policy for Mineral Resource Extraction Industry in Mozambique includes issues of consultation and community engagement, gender mainstreaming, attention to vulnerable groups and transparency. Cross-referencing these elements to the current draft EIA would strengthen coherence between the two documents.	The Project is aware of the Government of Mozambique's draft Corporate Social Responsibility (CSR) Policy for Mineral Resource Extraction Industry in Mozambique, and has been involved in the consultation process to draft the Policy. The Project is therefore, aware of the issues of consultation and community engagement, gender mainstreaming, attention to vulnerable groups and transparency, contained therein. The EIA, however, does not detail the project's comprehensive approach to consultation and community engagement, gender mainstreaming, attention to vulnerable groups and transparency. This will be contained in the Project ESMS. The project ESMS will include reference to MIREM's draft CSR policy, where applicable. The ESMS already operates beyond what is required in section 12 of the MIREM CSR policy, as it already has robust consultation methodologies enshrined as part of its strategic engagement implementation.
99	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	For the purposes of this comment, we will not address resettlement specifically as we understand that comments on the draft resettlement plan are not linked to the 31 October deadline of the EIA as resettlement will be reviewed separately.	Comment noted.
100	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	While the EIA contains good qualitative / theoretical data linked to PIIM, it fails to provide an estimate of the predicted scale (numbers and type) of in-migration or detail of what is actually planned. For example, estimates of: the number of formal labour migrants needed to support LNG operations and its direct contractors (construction / engineering /	A PIIM study is underway that will address these concerns. The project is also developing CMPs that contain mitigation measures to minimise impacts associated with in-migration. Many of these mitigation measures relate to the movement and behaviour of foreign workers, both expat and other country nationals, to reduce in-migration.

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			transportation / catering, *et al*), especially if third-country nationals, at the different stages of roll-out and of other in-migrants, informal and formal, is required.	
101	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA does not address the demographics of these potential labour migrants and related potential impacts. While it mentions how demographic changes may increase the pressures on already scarcely available public infrastructure and services, it fails to mention impacts on communities, particularly as kin groups are dispersed and cultural identity and traditional authority systems are diminished or lost. Given this expected impact on public services, the EIA does not present a plan to mitigate this impact on public services through additional service provision.	The PIIM study will address these aspects and appropriate mitigation measures will be developed and implemented to avoid or minimise potential impacts.
102	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA lacks information on plans for accommodation, social services, other 'soft' services e.g. entertainment and provides no information on the contractual status or the possibility of migrants living with their families.	Accommodation for workers is described in Chapter 4. The contractual status of migrants is not within the EIA scope, however this issue as well as the issue of migrant labour families are being considered in CMPs being developed for the project to ensure that potential issues are managed appropriately.
103	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	For expatriate in-migrants, a pre-departure cultural orientation programme should be considered.	This is addressed in the CMPs - cultural orientation is essential and will occur on arrival at the project site.
104	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA lacks a plan for community stabilization to mitigate potential tensions linked to formal and informal in-migration. As seen in Tete and other rapid industrialization and extractives sites in the region, stabilization plans and programmes when developed with participation from host communities may help mitigate tensions including xenophobia / violence.	Community stabilization is a key focus of the holistic approach the project is taking to ensure a stable operating environment. As such, various plans in the ESMS contribute to facilitate and ensure negative impacts on directly and indirectly project-affected communities are minimized and mitigated, including the possibility of the outbreak of violence and xenophobia as a result of PIIM, and that positive

ID	Name, Organisation	Received	Comment	Response
				opportunities arising from the Project's presence and activities, are maximized. The Project is conducting a PIIM Study that will assess the risks and impacts of PIIM. The Project will collaborate with key stakeholders, including various levels of Government, the Project operator, NGOs, community based organizations and project-affected communities during the study and mitigation and management measures will be developed and incorporated into the ESMS, and engagement initiatives with Provincial and District Government. The CIP will focus on community cohesion, supporting the preservation of cultural identity and promoting integration of vulnerable groups including women, youth, elderly and the disabled into cohesive communities, able to better deal with risks of in-migration. In addition, the community relations team currently monitors community perceptions on a daily basis, to understand community perceptions and concerns with clear recommendations to facilitate dialogue on matters that may have an impact on the stability within and adjacent to project-affected communities.
105	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	In section 13.4, Project Design and Facilities Access, four recommendations relate to operating "closed camps" in an attempt to limit the movement of employees and contractors and prevent direct interaction between the communities and the project workforce. This is extremely problematic and unlikely to be effective in that: it is essentially impossible to prevent interaction with local communities; limiting such interaction risks making any interaction more clandestine and thus potentially more dangerous; and it is likely to increase tensions with the community.	Camps will be closed for all foreign labour. This means that foreign labour will not freely interact with communities outside of the workplace. Interaction will be done through organised events and after foreign workers have undergone cultural awareness training. The camps will have good recreational facilities which should reduce the propensity of foreign workers needs to enter local communities. Significant educational and awareness programmes (eg heath programmes) are planned and will address cultural awareness but also health related issues associated with contact between workers and

ID	Name, Organisation	Received	Comment	Response
				locals. Workers will be focused on work sites during working hours and then return to camp for the evening so there will be limited “spread-out” worksites within communities (except for Early Works).
106	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Working with communities to implement Social Change Communications programmes to discuss changes that are happening / are likely to happen / are perceived to be happening is critical. The key to managing this change is working from the community side to determine emerging concerns and how those could be mitigated (e.g. though community support programmes, opportunities for employment from the community, establishing better services for community members, etc).	Community mobilisation is one of the key focus areas of the CIP. This is linked closely with community perceptions, community needs, community-driven development models and the development of vision-models by communities. These ‘models’ will make ample provision for discussion around expected and unexpected social change. In addition, the Project has mechanisms in place to facilitate affected communities through this process of rapid change, that may be a result of the Project or related activities. There are a number of tools the Project has in place to facilitate social change discussions, including the community relations team’s on-going interaction and constructive relationship with communities. When a pertinent concern from is raised or emerges, the community relations team will assess concerns as part of their continuous social perceptions monitoring. These will be discussed and incorporated into specific project programs, such as the CIP’s community cohesion programme. In addition, to this the Resettlement engagement team will help develop capacity of the community resettlement committees, including on aspects related governance and sustainable community development. As empowered members of community committees, they guide fellow community members to form a more comprehensive understanding of expected changes in their communities, and thereby to act as agents within their communities.

ID	Name, Organisation	Received	Comment	Response
				In addition, as part of stakeholder engagement activities at community level, the project will implement an applied theatre programme, that will be dedicated to build the capacity of community-based groups to facilitate discussion and build scenarios on social change and community perceptions, and provide a community-based and driven tool whereby communities can express and 'model' parameters of change they are comfortable with.
107	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA does not reference the project site as a mixed migration route of Ethiopians and Somalis from the Horn of Africa. In 2011, thousands of stranded migrants arrived to this area by boat from Kenya. A contingency plan to address this is required.	This is covered in Section 9.9.4 of the EIA Report.
108	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Number of users per water source has to follow Government of Mozambique (GoM) minimum service levels.	This will be done.
109	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Levels of service envisaged in host sites unclear "at least the same access to basic services" (p.13-30) has to be minimum GoM levels.	This will be done.
110	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Drainage is not mentioned and is critical to include as stagnant water increases the risk of vector-based diseases. (13-30)	Agreed. The project site will have adequate drainage to prevent stagnation of water and such measures are included in the CMPs. The on-going Health Impact Assessment study will identify further mitigation measures as necessary to minimise the creation of stagnant waters within the project site.

ID	Name, Organisation	Received	Comment	Response
111	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Water management programmes mentioned as project mitigation do not adequately describe responsibilities / plans for the decommissioning phase, specifically to ensure the entire site clean-up process. (13-31)	The decommissioning of the development will take place in at least 30 years' time. It is difficult to assess impacts associated with decommissioning with a high level of confidence. A draft Decommissioning and Rehabilitation Plan (see Annex F of the EIA Report) has been prepared which will be updated through the course of the Project's lifespan and finalised and submitted not later than two years before closure of the LNG facility. The final Decommissioning and Rehabilitation Plan is then submitted to MICOA for review in accordance with the Petroleum Law *(*Law no. 3/2001 of 21 February*)* and the Regulation of Petroleum Operations *(*Decree no. 24/2004 of 24 August*)*.
112	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Sanitation facilities are not mentioned with regard to the worker accommodation camp. (13-31)	Worker camps will have adequate and suitable sanitation and standards and expectations of contractors are prescribed in the CMPs
113	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Consultations and mitigation measures with affected communities (resettled communities, neighbouring communities as well as communities hosting resettled communities) should be ongoing and not a one-off activity (as suggested by chapter 13, page 8 on compensation of crops which might be extended to the ´near-term crop cycles´).	Agreed. The section referred to in the comment discusses implementing a RAP to mitigate the loss of access to natural resources. The RAP entails a comprehensive communication process with affected communities (on site and at relocation sites).
114	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The proposed nutritional baseline study should focus on the nutritional impact in the first 1000 days of life, consequently, the target groups should be adolescent girls, women of reproductive age, pregnant and lactating women and children younger than two years. This study should be coordinated with other on-going and planned studies in the province (e.g. the WFP and World Bank nutrition programmes)	The nutritional assessment in the baseline health survey focused on vulnerable groups. The study was performed in full cooperation with the national committee of bioethics as well as involvement by the Provincial Health Directorate of Cabo Delgado.

ID	Name, Organisation	Received	Comment	Response
115	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Mitigation measures for food security and nutrition should incorporate nutrition in the agricultural specific interventions, such as promoting production and consumption of nutritious crops instead of focusing on increasing yields.	This comment will be passed to the resettlement team.
116	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	With regard to the RHMIS, mentioned in chapter 13 page 43 is presumably the Regional Health Management Information System. It is critical to ensure capacity building support to existing systems rather than the creation of a parallel system where government health staff is used to collect additional data for the Project.	Agreed. The proposed health initiatives will target capacity building of the existing health system as a primary objective.
117	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	While the population potentially affected by the "project" is indicated as approximately 2,700 residents, the EIA does not present any clear projection on the expected influx of migrants to the area. In absence of clear population and epidemiological data of the area, it is difficult to assess the potential impact of this "project" on population health.	This is correct. The potential impacts associated with influx of people are covered (see Sections 12.11.5, 12.12.5, 12.13.5, 13.4 and 13.5) which is sufficient for EIA purposes. The PIIM Study will be more specific about estimated numbers and potential locations for in-migration.
118	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Any investment envisaged to enhance health service delivery in the area must be based on population needs, and designed according to the government policies and protocols, with a view of strengthening the local health system that is in place to provide access to an essential package of health services for the population.	Agreed.
119	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The document does not clarify whether the intention of the investors is to set up a (semi) parallel, private system and to which extent. This should be made clear, since a first class ad hoc system in the area may create inequities and attract demand from the neighbouring areas.	The intention is not to set up a parallel healthcare system in the region. The project workforce will have access to a project medical services provider that will not operate outside of the confines of the project footprint. Simultaneously, the project will support Health Systems Strengthening (HSS) of the local district health service in an effort to optimize health care delivery to the communities.

ID	Name, Organisation	Received	Comment	Response
120	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	We may expect that migration and occupational hazards will be risk factors that may require particular attention as they will create direct (eg. injuries) and indirect (eg. HIV/AIDS) additional burdens on the health system. The mitigation plan should spell more clearly how these risks will be tackled.	The baseline health survey provides a more defined perspective on the current and potential future community health challenges and the existing institutional capacity to address these, enabling the Community Health Impact Management Plan (CHIMP), currently under development, to be much more specific in its mitigations. Health related occupational risks to both the workforce and communities have been addressed in a detailed set of CMPs. Occupational health risks will also be addressed by the Project. There will be a clinical facility available for workers.
121	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The EIA refers to the risk of introducing new diseases in the project area, such as dengue, without any supporting evidence of the actual risks. As this may potentially have a large scale public health impact, it requires further investigation.	The risk of this potential event has been investigated and evaluated based on existing evidence at that time. Additional investigation into this risk was performed as part of the health survey and appropriate mitigation measures to address this risk will be included in the CHIMP.
122	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	In relation to the economic and revenues impact of the LNG project, the study identifies most of the possible source of revenues and the multifaceted/interlinked economic opportunities that are likely to rise at the local/regional and national level. This analysis is rather candid and clearly states that the overall impact on employment and the economy (revenues apart) will depend very much on the enhancing measures and policies needed to put in place to spur employment and local economic development. Failure to do so will translate in a very limited impact.	Agreed.
123	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Whereas the EIA provides an exhaustive list of possible sources of revenues and correctly identifies the different economic impacts/links that this project can create/trigger, it does not say how the project intends to address and maximize these impacts but for two forthcoming studies: (i) a revenue management study that, besides providing a more comprehensive understanding of the Mozambican economy, will encourage accountability and revenue distribution at provincial/district level using the EITI as a starting point and working alongside	The two studies mentioned (and indeed the Project) will follow those principles.

ID	Name, Organisation	Received	Comment	Response
			government, NGO and donors community; and (ii) a national content strategy which will detail employment, training and supplier development initiatives (local content/procurement) and set the objectives as well as the concrete activities planned by the project in these critical areas. The following principles stated in the study are worth underlining: • All project initiatives/activities will be done on the basis of provincial and district-level development plans. • The strategy on National Content Strategy is expected to be aligned with the government economic development/education and employment objectives. • The project will discourage any use of local recruitment office/agency and instead will work directly with the district-level government to develop a local workforce database for training and employment opportunities to prioritize local communities. • The project will create a "Grievance Mechanism" to address community grievances around local employment and procurement. The study does not say yet how this mechanism would function.	
124	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	The chapter (13) is well structured and addresses relevant issues and challenges but without tangible proportions or substantive mitigation considerations	Many of the mitigation measures in Chapter 13 defer to future studies (eg the Resettlement Action Plan, Revenue Management Study) but this is the nature of the EIA. The EIA is not the last statement on mitigation although it certainly identifies potential impacts / risks and what mitigation is important. The project will continue other studies in order to flesh out the mitigation measures identified in the EIA, to develop measurable, performance –based outcomes.
125	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Reference is made (13.6.2) to the challenging situation of about 80% of the population not having any level of formal education. In spite of that the project expects to gradually train and absorb local low skilled labour, but does not indicate in which proportion.	The National Content Strategy will define numbers for training. This level of detail is not within the scope of an EIA.

ID	Name, Organisation	Received	Comment	Response
126	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	With respect to the procurement of local goods and services (13.6.3) the project acknowledges the national local content strategy as a framework to abide by, but does not provide substantive clues as to where in the LNG value chain, or which other value chains could become the entry points for that.	The National Content Strategy will define the procurement strategy. This information is not within the scope of an EIA.
127	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	Upon considering the unmet community expectations for employment and procurement opportunities (13.6.4), this document overlooks the scale, impact and risk of this reality. i.e. not addressing such expectations, particularly with respect to employment creation, can become a permanent source of unrest and criminality.	The assessment does consider the scale, duration, and intensity of the impact – this is part of the impact assessment methodology (see Chapter 3 of the EIA Report). Even with mitigation, the assessment acknowledges that this can be a difficult impact to fully address and thus the residual impact remains as moderate significance. However the proposed mitigation is intended to avoid unrest and criminality through pro-active communication and the implementation of the grievance mechanism.
128	Lisa Kurbiel (United Nations)	By email, dated 31 October 2013	While the EIA acknowledges economic diversification as a potential result of the project operations in the district, it does not indicate how this investment could actively exert its catalytic role as an incentive or magnet for making viable (subsequent) infrastructure and business development projects.	It is expected that the Project will act as a catalyst for further investment and development in the Palma area. The extent of this is not yet substantiated but further studies such as the Revenue Management Study and PIIM study will help to provide further detail in this area. In addition, one of the focal areas for the project's CIP in Palma District is to support local livelihood development, including Small and Medium Enterprise development to help provide support for local communities and individuals to capture business opportunities that arise as Palma town develops.

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Annex B

MICOA Approval of EPDA and ToR

Ministry for Environmental Action Coordination

Minister's Office

To:

Mr. John Peffer

General Manager of Anadarko Moçambique, Area 1

Maputo

N/ Ref N 001 / GM / MICOA / 12

Subject: Study of Environmental Pre- Feasibility and Definition of Scope (EPDA : Estudo de Pré-Viabilidade Ambiental e Definição do Âmbito) and Terms of Reference (TrD: Termos de Referência) for the Liquefied Natural Gas (LNG) Project in the Cabo Delgado Province.

Dear Sir:

The Ministry for Coordination of Environmental Action (MICOA), has received your document, referring to the Project mentioned above, having given it it's due technical analysis.

TRANSLATION

After reviewing the project according to article 15Th of The Regulation on The Process of Environment Impact Assessment, MICOA communicates that the present document has been approved. However, MICOA recommends that, for the Environmental Impact Assessment all the issues presented within the EPDA and its respective Terms Of Reference are observed .

Subject: Report on the Revision of the Study of Environmental Pre-Feasibility and Definition of Scope (EPDA / Estudo de Pré-Viabilidade Ambiental e Definição do Ambito) and Terms of Reference (TrD/ Termos de Referência) for the Liquefied Natural Gas (LNG) Project, in the Cabo Delgado Province .

1. Introduction

The elaboration of the Study of Environment Pre- Feasibility and Definition of Scope and the Terms of Reference was carried out as part of a process of the Environmental Impact Assessment for the development and operation of the Natural Gas fields in Area 1 *offshore* of The Rovuma Block and The Liquefied Natural Gas Plant. The proponent of the project is Anadarko Moçambique, Area 1, Lda (AMA1).

The proposed project includes the following main components:

Gas fields in high sea

Offshore pipelines that connect the gas fields in high sea to the LNG Plant onshore;

Ground facilities to process, liquefy and store the natural gas;

Infra-structures and associated facilities

Logistic Activities

TRANSLATION

Etc.

2- Constitution of the Review Team for EPDA and Tdr

In order to review the project, a Technical Committee of Assessment was created. This committee is cpomposed by the National Directorate for the Environmental Impact Assessment , National Directorate of Environmental Management, National Directorate of Planning and Organization of the Territory, Provincial Directorate for the Coordination of Environmental Action, Cabo Delgado (Ministry for Coordination of the Environmental Action), National Institute of Petroleum (Ministry of Mineral Resources), National Directorate of Buildings (Ministry of Public Works and Housing), National Institute for Hydrographic and Navigation and National Institute of the Navy (Ministry of Transports and Communications), National Directorate of Tourism and National Directorate of Reservation Areas (Ministry of Tourism), National Directorate of Forests and Land (Ministry of Agriculture), National Directorate of Industry and National Direction of Trade (Ministry of Trade and Industry) National Direction of Technological Investigation and Innovation (Ministry of Science and Technology), National Direction of Planning and Project Analyses (Ministry of Planning and Development), National Direction of Fuel (Ministry of Energy), Institute for Fishing Research and Institute for the Development of Small Scale Fishery (Ministry of Fisheries) National Directorate of Public Health ((Ministry of Health). Also, involved in reviewing the EPDA, there were institutions whose members are part of the Liquefied Natural Gas Commission, namely: The Office of Studies and Cooperation (Ministry of Labour), National Directorate of Cultural Heritage (Ministry of Culture), Minister of Energy's Office (Ministry of Energy) and National Directorate of Technical and Professional Education (Ministry of Education).

3. Context of the execution of EPDA and ToR

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EPDA and Terms of Referenced were carried out during the preliminary phase of the extraction activity of natural gas in hydrocarbons reserves under the seabed, through underwater wells, transportation to the ground plant through pipelines, liquefaction and exportation through LNG vessels, built for this purpose.

4. Public Participation

Information on the process of public consultation, during the EPDA phase, is reported in Attachment D.

5. Alternatives

According to the project's characteristics, the alternatives for the location, and establishment of the LNG Plant and will be taken into consideration in the REIA.

6. Description of the Affected Environment

The areas of the project and of the project's influence are delimited in maps. The patterns for the Usage of Land in the area of influence are identified in the report, as well as the aspects related to Climate, Geology, Hydrology and Geohydrology, Soils, Oceanography, Vegetation and *Habitats,* Fauna, including socio-economic aspects.

7. Evaluation of the Team of Consultants responsible for EDPA and TdR

The EPDA and ToR was elaborated by a team of independent consultants from IMPACTO, Lda, and ERM, registered to MICOA, in compliance with Decree 45/2004, 29th September.

TRANSLATION

8. Comments / Observations

a) The present project has as its main goal, the building of a Plant for the production of Liquefied Natural Gas, to supply the national market and to export. However, under point 2.2.1, ” Relevant Authorities in Mozambique”, we notice the omission of the Ministry of Industry and Trade, the organ of government that supervises the areas which license Industrial and Commercial activities.

b) The development of the LNG Project foresees Economical and Social benefits for the country. In the meanwhile, on the employment area, and based on the various presentations promoted by the company, it remained underlined that, given the technical nature of the project, few direct jobs will be available to nationals.

c) The project will be implanted amidst a community deprived of means of subsistence and without the technical and professional training to compete with the remainders in the search for a job in the company, which constitutes a worry, the logical thing would be for the company to absorb local workforce as part of its social responsibility.

d) It is guided by conscience of the above that we consider important that the company promotes actions of professional training, prioritizing local youngsters and the Cabo Delgado Province.

e) For the local community to feel included in the project it is important that the company plays its role in the corporative social responsibility chapter, through the involvement of the community itself in the mitigation of adverse effects resulting from the project’s implementation. It is obvious that the implementation of the project will improve the purchasing power of certain social groups that, roughly, are not local. However, this same implementation will have a negative impact on the social groups deprived of these sources of income. This is where professional/vocational training proves itself indispensable, so that young locals are allowed to have access

TRANSLATION

to worthy jobs and also so that creation of new companies, downstream of the project, may happen.

f) EPDA warns that noise and vibration during the implementation of the project will disturb the maritime environment. In face of this situation, some species are in danger of extinction if not permanently, for a relatively long period. This situation may negatively affect the environment and potentiate conflict situations between the project and the various fishermen communities users in the zone. The study must clarify how to mitigate this impact;

g) EPDA refers the annual captures, the number of existing fishermen in Cabo Delgado Province and, in particular, in the Palma District. There is a need to evaluate the resulting impacts of oils spillages along the coast during the operation phase, the negative consequences of which are water pollution and damages on the maritime eco systems.

h) As to what regards the sea component of the project and focalizing on the kind of processing: it is not quite clear on the report what sort of facility is it Floating Processing Unit OR Floating, production, storage and Offloading - FPSO, with a facility to produce, process, store and transfer the gas).

i) In attachment A, the names of the Ministers in charge of the mentioned Ministries are to be completed, as well as the addresses of these institutions;

j) Still in attachment A, the name of the National Director of Environmental Management is Anselmina Liphola, not Alcecrua Uphla;

k) It is not clear to whom the emails presented in attchament A belong;

l) Presentation of the 1.1 image, alluded in the attachments, in a legible manner

TRANSLATION

9. Communication of Results

EPDA and TdR comply with the legislated in articles 10 and 11 of the Regulation on the Process of of the Environmental Impact Assessment and present relevant information to be detailed within the EIA.

10. Conclusions and recommendations of the review team

The present study provides information and data related to the the project's area, particularly in High Sea, taking into consideration that the latter has been subjected to the Environmental Impact Assessment on the Seismic Research and Drilling of Exploratory Oil Wells, including some initial proposals for the evaluation of environmental impact. The same study provides enough information for the making of a decision in favor of the approval of EPDA and TdR, and the prosecution of subsequent studies, thus recommending that the Report of the Environmental Impact Study (REIA) is to be structured.

1.The observance of The Regulation on the Process of The Environmental Impact Evaluation, approved by Decree 45/ 2004, 29 September, and of the General Directives for the Elaboration of Environmental Impact Studies, and for the Process of Public Participation, approved by Ministerial Diplomas 129/2006 and 130/2006, both from 19th July;

2. The creation of conditions for the involvement in the Public Consultation meetings, of Touristic operators exercising their activities in the surroundings of the proposed site for the project; including operators located in the Tecomaji and Rongui Islands and others.
3. The indication of actions to be taken so as to minimize the disturbance of marine mammals, in all phases of the project.
4. The presentation of procedures for management / elimination of unwanted products to be separated from the gas in the Floating Production Unit;
5. The inclusion of procedures for the management of solid waste and effluents, from the phase of generation up to their elimination, as well as the potential risk that they represent for public health and for the environment;

TRANSLATION

6. The presentation of subsistence alternatives for the families depending on the coast and on all the insertion zone of the project for the development of fishing activity (main source of income and subsistence)
7. Presenting the value of the project's investment;
8. The inclusion of the *Curriculum Vitae* of the members of the technical team of EIA that is not mentioned in the registration process in MICOA;
9. The clarification if there will be the need to relocate the population or to pay compensation for the loss of crops or other improvements.
10. The execution of an in depth inventory about the ways of land usage in the project's area of influence.
11. The presentation of the methodology to be used in the identification of the impacts.
12. The inclusion of a Health Center (Health Post) within the infra structures that are part of the project of the Liquefied Natural Gas Manufacturing Plant.
13. The inclusion of the Program of Education towards Health, with an emphasis on the Promotion of Hygiene and Sanitation of the Environment, STD/HIV/AIDS, Malaria and other infectious diseases, taking into account that the workers will be recruited in different areas of the country and beyond.
14. The identification of Anadarko's role in the preservation of the environment along the project's area, taking into account the abundance of many and diverse species.
15. The discrimination of the quantities and materials to be used and their respective costs.
16. The quantification of national and foreign workforce to be employed in each stage of the project.
17. To ensure the right to access the coast for all those who, directly or indirectly, intervene in artisanal, small scale, traditional fishing, in order to guarantee an effective articulation amongst economic and extra-economic factors.
18. The inclusion of a more detailed study on the impact of climatic changes due to infra structures implantation on that area.

TRANSLATION

19. Executing expert studies on the bottom of the sea, in order to minimize the impacts on marine sediments stemming from the enlargement and deepening of the Pemba Bay.
20. The description of the dimensions of the exclusion zone for the anchoring of LNG ships, in case of a different anchorage system than the dynamic positioning one.
21. The communication to other concessionaries in Cabo Delgado Province (ENI, STATOIL e PETRONAS) of the intention to build a LNG plant, in the chosen location, to evaluate the possibility of sharing the manufacture plant for gas processing, taking into account that environmentally it is not feasible for each concessionary to have its own plant.
22. The presentation in a legible way, of image 1.1, included in the attachments
23. The replacement of the initial DINAGECA (extinct) by DNTF (Direcção Nacional de Florestas e de Terras / National Direction of Forests and Lands.

The technical review team (in attachment)
The technical review team of the Liquefied Natural Gas (LNG) Project ,Cabo Delgado Province.

Technical Team Composition

Names	**/ Institutions**	**/ Area of Expertise**
Josefa Jussar	MICOA/DNAIA	chemical eng.
Pedro Magaia	MICOA/DNAIA	oceanographist
Margarida Mabjaia	MICOA/DNAI	geographist
Rosalina Niquice	MICOA/DNAIA	agronomist
Arsénio Diniz	MICOA/ DNAIA/	farming technician
Julieta Cuanda	MICOA DNGA	technician
Ricardo Nhatsave	MICOA/DNGC	technician
David Junior Cosa	MTC/DRI	cooperation technician
Ana Cândido	MISAU/DSA	biologist

TRANSLATION

Décio Monteiro	MIREM/INP	Phisicist
Leonor Machiana	M. Fishery/ DPPE	technician
António Carlos	MOPH/DNEd	Environment Manager
Anastância Nhantumbo	ME/DNC	chemical eng
Carlos Estevão Cossa	MIC/DNC	Trading technician
António Mabota	MTC/ INAMAR	Chemical Eng
Eduardo Chimela	MITRAB	Economist
Erikson Duarte	MITUR/DNAC	Veterinarian
Gilberto Botas	MINED/DINET	Mechanical Eng

To give continuity to the environmental licensing process, Your Ex must submit to MICOA one (1) copy of REIA in electronic support and thirty (30) copies on paper support A4, twenty four (24) of which are for DNAIA and six (6) for DPCA- Cabo Delgado.

Best regards

The Minister

Dra Alcinda António de Abreu

CC Their ex

Natural Resources Minister
Planning and Development Minister
Energy Minister
Trade and Industry Minister
Agriculture Minister
Health Minister
Public Works and Housing Minister
Transports and Communications Minister
Tourism Minister

TRANSLATION

Fisheries Minister
Labour Minister
Science and Technology Minister
Education Minister
Culture Minister
Governor of the Cabo Delgado Province

TRANSLATION

REPÚBLICA DE MOÇAMBIQUE

MINISTÉRIO PARA A COORDENAÇÃO DA ACÇÃO AMBIENTAL

GABINETE DO MINISTRO

Ao:

Senhor John Peffer
Director Geral da Anadarko
Moçambique, Área 1

Maputo

N/Refª Nº 004 /GM/MICOA/12

Maputo, 03 de Janeiro de 2012

Assunto: Estudo de Pré-viabilidade Ambiental e Definição do Âmbito (EPDA) e Termos de Referência (TdR) do Projecto de Gás Natural Liquefeito (GNL), na Província de Cabo Delgado

Exmo Senhor,

O Ministério para a Coordenação da Acção Ambiental (MICOA) recebeu o documento de V.Excia referente ao Projecto em epígrafe, tendo merecido a devida análise técnica.

Após a revisão feita nos termos do Artigo nº 15 do Regulamento sobre o Processo de Avaliação do Impacto Ambiental, o MICOA comunica à V.Excia, que o presente documento está aprovado mas, recomenda para o Estudo do Impacto Ambiental (EIA), a observância de todas as questões apresentadas no relatório de revisão em anexo, e o atendimento ao EPDA e respectivos Termos de Referência.

Rua de Kassuende, 167, C.P.2020. Maputo. Tel: 21496109/492403/485269, Fax: 21496108. Maputo

Para dar continuidade ao processo de licenciamento ambiental, V.Excia deverá submeter ao MICOA, uma (1) cópia do REIA em suporte electrónico, e trinta (30) cópias em suporte de papel A4, sendo vinte e quatro (24) para a DNAIA e seis (6), para a DPCA-Cabo Delgado

Com os melhores cumprimentos.

A Ministra

Drª Alcinda António de Abreu

CC: Suas Excelências:

A Ministra dos Recursos Minerais
O Ministro da Planificação e Desenvolvimento
O Ministro da Energia
O Ministro da Indústria e Comércio
O Ministro da Agricultura
O Ministro da Saúde
O Ministro das Obras Públicas e habitação
O Ministro dos Transportes e Comunicações
O Ministro do Turismo
O Ministro das Pescas
A Ministra do Trabalho
O Ministro da Ciência e Tecnologia
O Ministro da Educação
O Ministro da Cultura
O Governador da Província de Cabo Delgado

Assunto: Relatório de Revisão do Estudo de Pré-viabilidade Ambiental e Definição do Âmbito (EPDA) e Termos de Referência (TdR) do Projecto de Gás Natural Liquefeito (GNL), na Província de Cabo Delgado

1. Introdução

O Estudo de Pré-viabilidade Ambiental e Definição do Âmbito e os Termos de Referência foram elaborados como parte do processo de Avaliação do Impacto Ambiental para o desenvolvimento e operação dos campos de gás natural da Área 1 *Offshore* do Bloco do Rovuma e da Fábrica de gás natural liquefeito. O proponente do projecto é a Anadarko Moçambique, Área 1, Lda (AMA1)

O projecto proposto inclui os seguintes componentes principais:

- Campos de gás em alto mar;
- Sistemas de gasodutos em alto mar que liga os campos de gás em alto mar à fábrica de GNL em terra;
- Gasoduto em terra a partir do ponto de desembarque do gasoduto em alto mar para a fábrica de GNL;
- Instalações em terra para processar, liquefazer e armazenar o gás natural;
- Infra-estruturas e serviços associados;
- Actividades logísticas;
- Etc.

2. Formação da equipe de revisão do EPDA e TdR

Para a revisão do projecto constituiu-se a respectiva Comissão Técnica de Avaliação composta por: Direcção Nacional de Avaliação do Impacto Ambiental, Direcção Nacional de Gestão Ambiental, Direcção Nacional de Planeamento e Ordenamento Territorial e Direcção Provincial para a Coordenação da Acção Ambiental de Cabo Delgado (Ministério para a Coordenação da Acção Ambiental), Instituto Nacional de Petróleo (Ministério dos Recursos Minerais), Direcção Nacional de Edifícios (Ministério das Obras Públicas e Habitação), Instituto Nacional de Hidrografia e Navegação e Instituto Nacional da Marinha (Ministério dos Transportes e Comunicações), Direcção Nacional do Turismo e Direcção Nacional das Áreas de Conservação (Ministério do Turismo), Direcção Nacional de Terras e Florestas (Ministério da Agricultura), Direcção Nacional da Indústria e Direcção Nacional do Comércio (Ministério da Indústria e Comércio), Direcção Nacional de Investigação e Inovação Tecnológica (Ministério da Ciência e Tecnologia), Direcção Nacional de Planificação e Análise de Projectos (Ministério da Planificação e Desenvolvimento), Direcção

Nacional de Combustíveis (Ministério da Energia), Instituto de Investigação Pesqueira e Instituto de Desenvolvimento de Pesca de Pequena Escala (Ministério das Pescas) e Direcção Nacional de Saúde Pública (Ministério da Saúde). Foram envolvidas ainda na revisão do EPDA, as instituições cujos membros integram a Comissão do Gás Natural Liquefeito, nomeadamente: Gabinete de Estudos e Cooperação (Ministério do Trabalho), Direcção Nacional de Património Cultural (Ministério da Cultura), Gabinete do Ministro (Ministério da Energia) e Direcção Nacional do Ensino Técnico – Profissional (Ministério da Educação).

3. Contexto da realização do EPDA e TdR

O EPDA e TdR foram realizados na fase preliminar da actividade de extracção do gás natural em reservatórios de hidrocarbonetos abaixo do leito do mar através de poços submarinos, transporte através de gasodutos até a fábrica em terra, liquefação e exportação através de embarcações de GNL construídas para o efeito.

4. Participação Pública

Consta do anexo D, a informação sobre o processo de consulta pública realizada na fase do EPDA

5. Alternativas

De acordo com a natureza do projecto, serão consideradas no REIA as alternativas de localização, de disposição das infra-estruturas, tecnológicas e de processo

6. Descrição do Ambiente Afectado

As áreas do projecto e de influência estão delimitadas em Mapas. Os padrões de uso da terra na área de influência estão identificados no relatório, bem como os aspectos relacionados com o clima, geologia, hidrologia e geohidrologia, solos, oceanografia, vegetação e *habitats*, fauna, incluindo os aspectos sócio-económicos.

7. Avaliação da Equipa de consultores responsável pelo EDPA e TdR

O EPDA e TdR foram elaborados por uma equipa de consultores independentes da Impacto, Lda e da ERM, registados no MICOA de acordo com o Decreto 45/2004 de 29 de Setembro.

8. Comentários/Constações

a) O presente projecto tem como objectivo principal a construção de uma fábrica para a produção de Gás Natural Liquefeito para abastecer o mercado nacional e para a exportação. Contudo, no ponto 2.2.1 Autoridades Relevantes em Moçambique", nota-se a omissão do Ministério da Indústria e Comércio, "Orgão que superintende às áreas de licenciamento de actividades comerciais e industriais";

b) O desenvolvimento do Projecto de LNG prevém benifícios económicos e sociais para o país. Entretanto, o domínio de emprego e com base nas diversas apresentações promovidas pela empresa, ficou subjacente que dada a natureza técnica do projecto, serão criados poucos empregos directos;

c) O projecto será implantado numa comunidade desprovida de meios de subsistência e sem preparação técnico- profissional para concorrer com os demais na busca de emprego na empresa, o que constitui preocupação pois, o lógico é a empresa absorver mão-de-obra local como parte da sua responsabilidade social;

d) É orientado por esta consciência que consideramos importante a empresa promover acções de formação profissional, priorizando os jovens locais e da Província de Cabo Delgado;

e) Com vista a comunidade local se sentir parte integrante do projecto, é importante a empresa desempenhar o seu papel no capítulo da responsabilidade social corporativa, através do envolvimento da própria comunidade na mitigação dos efeitos adversos decorrentes da implementação do projecto. É óbvio que a implementação do projecto vai melhorar o poder de compra para certas camadas que, grosso modo, não são locais, no entanto, terá um impacto adverso para as camadas desprovidas destas fontes de rendimento. É aqui onde a formação profissional se mostra imprescindível para permitir os jovens locais terem acesso ao emprego digno e a criação de novas empresas à jusante do projecto;

f) O EPDA adverte que o ruído e a Vibração durante a implementação do projecto irá perturbar o ambiente marinho. Perante esta situação, algumas espécies correm o risco de desaparecer, se não definitivamente,

por um período relativamente longo. Esta situação poderá afectar negativamente o ambiente e potenciar situações de conflitualidade entre o projecto e as diversas comunidades de pescadores utilizadores desta zona. O estudo deverá esclarecer como mitigar este impacto;

g) O EPDA faz menção às capturas anuais, o número de pescadores existentes na Província de Cabo Delgado e em particular no Distrito de Palma. Há uma necessidade de se avaliar os impactos decorrentes do derramamento de óleos ao longo da costa durante a fase de operação, tendo como consequências negativas a poluição das águas e danos aos ecossistemas marinhos;

h) No que tange a componente do projecto no mar, focalizando o tipo de unidade de processamento não está bem patente no relatório que tipo de unidade se trata (Unidade de Processamento Flutuante, ou um Navio Sonda do tipo *flutuante- Floating, Production, Storage and Offloading* - FPSO, com unidade de produção, processamento, armazenamento e transferência do gás);

i) No anexo A, deve-se completar os nomes dos Ministros que tutelam os Ministérios referidos e os endereços dessas instituições;

j) Ainda no Anexo A, o nome da Directora Nacional de Gestão Ambiental é Anselmina Liphola e não Alcecrua Luphla;

k) Não está claro a quem pertencem os e-mails apresentados no Anexo A;

l) A apresentação de forma legível, da figura 1.1 constante dos anexos;

9. Comunicação dos Resultados

O EPDA e TdR cumprem com o legislado nos Artigos 10 e 11 do Regulamento sobre o Processo de Avaliação do Impacto Ambiental, e apresentam uma informação relevante a ser detalhada no EIA.

10. Conclusões e recomendações da equipa de revisão

O presente estudo fornece uma informação e dados de base sobre a área do projecto, principalmente no alto mar, tendo em conta que a mesma foi sujeita à Avaliação do Impacto Ambiental nas fases de Pesquisa Sísmica e Perfuração de Poços de Pesquisa, incluindo algumas propostas iniciais para a avaliação do impacto ambiental. O mesmo fornece informação suficiente para a tomada de uma decisão favorável à aprovação do EPDA e TdR, e o prosseguimento dos

estudos subsequentes, sendo de se recomendar na estruturação do Relatório de Estudo de Impacto Ambiental (REIA):

1. A observância do Regulamento sobre o Processo de Avaliação de Impacto Ambiental, aprovado pelo Decreto 45/2004, de 29 de Setembro e das Directivas Gerais para a Elaboração de Estudos de Impacto Ambiental, e para o Processo de Participação Pública, aprovadas pelos Diplomas Ministeriais 129/2006 e 130/2006, ambos de 19 de Julho;

2. A criação de condições para o envolvimento nas reuniões de Consulta Pública, dos operadores turísticos que exercem as suas actividades nas proximidades do local proposto para o projecto, incluindo os operadores dos projectos localizados nas Ilhas Tecomajy, Rongui e outros;

3. A indicação de medidas a serem tomadas para minimizar a perturbação dos mamíferos marinhos em todas as fases do projecto;

4. A apresentação de procedimentos para a gestão/eliminação dos produtos indesejáveis a serem separados do gás na Unidade de Produção Flutuante;

5. A inclusão de procedimentos para a gestão de resíduos sólidos e efluentes, desde a fase de geração até a sua eliminação, bem como o potencial risco que apresentam para a saúde pública e para o meio ambiente;

6. A apresentação das alternativas de subsistência das famílias que dependem da costa e toda a zona de inserção do projecto para o desenvolvimento da actividade piscatória (principal fonte de renda e de subsistência);

7. A apresentação do valor de investimento do projecto;

8. A inclusão dos *Curriculum* Vitae dos membros da equipa técnica do EIA não constantes do processo de registo no MICOA;

9. A clarificação se haverá ou não necessidade de reassentamento populacional ou compensação por perda de culturas ou outras benfeitorias;

10. A realização de um inventário aprofundado das formas de uso de terra na área de influência do projecto;

11. A apresentação da metodologia a ser usada na identificação dos impactos;

12. A inclusão de um Posto Médico no conjunto das infra-estruturas que compõem o projecto da Fábrica de Gás Natural Liquefeito;

13. A inclusão do programa de educação para a Saúde, com ênfase para a promoção de Higiene e Saneamento do Meio, ITS/HIV/SIDA, Malária e outras doenças infecciosas, tendo em conta que os trabalhadores serão recrutados em diferentes regiões do País e não só;

14. A indicação da comparticipação da Anadarko na conservação do meio ambiente ao longo da área de influência do projecto, tendo em conta que abundam muitas e variadas espécies;

15. A discriminação das quantidades e dos materiais a serem usados e seus respectivos custos;

16. A quantificação da mão-de-obra nacional e estrangeira a ser empregue em cada fase do projecto;

17. A assegurar o direito do acesso à costa, de todos aqueles que directa ou indirectamente intervêm na pesca artesanal, com vista a garantir uma articulação efectiva entre os factores económicos extra-económicos;

18. A inclusão de um estudo mas detalhado sobre o impacto das mudanças climáticas devido a implantação da infra-estrutura na área;

19. A realização de estudos especializados do fundo do mar, com vista a minimizar os impactos sobre os sedimentos marinhos derivados do alargamento e aprofundamento do canal na Baía de Pemba;

20. A descrição das dimensões da zona de exclusão para a ancoragem dos navios GNL, caso se trate de um sistema de ancoragem diferente ao do posicionamento dinâmico;

21. A comunicação a outros concessionários da Província de Cabo Delgado (ENI, STATOIL E PETRONAS), da intenção da construção da fábrica de GNL no local proposto, para a avaliação da partilha da mesma para o processamento do gás, tendo em conta que ambientalmente não é viável que cada concessão tenha a sua própria fábrica;

22. A apresentação de forma legível, da figura 1.1 constante dos anexos;

23. A substituição da sigla DINAGECA (extinta) por DNTF (Direcção Nacional de Terras e Florestas).

A equipa técnica de revisão (em anexo)

A equipa técnica de revisão do projecto de Gás Natural Liquefeito (GNL), Provincia de Cabo Delgado:

Nome	Instituicao	Especialidade	Assinatura
Josefa Jussar	MICOA/DNAIA	Engª.Química	
Pedro Magaia	MICOA/DNAIA	Oceanógrafo	
Margarida Mabjaia	MICOA/DNAIA	Geógrafa	
Rosalina Niquice	MICOA/DNAIA	Eng.ª Agrônoma	
Arsénio Dinis	MICOA/DNAIA	Técnico-Agro. Pecuário	
Julieta Cuanda	MICOA/DNGA	Técnica	
Ricardo Nhatsave	MICOA/DNGC	Técnico	
David Júnior Cossa	MTC/DRI	Técnico de cooperação	
Ana Cândido	MISAU/DSA	Biologa	
Décio Monteiro	MIREM/INP	Físico	
Leonor Machiana	M.pescas/IDPPE	Técnica	
António Carlos	MOPH/DNEd	Gestor Ambiental	
Anastância Nhantumbo	ME/DNC	Engª.Química	
Carlos Estevão Cossa	MIC/DNC	Técnico de Comercio	
Antônio Mabota	MTC/INAMAR	Eng. Químico	
Eduardo Chimela	MITRAB	Economista	
Eriksson Duarte	MIC/DNI	Eng. Químico	
Oraca Cuambe	MITUR/DNAC	Veterinária	
Gilberto Botas	MINED/DINET	Engº. Mecânico	

Annex C

Baseline Methodologies

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C1 INTRODUCTION

C1.1 OVERVIEW

This annex provides the methodologies developed and used by the various environmental and socio-economic specialists to collect, interpret and present baseline findings for their respective specialist studies. In the cases where modelling was undertaken (eg air quality and noise), the methodology for that modelling and any assumptions made are provided in the relevant sections. This annex is set out as follows:

- *Section C2* Air Quality
- *Section C3* Climate Change
- *Section C4* Noise
- *Section C5* Soils
- *Section C6* Hydrology
- *Section C7* Groundwater
- *Section C8* Surface Water Ecology
- *Section C9* Vegetation
- *Section C10* Herpetology
- *Section C11* Mammals
- *Section C12* Avifauna
- *Section C13* Marine Ecology
- *Section C14* Landscape and Visual
- *Section C15* Waste
- *Section C16* Socio-Economics
- *Section C17* Health
- *Section C18* Archaeology

The Impact Assessment (IA) methodology used by the specialists is based on the methodology developed and distributed by ERM and Impacto which is described in *Chapter 3* of the EIA. Any deviations to the IA methodology are included in this annex under the respective studies. Those sections that present different IA approaches are the Air Quality and Landscape and Visual studies). They are different because the general impact assessment methodology did not lend itself to the specifics of the subject matter. Therefore more appropriate methodologies are described herein for these.

C2 AIR QUALITY

C2.1 OVERVIEW

This section sets out the methodology used for the air quality baseline description and the assessment of potential impacts that may arise from the operation of the facility. Site visits were undertaken to take air quality baseline measurements. The impact assessment used differs from the methodology provided in *Chapter 3* of the EIA Report and is more appropriate for specifically air quality assessments.

C2.2 ASSESSMENT CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

Air emissions for the purposes of this guideline are framed within the Regulations on the Emission of Effluents and Environmental Quality Standards (Decree, 18/2004 dated June 2) and Decree No. 67/2010, dated December 31 (amendments to Appendix I and inclusion of Appendices 1A and 1B to Decree No. 18/2004). The IFC General Environmental Guidelines and the IFC EHS LNG Facility Guidelines defer to the WHO Air Quality Guidelines Global Update, 2005 as set out in *Table 2.1*. Both Mozambique national air quality standards and WHO standards have been used in the assessment. This approach was adopted to ensure that the results are robust, and because the Mozambique standards do not cover impacts associated with PM_{10} and $PM_{2.5}$.

Table 2.1 Air Quality Standards and Guidelines

Pollutant	Averaging Period	Guideline Value (µg/m³)	
		WHO	Mozambique Decree no. 67/2010
SO_2	1-year mean		40
	24-hour maximum	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)	100
	1-hour maximum		800
	10-minute maximum	500 (guideline)	500
NO_2*	1-year mean	40 (guideline)	10
	24-hour maximum		-
	1-hour maximum	200 (guideline)	190
TSP	1-year mean		60
	24-hour maximum		150
PM_{10}	1-year mean	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)	-
	24-hour assessed as the third highest 24 hour period (99th percentile)	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)	-

Pollutant	Averaging Period	Guideline Value (µg/m³)	
		WHO	Mozambique Decree no. 67/2010
$PM_{2.5}$	1-year mean	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)	-
	24-hour maximum	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)	-

*MICOA has authorised the Project to use the WHO NO_2 standard instead of the Mozambican NO_2 standard.

C2.3 ASSESSMENT CRITERIA FOR THE PROTECTION OF ECOLOGICAL HABITATS

Impacts relating directly to air quality (ie NO_x, SO_2) are not habitat or species specific and are the same for all sites. NO_x and SO_2 are especially relevant in this context as they both play a role in the acidification of water and soil and NO_x also contributes to eutrophication. These criteria used in this assessment are derived from European Directives, and are set out in *Table 2.2*.

Table 2.2 Air Quality Critical Levels used for the Assessment of Impacts on Sensitive Ecological Receptors

Pollutant	Averaging Period and Statistic	Assessment Criterion (µg/m³)	Source
NO_x	Annual mean	30	AQS (1)
SO_2	Annual mean	20	AQS[5]

C2.4 SIGNIFICANCE CRITERIA

The magnitude of impacts was quantified using predictive techniques based on detailed dispersion modelling. The magnitude of the impact is the 'Process Contribution (PC)'; this is the impact arising solely from project related emissions. In order to consider the significance of those impacts, consideration is required of the existing baseline. The PC added to the existing baseline is described as the Predicted Environmental Concentration (PEC). Baseline data is available from 24th February till 27th June, but only for NO_2 and NO_x. Therefore not all PECs can be derived for this assessment. Based on initial baseline results we will assume that the local airshed is considered undegraded.

When considering the significance of impacts in the context of air quality, all receptors are considered equally sensitive. This arises from the fact that all receptors will experience similar health effects when exposed to increases in

(1) Air Quality Standard – these are derived from CAFÉ.

airborne pollution. Therefore, the significance of impact is dependent on the magnitude of impact, with due regard to the existing baseline (as stated above the airshed is defined as undegraded based on initial baseline data). The significance criteria used in this study for the assessment of human health follow the IFC guidelines, but are expanded upon to provide an indication of the importance of impacts.

When considering sensitive ecological receptors, generally all receptors are considered to be equally sensitive to the main pollutants of interest (NO_x and SO_2).

The significance of the predicted impacts was ascertained by means of comparison to air quality standards and guidelines as set out in Section C2.2 and *Table 2.1* above. The significance of impacts is primarily based upon whether or not the impacts result in air quality standards being exceeded or contribute a substantial proportion of airborne pollutants in the local airshed.

IFC make differentiation in the significance of impacts, based upon the existing baseline air quality in the vicinity of a proposed development. Essentially, this is based upon whether there is a significant risk of the existing baseline air pollution to result in air quality guidelines being exceeded; this is described in more detail below.

The IFC General EHS Guidelines state:

> *"Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:*
>
> - *Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources.*
> - *Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed [ie in an undegraded airshed]".*

And:

> *"An airshed should be considered as having poor air quality [degraded] if nationally legislated air quality standards or WHO Air Quality Guidelines are exceeded significantly".*

The IFC guidelines further state:

> *"Facilities or projects located within poor quality airsheds, and within or next to areas established as ecologically sensitive (eg national parks), should ensure that any increase in pollution levels is as small as feasible, and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment."*

On the basis of the IFC guidance, a degraded airshed is therefore defined in this assessment as locations where the baseline air quality is already in excess of the air quality standards.

The significance of impacts is therefore defined in terms of the magnitude of impacts (*ie* the Process Contribution or PC), and whether the baseline pollution concentrations are above or below the air quality standards. Using this approach, the significance criteria for air quality have been defined. These are set out in *Table 2.3*. As stated above complete baseline data is not available yet (monitoring started in February 2012). Based on initial baseline results we will assume that the local airshed is considered undegraded.

Table 2.3 Significance Criteria for Assessment of Airborne Pollutants[1]

Significance of impact	**Magnitude of impact**	
	Undegraded airshed	**Degraded airshed**
Not Significant	***Negligible***: PC <25% of AQS	***Negligible***: PC <10% of AQS
Minor Adverse	***Small***: PC between 25% and 50% of AQS and PEC <100% of AQS	***Small***: PC between 10% and 30% of AQS and PEC >100% of AQS
Moderate Adverse	***Medium***: PC between 50% and 75% of AQS, and PEC <100% AQS; or ***Medium***: PC between 25% and 50% of AQS, and PEC >100% of AQS	***Medium***: PC between 30% and 50% of AQS, and PEC >100% of AQS; or
Major Adverse	***Large***: PC between 75% and 100% of AQS, and PEC <100% AQS; or ***Large***: PC between 50% and 75% of AQS, and PEC >100% of AQS	***Large***: PC between 50% and 100% of AQS, and PEC >100% of AQS; or
Critical Adverse	***Very Large***: PC>100% of AQS; or ***Very Large***: PC between 75% and 100% of AQS and PEC >100% of AQS	***Very Large***: PC>100% of AQS
PC: Process Contribution PEC: Predicted Environmental Concentration		AQS: Air Quality Standard

C2.5 RECEPTORS

The air quality standards and guidelines apply at all off-site locations (see *Table 2.1* and *Figure 2.1*).

In order to capture the maximum off-site impacts the model utilises four grids of receptors with following characteristics:

- grid 1:
  - resolution = 50 m;
  - extent around plant fenceline = 1 – 2.9 km;
- grid 2:
  - resolution = 100 m;

(1) [1] the significance for humans and ecology are treated as the same in light of no alternative information.

- extent around plant fenceline = 3.6 – 6.7 km;
- grid 3:
  - resolution = 500 m;
  - extent around grid 2 = 5 km;
- grid 4:
  - resolution = 1000 m;
  - extent = proposed Rovuma National Reserve.

The maximum air impacts have been assessed for all off-site locations within the receptor grid.

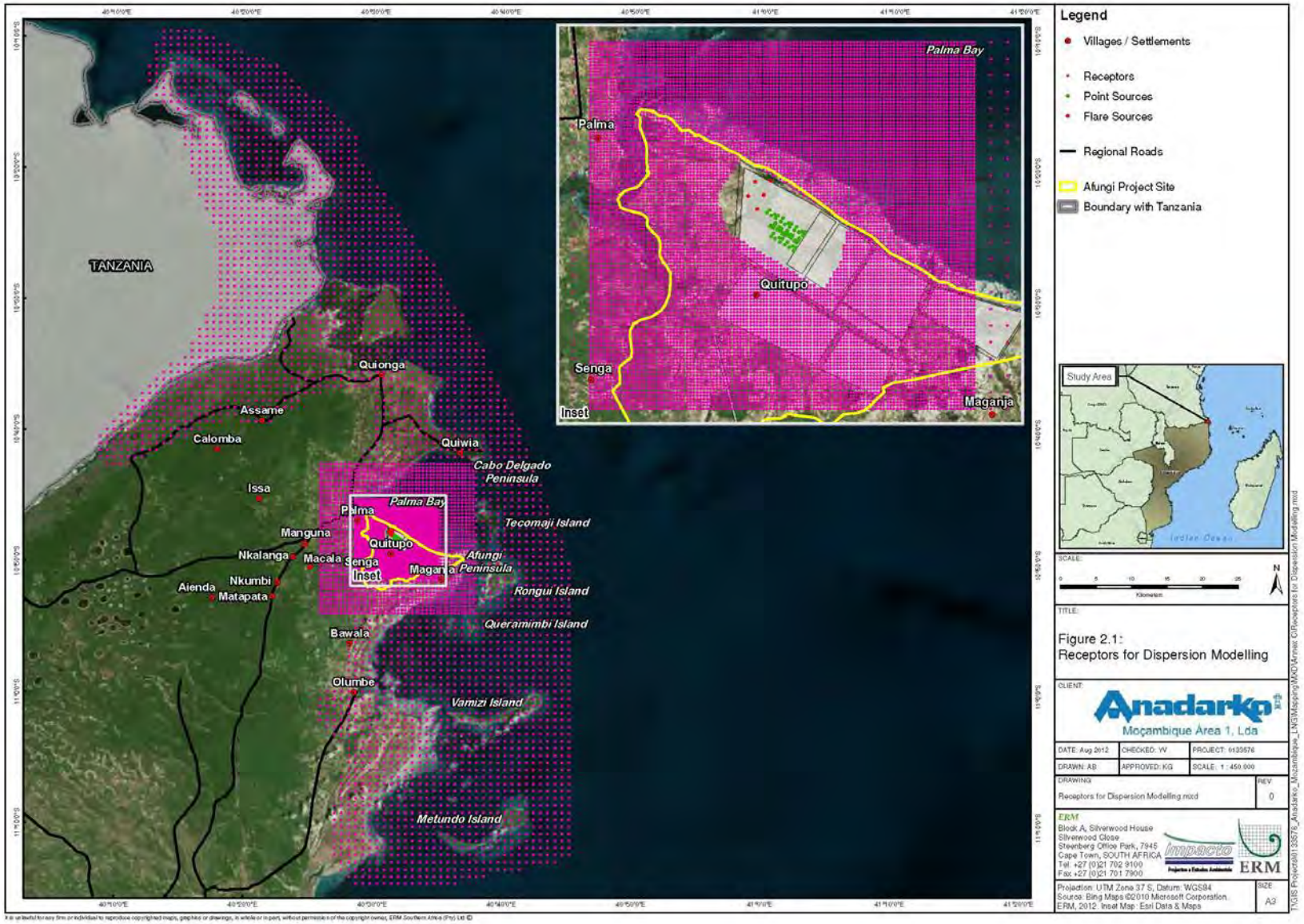
C2.6 POINT SOURCE DISPERSION MODELLING INPUTS AND METHODOLOGY

C2.6.1 Overview

The potential for impacts to air quality due to emissions arising from the project are assessed by comparing the predicted impacts against standards and guidelines for the protection of human health, and critical levels for the protection of sensitive ecology as described above. The assessment uses dispersion modelling to predict the ground level increases in pollution concentrations attributable to the plant emissions to establish whether there is the potential for significant impacts to occur.

The detailed dispersion modelling is used to predict concentrations of pollutants at ground level locations outside the plant boundary, at sensitive receptors. Five years of hourly sequential meteorological data are used, so that inter annual variability is incorporated in the model. The results of the assessment are based upon the worst case result for any of the five meteorological years used.

Figure 2.1 Receptors for Dispersion Modelling



C2.6.2 Dispersion Model

The model used in the assessment is the United States Environmental Protection Agency's AERMOD dispersion model.

AERMOD is considered to be appropriate for this type of assessment as the model is well recognised within the air quality and impact assessment practice by numerous organisations including IFC.

C2.6.3 Operating Scenarios

The air quality assessment has evaluated impacts from 4 operating scenarios. These scenarios are as follows:

Scenario 1 (normal phase 1 operation):
- Train 1 and 2 operating normally; and
- No flaring.

Scenario 2 (short term assessment only, normal phase 1 operation with maximum flaring event):
- Train 1 and 2 operating normally; and
- 60 minutes emergency flaring event on 1 flare.

Scenario 3 (normal phase 2 operation):
- Train 1, 2, 3, 4, 5 and 6 operating normally; and
- No flaring.

Scenario 4 (short term assessment only, normal phase 2 operation with maximum flaring event):
- Train 1, 2, 3, 4, 5 and 6 operating normally; and
- 60 minutes emergency flaring event on 2 flares.

C2.6.4 Model Inputs for LNG Trains

Each LNG Train comprises following relevant emission sources:

- 1 MR Compressor Turbine (47 MWth);
- 1 PR Compressor Turbine (47 MWth);
- 1 Hot Oil Heater (15 MWth);
- 4 Power Generator Turbines (total of 116 MWth) for Train 1;
- 3 Power Generator Turbines (total of 99 MWth) for Trains 2 - 6;
- 1 Acid Gas Incinerator (3.5 MWth) per 2 trains.

The stack parameters for the emission sources for 1 LNG Train are set out in *Table 2.4*.

The pollutant emissions data for these sources that has been used in the assessment are set out in *Table 2.5*. As much of the design of the plant is still

unknown, no accurate emission data is available, therefore the client has provided emission data based on emission factors from literature[1] (except for SO_2 which was calculated based on material balance and sulphur content).

The PCs are based upon modelling of emissions at design limits.

(2) AP-42 Compilation of Air Pollutant Emission Factors, http://www.epa.gov/ttnchie1/ap42/

Table 2.4 Summary of Stack Parameters for LNG Trains

Installations		MR Turbine	PR Turbine	Power Generator Turbines		Hot Oil Heater	Acid Gas Incinerator
Parameter	Units	1 x 47 MWth per train	1 x 47 MWth per train	train 1: 4 x 29 MWth	train 2- 6: 3 x 33 MWth per train	1 x 15 MWth per train	1 x 3.5 MWth per 2 trains
Number of installations per stack		1	1	1	1	1	1
Stack height actual	m	40	40	40	40	25	40
Flue diameter	m	3.85[1]	3.85[1]	3.23[1]	3.44[1]	0.677[1]	0.769[1]
Stack Area	m²	11.6[1]	11.6[1]	8.18[1]	9.31[1]	0.36[1]	0.464[1]
Gas-fired							
Emission velocity	Am/s	15.0[2]	15.0[2]	15.0[2]	15.0[2]	10.0[2]	10.0[2]
Volume flow rate gas fired (normalised, dry)	Nm³/s	61.78[3]	61.7[3]	43.4[3]	49.3[3]	2.08[3]	1.64[3]
Volume flow rate gas fired (actual)	Am³/s	175	175	123	140	3.60	4.64
Emission temperature gas fired (actual)	Celsius	500[4]	500[4]	500[4]	500[4]	200[5]	500[4]
Oxygen (normalised)	%v/v	15.0	15.0	15.0	15.0	3.00	3.00
Oxygen gas fired (actual)	%v/v	15.0[6]	15.0[6]	15.0[6]	15.0[6]	3.00[6]	3.00[6]

[1] calculated based upon ASSUMED emission velocities and calculated/ASSUMED volumetric flow rates

SENSITIVITY: decreasing stack diameter/area will increase emission velocity and therefore increase dispersion, resulting in lower impacts.

[2] ASSUMPTION: based upon relevant project experience

[3] calculated based on provided estimations of NOx mass flow and NOx concentration of:

- 51 mg/Nm³ for turbines (per WB/IFC standards);
- 100 mg/Nm³ for acid gas incinerator and hot oil heater (ASSUMPTION).

SENSITIVITY: higher concentrations, without increase in mass flow will result in lower volumetric flow rates and therefore decreased dispersion and higher impacts.

[4] ASSUMPTIONS based upon relevant project experience

[5] ASSUMPTION based upon relevant project experience

SENSITIVITY: lower temperature will reduce dispersion and increase impact

[6] ASSUMPTION: actual oxygen content in flue gases is usually around the normalised oxygen content

SENSITIVITY: Actual oxygen level in flue gases are indicative of the amount of air used for combustion and establishing exhaust flow through the stack. Higher actual oxygen level means more air is used, diluting in effect the flue gases with higher volume flow rates and lower actual emission concentrations as a result.

Table 2.5 Pollutant Emissions Data

Pollutant	Units	Emissions						Basis of emission rate used in modelling
		MR Turbine	PR Turbine	Power Generator Turbines Train 1	Power Generator Turbines Train 2 - 6	Hot Oil Heater	Acid Gas Incinerator	
NO_x	g/s	3.15 per train	3.15 per train	4 x 2.21	3 x 2.52 per train	0.208 per train	0.164 per 2 trains	estimated data provided by client and based on: - AP-42 for acid gas incinerator and hot oil heater; and - WB/IFC for gas turbines
SO_2	g/s	-	-	-	-	-	4.31 per 2 trains	provided by client and based on material balance with 100% conversion of vent/fuel gas sulphur to SO_2
TSP	g/s	0.294 per train	0.294 per train	4 x 0.182	3 x 0.207 per train	0.0308 per train	0.0250 per 2 trains	estimated data provided by client and based on: AP-42
PM_{10}	g/s	0.294 per train	0.294 per train	4 x 0.182	3 x 0.207 per train	0.00770 per train	0.00560 per 2 trains	estimated data provided by client and based on: AP-42

C2.6.5 Model Inputs for the Flares

The stack parameters and emission rates for the LNG worst case flaring are set out in *Table 2.6.*

Table 2.6 Summary of Stack and Emission Parameters for the Flare

Parameter	Units	Combined HP / LP
Continuous flaring?		No
Description of flaring event		worst case emergency
Duration of flaring event	min	60[1]
Amount of gas flared in emergency blowdown event	kg	~350 000[2]
Composition of typical flared gas		C1-C6 > 94% (rest = N2)
Number of stacks		1
Stack height actual	m	140[3]
Emission velocity	m/s	100[4]
Volume flow rate (actual)	Am^3/s	126[5]
Heat Release Rate	cal /s	1 436 000 000
Emission temperature (actual)	Celsius	1 000[6]
NO_x Emission Rate	g/s	87.8 (AP-42)
$PM_{10}/PM_{2.5}$ Emission Rate	g/s	negligible
SO_2 Emission Rate	g/s	negligible

[1] ASSUMPTION based upon relevant project experience	SENSITIVITY: longer events will cause larger impacts given that other parameters stay the same
[2] ASSUMPTION based upon relevant project experience and design capacity	SENSITIVITY: higher mass flow will result in higher impacts
[3] conservative ASSUMPTION based upon relevant project experience	SENSITIVITY: increasing stack height will result in lower impact.
[4] ASSUMPTION based upon relevant project experience	SENSITIVITY: since a flare is an external combustion process, mass flow and volumetric flow are directly related to each other. The mass of gas that needs to be flared will define the volume flow through the flare pipe and the emission velocity, and more importantly the mass of emitted pollutants. The combustion of this mass of gas and the resulting flame height and temperature are the main factors that will define dispersion of these pollutants.
[5] ASSUMPTION based upon calculations, relevant project experience and design capacity	
[6] ASSUMPTION based upon relevant project experience	SENSITIVITY: lower temperature will reduce dispersion and increase impact.

C2.6.6 Meteorological Data Selection

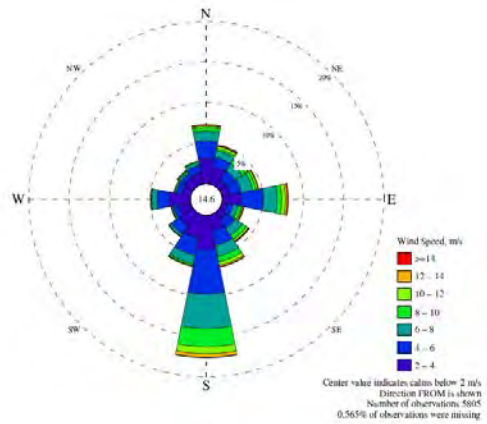
The meteorological data used in the model must be reflective of the local conditions. Unfortunately there are only a very limited number of meteorological stations in Africa which measure all of the parameters required by the model. The station at Dar Es Salaam Airport is the closest station to the LNG plant which measures all of the parameters and is also located at a shoreline, but is approximately 450 km north northwest of the site.

The most critical parameters determining local dispersion are wind speed and wind direction. During the assessment process, data on these parameters was sought from a more local source of monitoring (Mocimboa Da Praia (approx.

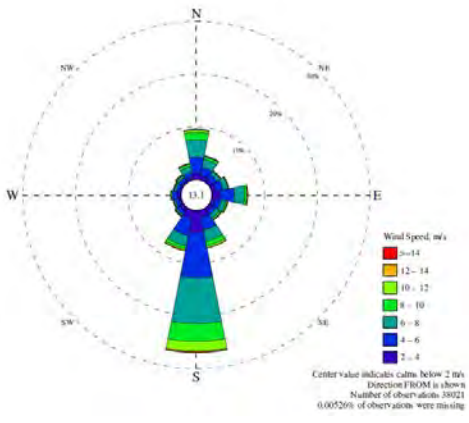
70 km south of LNG plant) and Mtwara (~70 km north of LNG plant)). This provided some understanding of the uncertainty in the modelling and proved that the data from Dar Es Salaam Airport is somewhat unrepresentative of the conditions at the development site as shown in *Figure 2.2*. It is clear that Dar Es Salaam has less frequent southern and western winds, and more eastern winds.

Therefore, five years of MM5 modelled meteorological data for 2007-2011 was sourced from Lakes Environmental, as this is somewhat more representative of local conditions. However, as illustrated by the locally sourced data, uncertainties in the local meteorological conditions remain. For the modelling the MM5 data was used. Wind roses based on the MM5 data are also shown in *Figure 2.2.* According to this figure easterly winds dominate, just as in Dar Es Salaam, but with lower wind speeds.

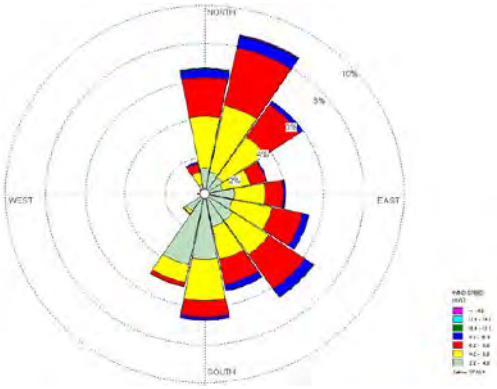
Figure 2.2 Comparison of meteorological data for Dar Es Salaam and project region



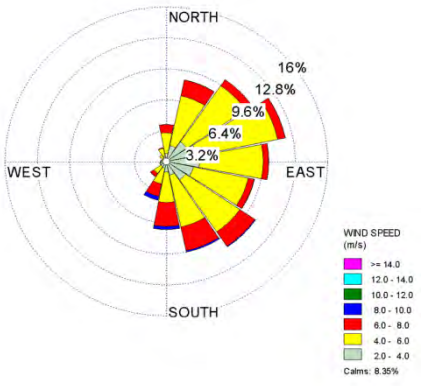
MocDaPraia (1973 – 2012)



Mtwara (1957 – 2012)



Dar Es Salaam (2006 – 2011)



MM5 (2007 – 2011)

C2.6.7 Consideration of Terrain Effects

Changes in terrain elevations (ie hills or mountains) can have a significant impact on dispersion of emissions, in terms of funnelling of plumes and changing local wind flows. Terrain effects are typically considered important

where there are sustained gradients of 1:10 or greater which is not the case here. For this assessment terrain was therefore not included in the model.

C2.6.8 Consideration of Building Downwash

When air flow passes over buildings, a phenomenon known as building downwash occurs where the air is entrained in the lee of the building and drawn down to ground level. This effect can bring the plume from the stack down to ground level more quickly than would otherwise be the case, and therefore increase the ground level concentration relative to a case where there are no buildings. Based on currently available data, only the LNG Train buildings with the coolers on top have been included in the model. At this point, detailed height information is available, but only basic plant footprint is available.

Within the model, buildings are conceptually considered as a block shape, as the model cannot take into account downwash effects around a complex building shape. The dimensions of the buildings are presented in *Table 2.7*.

Table 2.7 Dimensions of Buildings, as Modelled

Buildings	Shape	Height (m)	Length/Diameter (m)	Width(m)
LNG Train building	rectangular	20	221	36
Power generator buildings	rectangular	6	18	6
Storage tanks	circular	45	80	-

C2.6.9 Conversion of NO_x to NO_2

The combustion process generates oxides of nitrogen (NO_x). In the exhaust gases from the stack, these are in the ratio of approximately 95% nitric oxide (NO) to 5% nitrogen dioxide (NO_2). With regard to the assessment of impact on human health NO_2 is the pollutant of interest as NO is largely inert in the human body. Within the atmosphere various processes oxidise NO to create NO_2 but this process will not occur quickly or completely before the plume reaches ground level. Therefore it is overly pessimistic to assume 100% conversion from NO to NO_2, and it is necessary to use a factor to estimate ground level concentrations of NO_2 based upon total NO_x emitted.

A number of international agencies have developed guidelines for including in assessments the conversion of NO to NO_2. A summary of the main guidelines are set out below in *Table 2.8*. The ratios set out in *Table 2.8* indicate that a wide range of ratios to convert NO to NO_2 are recommended by a variety of country agencies as set out in *Table 2.8* These conversion factors have been applied in the results interpretation.

Table 2.8 Recommended NO to NO_2 conversion ratio

Country	Averaging period	Recommended NO to NO_2 conversion ratio
United States	24 hour	75%
	Annual	75%
Germany	24 hour	60%
	Annual	60%
United Kingdom	Short term (1 hour)	35%
	Annual	70%
Hong Kong	24 hour	20%
	Annual	20%
Ontario, Canada	24 hour	52%
	Annual	68%

Adopting a pragmatic approach a conversion factor of 35% for the short term and 70% for long term was adopted.

This applies only to the assessment of impacts on sensitive human receptors, as when assessing impacts on sensitive ecological receptors total NO_x is assessed and therefore no conversion is required.

C2.6.10 Non-Routine Events

A technically complex process, such as a LNG plant, is highly unlikely to operate for a protracted period of time without some non-routine events occurring. These events are typically short term but have the potential to result in short term elevated emissions. In the case of this facility, the key consideration is the safe disposal of gas when the plant is experiencing a non-routine event. This is achieved by diversion of gas to flares where it can be burned off until the plant operations are restored to normal.

Flares will be installed to combust gas from non-routine events related to maintenance and emergencies. Typical flaring events will occur for less than 60 minutes. The flaring event selected for modelling represents the worst case volume of gas reasonable expected to be flared from anticipated non-routine events. Note that an assessment of gas composition for identified flaring events revealed that no sour gas flaring is expected, so SO_2 emissions should remain negligible for all flaring.

C3 CLIMATE CHANGE

C3.1 INTRODUCTION

This study has been undertaken in accordance with international best practice emissions estimation techniques and the impact assessment methodology outlined in *Chapter 3* of the EIA. This section provides an overview of the methodology for calculating the carbon footprint and provides comment on how the impact assessment has been approached.

The study has involved a desktop assessment of international and national climate change literature; review of relevant documentation and discussion with the Project and specialist consultants. No field work was undertaken.

C3.2 CARBON FOOTPRINT CALCULATION

C3.2.1 Methodology

A carbon footprint is a measure of the estimated greenhouse gas emissions caused directly and indirectly by an individual, organisation, event or product. The calculation of a carbon footprint generally involves the following equation:

Carbon footprint emissions = activity data x emissions factor x global warming potential

- *Activity data* relates to the emission causing activity eg the combustion of a quantity of diesel or the use of a quantity of refrigerant gases;
- *Emission factors* convert the activity data collected and consolidated into tonnes of the relevant greenhouse gas; and
- *Global warming potentials* are applied to non-CO_2GHG to convert the result to carbon dioxide equivalent (tCO_2e).

The Projects carbon footprint has been estimated in accordance with the *GHG Protocol: Corporate Accounting & Reporting Standard* developed by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI). The *GHG Protocol* provides comprehensive guidance on accounting and reporting corporate GHG emissions. It is the most widely used standard for mandatory and voluntary GHG programmes and makes use of the Intergovernmental Panel on Climate Change (IPCC) GHG Inventory guidelines for specific heating values, carbon content, densities and emission factors. Where applicable, ERM has referred to specific data provided by the Engineering Team and the following sources for country and process specific factors:

- IPIECA Petroleum industry guidelines for reporting greenhouse gas emissions; and
- American Petroleum Institute's 2009 Compendium of Greenhouse Gas Emissions.

The calculation using these standards ensures that the Project's Carbon Footprint is aligned with international standards.

C3.2.2 Emissions Boundary Definition

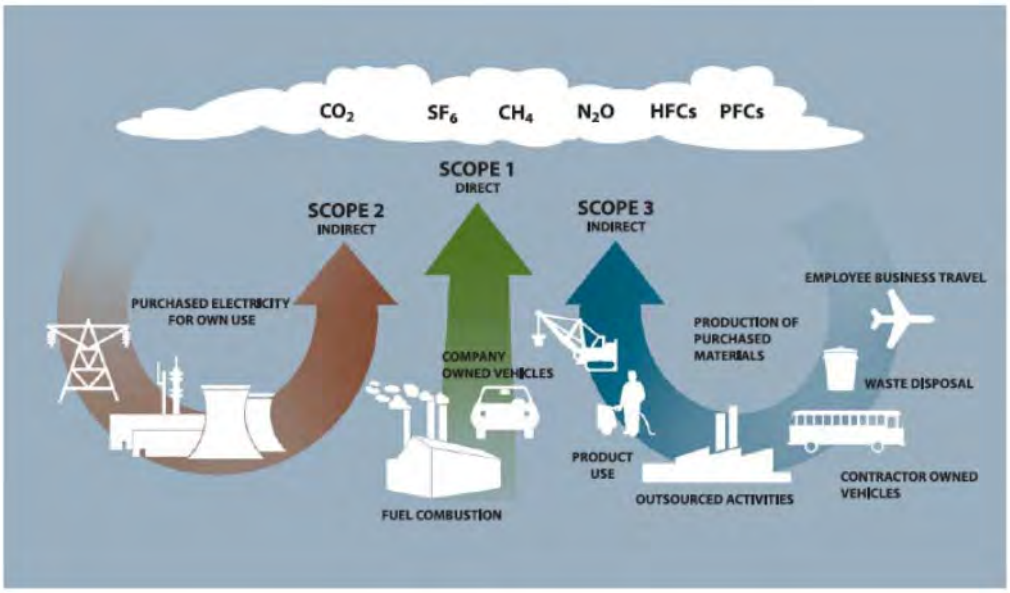
The scope of the carbon footprint depends on definition of two boundaries relating to the organisational and operational aspects of the project as outlined below. The boundaries drawn for the purposes of this project are discussed below.

Organisational boundaries determine whether reporting is done according to the "equity share approach" (different economic interest is reflected by companies being wholly owned, incorporated or non incorporated joint ventures or subsidiaries) or the "control approach" (emissions accounted for from operations under the direct operational control of the parent company).

Operating boundaries determine which emission causing activities will be included in the carbon footprint. The GHG Protocol divides emissions into three categories as described below and illustrated in *Figure 3.1*.

- *Scope 1 – direct emissions* from sources owned or under the operational control of the company;
- *Scope 2 – indirect emissions* from the consumption of purchased electricity; and
- *Scope 3 – indirect emissions* an optional reporting category allowing for other indirect emissions associated but not controlled by the company to be included such as contractor activities.

Figure 3.1 GHG Protocol Emission Scopes



C3.3 IMPACT ASSESSMENT METHODOLOGY

A traditional impact assessment is conducted by determining how the proposed activities will affect the state of the environment prior to development of a project (as outlined in *Chapter 3* of the *EIA Report*). In the case of GHG emissions, this process is complicated by the fact that the impact of GHG emissions on the environment cannot be quantified within a defined space and time.

The greenhouse effect occurs on a global basis and the point source of emissions is irrelevant when considering the future impact on the climate. It is not possible to link emissions from a single source such as the LNG facility to particular impacts in the broader study area.

Subsequently, this specialist study does not consider the physical impacts of climate change resulting from increasing GHG emissions, but rather the impact of the project on Mozambique's National GHG Inventory and the implications of this.

The impact of the estimated Project's operational emissions has been compared with a national emissions trajectory from Mozambique from 1994 to 2028 which has been determined based on historic and projected economic growth and development pathways.

C3.4 SCOPE OF THE CARBON FOOTPRINT

C3.4.1 Introduction

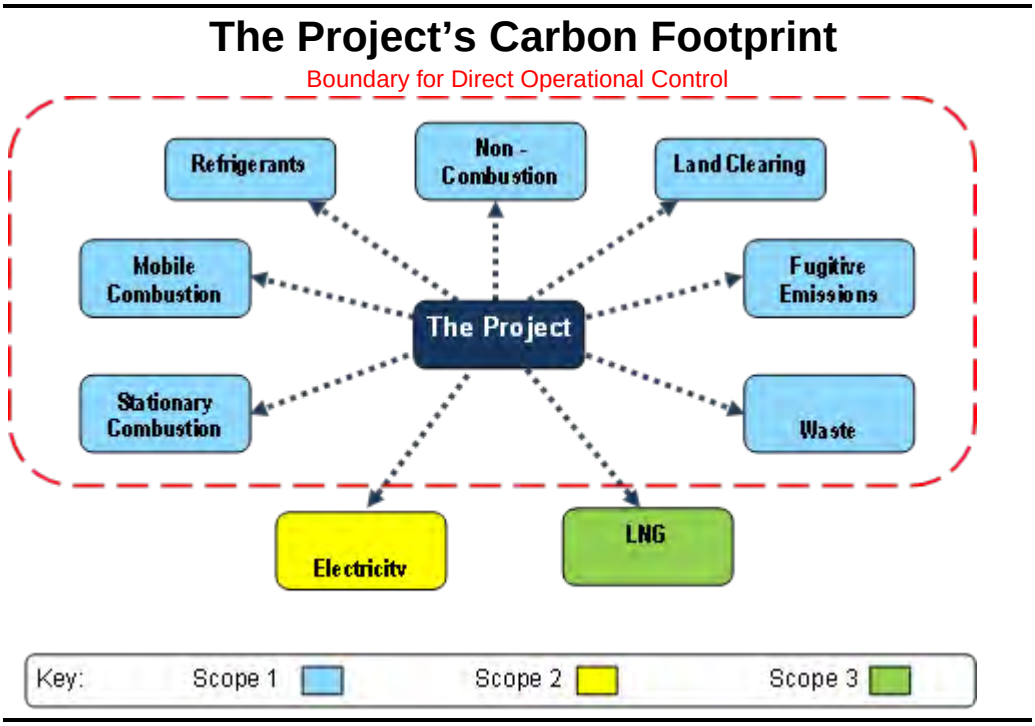
This section defines the scope of the Project's carbon footprint in terms of emission boundaries, timing of emission causing activities coming online, and an overview of emission causing activities.

C3.4.2 Organisational and Operational Boundary

The organisational boundary has been defined according to the control approach where emissions from sources under the direct operational control of the Project will be included in the carbon footprint as illustrated in *Figure 2.3*.

Scope 3 (indirect) emissions would typically be from outsourced activities, such as contractor activity and employee business travel. These emissions have been excluded for the purposes of this study due to the fact that there is considerable uncertainty with respect to estimating contractor activity and employee business travel.

Figure 2.3 ***The Project's Carbon Footprint Boundary***



It is assumed that the Project will pay for the fuel used by contractors on site and therefore the emissions associated with their activities have been included under Scope 1. All electricity is generated on site (Scope 1) and therefore there are no Scope 2 emissions from purchased electricity. Scope 3 emissions associated with export of LNG have been estimated but not included in the overall carbon footprint as discussed in *Section 5*.

C3.4.3 Timeframe

Construction is due to begin in 2014 with operations beginning as the first LNG 'train' comes online during Quarter 4 of 2018. The production capacity of each LNG train is 5 million tonnes of LNG per year. Construction will continue until 2021 when six trains will be in operation bringing the total production of the facility to 30 million tonnes of LNG per year. The life of the facility is anticipated to be approximately 30 to 40 years indicating closure in 2058. *Table 3.1* shows the timing of trains coming online and how the three phases of activity are expected to impact the number of people working on site.

Table 3.1 Timeframe from Construction to Full Operations of the Project

Phase	Timing of trains	Approx number of people on site
Construction 2014 – 2018	N/A	8,000
Combined Construction and Operations 2018 – 2021	Train 1 – 2018 Q4 Train 2 – 2019 Q2 Train 3 – 2020 Q1 Train 4 – 2020 Q3 Train 5 – 2021 Q1 Train 6 – 2021 Q3	10,000
Operations only Phase 2021 – 2058	N/A	700

C3.4.4 Overview of Project Emission Causing Activities

The proposed LNG and support facilities are expected to cover an area of some 36km²within a larger site area of approximately 80km². The associated offshore gas fields are located approximately 50 kilometres east of the onshore facilities. The Project Description in *Chapter 4* of the *EIA Report* provides a detailed account of the activities associated with the proposed project.

There are four major components to the project which include:

- Offshore - gas fields and associated infrastructure;
- Onshore
  - LNG industrial complex;
  - a residential camp accommodating up to10,000 people; and
  - services including port, roads, power, water and sewage etc.

Table 3.2 summarises the key emission sources occurring on site and indicates those which are included in the carbon footprint.

Table 3.2 Summary of Key Emission Sources (all Scope 1)

Emission Scope	Emission Source
Mobile combustion	Fuel used in marine vehicles including tug, utility and chase boats, freight carriers and Project LNG carriers Fuel used in terrestrial vehicles including cars, utility vehicles, buses etc Fuel used in airplanes contracted for exclusive use by the Project
Stationary combustion	Diesel used for power generation Gas used for power generation Diesel use by contractors during construction Flaring Incineration of acid and fuel gas Oil heating
Waste emissions	Methane emissions from waste water (sewage) treatment
Refrigerants	Leakage/use of refrigerant gases in air conditioning units in vehicles and offices/accommodation
Fugitives	Natural gas leaks from pipelines
Lubricants	Use of lubricant oils and greases in machinery
Land clearance	Clearance of vegetated land (at the start of the project)

C3.5 ASSUMPTIONS MADE IN ESTIMATING OPERATIONAL ACTIVITY DATA

Good practice for calculating a carbon footprint dictates that actual activity data (eg litres of diesel consumed) for a financial year is used. Given that this project involves an estimation of a future carbon footprint for activities yet to begin, a series of assumptions have been made in order to obtain the activity data required to undertake this calculation.

Data was obtained from the ESIA Aspects Register, the Specialist Study Workshop held on 25 – 26 January 2012 and through discussion with the Engineering Team to clarify and confirm assumptions. The carbon footprint has been estimated in accordance with current design options and these may well change following completion of the ESIA and Front End Engineering and Design (FEED) studies. A number of assumptions have been made in relation to each aspect of the carbon footprint calculation (these are not detailed here).

The carbon footprint includes estimated direct emissions from activities associated with the construction and operation of the facilities. Embedded emissions associated with the materials used are regarded as Scope 3 and not included as they are outside the scope of this project. The emissions from the consumption of LNG sold by the Project are not included as this is outside the control of the company and the demand for LNG would have been met by an alternative supplier, meaning that it does not add additional emissions into the atmosphere.

C4 NOISE

C4.1 APPROACH AND METHODOLOGY

C4.1.1 Overview

The broad objectives are to implement a project that in an environmentally, economically and socially sustainable manner consistent with the requirements of the IFC/ WB Noise Guidelines and Performance Standards.

C4.1.2 Noise Sensitive Receptors

The LNG Plant will be located on the eastern coastal area approximately 5km from the town of Palma. There are several villages and settlements located in the vicinity of the proposed LNG Plant and airstrip. There are sizeable settlements of more than 20 dwellings and smaller hamlets lie scattered throughout the area. The surrounding land is largely used for agriculture, particularly rice fields.

Several villages and communities are currently situated within the Afungi Project Site. It is envisaged that these receptors will be resettled as part of the Resettlement Plan, and hence, have not been assessed as Noise Sensitive Receptors (NSR). NSRs outside the Afungi Project Site are considered in the impact assessment.

Existing ambient and background noise levels within the Project Area and surrounds were also measured to inform the impacts assessment. The methodology in determining representative existing noise levels is described in the section below.

An overview of the Project area highlighting the location of the LNG facility, airstrip, baseline noise measurement locations and noise assessment locations are shown in *Figure 4.1* and are listed in *Table 4.1*

Figure 4.1 LNG Plant and Assessment Locations

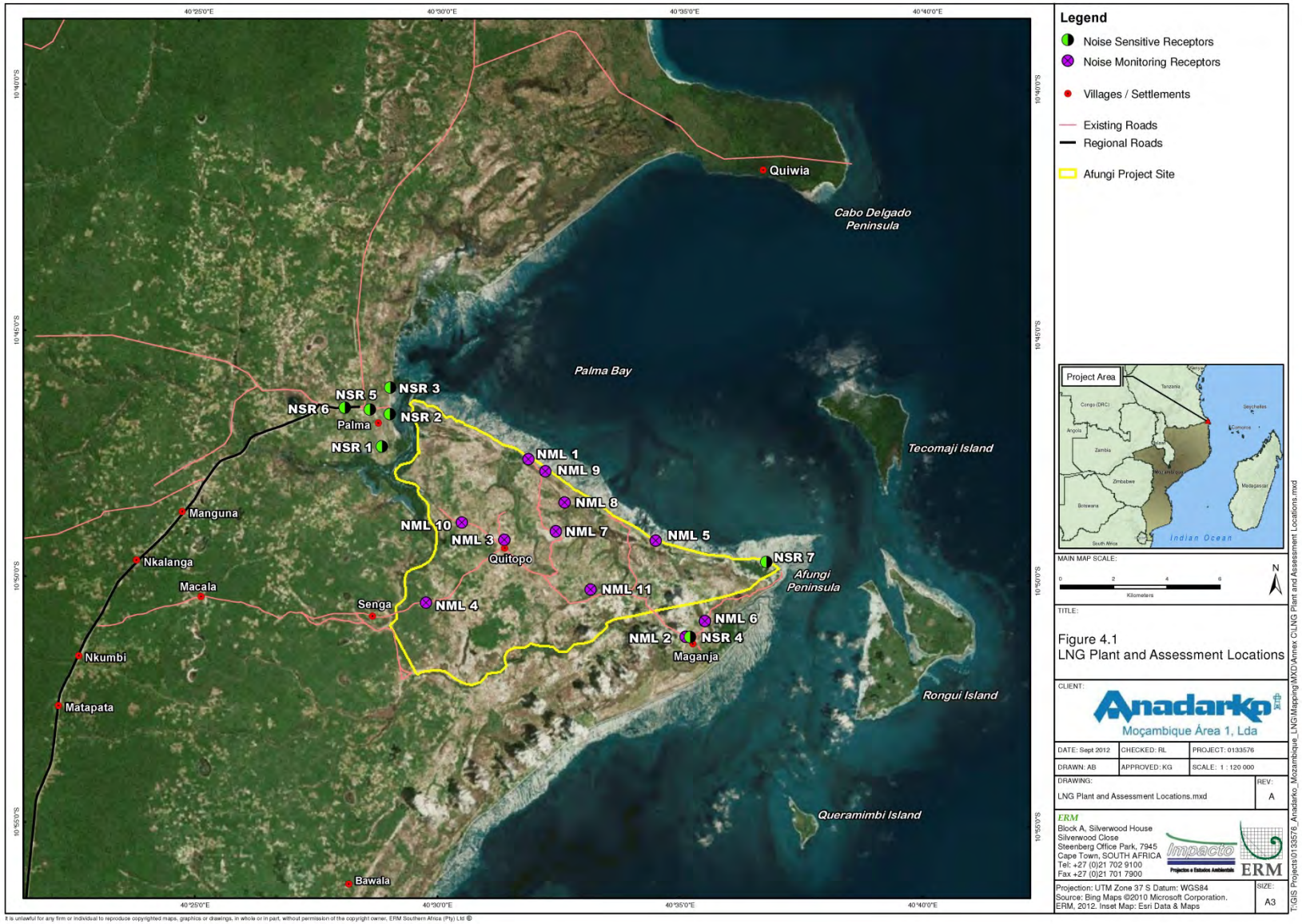


Table 4.1 Assessment Locations and Characteristics

NSR ID	District	Village	Population	Easting (1)(m)	Northing(1)(m)	Distance to LNG plant (m)	Nearest Noise Survey Location (distance)
1				661826	8806977	3000	Road closest to airstrip (4.1km)
2				662120	8808185	3200	Road closest to airstrip (5km) Maganja village (5.5km)
3				662137	8809181	3600	Maganja village (5.8km)
4				673400	8799835	3000	Near village 5,6,7 (0.1km)
5				661374	8808355	3900	Road closest to airstrip (5.4km)
6				660428	8808433	4800	Road closest to airstrip (6.1km)
7				676257	8802645	1700	Heli Pad (3.2km) Quitopo village (4.3km)

Note 1: Coordinate System: WGS84 – UTM 37S

C4.2 IMPACT PREDICTION

C4.2.1 Noise Prediction Methodology – LNG Plant

During the construction phase, impacts are related to machinery noise emissions that have the potential to affect the area adjacent to the project site. Construction noise sources are generally intermittent and impacts depend on the number and types of machinery used for each activity. An increase in the noise level in the area adjacent to the Afungi Project Site is also expected during the operational phase.

Noise level predictions must take into account all significant noise sources associated with the proposed operations. One method of determining the impact of numerous noise sources at a receiver is to develop a computer model of the proposed operations using a commercially available software package. An acoustic model has been developed using the environmental noise modelling program "SoundPLAN", version 7.0, developed by Braunstein + Berndt GmbH. The model has been used to generate expected noise contours for the area surrounding the LNG plant and also to predict noise levels at the nearest noise sensitive receptors, identified in *Figure 4.1* for the following scenarios:

- LNG Plant construction;
- Airstrip construction; and
- Normal LNG plant operation.

The model has been used to implement the methods identified within ISO9613 Part 2 for the propagation of noise. SoundPLAN uses the following information to predict noise levels attributable to the LNG plant at nearby receivers:

- three-dimensional digital terrain map of site and surrounding area;
- frequency-based sound power level noise source data for plant and equipment operating at the site;
- intervening ground cover;
- shielding by barriers, intervening buildings or topography; and
- atmospheric conditions.

Meteorology

The model has been used to predict noise levels and produce noise contours considering (as per ISO 9613-2) the following environmental conditions:

- Air Pressure 101,325 Pa
- Air Temperature 299.15 K (26 °C)
- Humidity 83%

The noise propagation is carried out under down wind conditions (from source to receptor). Downwind propagation conditions for the method specified in ISO 9613 are:

- wind direction within an angle of ±45° of the direction connecting the centre of the dominant sound source and the centre of the specified receiver region, with the wind blowing from source to receiver; and

- wind speed between 1 m/s and 5 m/s, measured at a height of between 3 m to 11 m above the ground.

The meteorological parameters have been set up for the whole calculation domain, to represent as the probable atmospheric conditions of the Project area.

Topography and Land Cover

Topographical information for the acoustic model was extracted from 1m ground contours available in electronic format for the area surrounding the LNG Plant. A 3-D representation of the terrain's surface has been calculated through the generation of a digital ground model (DGM) in SoundPlan. The screening effects of buildings and barriers at the site have been excluded from the acoustic model to represent a conservative calculation methodology.

The attenuation due to the ground between the noise sources and the receptors has been included in the noise model. An absorption coefficient value of 0.2 dB has been applied for surfaces covered by vegetation and fields; and an absorption value of 0.0 dB has been applied for the plant site and the sea.

C4.2.2 Modelling Scenarios

Construction Phase

Noise associated with construction of the LNG plant will be variable in nature and will depend on the particular activities being undertaken as well as the equipment in operation. The construction phase is expected to be approximately 51 months and is anticipated to begin in early 2014.

Noise will be potentially generated at the LNG Facilities site, both onshore and offshore, by:

- **Site preparation and earthmoving.**
  This scenario includes significant noise-producing activities such as vegetation clearance, topsoil removal, earthworks, construction of the earth causeway and the Materials Offloading Facility. These activities will require heavy construction vehicles and equipment such as bulldozers, scrapers, graders, rollers, dump trucks and water carts.

- **Civil works and Plant Fabrication.**
  This scenario includes significant noise-producing activities such as installation of concrete and asphalt batch plants, installation of foundation structures and paved areas within the LNG Facilities, upgrade of the existing local road and installation of on-site roads. These activities will require equipment such as piling, heavy rollers, concrete trucks, generator sets and steel reinforcement fabrication hand tools such as grinders.

- **Construction of the Plant Utilities.**
  This scenario will include activities such as receiving and transporting large plant items from the Materials Offloading Facility to the LNG Facilities site, which will typically require equipment such as offloading crawler cranes and heavy transport equipment. Onsite steel fabrication, pipe erection and assembly of plant items will typically require tower cranes, grinders, welders, generator sets, air compressors and forklifts.

The overall noise produced during the construction phase comes from several types of equipment and from specific activities. Therefore, the noise impact related to this phase can be variable and it is difficult, to accurately predict construction noise emissions throughout the entire construction period. Hence, to facilitate the noise assessment, three 'worst case' scenarios have been developed:

- a site preparation scenario;
- a civil works scenario; and
- a construction plant utilities scenario.

Considering that construction activities will extend throughout the project site, each scenario has been simulated several times, varying the location of the equipment to represent a 'typical' maximum activity with all equipment operating in the area closest to noise sensitive receptors.

The predicted noise levels from the model are based on the assumption that all equipment is operating simultaneously and at full load. The equipment simulated and their acoustic performances for each scenario are shown in *Table 4.2* to *Table 4.4*.

Table 4.2 Site Preparation Equipment List

Equipment	Num.	Octave Band (Hz) Sound Power Level, dBA								Lw(dBA)	Location Area
		63	125	250	500	1K	2K	4K	8K		
Chainsaws	1	81	91	98	104	107	108	108	106	114	Onshore facilities area
Bulldozer	2	101	105	108	111	109	104	99	-	116	
Scraper	1	76	85	91	96	98	97	90	81	113	
Grader	1	83	92	98	103	105	104	97	88	110	
Loader	2	89	93	97	100	103	101	96	91	108	
Roller	1	89	68.5	73	74	71	69	64	56	106	
Dump truck	3	96	100	104	107	110	108	103	98	115	
Water cart	1	81	85	89	92	95	93	88	83	100	
4WD vehicle	3	43	56	66	73	76	73	70	64	80	
Dump truck	2	96	100	104	107	110	108	103	98	115	Offshore facilities area
Excavator large	2	91	95	99	102	105	103	98	93	110	
Bulldozer small	1	99	103	106	109	107	102	97	-	114	
Roller	1	89	68.5	73	74	71	69	64	56	112	
Sheet pile driver	1	80	110	115	110	119	110	104	97	122	
4WD vehicle	2	43	56	66	73	76	73	70	64	80	

Table 4.3 Civil Works Equipment List

Equipment	Num.	Octave Band (Hz) Sound Power Level, dBA								Lw(dBA)	Location Area
		63	125	250	500	1K	2K	4K	8K		
Pile driver	1	80	110	115	110	119	110	104	97	122	Onshore facilities area
Roller	2	89	68.5	73	74	71	69	64	56	106	
Concrete and asphalt batch plant	1	92	96	100	103	106	104	99	94	111	
Concrete mixer truck	3	91	95	99	102	105	103	98	93	110	
Concrete pump	2	106	106	98	98	102	97	92	92	112	
Grinder	3	-	91	97	100	102	97	92	88	111	
Generator	3	99	98	96	92	91	90	78	81	105	
4WD vehicles	5	43	56	66	73	76	73	70	64	80	

Table 4.4 Plant Utilities Equipment List

Equipment	Num.	Octave Band (Hz) Sound Power Level, dBA								Lw (dBA)	Location Area
		63	125	250	500	1K	2K	4K	8K		
Tower crane	1	-	-	-	110	-	-	-	-	110	Onshore facilities area
Welder and generator	3	99	98	96	92	91	90	78	81	105	
Grinder	3	-	91	97	100	102	97	92	88	110	
Air compressor	3	91	90	93	96	96	94	91	-	106	
Forklift	2	62	72	79	85	88	89	89	87	95	
Flat bed truck	2	79	95	96	100	104	103	98	92	114	
4WD vehicle	5	43	56	66	73	76	73	70	64	80	
Crawler crane	1	-	-	-	111	-	-	-	-	111	Offshore facilities area
Heavy transport	1	70	86	87	91	95	94	89	83	105	
Piling from barge	1	76	106	111	106	115	106	100	93	118	
Crawler crane from barge	1	-	-	-	113	-	-	-	-	113	

Operation Phase

LNG Facilities operations comprise a large number of processes, activities and equipment that generate noise. It is anticipated that the operational life of the facility will be approximately 30 years and the LNG Plant will run 24 hours a day, 7 days a week and the main noise sources will be located within:

- the LNG Plant and utilities areas, characterised by up to 6 LNG trains, different operational areas (feed gas reception, water and effluent treatment, air compression and fractionation area, MEG unit, refrigeration storage) and common facilities;

- the flare area, due to the necessity during normal LNG plant operations to occasionally and intermittently burn unwanted gas from the flare tower. The flare will be 140 meters above ground level; and

- the LNG Jetty and harbour area, where LNG loading will require tankers, tugs and equipment such as pumps and tanker auxiliary power generators.

To predict noise emissions from LNG processing operations, a typical worst case activity case has been assumed based on the simultaneous occurrence of the following typical scenarios:

- LNG Processing scenario;
- Flare scenario; and
- Shipping scenario.

The predicted noise levels in the model are based on the assumption that equipment is operating simultaneously and at full load. The equipment simulated and their acoustic performances for each scenario are shown in *Table 4.5* to *Table 4.7.*

Table 4.5 LNG Processing and Utilities Scenario Equipment List

Equipment	Octave Band (Hz) Sound Power Level, dBA									Overall (dBA)
	31.5	63	125	250	500	1K	2K	4K	8K	
Power generation and refrigeration storage										
LNG Train	58	70	90	108	105	120	116	102	77	125
Air coolers (number =189)	67	69	71	76	82	86	88	88	93	96
Exhaust chimney	103	99	98	93	86	83	79	76	67	90
Generator	98	98	97	95	91	90	89	77	80	104
Ethane/Propane pumps	89	89	89	87	87	85	80	75	75	96
Feed gas reception area										
Gas reception unit	87	91	85	81	79	91	95	72	57	101
Water treatment area										
Fresh water pump	85	85	85	83	83	81	76	71	71	92
Potable water pump	84	84	84	82	82	80	75	70	70	91
Demin water pump	84	84	84	82	82	80	75	70	70	91
Fresh water fire pump	93	110	99	97	95	97	92	79	66	111
Jockey pump	84	84	87	88	86	86	86	86	80	95
Fresh water diesel fire pump	93	110	99	97	95	97	92	79	66	111
Air compression and nitrogen area										
Air compression	-	91	90	93	96	96	94	91	-	102
Emergency and laboratory										
Labs sanitary pump	84	84	84	82	82	80	75	70	70	91
Effluent treatment										
Contaminated water recycle pump	82	82	82	80	80	78	78	68	68	89
Irrigation water pump	82	82	82	80	80	78	78	68	68	89

Effluent discharge pump	82	82	82	80	80	78	78	68	68	89
Fractionation										
Fractionation column	89	96	95	97	100	100	94	82	110	112
Pumps	89	89	89	87	87	85	80	75	75	96
MEG Unit										
Meg flash separator recycle heater	101	102	97	95	89	88	89	85	77	106
Pumps	89	89	89	87	87	85	80	75	75	96
Lean MEG booster pump	87	87	87	85	85	83	78	73	73	94

Table 4.6 Elevated Flare Equipment List

Equipment	**Height (m)**	**Octave Band (Hz) Sound Power Level, dBA**								**Overall (dBA)**
		63	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**	
Flare	140	119	118	115	110	109	109	111	112	124

Table 4.7 Shipping. Equipment List

Equipment	**Number**	**Sound Power Level (dBA) (ref 10^{-11} Watts)**
LNG tanker	1	111
Tugs	4	111
Condensate tanker	1	101
Condensate pumping	1	105

C4.2.3 Noise Prediction Methodology – Airstrip

The Integrated Noise Model (INM) version 7.0b was used to compute flight profiles and noise contours based on the following data:

- Runway geometry.
- Aircraft types.
- Aircraft performance data.
- Aircraft numbers for the peak period, during the construction phase.
- Flight tracks (or routes).
- Meteorological data.

The Integrated Noise Model was developed in the USA, and is maintained with an up to date database of aircraft performance and noise data. Version 7.0b has such data for 138 types of commercial aircraft, 115 military aircraft and 19 helicopters. The model is not solely a noise model. As well as predicting noise levels, the INM computes 3-dimensional flight paths, based on the 2 dimensional flight 'track' and the vertical flight profile that it computes from individual aircraft thrust and flap settings, aircraft air speed, and headwind data specific to each aircraft operation that the user defines. Hence, a great deal of information is required to construct a reliable airport noise model.

Most of the necessary aircraft performance data was available in the INM databases. Where particular aircraft types were not available in the INM, suitable substitutions were made based on aircraft function, weight and performance.

In this case three types of aircraft are expected to use the airstrip, as follows:

- Antonov 124 (INM standard substitution Boeing 747 20B);
- Cessna 208 Caravan (INM standard substitution General Aviation single turboprop GASEPF); and
- Sikorsky S76 Sprint helicopter.

Flight numbers will be highest during construction, and are assumed as follows:

- Antonov 124 1 every 2 days
- Cessna 208 1 every 2 days
- Sikorsky S76 1 per day

It is assumed that all flights will operate during daytime hours.

Given the low total number of daily flights (2 arrivals and 2 departures on average) a relatively simple noise model has been created to predict peak noise levels (L_{Amax}) and assess impacts on the local area.

Key Data and Assumptions

It has been assumed that all flights will land and take off heading to the south due to the predominance of winds from the South and South East. However, given the low numbers of flights each day it may be possible to operate the runway in both directions to allow, say, arrivals from the south and departures to the South. Indeed, in this case, the direction of operation is a noise mitigation measure that could be explored if necessary.

It is assumed that all aircraft approach on a standard 3 degree glide slope and approach and depart using standard aircraft operating procedures. The Sikorsky S76 helicopters are assumed to operate from a helipad at the

northern end of the airstrip and to follow the same routes straight in and out of runway for the area of interest to this study, departing and arriving on Visual Flight Rules to/from a height of 1000ft.

KBR meteorological data (CV-60-G20-0001, 16 January 2012) has been used to generate appropriate headwinds for runway operations, temperature and pressure, which influence aircraft climb rates and hence noise levels on the ground. An average temperature of 25 degrees Celsius was used. Although there is a predominance of winds from the South, headwinds were taken to be neutral, to model a likely worst case. Annual mean pressure was taken to be 101,400 Pa.

C4.3 EVALUATING SIGNIFICANCE

C4.3.1 Overview

The environmental values to be protected are the qualities of the acoustic environment that are conducive to:

- the wellbeing of the community or a part of the community; and
- the wellbeing of an individual, including the individual's opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise.

C4.3.2 Impact Threshold Noise Levels

Review of the IFC guidelines and the WHO guidance, indicates that where possible, the overall noise level at a receptor should not exceed identified threshold values (*Table 4.8*). Hence, the noise emissions from the Project (the Specific Noise Level) should be designed to ensure that compliance with these noise levels is achieved.

Table 4.8 IFC/ World Bank Noise Level Guidelines

Receptor	**Maximum Allowable Ambient Noise Levels, LAeq,1hr, dBA Free field**	
	Daytime	**Night-time**
	07:00 – 22:00	**22:00 – 07:00**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

C4.3.3 Evaluating Significance of Noise Impacts

Four key factors are considered when determining the significance of noise effects – receptor sensitivity, magnitude of impact, duration and likelihood of occurrence. Of these factors, three are generally the same for the operation:

- the sensitivity of the receptor – generally all humans hear noise and react to noise similarly and the difference between daytime and night time is addressed by adopting different thresholds;

- likelihood – we know the noise will occur from predictive modelling; and

- duration – the noise is relatively continuous and would be considered to be of a long term duration (except for construction).

For construction the noise duration is a more variable factor which is accounted for in the impact assessment matrix by a reduction in the acceptable noise thresholds adopted for the Project.

For both construction and operational noise, impacts are considered to be *Direct* in their nature and of a *Local* extent, whereas *Intensity* is not considered when determining impacts from noise.

Therefore, the deciding factor in determining the significance of an impact is the magnitude of the noise level, expressed as an exceedance of the criterion (*Table 4.9* and *Table 4.10*). The significance assessment matrix is presented in Tables below and sets out the level of significance based on noise levels during the construction and operation phases. The definition of the significance ratings are explained below:

- **Negligible/ Not Significant** – no need to consider in decision making, no mitigation required;

- **Minor** – an impact that is significant, to be considered by decision makers, but small enough that noise management practices would ensure noise levels are below significance criteria;

- **Moderate** – an impact that is significant and mitigation should be considered. Mitigation is likely to affect design and cost;

- **Major** – an impact that is significant and mitigation must be considered. Mitigation will alter project design and cost. Impacts are undesirable if not addressed; and

- **Critical** – Creating adverse direct and immediate potential health and human comfort effects and should stop the project proceeding in this form and significant mitigation will be required to alter design.

C4.3.4 Noise Criteria – LNG Plant

Construction Phase

There is no relevant national guidance for construction noise and it is not addressed directly by IFC EHS guidance. In consideration of the construction period, being a period of over 4 years, it is considered that the IFC and WHO threshold levels of 55 dB(A) for the daytime and 45 dB(A) for the night time would be appropriate for this project. Additionally, a L_{AMax} of 85 dBA is a well-accepted action limit for occupational noise management as it is the threshold at which the potential for hearing damage starts to occur. This level has been adopted as the threshold for critical impacts.

The significance of construction noise is evaluated by establishing a threshold noise level at which significant impacts start to occur and higher levels for ***moderate*** and ***major*** impacts. Using these standards and guidelines for reference, usually it is appropriate to set significance thresholds for day and night time according to the duration of the noise, on the basis that temporary construction (<1 month) will have lesser impact than short term (1-6 months) or long term (> 6 months).

Table 4.9 presents the impact assessment matrix relating to the contributed noise level from the construction phase. Given the duration of construction for this project, a conservative approach has been taken, adopting the most stringent (> 6 months duration) long term criteria.

Table 4.9 Noise Impact Significance NSR - Construction Phase

Operating Period	**Daytime Noise Level, dBA**				**Night time Noise Level, dBA**				**All Periods**
Impact Rating	*Not Significant*	*Minor*	*Moderate*	*Major*	*Not Significant*	*Minor*	*Moderate*	*Major*	*Critical*
Construction LAeq,1hr									
Temporary exposure < 1 month	<70	70-75	>75-80	>80	<55	55-60	>60-65	>65	>85
Short term exposure 1 to 6 months	<65	65-70	>70-75	>75	<45	45-55	>55-60	>60	>85
Long term exposure >6 months	<55	55-60	>60-65	>65	<45	45-50	50-55	>55	>85

Operation Phase

There is no relevant national guidance for noise and therefore IFC EHS guidelines will be adopted for the project.

Table 4.10 presents the impact assessment matrix relating to the contributed noise level from the Project operational phase.

Table 4.10 Noise Impact Significance for Residential Receptors. Operational Phase

Operating Period	**Daytime Noise Level, dBA**				**Night time Noise Level, dBA**				**All Periods**
Impact Rating	*Not Significant*	*Minor*	*Moderate*	*Major*	*Not Significant*	*Minor*	*Moderate*	*Major*	*Critical*
Plant Operation LAeq,1hr	<55	55-60	>60-65	>65	<45	45-50	>50-55	>55	> 85
Δ LA90	<3	3 -8	>8 – 15	>15	<3	3 -8	>8 – 15	>15	> 85

For the operational phase, the noise generated by plant activities at NRSs will be compared with the background noise level monitored during the field survey, taking into account the L_{A90} value that describes the A-weighted sound pressure level exceeded for 90% of the measurement time [1]. Where background level is not available, due to the significant distance between monitoring sites and noise sensitive receptors, a value of 30 dB(A) as L_{A90} will be considered. This assumption is acceptable due to the particular nature of the area surrounding the plant site, largely used for agricultural activities, with no significant noise sources.

C4.3.5 Noise Assessment Criteria – Airport

There are no aircraft noise guidelines in Mozambique.

There are numerous metrics used around the world to describe aircraft noise. Most are either peak or averages of some type. For example:

- L_{Aeq} 12 hr dB: The A-weighted equivalent noise level, log averaged over a 12 hour period (0700-1900 hours) gives a form average noise exposure taken over an average day.
- L_{Amax} dB: The A-weighted maximum noise level during any aircraft noise event (ie the peak).

In Europe the Day Evening Night Noise Level (L_{den}) is the noise metric now used most widely for assessing aircraft noise impacts. The metric is based on L_{Aeq} but sums all aircraft noise events over a 24 hour period, giving the different logarithmic summation weightings according to time of day. Other metrics are based on L_{Aeq} all of which sum noise over a period and logarithmically average. In this case, there will be on average up to about four aircraft movements each day, and an averaging approach is not considered appropriate.

L_{Amax}(peak) noise levels are sometimes used to assess sleep disturbance or to compare peak noise levels during an aircraft fly-over against ambient noise

(4)ETSU-R-97 Guidelines for Wind Farm Noise Assessment advises using the LA90 noise index for background noise; the LA90 level noise is typically 2 dBA less than the equivalent LAeq,t value.

levels. An aircraft noise level of L_{Amax} of 80dB (with ground effect) is commonly taken as the level above which significant community sleep disturbance can arise, assuming a degree of habituation over time.

C4.4 BASELINE DATA COLLECTION

C4.4.1 Overview

An important part of the noise assessment is the quantification and understanding of the existing acoustic environment including the identification baseline noise levels at potentially affected NSRs. The baseline environment can be defined as the conditions that would prevail in the absence of this Project. This information sets the scene for the assessment of the potential for noise impacts at the NSRs created by the LNG Facility.

C4.5 DATA COLLECTION METHODOLOGY

Representative measurement locations were chosen in on the outskirts of each village to capture the baseline noise level without being affected by village noise sources, such as people, vehicles or the movement of animals.

Ambient (background) noise levels for the Project Area were measured by undertaking long-term measurements during the day and night and a series of attended short-term measurements during the day over the period between 20th February to 27st February 2012 at the measurement locations shown in *Figure 4.2* to capture the existing day and night time noise baseline.

A Rion NL-52 Type 1 Sound Level Meter (SLM) was used to conduct unattended long term and attended short-term measurements. The instruments were calibrated before and after measurements and no significant calibration drift was detected. Meteorological conditions during the measurement period were observed as predominantly sunny; however, light rain did occur over the period of measurement. An anemometer recorded the average wind speed to be under 5.2 km/h during the short-term measurements and recorded an average temperature of 34 °C.

C4.5.1 Long Term Measurements

At each long term location, a minimum of 24 hours continuous noise monitoring was conducted to provide a description of the noise levels and to understand the variation between the daytime and night time periods. The microphone of the long term monitor was set on a tripod to a height of 1.5m and greater than 3.5m from any reflective surface (except ground) so that it was a free-field measurement. The monitor automatically logged environmental noise measurement parameters including L_{Aeq}, L_{A90}, L_{A10}, L_{AMax} and L_{AMin} parameters.

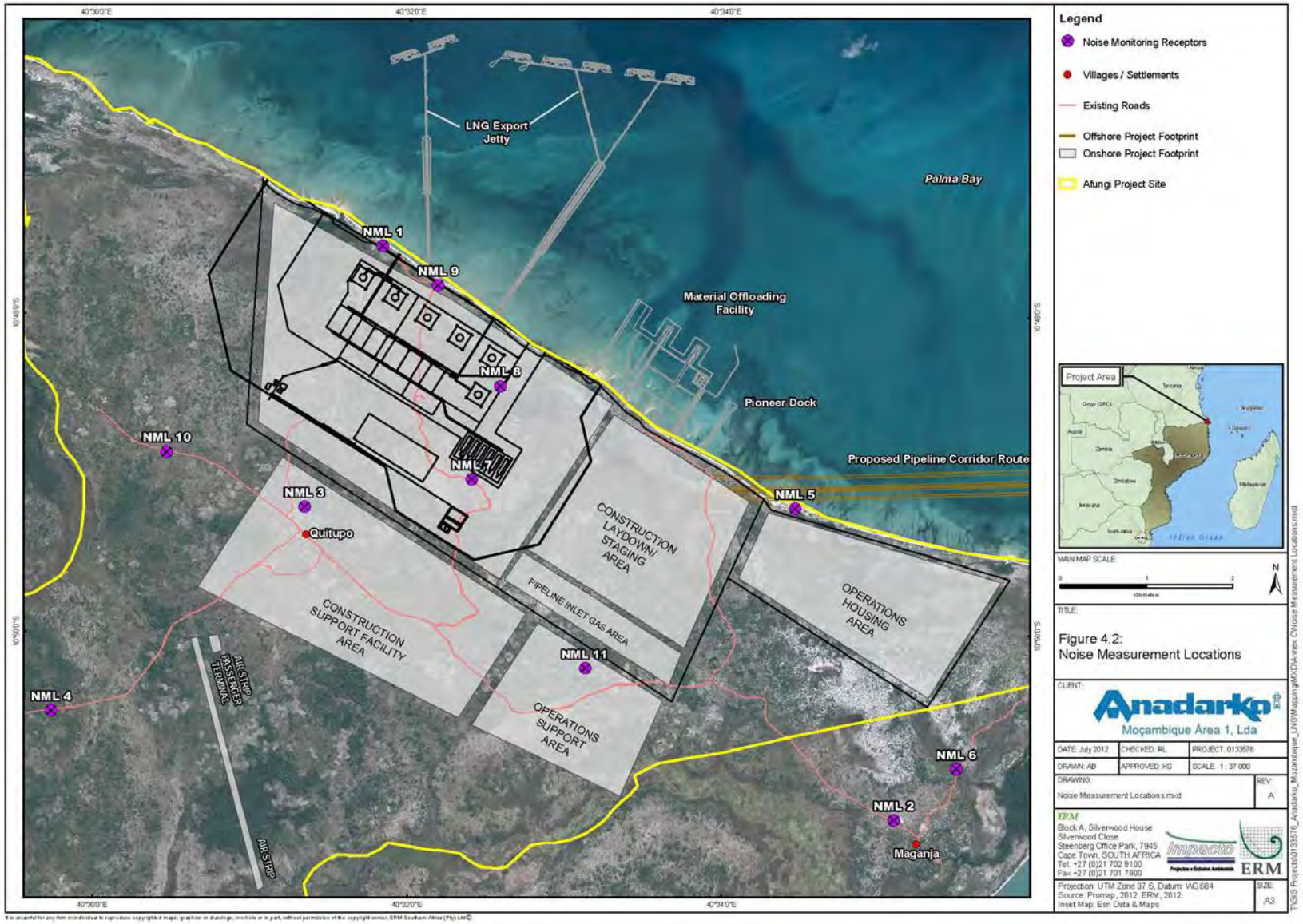
Long term measurements were collected at a total of four locations (see *Figure 4.2*). Location D (NML1) is situated along the coast line north east of the

project site, Maganja (NML2) to the south east, Quitopo (NML3) to the west, and final location (NML4) being the road closest to the air strip, south west of the project site. These four locations were deemed representative of the acoustic environment for the typical rural villages, located in and around the Project site.

C4.5.2 Short Term Attended Measurements

A series of attended short-term (day time) measurements were undertaken to identify the nature, character and dominant noise sources surrounding and within the Project site. Short-term measurements were also undertaken at each long-term location before in order to verify the long-term measurements. Short-term measurements were recorded at total of 11 locations.

Figure 4.2 *Noise Measurement Locations*



C5 SOILS

C5.1 METHODOLOGY

Baseline data for the soil section was collected during a site visit from 9 to 22 December 2011. Baseline information provides a description of the current soil environment against which the impacts can be assessed and future changes monitored.

A soil survey was planned with the objective of identifying and classifying the area in terms of:

- soil types associated with the area to be disturbed;
- physical and chemical properties of the identified soil types;
- depth of the soil;
- erodibility of the soils;
- nutrient status of the soil; and
- pre-construction soil utilisation potential (land capability)

The Study Area comprised the boundary of the larger area (Areas 1 and 2) as shown in *Figure 5.1* Area 1 shows the demarcation originally identified for investigation, while the larger enclosure was added at a later stage (Area 2) to incorporate a larger project footprint. Access to Area 1 was limited by the absence of roads during the time of study, while access to Area 2, as indicated above, was prohibited. Consequently two methods of deriving the products data were employed. Delineations on Area 2 were conducted based on the field observations, namely landscape positions of sandy well drained soil and waterlogged wetland soil, found in Area 1 including additional satellite image interpretation. Reconnaissance soil survey accuracy can be expected using this approach.

C5.2 INVESTIGATION OF AREA 1

The method applied is summarised below. Details of specific steps are addressed in Appendix D.

- GIS software was used to generate a grid system (350 m spacing) to cover the area under discussion;

- The grid system allows for geo-referenced points at the gridline intersections;

- The points were numbered and transferred to a Global Positioning System (Garmin GPS instrument) using WGS84 datum;

- The geo-referenced coverage provided was used as a basis for the selection of points for investigation;

- Based on in-field interpretation of topography, anticipated pattern and characteristics of the soil and outlay of roads and foot pathways, a selection of grid points was chosen to investigate and represent the area of study;

- Existing pits encountered during the fieldwork sessions were included for investigation; and

- By application of the above, 127 observation points (including 5 pits) were established and visited for investigation.

C5.2.1 Data Collection

The data collection phase consisted of collecting soil information for evaluation of physical properties as presented in the section below. For soil chemical and particle size evaluation samples were collected at selected points as depicted in *Figure 5.1. A*t each observation point the following tasks were executed in order to collect baseline information of the soil cover:

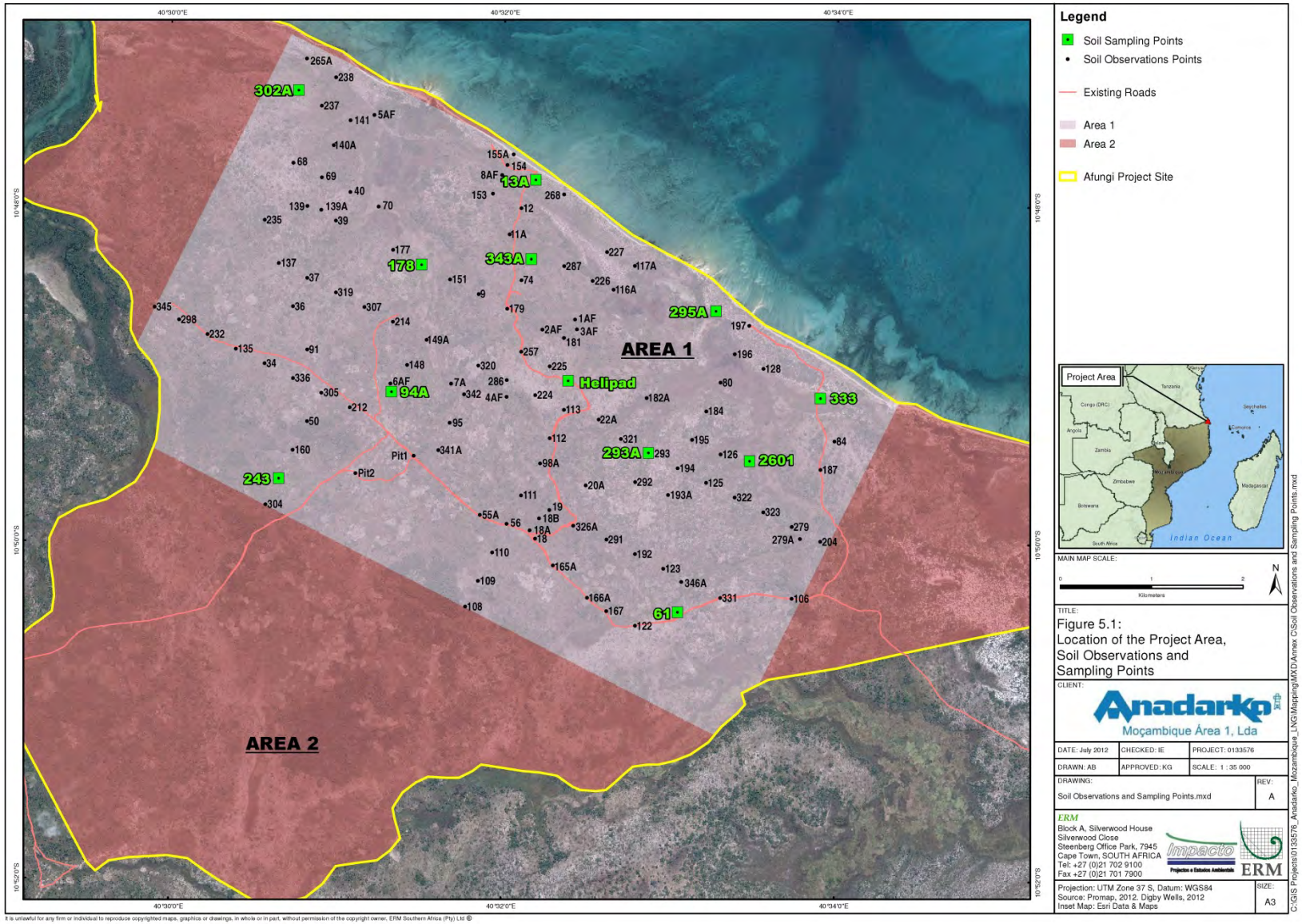
- At each observation point the soil was excavated using a hand operated auger to a depth of 1,500 mm or until refusal was obtained.

- The auger holes (and pits) allowed for an in-situ examination of the soil profile from which an identification and classification (and descriptions) of the soil type (soil form) was made.

- The Taxonomic Soil Classification System for SA [(1)] was applied to derive a soil form for each observation point.

(1) Soil Classification Working Group, 1991. Soil classification. A taxonomic system for South Africa. Memoirs on the Agricultural natural resources of South Africa No. 15. Institute for Soil, Climate and Water, Pretoria.

Figure 5.1 *Location of the Project Area, Soil Observations and Sampling Points.*



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C5.2.2 Sampling Program

Sampling was conducted on selected sites with the following purposes in mind:

- to obtain adequate representation of the soils in each of the identified units;
- to compare laboratory analysis with field findings; and
- to obtain a baseline for the current chemical status.

Twelve sampling sites were selected from which a total of 27 samples were collected, see *Figure 5.1.* The samples were submitted to Geolab analytical laboratory for analysis. The soil samples were analysed for physical and chemical properties as follows:

- Extractable cations namely Na, K, Ca and Mg using an ammonium acetate as extractant.
- Cation Exchange Capacity of the topsoil.
- Carbon content of the topsoil.
- Phosphorus (Bray1) of the topsoil.
- Soil texture namely sand, silt and clay were also determined.

No sampling and analysis was conducted with a baseline contaminated status in mind as it was very unlikely that extreme levels of any elements will occur. Apart from low impact cultivation practices (minor or no use of artificial fertilizers) no known events with the potential to have given rise to such disturbances were known.

C5.3 INVESTIGATION APPROACH FOR AREA 2

Based on an existing broad scale land inventory map (FAO, 1982), aerial image interpretation and results of the Area 1 fieldwork, it was inferred that the non-wetland areas in outside Area 1 will comprise of deep (>1.5 m) deposited sand as was found for Area 1.

C6 HYDROLOGY

C6.1 METHODOLOGY

C6.1.1 Introduction

The methodology utilized in this study entailed a review of available data sets and reports from the public domain, a site visit, and computer modelling.

C6.1.2 Delineation of Water Courses and Catchment Boundaries

The modeled drainage network and catchments were developed by applying Watershed Modeling System (WMS) software and NASA' Aster Global Digital Elevation Model (GDEM). WMS was developed by Aquaveo (2004) and provides typical hydrologic and hydraulic modeling using models such as HEC-HMS and HEC-RAS. River/stream/drainage networks and catchment basins were mapped using Digital Elevation Model data.

C6.1.3 Determination of the Peak Rainfall Estimates

The determination of peak rainfall events for the respective return periods and peak flow rates for the identified rivers within the catchments was undertaken by the rational and SCS Methods.

The peak flow and volume generated were determined using the Rational Method. This is a simplistic method of peak flow estimation, which includes a composite estimation of the runoff coefficient, and allows for the influence of slope, soil permeability, vegetation and land cover (eg area of natural forests compared to areas which have been cleared of vegetation) to be considered. A time of concentration (Tc) was calculated (defined as the time it would take for water travelling from the furthest point in the catchment to reach the point of consideration) that enabled a more realistic estimation of the peak rainfall intensity.

The calculated rainfall intensities (mm/hr), which is defined as the amount of rainfall over a time period, and through the inclusion of a catchments specific runoff coefficient, and catchment area (km^2) enabled the application of the Rational Method through the formula:

$$Q = 0.36CIA$$

Where:
Q = peak flow (m^3/s)
C = runoff coefficient (dimensionless)
I = average rainfall intensity over the catchment (mm/hr)
A = effective area of the catchment (km^2)
3.6 = conversion factor

The SCS method was also used for computing the peak flows and runoff-volumes. The United States Department of Agriculture's (USDA) Soil Conservation Service developed a method to calculate run-off from small catchments with different soil groups, vegetation covers and land uses by examining measured precipitation and run-off amounts, and named it as 'SCS Curve Number Method'. The SCS-CN method arose out of the empirical analysis of run-off from small catchments and hill slope plots monitored by USDA.

The SCS method defines stormflow as the direct runoff response to a given rainfall event, and consists of both surface runoff and subsurface flows, but excludes baseflow (ie the delayed subsurface response). A detailed description of the SCS method and its applications in South Africa is given by Schulze and Arnold (1979).

The general equation for the SCS method is as follows:

$$Q = (P-I_a)^2/(P-I_a)+S \quad \text{for } P>I_a$$

Where:

Q = stormflow depth (mm)
P = daily rainfall depth (mm)
S = potential maximum retention (mm), index of wetness of the catchments soil prior to a rainfall event
I_a = initial abstraction prior to the commencement of stormflow, comprising of depression storage ,interception and initial infiltration (mm)

$$I_a = 0.1S$$

Stormflow depth represents a uniform depth over the catchment and may be converted to volume by introducing the catchment area. The SCS method accounts for potential maximum soil water retention through the application of:

- hydrological soil properties;
- land cover and land management conditions;
- takes into account the time distribution and duration of rainfall
- catchment antecedent soil moisture status prior to the rainfall event (through application of a dimensionless response index termed the catchments Curve Number *(CN)*). The *CN* and *S* are related by the following equation:

$$S = (24500/CN)-245$$

C6.1.4 Determination of Floodlines

The HEC-RAS model is designed to perform one-dimensional hydraulic calculations for natural and constructed channel networks and was used to assess all major surface water systems within the study area that could be impacted by the project.

The floodlines were calculated with the HECRAS Model by performing a steady state analysis. Calculations for steady state analysis require the relevant information presented in the Floodline Analysis – *Chapter 8 of the EIA Report*. A Manning's Roughness Coefficient of 0.04 was considered for the wide river channels. User defined cross sections are created in the model.

C7 GROUNDWATER

C7.1 APPROACH

The following sections outline the approaches used to undertake an initial groundwater baseline investigation (*Section C7.2*), a further baseline investigation (Section *C7.3*) and modelling (Section *C7.4 to C7.5*).

C7.2 INITIAL BASELINE INVESTIGATION

The key steps involved in the initial baseline investigation included:

- a literature review;
- a field investigation involving a hydrocensus and sampling for geotechnical boreholes; and
- geochemical analysis.

These are detailed below.

C7.2.1 Literature Review

The following technical reports where reviewed in the compilation of this baseline assessment:

- Pre-feasibility and scope definition report and terms of reference, Impacto, November 2011.
- Afungi Site Improvement – Final report on a geotechnical investigation, WorleyParsons, May 2012.
- Onshore reconnaissance geotechnical investigation – Factual field interim report, AMA1, IntecSea WorleyParsons Group, February 2012.
- AMEC hydrogeological conditions desk top study, LNG siting in northern coastal Mozambique, IntecSea WorleyParsons Group, November 2011.
- Soil specialist assessment as part of an environmental impact assessment for the development of a LNG plant on the Afungi peninsula near Palma, north Mozambique, Digby Wells, April 2012.

C7.2.2 Hydrocensus

The aim of a hydrocensus survey was:

- To determine groundwater level information for the study area;

- To identify groundwater users in the study area and establish baseline groundwater use (volume); and

- To recover groundwater samples from selected wells and boreholes for selected laboratory analyses to establish the baseline groundwater quality.

Two field visits were conducted with the first being in February 2012 (dry season) and the second during May 2012 (wet season). The groundwater quality data for both of these sampling runs is presented in this report.

A total of 20 water abstraction points were visited, including:

- four community supply boreholes equipped with handpumps;
- seven monitoring boreholes installed by AMA1;
- seven natural spring-fed hand-dug wells for community use;
- one borehole at the Pemba site camp; and
- one dambo (wetland area).

A summary of data pertaining to the hydrocensus points is summarized in *Table 7.1* and *Table 7.2.* The locations of the hydrocensus points indicated in *Figure 7.1*.

Table 7.1 Rest Water Level Measurements in selected Hydrocensus Points

Source Ref	Description	February 2012 (m bgl)	April 2012 (m bgl)	Comment
HC1	Borehole	0.230		Working handpump in the middle of the village
HC4	Well	0.320		Hand dug well next to stream
HC5	Well	0.290		Hand dug well next to stream
HC6	Well	0.480	0.400	Hand dug well next to stream
HC7	Well	0.210		Hand dug well next to stream close to beach
AF06	Borehole	2.810	1.500	Piezometer installed in bore
AF14	Borehole	4.200	2.850	Piezometer installed in bore
AF17	Borehole	0.005		Additional sample AF17c taken as control
AF18	Borehole	1.695	0.150	Piezometer installed in bore
AF20	Borehole	2.290		No sample due to obstruction in piezometer
AF21	Borehole	5.030		Piezometer installed in bore
HC1	Borehole	5.030		No access due to obstruction in well

Table 7.2 Location and Description of Hydrocensus Points

Source ref	Source Description	Latitude (dd.dddd)	Longitude (dd.dddd)	Altitude (GPS) mamsl	Topographical Setting	Comment
HC1	Handpump	10.82264	40.52168	30	Flat surface	Working handpump in the middle of the village
HC2	Handpump	10.82222	40.52192	31	Flat surface	Non-working handpump in the middle of the village
HC3	Handpump	10.82161	40.52272	29	Flat surface	Working handpump in the middle of the village
HC4	Well	10.81800	40.52734	14	Along stream	Hand dug well next to stream
HC5	Well	10.82238	40.53188	13	Along stream	Hand dug well next to stream
HC6	Well	10.82039	40.56497	11	Along stream	Hand dug well next to stream
HC7	Well	10.81828	40.56903	8	Along stream	Hand dug well next to stream close to beach
HC8	Well	10.81344	40.54964	9	Next to mangrove	Hand dug well next to stream/mangrove
HC9	Well	10.81087	40.50038	19	Along stream	Hand dug well next to stream
HC10	Handpump	10.84521	40.47839	51	On hill	Working handpump in the middle of the village
HC11	Well	10.84782	40.47372	31	Along stream	Hand dug well next to stream
AF06	Borehole	10.81806	40.54095	15	Flat surface	Piezometer installed in well
AF14	Borehole	10.80762	40.53704	14	Flat surface	Piezometer installed in well
AF17	Borehole	10.80532	40.54504	10	Close to ocean	Piezometer installed in well
AF18	Borehole	10.80769	40.54285	12	Flat surface	Piezometer installed in well
AF19	Borehole	10.81248	40.54038	15	Flat surface	No sample due to obstruction in well
AF20	Borehole	10.83976	40.50328	36	Flat surface	Piezometer installed in well
AF21	Borehole	10.80037	40.51055	26	Flat surface	No sample due to obstruction in well
Camp	Borehole	10.76145	40.47345	24	On hill	Borehole supplying the base camp
Dambo	Wetland	10.84061	40.46881	38	On hill	Natural wetland structure known as Dambo

C7.2.3 Geotechnical Boreholes

AMA1 advanced eighteen geotechnical boreholes in the project area as part of the preliminary investigation. Details pertaining to borehole depths are described in *Table 4.4* and the positions of these boreholes are indicated in *Figure 7.1*. However, as these boreholes were drilled for geotechnical purposes, only seven bores remain suitable for groundwater monitoring.

Figure 7.1 AMA1 Geotechnical Borehole Localities



Table 7.3 Geotechnical Borehole Co-ordinates and Depth

Borehole No.	Coordinates (Latitude and Longitude)	Depth (m)	Contractor
AF02	S10 47.96173 E40 32.32831	100	SUGEC
AF03	S10 48.72300 E40 33.16371	100	SUGEC
AF03A	S10 48.74700 E40 33.00000	10	Geopractica
AF04	S10 48.88994 E40 33.76639	100	SUGEC
AF05	S10 49.55189 E40 33.31169	40	Geopractica
AF06	S10 49.07131 E40 32.45870	40	SUGEC
AF08	S10 49.13026 E40 30.98171	40	Geopractica
AF09	S10 49.62764 E40 31.90172	40	Geopractica
AF10	S10 49.90847 E40 32.70051	40	Geopractica
AF11	S10 50.30834 E40 33.42825	40	Geopractica
AF12	S10 48.85974 E40 30.48525	40	Geopractica
AF14	S10 48.45792 E40 32.23012	40	Geopractica
AF15	S10 48.84042 E40 32.04009	40	SUGEC
AF17	S10 48.36700 E40 32.71097	100	SUGEC
AF18	S10 48.46040 E40 32.57116	40	SUGEC
AF19	S10 48.73714 E40 32.40541	40	SUGEC
AF20	S10 50.39182 E40 30.21299	40	SUGEC
AF21	S10 48.02202 E40 30.63715	40	Geopractica

C7.2.4 Geochemical Assessment

The groundwater quality was determined both in the field and by laboratory analyses. Parameters included:

- Field measured parameters – pH, electrical conductivity (EC);
- Dissolved anions - fluoride, sulphate, chloride, nitrate as NO_3, ortho phosphate as PO_4,, total alkalinity;
- Dissolved cations – magnesium, potassium, sodium, calcium, ammonia.
- Dissolved trace elements - aluminium, antimony, arsenic, barium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum nickel, niobium, phosphorus, selenium, silver, strontium, thallium, tungsten, vanadium, zinc, zirconium.
- Organic compounds including benzene, toluene, ethylbenzene, xylene, naphthalene, tert-amyl-methyl-ether (TAME) and extractable petroleum hydrocarbons (EPH).

The geochemical assessment of the groundwater was undertaken:

- To establish the baseline groundwater quality in the study area; and
- To undertake a geochemical assessment of the water quality.

C7.3 FURTHER BASELINE INVESTIGATION

C7.3.1 Borehole Drilling

Based on the findings of the baseline study (as described above), a drilling programme was designed and executed between August and September 2012. The programme included drilling of groundwater exploration boreholes for Project water supply, community water supply boreholes and environmental monitoring boreholes.

G. M. Todd Irrigation LDA undertook the drilling and well installations. Based on the ground conditions on site, the mud-rotary drilling method was selected to achieve the drilling objectives. In the mud rotary drilling method, the drill bit is attached to the drill rod and the borehole advanced while mud is pumped down the hole as a formation stabiliser. The drilling mud is circulated into a mud pit where the cuttings from the borehole drop out and the mud is reused.

Due to the selected drilling method and available equipment on site, the collection of geological and hydrogeological data was limited. The geology was logged by an experienced field hydrogeologist and final blow yield

recorded after the successful completion of each boreholes (note blow yields should be regarded only as indications of the yield potential of a borehole, and should not be considered a sustainable yield). Electrical conductivity (EC) was measured in the recovered drill mud on a regular basis and used as an indicator of groundwater inflow into the bore and to guide the placement of the screened casing.

C7.3.2 Aquifer Testing

Each of the drilled boreholes was subjected to an aquifer test to define the hydraulic parameters and response of the groundwater occurrence on site. Aquifer testing was undertaken by *G. M. Todd Irrigation LDA*.

As the pumping rate was limited due to the diameter of the installed casing and the available test pumps, only constant discharge tests (CDT) and recovery tests (RT) were undertaken.

During the CDT each individual borehole was pumped for 1440 minutes (24 hours) at a constant rate, with the exception of borehole LNG-W009 which returned a yield that was too low to sustain a 24 hour test.

Prior to each test, water levels were measured in both the pumped and observation boreholes from a fixed reference point. In the abstraction boreholes an electronic contact gauge was employed to record water level changes, and in the observation boreholes automatic water level loggers were used to record water levels. Drawdown over time in the abstraction boreholes was monitored at gradually increasing time periods, since drawdown as a result of pumping normally varies logarithmically with time.

During the CDT the temporal water level drawdown was recorded in both the pumping and the available observation boreholes. Discharge measurements were taken at predetermined intervals to ensure that the constant discharge rate was maintained throughout the test period. Any changes in discharge were recorded and reported.

The RT water level recordings commenced directly after pump shut down at the end of the CDT. The water level recovery was measured in both the pumped and the observation boreholes for a period of 24 hours, or until at least 90% water level recovery had been achieved.

The time-drawdown data gathered during the aquifer tests was analysed using *Aquifer Test Pro v2011.1* (Schlumberger Water Services). *Aquifer Test Pro* includes a range of analytical methods to obtain representative hydraulic properties of the aquifers.

C7.3.3 Water Sampling

The exploration, environmental monitoring and camp supply boreholes (open boreholes) were sampled by a submersible pump. The community and camp

water supply boreholes were equipped with hand pumps and powered pumps respectively.

The sampling methodology for both open boreholes and boreholes equipped with hand pumps is based on *USGS National Field Manual for the Collection of Water-Quality Data* (USGS, 2006).

The open boreholes were purged according to the volumetric purging method. This involved the removal of three times the volume of standing water in the well and pore space of the filter pack prior to sample collection. The rationale is to ensure that all the stagnant water in the casing and filter pack is removed and replaced with fresh formation water.

Prior to any purging/sampling activities, the depth to groundwater was measured using a dip meter and recorded on the sampling fieldsheet. The pump was lowered to beneath the water level and the borehole purged at a rate of approximately 2.6 l/s. Field parameters (pH, temperature and electrical conductivity (EC)) were monitored on a regular basis.

The boreholes were until at least three times the well volume was removed and until stabilisation of field parameters was achieved.

Samples were collected directly from the pump with the groundwater being discharged directly into the appropriate sample container.

Due to the community water supply boreholes and the camp supply boreholes having existing pumps, access was restricted and therefore static water levels were not measured. The boreholes were purged using the existing pumps until stabilisation of field parameters was achieved.

Samples were collected directly from the pump with the groundwater being discharged directly into the appropriate sample container.

At each sample point, samples were collected in separate sample bottles for:

- General chemical parameters and major ions to establish the groundwater baseline quality and to allow fingerprinting of groundwater, including:
    - Total hardness (dissolved as $CaCO_3$)
    - Cations – sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), ammonium (NH_4^+);
    - Anions – fluoride (F), chloride (Cl), sulphate (SO_4^{2-}), alkalinity, nitrate (NO_3^-), nitrite (NO_2-) phosphate (PO_4^{3-}); and
    - Total phosphorus and total nitrogen.

- Trace elements (filtered and acidified to pH <2) to establish the baseline groundwater quality, including aluminium (Al), antimony (Sb), bismuth (Bi), arsenic (As), barium (Ba), beryllium (Be), boron (B), cadmium (Cd), chromium total (Cr), cobalt (Co), copper (Cu), iron (Fe), lead (Pb), lithium

(Li), manganese (Mn), mercury (Hg), molybdenum (Mo), nickel (Ni), niobium (Nb), selenium (Se), silver (Ag), strontium (Sr), thallium (Tl), tin (Sn), titanium (Ti), tungsten (W), vanadium (V), zinc (Zn) and zirconium (Zr).

- Organic compounds to establish the baseline groundwater quality, including:
    - Extractable petroleum hydrocarbons (EPH) (C8-C40);
    - Benzene, toluene, ethylbenzene and xylenes (BTEX); and
    - Naphthalene.
- Stable isotope analysis to allow groundwater fingerprinting, namely deuterium and oxygen-18.

All samples were placed in a cooled container directly after sampling and transported (at 4^0C) to Jones Environmental Laboratory (an accredited analytical facility) in the UK.

C7.3.4 Quality Assurance/Quality Control – QA/QC

As part of ERM's Quality Assurance and Quality Control protocol (QA/QC) standard operation procedures for sample collection were followed. Defensible quality control for sampling and decontamination procedures were followed to allow for the collection of representative samples and to minimise the potential for cross-contamination between samples. The samples were collected in laboratory-supplied sample bottles, filtered on site using a 0.45µm nylon membrane filter (laboratory supplied) where required. Two blind duplicate samples were collected.

During sampling and decontamination activities, disposable nitrile gloves were worn to minimise transfer of contaminants. Any disposable equipment, such as gloves, was dedicated to each sampling location and disposed of after use.

Samples were handled, stored and transported to the laboratory in accordance with established protocols using Chain of Custody documentation, which was used to track samples and to ensure that the correct analyses were performed.

C7.3.5 Topographic Survey

The sub-contractor *Nikotcholaka Engenharia & Construção, EI* undertook the required topographical survey in December 2012 to allow for accurate coordinates and elevation data of boreholes and selected surface water points.

Three Benchmark Co-ordinates were provided to the sub-contractor to support the survey (*Table 7.4*).

Table 7.4 Benchmark Coordinates

Benchmark	X (m) - Easting	Y (m) - Northing	Z (mamsl) - Elevation
BEACH	670854.740	8804079.260	5.850
KUMBI	651171.380	8800246.840	86.950
TOWER	667947.460	8803967.700	17.320

The Benchmark coordinates are in WGS84 Datum projected in UTM Zone 37 South Zone, corresponding to the Cabo Delgado Province.

For the field observations 2 Topcon Hiper Pro model GPS + GNSS Receivers (L1 + L2) were used, resorting to the RTK and Static Occupation Survey modes.

For the detailed methodology please refer to the complete report of the topographic survey, which is appended in *Annex D*.

C7.4 GROUNDWATER MODELLING METHODOLOGY

C7.4.1 Conceptual Site Model Development

Information collected during the field investigation, combined with information sourced from literature and historical reports, was interpreted to develop a catchment scale hydrogeological conceptual site model (CSM) for the proposed Project area.

In detail, the CSM describes the dynamics of groundwater and contaminant transport movement, considering groundwater recharge, boundaries to groundwater flow, hydraulic characteristics of the aquifers in the area and potential contaminant source areas, as well as the groundwater - surface water interaction.

The CSM can be described as a simplified representation of the hydrogeological conditions, describing the source-pathway-receptor interaction which is described in more detail below:

Source areas are assessed in the context of the groundwater hydrochemical environment. From this assessment the contaminants of concern (CoC) that could potentially pose a risk to human health and the environment through exposure via the different exposure pathways, are determined.

Groundwater ***pathways*** link sources with receptors, and only in the case where a source and receptor are linked, can environmental and human health risks arise. The main groundwater pathways, including aquifers and preferential flow paths (ie geological structures), are identified.

Typical ***receptors*** include water supply boreholes, base flow to rivers, springs or wetlands. The understanding of linkages between the source, pathway and

receptor are essential to determine the potential exposure risk for each identified CoC.

The CSM allows for the effective determination and characterisation of the identified contamination source areas and activities, as well as the preferred migration pathways to reach identified receptors, or points of exit along the boundaries of the Project area.

Using the CSM, a numerical groundwater model representing the current catchment scale hydrogeology was developed simulating the current groundwater conditions. The flexibility of the model allowed for the effect of potential Project impacts to be simulated allowing for predictive outputs to be generated, allowing for the impacts to be evaluated and enabling management scenarios to be evaluated.

C7.4.2 Modelling Approach

The steady-state groundwater flow model was calibrated based on groundwater elevations measured in the field. In steady-state, the hydraulic head does not change with time, and the calibrated steady state solution represents the baseline groundwater elevations and flow direction. Steady state simulations are used to calibrate time independent model parameters such as the hydraulic conductivity.

The hydraulic head distribution of the calibrated steady state solution is then used as the initial head distribution for the transient (time-dependent) model. The transient model is calibrated using available time-dependent data such as time-drawdown data from aquifer tests. Transient calibration is then performed to define additional parameters required for transient models, eg. specific storage, and also for verification purposes of the steady state solution.

The calibrated transient model is then used to quantify potential impacts caused by the proposed Project and assess the effectiveness of various mitigation options.

C7.4.3 Model Calibration

Model calibration is the process of varying model input data within realistic ranges of values until a satisfactory match between simulated and observed data can be reproduced. The large number of parameters and complex nature of the natural system, combined with the simplification assumptions made in the CSM, means that the calibration solution is non-unique. Reducing the non-uniqueness of the parameter combinations that can lead to a seemingly calibrated model can, for example, be achieved by reducing the number of degrees of freedom (i.e. the number of unknown input parameters) by choosing a distinct calibration strategy and by constraining spatially distributed input data via remote-sensing techniques (Brunner *et al.*, 2007).

In order to avoid an over-fitting of the model, the number of unknown input parameters (i.e. the degrees of freedom) must be limited. The more the

degrees of freedom used for model calibration, the better the measured water levels, called "piezometer heads" can be reproduced by the model. However, with an over-fitted or over-parameterised model a good fit between the observed and simulated piezometric heads can always be obtained even if the model does not reflect the structure and the behaviour of the real aquifer.

An objective criterion is used (MSE: mean square error or variance) to compare different calibrations:

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(h_i^m - h_i^c)^2$$ with h_m measured head and h_c calculated head

The model has reached a good or acceptable model calibration, when the root mean square error (RMSE) is $\sqrt{MSE} \leq 10\%$ of the head difference between upstream and downstream measured groundwater heads.

Models should ideally be used in prediction in a manner that is consistent with their calibration. For example, a model that is calibrated in steady state only will likely produce transient predictions of low confidence. Conversely, when a transient calibration is undertaken, the model may be expected to have a high level of confidence when the time frame of the predictive model is of less or similar to that of the calibrated model.

Furthermore, when a predictive model includes stresses (i.e. groundwater abstraction) that are well outside the range of stresses included in the calibration, the reliability of the predictions will be low and the model confidence level also (Barnett *et al*, 2012).

C7.4.4 Software Selection

Processing Modflow Pro (PMWIN version 8.0.31) was used for the groundwater flow simulation. PMWIN is a proven finite-difference modelling software package for 3-D groundwater flow and contaminant transport problems, utilising MODFLOW, MT3DMS, PEST and other analytical packages and algorithms.

MODFLOW is a 3-D finite-difference groundwater flow model that was developed by the U. S. Geological Survey for groundwater flow simulation.

MT3DMS is a modular three-dimensional transport model that can simulate advection, dispersion, and chemical reactions of dissolved constituents included in PMWIN, which was used to provide numerical solutions for the contaminant transport simulations.

PEST (Doherty *et al*., 2004) is an inverse code, used for the automated estimation of parameters and sensitivity analysis of parameters including for example transmissivity, hydraulic conductivity and recharge etc.

C7.4.5 Model Limitations

Numerical models have become a popular tool to solve problems. However, groundwater systems are complicated beyond our capability to practically evaluate them in detail. A model, no matter how sophisticated, will never describe the investigated groundwater system without deviation of model simulations from the actual physical processes that occur in the study area (Spitz, 1996).

All numerical modelling simulations require assumptions to be made during the translation of the CSM into a numerical model. These assumptions, which reflect data gaps in the conceptual model regarding the aquifer distribution and the aquifer parameters, can result in uncertainty in the model output and predictions.

Sensitivity analysis gives an indication of which assumptions regarding the model input parameters are most likely to affect the model output most. Based on the sensitivity analysis results, areas of concern and parameters that should be studies in more detail were identified and included in the recommendations.

C7.5 NUMERICAL GROUNDWATER MODELLING

C7.5.1 Model Setup

Model Domain

The model domain was selected based on the CSM to achieve the modelling objectives. The model domain includes the Project area and extends from the Rio Mipama in the north to the ocean (Palma Bay) along the shoreline of the Afungi Peninsula in the east and south-east.

In the south, the model boundary follows the surface water/wetlands catchment boundary. The western boundary was chosen approximately 8km west of the planned Pioneer Camp, located sufficiently far away from planned groundwater extraction activities.

The model domain covers a total area of just over 160km^2 and is presented in *Figure 7.2*.

Model Geometry

Topography data was available at an accuracy of 1m for 95% of the model domain. For the remaining 5%, the accuracy was 90m. The data was combined and interpolated to the model grid using *Surfer* (version 9.x). The topography elevation ranges roughly from 0 to 60mamsl in the north-west (*Figure 7.3*).

As no boreholes were drilled to intersect the base of the aquifer, a constant model aquifer thickness of 200m was applied to avoid boundary effects.

Figure 7.2 Model Domain

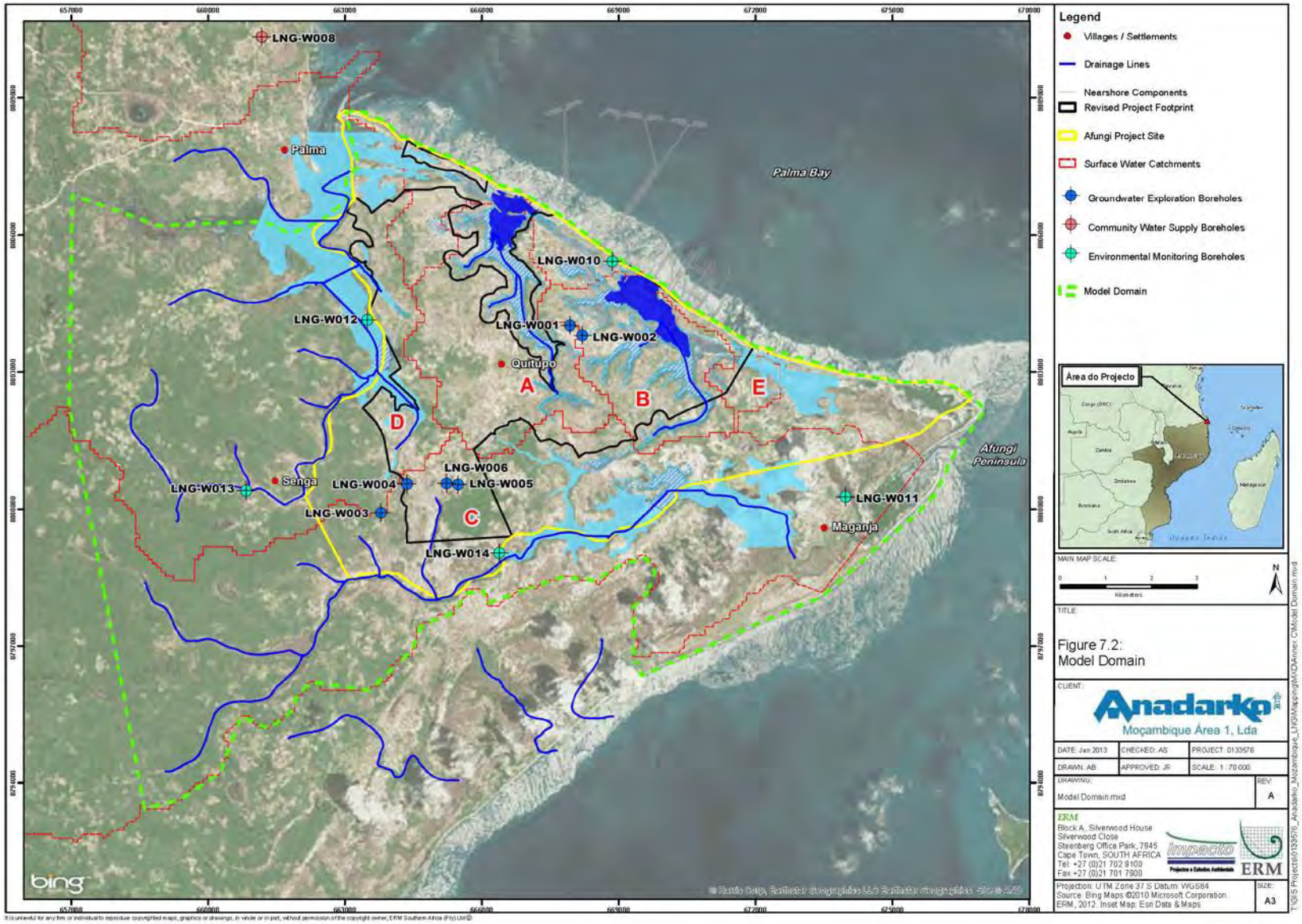
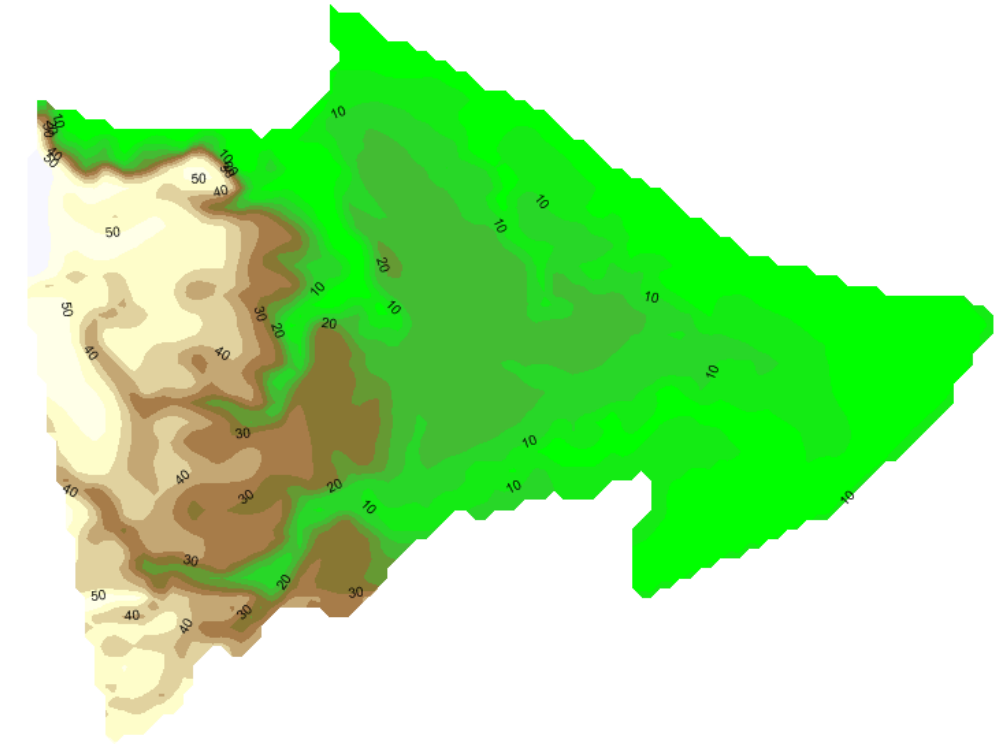


Figure 7.3 Surface Topography in Model Domain (mamsl)



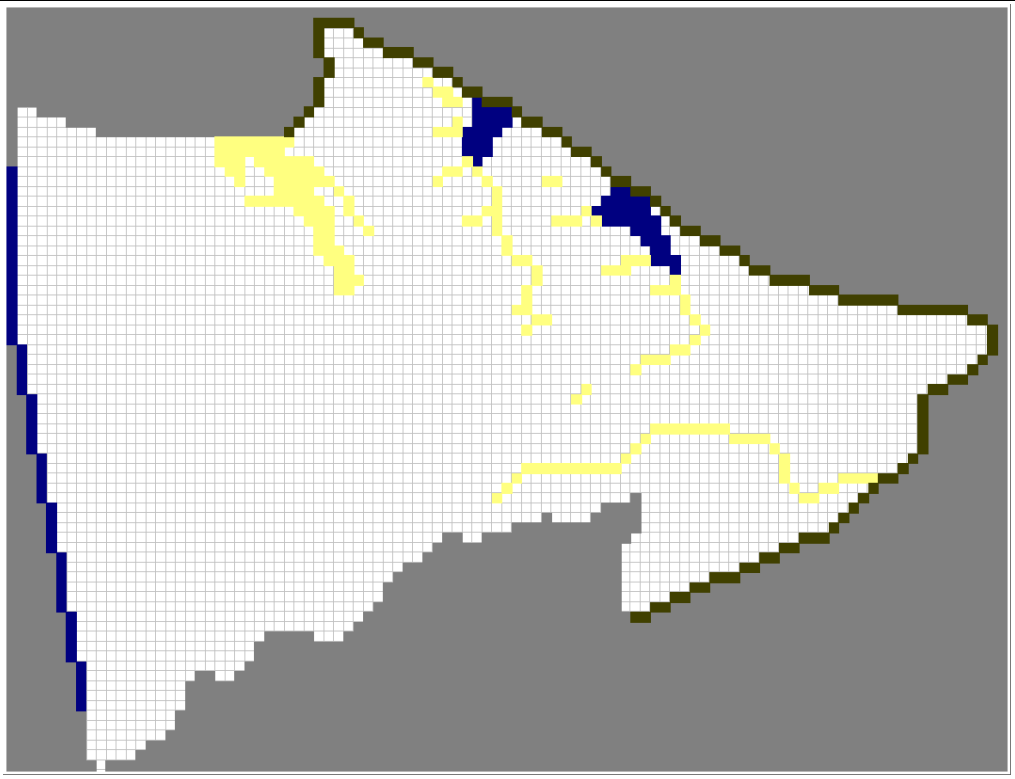
Discretisation

The numerical simulation of groundwater flow by a block-centred finite difference method as used in MODFLOW requires a spatial discretisation of the aquifer parameters across a rectangular grid that can be orientated to correspond to the general flow direction.

The cell size in the steady state numerical groundwater flow model grid is 200m in both horizontal directions (north/south and west/east). The rectangular grid has side lengths of 20.2km corresponding to 101 cells (west/east) and 15.4km corresponding to 77 cells (north/south). The model grid is presented in *Figure 7.4*.

The model grid was subsequently refined horizontally and vertically for transient model calibration and scenario modelling, to allow for accurate groundwater drawdown calculation induced by groundwater abstraction.

Figure 7.4 Model Grid and Boundary Conditions



Notes: White cells are active cells and grey cells are inactive
Blue cells represent Constant Head Boundary cells (estuaries and regional groundwater inflow)
Yellow cells represent Drain Cells (wetlands and streams)
Brown cells represent General Head Boundary cells (Palma Bay)

Boundary Conditions

The model boundaries were chosen in order to centralise the area of interest (Project area) and follow real hydrogeological and hydrological boundaries as far as possible. The Palma Bay coast was followed along the Afungi Peninsula as well as the Rio Mipama in the north and the surface water catchment boundary in the south. The western boundary was chosen approximately 8km to the west of the planned Pioneer Camp, located sufficiently far away from planned groundwater extraction activities.

The following boundary conditions were selected for the model domain:

- *General head boundary* condition (3rd order or Cauchy Boundary) along the Palma Bay coastline north-east to south-east;
- *General head boundary* condition (3rd order or Cauchy Boundary) along the lower reaches of Rio Mipama in the north, where it meets Palma Bay;
- *No flow boundary* condition (2nd order or Neumann Boundary) along the rest of Rio Mipama;
- *Constant head boundary* condition (1st order) along the western boundary representing regional groundwater inflow. This boundary was converted into an inflow boundary (2nd order or Neumann Boundary) using the *Well Package* after model calibration;

- *No flow boundary* condition (2nd order or Neumann Boundary) along the surface water catchment boundary in the south simulating a water shed;
- *Drain boundary* condition (3rd order or Cauchy Boundary) along the rivers, streams and wetlands within the model domain;
- *Recharge boundary* condition (2nd order or Neumann Boundary) on the model top; and
- *No flow boundary* condition (2nd order or Neumann Boundary) at the model bottom.

C7.5.2 Model Parameters

Hydraulic Conductivity

Data pertaining to hydraulic conductivity (K) was available from 11 aquifer tests (refer *Section C7.3.2*). K values derived from aquifer tests were mostly within one order of magnitude for each of the tested boreholes.

No distinct areas of different K values were identified and therefore, an average K value of 7m/d was assigned to the entire model domain.

Groundwater Recharge

Groundwater recharge represents infiltration of rainwater through the overlying geology into the modelled aquifer. Recharge is one of the most uncertain model parameters because the collection of direct field measurements is difficult and no specific recharge assessment was carried out. Limited information about groundwater recharge was available from literature. Recharge was therefore calibrated during steady state calibration.

Surface Water Features

Wetlands and Streams

Numerous non-perennial streams and drainage channels are located within the model domain, however, no detailed mapping of the streams was available. Therefore a watershed analysis was performed using *Global Mapper* (version 12) in order to identify surface water drainage lines based on topography data.

In topographically lower areas of the model domain, these surface drainage lines are closely related to the numerous wetlands present in the study area as documented by NSS (2012). A detailed study of wetlands was only performed within the Afungi Project area, which identified estuaries, perennial and seasonal wetlands. A number of unidentified wetlands are also mentioned outside of the Project area.

Drainage lines identified in the western part of the model domain were found mostly dry during the various field visits and were therefore not included in the model representing seasonal features.

Within the Project area, perennial wetlands were represented in the model using the *Drain Package* and outside some unidentified wetlands were also included based on model calibration.

The surface elevation (topography) was set for the drain elevation and a drain conductance of 50m²/d was applied reflecting sandy riverbeds.

Estuaries

Two prominent estuaries were identified by NSS (2012) in the model domain. These are thought to be in direct contact with the ocean at Palma Bay and also with groundwater. Therefore they were implemented in the model using *Constant Head Cells*. The elevation of these cells (water level) was set to between 3.5 and 4mamsl following model calibration and based on available survey data.

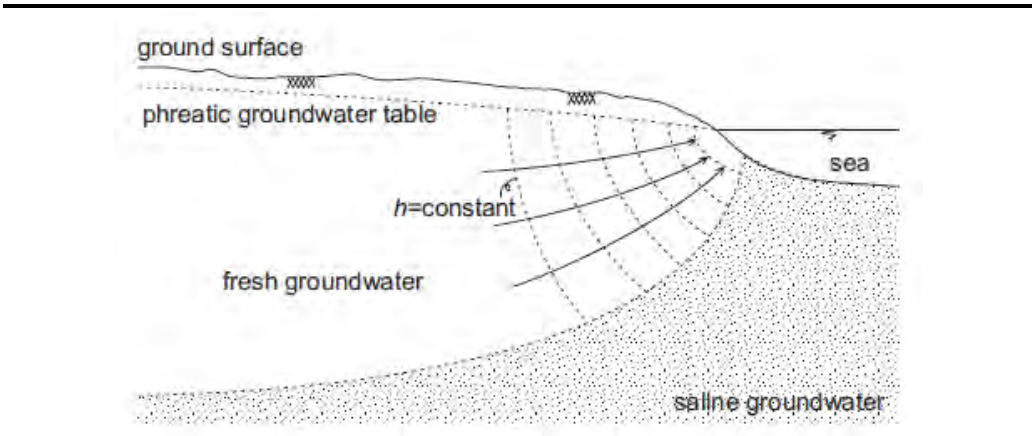
Ocean - Palma Bay

The Palma Bay coastline is thought to be a major groundwater discharge area in the model domain. Currently the saline water in the bay is expected to be in equilibrium with the fresh groundwater, which is replenished by groundwater recharge representing a natural equilibrium.

As illustrated in *Figure 7.5* (Oude Essink, 2001), groundwater outflow into the ocean is limited by saline groundwater which is present. Therefore the groundwater boundary at Palma Bay (ocean) was modelled using the *General Head Boundary* (GHB) package enabling to simulate a decreased outflow area with regards to the total model thickness.

GHB conductance was calibrated at 70m²/d, resulting in an outflow zone of 10m thickness and the elevation was set to mean sea level (0mamsl). Since the model time scale is yearly, daily tidal influence was not modelled.

Figure 7.5 Groundwater Outflow Zone



C7.5.3 Steady State Calibration

During steady state calibration groundwater recharge was optimized in order to best fit groundwater elevations observed in the model domain. Other

optimised parameters included drain conductance, GHB conductance, water elevation in estuaries and regional groundwater inflow.

Calibration was performed using both manual and automated methods. PMWIN includes a number of automated parameter estimation methods of which PEST (Doherty *et al.* 2004) was used.

Observation Boreholes

The eleven deeper boreholes (*viz.* LNG-W001 to LNG-W006 and LNG-W010 to LNG-W014) were used as observations for steady state model calibration of the numerical groundwater flow model. The observation boreholes and water levels used in the model calibration are detailed in *Table 7.5*. As the piezometers that were installed for geotechnical purposes (MSJ, 2012) only intersect the shallow perched groundwater, this data was not used for calibration purposes.

Table 7.5 Observation Boreholes

BHID	X	Y	SWL (mamsl)
LNG-W001	667930	8804020	5.08
LNG-W002	668207	8803800	6.47
LNG-W003	663784	8799918	13.41
LNG-W004	664354	8800548	12.44
LNG-W005	665478	8800537	11.53
LNG-W006	665234	8800562	11.69
LNG-W010	668864	8805421	3.95
LNG-W011	673967	8800273	4.17
LNG-W012	663490	8804139	6.51
LNG-W013	660836	8800409	16.70
LNG-W014	666381	8799042	10.73

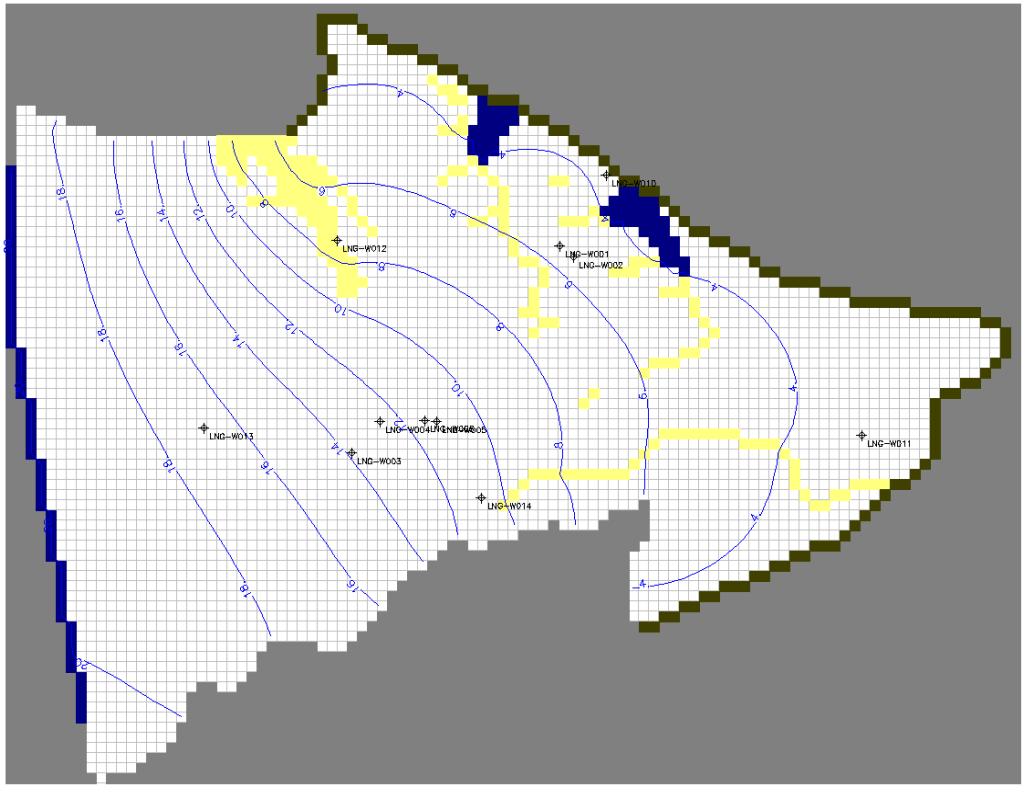
Notes: Surveyed Coordinates and Elevations: Datum: WGS84, Projection: UTM37S
SWL Static Water Level

Steady State Calibration Results

Groundwater Levels and Flow Direction

Piezometric heads for the calibrated steady state models range from 1,306 to 1,812mamsl for the low recharge scenario and from 1.6mamsl in the east to 20mamsl (*Figure 7.6*) in the west. The groundwater flow direction is to the north-east and east towards Palma Bay.

Figure 7.6 Steady State Piezometric Head Distribution



Scatter Diagram

Calculated piezometric heads were compared to observed heads in *Figure 7.7*. The residuals (difference between observed and calculated heads) are mostly below 0.5m except for LNG-W002, LNG-W011 and LNG-W0012 with residuals of 1m, and 0.8m respectively. The root mean square error of the model calibration is 0.3m, which is considered to be sufficiently small, given the model area, limited data and given that the maximum head difference over the model area is approximately 25m.

Figure 7.7 Scatter Diagram of Calculated vs. Observed Heads

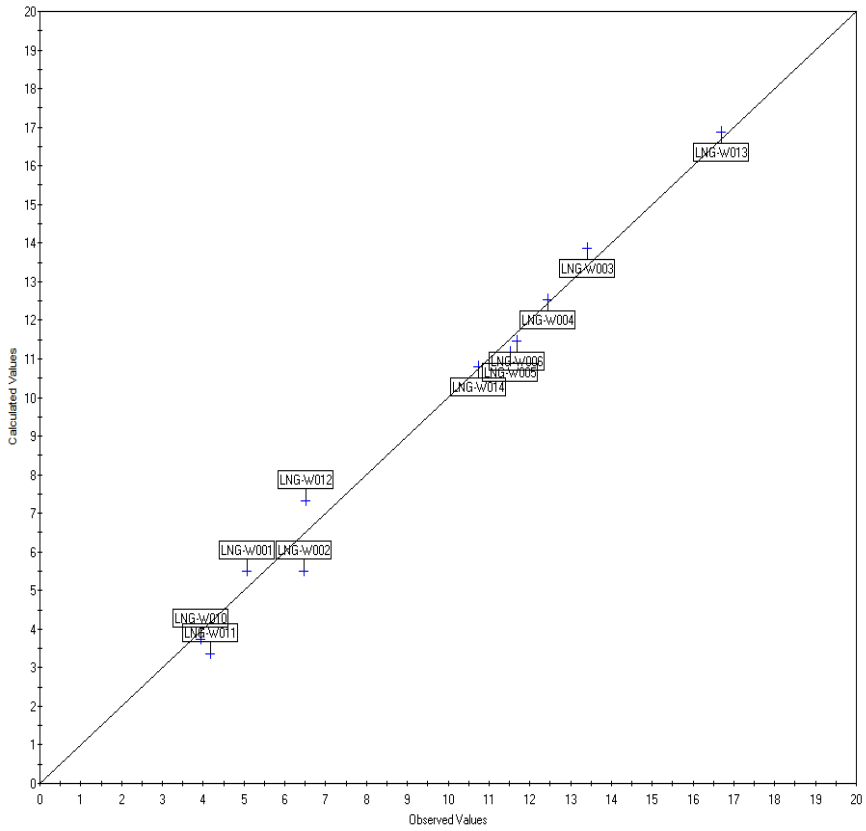
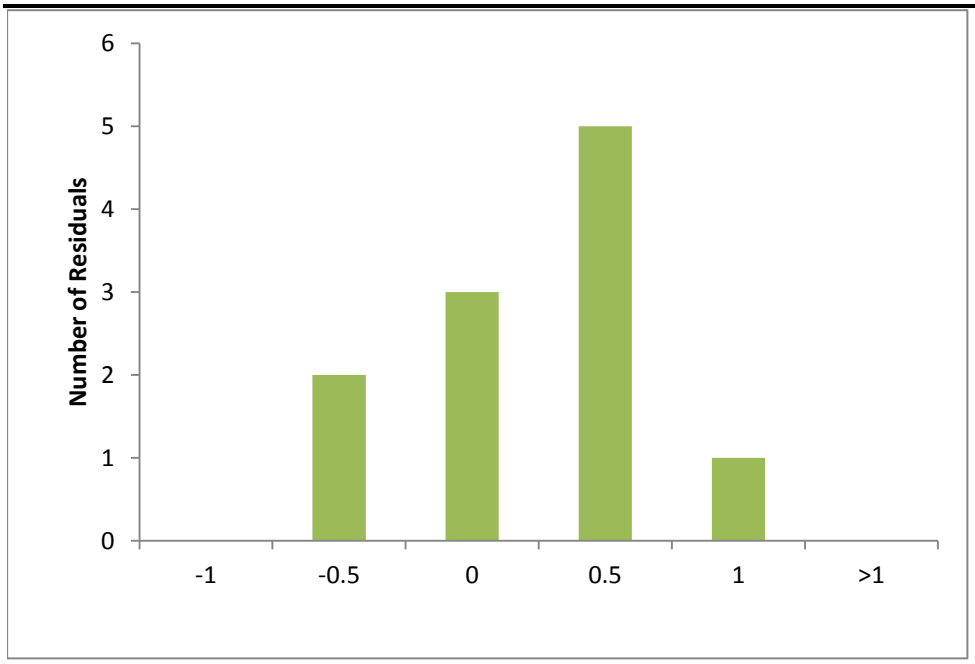


Figure 7.8 Histogram of Residuals (Observed Minus Calculated Heads)



In *Figure 7.8* the histogram of the differences between observed and calculated head values (residuals) is plotted for both recharge scenarios. Class "0", for example indicates how many residuals were between -0.5 and 0.

73% of all residuals are between -0.5m and 0.5m. In conclusion, the histogram shows that the model very slightly over-predicts, rather than under-predicts water levels.

Calibrated Parameters

The model recharge value was optimised during steady state calibration and an optimal value of 3.2×10^{-4}m/d was calculated. This represents 10% of the mean annual precipitation (MAP) in Palma, compared to the literature values of between 9%-26% MAP.

Considering the CSM where it was postulated that not all the groundwater recharge actually reaches the modelled aquifer but rather remains perched on localised clay/silt lenses and discharges directly into surface drainage features, the 10% recharge rate adopted for modelling is considered representative.

Drain conductance was optimised to 50m^2/d representing sandy streambeds and wetland bottoms. GHB conductance was optimised to 70m^2/d representing the model hydraulic conductivity of 7m/d and a groundwater outflow zone thickness of 10m. The water elevation in estuaries was calibrated to between 3.5 and 4mamsl and regional groundwater inflow amounts to 9 300m^3/d, distributed to a total inflow length of 11km.

Groundwater Balance

The steady state water budget of the whole model domain is shown in *Table 8.2*. In flux represents water flowing into the groundwater system (aquifer/model) and out flux represents water leaving the system (groundwater discharge).

Water flows into the model domain mainly via recharge and regional groundwater flow across the western model boundary and leaves the model to Palma Bay, rivers, streams and wetlands in the model domain (drains) and the Estuaries.

As expected, there is limited water exchange from, and to, the estuaries. Furthermore, 0.4% of the total in-flux is leaving the model across the western boundary, which is related to local hydraulic head distribution in proximity of the edges of the inflow boundary. This flux is, however, negligible compared to the total groundwater fluxes.

In a steady state system total inflow and total outflow fluxes are equal. Total flux into and leaving the model domain equals 61 700m^3/d. In-flux across the western boundary represents 15% of the total inflow and direct recharge from rainfall 82%. Water exchange at the estuaries accounts for 3% of the total in-flux.

Most groundwater is discharged from the model via drains (wetlands and streams) and via Palma Bay (ocean). Groundwater discharge into wetlands

and streams accounts for 49% and into the ocean for 36% of the total out-flux. Water exchange at the estuaries accounts for 15% of the total out-flux.

Table 7.6 ***Groundwater Budget Steady-State Calibration***

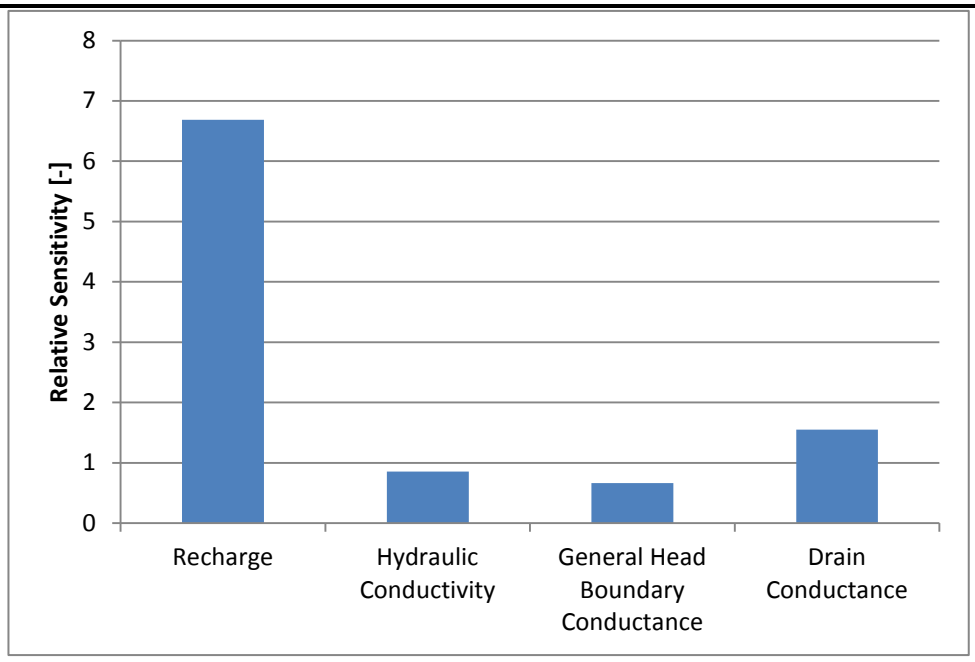
Boundary	In-Flux (m^3/d)	Out-Flux (m^3/d)
Palma Bay (Ocean)	0	22 000
Western Boundary	9 500	200
Estuaries	1 700	9 400
Recharge	50 500	0
Drains	0	30 100
Sums	**61 700**	**61 700**

Sensitivity Analysis

Sensitivity analysis was carried out using PEST for recharge, hydraulic conductivity, GHB conductance and drain conductance. *Figure 7.9* presents the relative sensitivities for the respective parameters. Relative sensitivity of a parameter is a measure of the changes in model outputs that are incurred by a change in the value of the parameter (Doherty et al., 2004).

The most sensitive parameter is recharge followed by the drain conductance. Changes in these parameters will have a greater impact on the model output than other less sensitive parameters.

Figure 7.9 ***Sensitivity Analysis Results***



C7.5.4 *Transient Calibration*

Transient simulations require additional parameters, specific storage and specific yield. Specific storage is the amount of water per unit volume of a

saturated formation that is stored or expelled from storage owing to compressibility of the mineral skeleton and the pore water per unit change in head and is relevant in confined layers.

Specific yield is relevant for unconfined layers and represents the unit volume of water that is drained from the formation per unit decrease in head. No field measurements were available for these parameters (refer *Section C7.3.2*).

The model was calibrated using time-drawdown data of the aquifer tests carried out by ERM (*Section C7.3.2*). Borehole pumping was simulated and the models were calibrated to fit the measured time-drawdown data. This model *stress* is similar to the planned groundwater exploration but on a much shorter time scale.

Model Setup

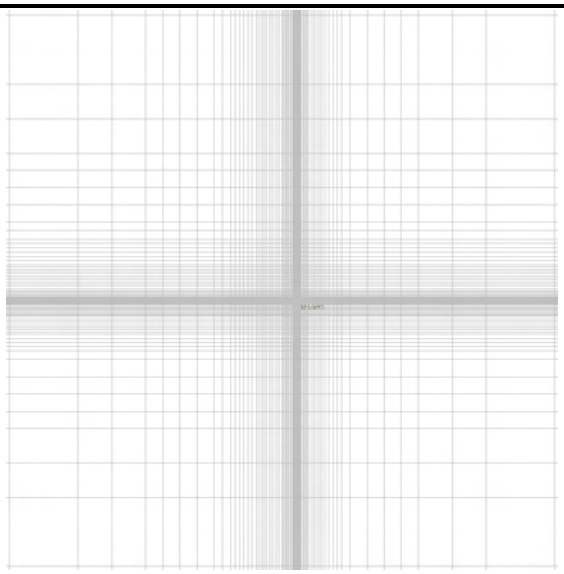
During the setup of the transient model, the steady state groundwater flow model is converted into a transient ("time-dependent") groundwater flow model in order to run time-dependent simulations and predictive model scenarios.

The geometry of the model domain, model boundaries, top and bottom of the model, discretization and layer type were taken from the steady state model as well as the time-independent parameters like hydraulic conductivity, recharge, drain conductance and elevation etc. The solution of the calibrated steady state model was used as initial hydraulic head distribution.

Grid Refinement

A different model was created for each of the boreholes. In a first step, the model grid needs to be gradually refined around the tested borehole. The cell size within which the tested well is located should ideally represent the borehole diameter (114 - 165mm). However, due to model restrictions, the grid could only be refined to a cell size of 195mm, which is considered sufficiently accurate. As an example, *Figure 7.10* details the grid refinement around LNG-W001, where the biggest cells (in the corners) are 200m by 200m in size.

Figure 7.10 Grid Refinement LNG-W001



Furthermore, the grid was refined in vertical direction in order to accurately represent the tested interval. Based on the individual borehole constructions, three layers with variable thickness were modelled and the layer thickness of layer 2, where the aquifer was pumped, was also optimised (see below).

Boundaries and Model Parameters

Steady state model boundary conditions were used for each of the three layers except for the surface water features including estuaries, wetlands and streams, that were only implemented in the first layer. Vertical hydraulic conductivity (K_v) was assigned at 10% of the horizontal hydraulic conductivity (K_h) following a common approach. Other model parameters were taken as is from the calibrated steady state model.

Stress Periods and Time Steps

Time unit (minutes), stress periods and time steps were chosen in order to accurately represent the aquifer tests performed for the respective boreholes. 24 hour aquifer tests were conducted with increasing time intervals. This was followed by recovery tests of variable length where, after pump shut down, groundwater levels in the boreholes were measured until at least 90% recovery was achieved.

Observation Boreholes

As no water level fluctuations were recorded in any of the observation boreholes during abstraction from the pumped borehole, only the water levels measured in the pumped boreholes could be used as observations for the calibration process. Observation data is detailed in *Annex B*.

Aquifer Test – Groundwater Abstraction

Pump rates varied for each borehole. Pumping was implemented in the model using the *Well Package*. The tested interval was based on the borehole

construction and also optimised during calibration. Pumping was simulated from layer two in the middle.

Optimised Parameters

Optimised parameters include *Specific Storage* and *Layer Thickness*, which is directly related to the *Transmissivity (T)* of the tested formation:

$$T = Layer\ Thickness\ x\ K$$

The model uses T to calculate groundwater flow and head distribution in the model domain.

Transient Calibration Results

Specific storage and layer thickness was calibrated using the aquifer test data of a total of 11 boreholes (constant discharge tests). Calibration results figures are presented in *Annex F*.

Due to a restriction in Processing Modflow Pro with regards to number of digits and the fine discretisation at the pumping well, the observation point could not be located exactly in the middle of the pumping well cell. Hydraulic gradients close to the pumping well are very steep and therefore there is a discrepancy between the maximum modelled drawdown in the model and in the figures (observation point). Therefore the modelled maximum drawdown in the pumping well cell is also mentioned in the figure titles.

Calibrated specific storage values vary mostly within less than one order of magnitude (*Table 7.7*). Considering only boreholes with acceptable drawdown data an optimised specific storage value of $9 \cdot 10^{-4}$ (geomean) was retained for scenario modelling.

The results for layer thickness indicate that the layer thickness and indirectly the transmissivity (T), which is used for the flow calculations, have a significant impact on the magnitude of drawdown in the borehole. For most boreholes calibrated layer thickness was smaller than the length of the well screen.

Table 7.7 Transient Calibration Results

		Aquifer Tests			Numerical Model				
BHID	Q (l/s)	Screen Length (m)	T (m2/d)	K (m/d)	Layer Thickness (m)	T (m2/d)	K (m/d)	SS Cal (-)	Notes
LNG-W001	1.5	21	5E+01	2E+00	10	7E+01	7E+00	1E-03	-
LNG-W002	4.7	9	5E+01	6E+00	4	3E+01	7E+00	3E-03	-
LNG-W003	1.5	9	2E+02	2E+01	5	4E+01	7E+00	1E-04	DD data not acceptable
LNG-W004	3.8	9	2E+00	2E-01	2	1E+01	7E+00	1E-03	DD data not acceptable
LNG-W005	1.7	9	6E+00	7E-01	0.8	6E+00	7E+00	2E-03	Based on Recovery
LNG-W006	4.6	9	6E+01	7E+00	5	4E+01	7E+00	1E-03	-
LNG-W010	2.9	12	7E+01	5E+00	8	6E+01	7E+00	1E-03	DD data not acceptable
LNG-W011	1.7	17	6E+00	4E-01	1	7E+00	7E+00	6E-03	-
LNG-W012	0.8	14	4E+01	3E+00	5	4E+01	7E+00	1E-04	Based on Recovery
LNG-W013	1.8	11	1E+02	1E+01	8.7	6E+01	7E+00	1E-03	-
LNG-W014	0.8	12	9E+01	7E+00	12	8E+01	7E+00	1E-04	-

C7.6 GROUNDWATER MODELLING SCENARIOS

The main potential groundwater impacts of the proposed Project are related to following activities:

- Over-abstraction of water supply wells;
- Surface sealing in the LNG Processing Area; and
- Filling in of estuaries, wetlands and streams in the LNG Processing Area.

Groundwater modelling scenarios were run to quantify potential impacts of the planned groundwater abstraction and other Project activities on the groundwater environment, groundwater users and groundwater-dependent ecosystems. Furthermore, the aquifer capacity to deliver the total Project water demand for domestic use was investigated and recommended pumping rates calculated for each production borehole.

Pumping rates per borehole can be limited by a number of factors including the following:

- Borehole and aquifer capacity;
- Borehole depth;
- Available drawdown;
- Saline intrusion; and
- Casing diameter.

The borehole capacity to sustain a given pumping rate was determined by scenario modelling using the calibrated model, where a maximum pumping rate is limited by the aquifer capacity and/or the borehole becoming dry (i.e. the dynamic water level [1] falling below the bottom of the borehole).

The concept of *available drawdown* was applied per individual borehole to determine a maximum pumping rate to avoid saline intrusion. A safety buffer was applied to keep the dynamic water levels in the different boreholes above 3mamsl at all times, which is deemed sufficient to avoid saline intrusion (given that the maximum pumping rates are below the ones calculated).

Another limiting factor to maximum pumping rates is the casing diameter, which determines what kind of commonly used submersible pumps can be accommodated. Submersible pumps that fit in a 4½" OD borehole can generally deliver approximately 1.5L/s (5.4m^3/hour) whereas pumps that fit in larger diameter boreholes with 5-6½" OD casing can deliver up to 4L/s (14.4m^3/hour) and more depending on the available groundwater head (i.e. the pumping rate would decrease with decreasing head). However, higher pumping rates can be achieved by using alternative pumping-systems (i.e. mono-pumps etc.).

[1] *Dynamic water level* describes the groundwater level in the borehole during pumping

Five scenarios were run in steady-state and four in transient (time-dependent) state. The different scenarios are presented in *Table 7.8*.

Table 7.8 Groundwater Modelling Scenarios

Scenario Number	Model Type	Description	Aim
Scenario 1	Steady-State	Determine maximum recommended pumping rate for each borehole, based on borehole/aquifer capacity, in order to avoid saline intrusion	Respect the maximum available drawdown to avoid saline intrusion: Dynamic water level > 3mamsl
Scenario 2	Transient	Meet Project borehole water demand (peak of 600m³/d) using the least number of boreholes required (3 boreholes for peak demand and 2 backup)	Only pump inland (Pioneer Camp) using maximum recommended pumping rates determined in Scenario 1; no restrictions in pumping rates with regards to borehole diameter
Scenario 3	Transient	Meet Project borehole water demand (peak of 600m³/d) using the least number of boreholes required but restricted to feasible pumping rates using submersible pumps (5 boreholes for peak demand and 1 backup)	Only feasible pumping rates in terms of maximum recommended pumping rates determined in Scenario 1 and borehole diameter, i.e. 5.4m³/hour (1.5L/s) in 4½" boreholes and 14.4m³/hour (4L/s) in 5 - 6½" boreholes
Scenario 4	Transient	Model the maximum impact by pumping the total water demand (peak of 3 000m³/d) from one borehole (LNG-W006)	Determine whether the aquifer can sustain the total Project water demand (domestic)
Scenario 5	Transient	Maximum impact after mitigation (pump each of the existing boreholes at the maximum allowable pumprate (Scenario 1) and additional 3-11 boreholes at 120 - 220m³/d to meet the peak demand	To keep the dynamic water level above 3mamsl by adding more extraction boreholes to deliver the total demand
Scenario 6	Steady-State	Surface Sealing resulting in reduced recharge based on an inferred LNG Processing Area (6km²)	Investigate impact of reduced recharge
Scenario 7	Steady-State	Surface Sealing resulting in reduced recharge and filling of estuaries, wetlands and streams; based on the inferred LNG Processing Area (6km²)	Investigate impact of reduced recharge combined with filling of estuaries, wetlands and streams
Scenario 8	Steady-State	Surface Sealing resulting in reduced recharge based on the total Revised Project Footprint area (14km²)	Investigate impact of reduced recharge (largest potentially sealed area)
Scenario 9	Steady-State	Surface Sealing resulting in reduced recharge and filling of estuaries, wetlands and streams; based on the total Revised Project Footprint area (14km²)	Investigate impact of reduced recharge combined with filling of estuaries, wetlands and streams (largest potentially sealed area)

C7.6.1 Model Setup

Grid Refinement

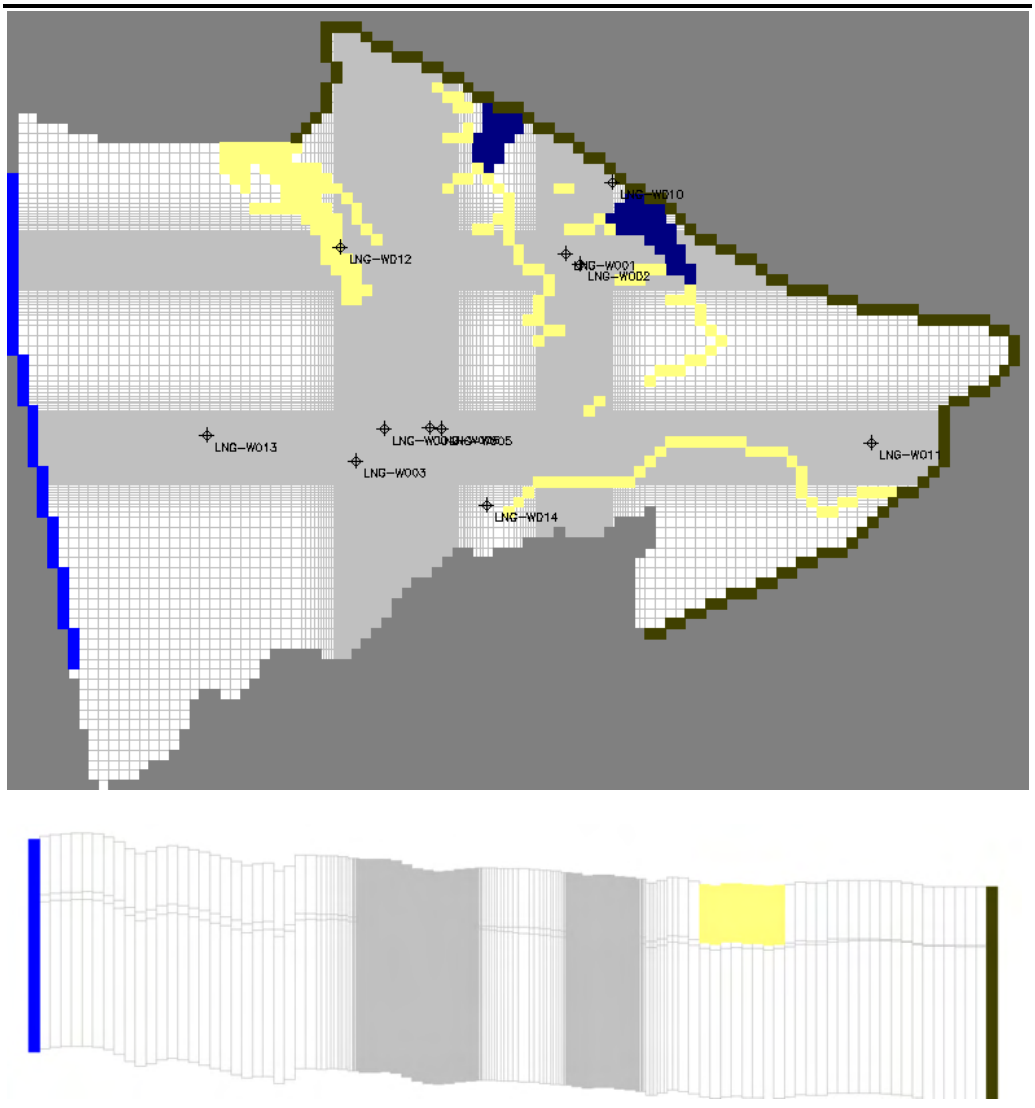
To accommodate the likely steep hydraulic gradient in the vicinity of extraction boreholes, the model grid was gradually refined horizontally in the

areas where groundwater abstraction is to take place to a 10m cell size: (i) Pioneer Camp and (ii) LNG Processing Area. In vertical direction the grid was refined to three layers as follows: (i) overburden, (ii) pumping horizon and (iii) base layer based on the transient state model calibration.

The borehole construction and the calibrated layer thickness per borehole were used to interpolate the top and bottom of the second layer.

The refined model is presented in *Figure 7.11* in both plan-view and cross-section view (west-east).

Figure 7.11 Refined Model



Boundary Conditions

The constant-head boundary in the west was converted to an inflow boundary simulated using the well package. The inflows were distributed to the three layers relative to the area of through-flow of each individual cell.

The ocean at Palma-Bay was implemented the same way as in the steady-state model but across all three layers. The surface water features (estuaries, streams and wetlands) were implemented in the first layer (top) only representing shallow surface features.

Aquifer Type

The uppermost layer was modelled as an unconfined layer and the two layers at the bottom as confined/unconfined layers.

Hydraulic Parameters

Vertical hydraulic conductivity (K_v) was assigned at 10% of the steady-state horizontal hydraulic conductivity (K_h) following a common approach. The calibrated specific storage (SS) of $9 \cdot 10^{-4}$ was assigned for all layers.

Other model parameters were taken as is from the calibrated steady state model including recharge, horizontal hydraulic conductivity, drain conductance and general-head-boundary conductance.

Stress Periods and Time Steps

For the transient (time-dependent) simulations, time unit (days), stress periods and time steps were selected to enable accurate simulation of the time-dependent groundwater abstraction as per Project water demand.

Stress periods are detailed in *Table 7.9* relative to the different Project phases. Stress periods were further divided into monthly time steps to facilitate numerical model stability except for the 10 year post-closure phase that was sub-divided into ten yearly time steps.

A one-year *dry-run* was modelled at the beginning of the transient models. This is a common approach used in transient modelling to assure the correct initial parameters are implemented. In order to calculate the initial parameters (initial head distribution), the refined model was first run in steady-state mode.

Table 7.9 Stress Periods and Time Steps

Stress Period Number	Stress Period Length (days)	Stress Period Length (months)	Number of Time Steps	Project Phase
1	360	12	12	Dry run
2	180	6	6	Construction
3	180	6	6	Construction
4	360	12	12	Construction
5	720	24	24	Construction
6	720	24	24	Construction and Operation
7	10140	338	338	Operation
8	3600	120	10	Post-closure

C7.6.2 Drawdown Correction

The model cells (10m by 10m) are much larger than the boreholes, which results in calculate drawdowns that are smaller than in reality. Therefore, the calculated drawdowns have to be corrected in order to get effective drawdowns in a production borehole (*real drawdown*).

To obtain the effective drawdown (Δd_{eff}) of a borehole with the radius r_{BH}, the drawdown calculated (Δd_{calc}) in a model cell with a certain grid size *a* is corrected by a corrective term Δd_{corr} as follows (Prickett and Lonnquist, 1971):

$$\Delta d_{eff} = \Delta d_{calc} + \Delta d_{corr}$$

$$\Delta d_{corr} = 0.3665\left(\frac{q}{T}\right)\log\left(\frac{a}{4.81 r_{BH}}\right)$$

Where:

q Abstraction rate of well [m^3/d];
T Transmissivity [m^2/d];
a Grid cell size [m]; and
r_{BH} Radius of the well [m].

C8 SURFACE WATER ECOLOGY

C8.1 OVERVIEW

This study was undertaken by Natural Scientific Services CC. The methodologies utilised for the aquatic and wetland assessment are detailed below. Since no known protocols have been developed for Mozambique, these methodologies have been largely based on South African methodologies, which have been designed for southern African environments and are therefore considered suitable for this study.

C8.2 SAMPLING SITES

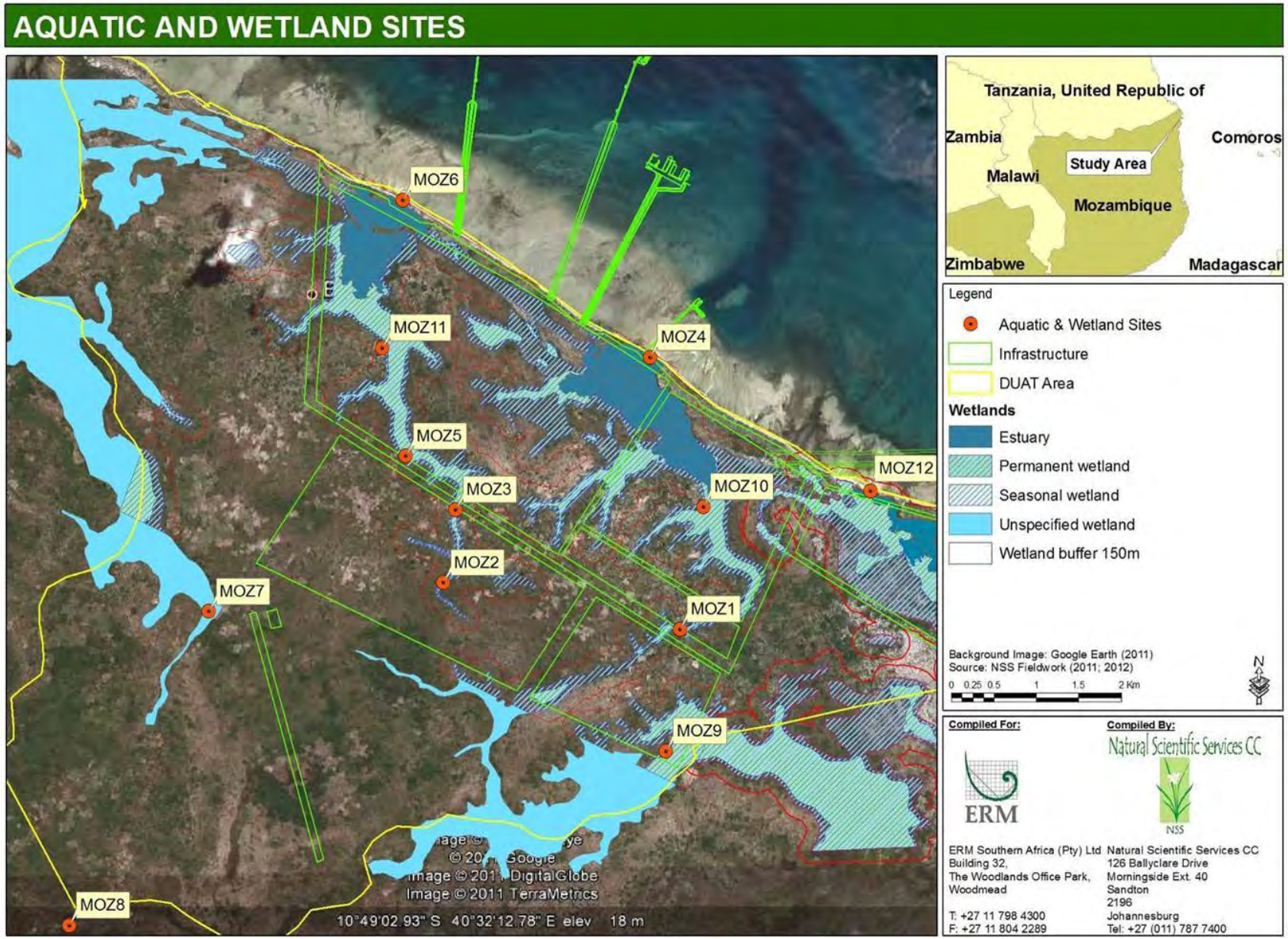
The initial objective of the study was to set a baseline status for the area by assessing the aquatic and wetland systems in the vicinity of the Afungi Project Site, specifically the Onshore Project Footprint Area, prior to the construction of the onshore LNG facilities, and the impacts that will follow due to these developments. The sampling sites were, therefore, positioned based on the proposed location of the Project infrastructure. The accessibility of areas also played a role in final site selection. The sites selected are summarised in *Table 8.1* and illustrated in *Figure 8.1.*

Table 8.1 Selected Sampling Sites

Site Position (in relation to proposed LNG Facility)	Site Name	Site Description	Co-ordinates	
In the proposed pipeline gas inlet area	MOZ 1	Wetland	S 10°50′07.58″	E 40°33′21.57″
In the proposed construction support facility area	MOZ 2	Wetland	S 10°49′50.94″	E 40°31′50.89″
On the proposed main access road	MOZ 3	Wetland	S 10°49′21.89″	E 40°31′55.34″
In the proposed operation dock zone	MOZ 4	Estuary	S 10°48′23.53″	E 40°33′09.69″
Upstream from proposed utilities area	MOZ 5	Wetland	S 10°49′00.74″	E 40°31′36.83″
In the proposed process utilities area	MOZ 6	Estuary	S 10°47′23.84″	E 40°31′35.83″
Upstream from the proposed airstrip	MOZ 7	Wetland	S 10°50′00.73″	E 40°30′20.72″
Upstream from the proposed airstrip	MOZ 8	Wetland	S 10°52′01.51″	E 40°29′27.94″
Upstream from operations support area	MOZ 9	Wetland	S 10°50′54.77″	E 40°33′16.08″
Downstream from construction staging area	MOZ 10	Wetland	S 10°49′21.31	E 40°33′30.34″
Downstream from process utilities area	MOZ 11	Wetland	S 10°40′20.53″	E 40°31′27.52″
In the operations housing area	MOZ 12	Estuary	S 10°49′15.53″	E 40°34′34.29″

All of the twelve sites selected were wetlands, nine of which were freshwater sites namely MOZ 1, 2, 3, 5, 7, 8, 9, 10 and 11. Three of the sites were estuarine sites ie MOZ 4, 6 and 12.

Figure 8.1 *Aquatic and Wetland Monitoring Sites*



The freshwater sites were assessed by determining the present ecological status (PES) of each site during low flow 2011 and high flow 2012. Four of the sites, MOZ 8, 9, 10 and 11 were added during high flow 2012. The low flow assessment of these sites was done during low flow 2012 (21-26 June 2012).

C8.3.1 Water Quality

Water quality is a measure of the physical attributes (turbidity, suspensoids, temperature) and chemical constituents (non-toxic: pH, TDS, salinity, conductivity, individual ions, nutrients, organic enrichment and dissolved oxygen including toxicants such as: trace metals and endocrine disrupting chemicals) of a sample of water, of which most can have an effect on the aquatic ecosystem characteristics.

Physical Water Quality Parameters

The physico-chemical constituents measured *in situ* included five standard physical WQ variables, namely, Dissolved Oxygen (DO) (mg/l and %), temperature (˚C), Electrical Conductivity (EC) (mS/m), Total Dissolved Solids (TDS) (mg/l) and pH. This was done by using a pre-calibrated HI 9828 Multiparameter with pH/ORP/EC/TDS/DO multisensor probe (Hanna Instruments).

Chemical Water Quality Parameters

The anthropogenic activities (agriculture and informal settlements) taking place in the Afungi Project Site were identified. The pollutants commonly associated with these activities were tested to determine the chemical constituents (nutrients and trace metals) through collection of water samples in polyethylene bottles. The analysis was done by Cleanstream (Pty) Ltd (ISO accredited laboratory) based in Pretoria, South Africa. The variables evaluated in low flow 2011 were: total alkalinity, chloride (Cl), fluoride (F), sulphate (SO_4), nitrate (NO_3), ammonium (NH_4), orthophosphate (PO_4), total hardness, including the metals aluminium (Al), beryllium (Be), bismuth (Bi), boron (B), cadmium (Cd), calcium (Ca), cobalt (Co), copper (Cu), gallium (Ga), iron (Fe), lead (Pb), lithium (Li), magnesium (Mg), manganese (Mn), molybdenum (Mo), nickel (Ni), potassium (K), rubidium (Rb), silicon (Si), sodium (Na), strontium (Sr), silver (Ag), tellurium (Te), thallium (Tl), total chromium (Cr), vanadium (V) and zinc (Zn). Some of the constituents, identified in low concentration (undetectable) during low flow 2011, were excluded from the high flow 2012 and low flow 2012 analysis, ie beryllium, bismuth, gallium, rubidium, tellurium, thallium and vanadium. Various constituents, namely mercury (Hg), nitrite (NO_2), chemical oxygen demand (COD), suspended solids (SS), turbidity (NTU) and soap, grease and oil (SOG), were added for WQ analysis of high flow 2012 and low flow 2012.

The physical and chemical water quality results were compared against the Target Water Quality Range (TWQR), which is a management objective

developed by DWAF (1996) for South African aquatic ecosystems and used to specify the desired or ideal concentration range and/or water quality requirements for a particular constituent. Although there are some water quality standards in place in Mozambique, none are specifically related to the standards required for optimal ecosystem functioning (Mozambique Environmental quality regulations, 2004). Consequently, the South African guidelines were utilised to give an indication of ecosystem deterioration in this study. Unfortunately no historical data was available at the time of this report write up due to limited commercial activity in the area. This project will thus form the baseline water quality monitoring for the area.

C8.3.2 Diatoms

Diatoms are a group of unicellular algae with characteristic siliceous cell walls, unique photosynthetic pigments and specific storage products (oil and chrysolaminarin). They are important components in algal communities and form the base of aquatic ecosystems (Taylor *et al*. 2007). The assessment of diatoms involves a biological monitoring technique that has been introduced as part of routine monitoring programmes because of certain shortcomings in standard physical and chemical methods. Although they do not currently form part of the array of bioindicators used in the National Aquatic Ecosystem Biomonitoring Programme (NAEBP), there is strong motivation to include diatoms as alternatives to macro-invertebrate assessments when low habitat diversity occurs (Dr Taylor, Annual Champions Symposium, 2006). The main advantage of this biological approach is that it examines organisms whose exposure to water and any pollutants there-in is continuous, and reflects the actual impacts (both long and short-term) of pollutants on the ecosystem. Therefore, diatoms are considered useful organisms to include in the suite of biomonitoring tools used in this study, both to establish current water quality and historical conditions (Taylor *et al*. 2005) in the wetland sites analysed. These wetland habitats have limited habitat availabilities, which has a large influence on other biotic assemblages within the system. Macro-invertebrates are particularly influenced by the lack of diverse habitats including cobbles, fast flowing waters and other biotopes and as such diatoms are particularly useful as an alternative to determine water quality influences in these habitats.

Diatoms were collected at the sampling sites according to the methodology described by Taylor *et al.* (2005) as well as Fore and Grafe (2002). Five objects submerged in water (plants, roots, reeds etc) were chosen from each site. The diatoms were collected by scrubbing the upper surfaces of these objects with a toothbrush and then rinsed into a tray. These were mixed with a small amount of water (obtained from the aquatic ecosystem) and poured in polyethylene bottles. Thereafter, the samples were fixed with 20% ethanol (final concentration by volume) to preserve and store the samples. The laboratory techniques, namely cleaning, preparation, enumeration, notation of deformed cells and identification of the diatoms, were done according to Taylor *et al*. (2005). All slides and material have been archived in the Diatom Collection of the North-West University, South Africa, should any material be required for independent verification. Index scores were calculated using OMNIDIA version 5.3 (Lecointe *et al*. 1993; database updated March 2009). The index

scores used in the interpretation of the data included the Specific Pollution sensitivity Index (SPI), Biological Diatom Index (BDI) and Percentage Pollution Tolerant Valves (%PTV). These index scores, ranging from deteriorated to high quality as defined by Eloranta and Soininem (2002), for each site was classed and presented in *Table 8.2*

Table 8.2 Index score and class used for interpretation of diatom assessment (Taylor 2011)

Interpretation of index scores		
SPI and BDI	%PTV	Class
>17	–	high quality
13 to 17	–	good quality
9 to 13	10–15	moderate quality
5 to 9	<20	poor quality
<5	<20	bad quality
– Not available		

C8.3.3 Habitat Integrity (IHI)

The Index of Habitat Integrity (IHI) assessment protocol, described by Kleynhans (1996), was used to assess the impacts on the aquatic and surrounding habitats of each site. Respectively the instream (IH) and riparian (RH) habitats are analysed based on a set of 12 weighted disturbances in the index. These disturbances represent some of the important and easily quantifiable anthropogenically induced impacts, including bank erosion, bed-, channel- and flow modification; exotic aquatic fauna, -macrophytes and -vegetation encroachment; indigenous vegetation removal; inundation; solid waste disposal and water abstraction. The respective level of impacts for the IH and RH habitats were calculated. Each disturbance was assigned an impact rating (*Table 8.3*) and a confidence score. These values were used to calculate an impact score using the formula: (impact rating/25) x (the weight of that impact defined in *Table 8.4*). The estimated impacts of all criteria was summed, expressed as a percentage and subtracted from 100 to obtain a habitat integrity value for the instream and riparian components, respectively in accordance with Kleynhans (1996).

However, in cases where riparian zone criteria and the water abstraction, flow, bed and channel modification, water quality and inundation criteria of the instream component exceeded ratings of large, serious or critical, an additional negative weight was applied. The aim of this is to accommodate the possible cumulative effect (and integrated) negative effects of such impacts (Kemper, 1999). The following rules were applied in this respect:

- Large Impact = Lower the integrity status by 33% of the weight for each criterion with such a rating.

- Serious Impact = Lower the integrity status by 67% of the weight for each criterion with such a rating.

- Critical Impact = Lower the integrity status by 100% of the weight for each criterion with such a rating.

The final IHI estimate was then calculated by adding the negative weights for the instream and riparian habitat values and subtracting this total from the provisionally determined intermediate habitat integrity. This final IHI is then characterized into one of the six categories defined by Kleynhans and Louw (2008) and indicated in *Table 8.3*

Table 8.3 The IHI scoring of each criterion to describe the extent of each impact (from Kleynhans 1996)

Impact Class	Description	Score
None	No discernible impact or the modification is located in such a way that it has no impact on habitat quality, diversity, size and variability	0
Small	The modification is limited to very few localities and the impact on habitat quality, diversity, size and variability is limited.	1-5
Moderate	The modifications are present at a small number of localities and the impact on habitat quality, diversity, size and variability are fairly limited.	6-10
Large	The modification is generally present with a clearly detrimental impact on habitat quality, diversity, size and variability. Large areas are, however, not affected	11-15
Serious	The modification is frequently present and the habitat quality, diversity, size and variability in almost the whole of the defined area are affected. Only small areas are not influenced.	16-20
Critical	The modification is present overall with a high intensity. The habitat quality, diversity, size and variability in almost the whole of the defined section are influenced detrimentally.	21-25

Table 8.4 Criteria and weightings used for the assessment of Instream and Riparian Habitat

Instream Criteria	Weight	Riparian Criteria	Weight
Water abstraction	14	Vegetation removal	13
Water quality	13	Exotic vegetation	12
Flow modification	13	Bank erosion	14
Bed modification	13	Channel modification	12
Channel modification	14	Water abstraction	13
Inundation	10	Inundation	11
Exotic macrophytes	9	Flow modification	12
Exotic fauna	8	Water quality	13
Rubbish dumping	6		

Fish Habitat Availability

A fish habitat assessment was undertaken to provide a measure of the fish refuge potential associated with each of the sampling sites. This assessment characterises the fish habitats into four velocity-depth classes (including slow-deep, slow-shallow, fast-deep and fast-shallow habitat class, where fast is greater than 0.3 m/s, slow is less than 0.3 m/s, deep is greater than 0.3 m and shallow is less than 0.3 m) and associated cover present at each of the habitats (Dallas 2005). All of these were quantified on a scale from 0 to 5, being absent (0), rare (1), sparse (2), common (3), abundant (4) or entire (5) (Dallas 2005). Measuring these various habitat types are an essential component in the interpretation of the fish integrity because it can influence (by creating or restricting) the fish populations and communities present within each sampling site.

Macro-Invertebrate Habitat Availability

Macro-invertebrate communities, like most aquatic fauna, are largely influenced by the habitat diversity within an aquatic ecosystem. Therefore, different biotope diversities were evaluated where available ie instream vegetation, marginal vegetation and GSM (gravel, sand and mud)[1]. Each of the biotopes were scored, rated on a scale from 0 to 5 according to presence of biotopes, namely absent (0), rare (1), sparse (2), common (3), abundant (4) or entire (5) (Dallas, 2005). The invertebrate habitat assessment system (IHAS) index was not incorporated into the present study as it still requires validation, according to Dallas (2005). NSS however does utilise the index as a guide to identify impacts in the habitat eg algal enrichment etc. Some of the categories from the IHAS were therefore identified in this study, including algal presence, biotopes and dominant vegetation types.

C8.3.4 Macro-Invertebrates

The assessment of macro-invertebrate communities in a river system is a recognised means of determining river "health" (Dickens and Graham 2002). Macro-invertebrates are good indicators because they are visible, easy to identify and have rapid life cycles. The macro-invertebrates were collected and identified to family level using the standardised SASS5 (South African Scoring System, version 5) sampling method described by Dickens and Graham (2002). SASS5 is a rapid assessment method of macro-invertebrate status of a flowing instream system. Macro-invertebrates were collected using a standard SASS net in available habitat types within specified time frames. Fifteen minutes were taken to identify the presence and approximate abundances of macro-invertebrate families in each of the habitats. The results for each site was then analysed using the following metrics:

(1) [1] Unfortunately, stones in fast and slow flowing habitats were not present at any of the sampling sites. Such habitats are generally more favourable for macro-invertebrates and therefore there absence will reduce the macro-invertebrate index scores utilised in this study.

- Occurrence of macro-invertebrates: The number and abundances of families sampled were used to determine the overall family richness. These two measures are simple and were used as an indicator of contaminant stress on macro-invertebrate communities.

- EPT richness: This evaluates the total number of families occurring in the order Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies) (Marshall et al., 2001) ie EPT = # Ephemeroptera families + #Plecoptera families + #Trichoptera families. It is based on the sensitivity of these families and as such a decrease in the number of these orders would indicate an increase in water quality perturbations.

- Biotic indices: Such indices are usually based on the assignment of various macro-invertebrate taxa. Their utility in countries other than those for which they are originally designed may be limited as tolerances may not be reliably transferred to different areas where there are different families, climates and ecoregions. The biotic indices included SASS5, Average Score Per Taxon (ASPT) and Macro-invertebrate response index (MIRAI).

SASS5

The SASS5 score was calculated by the sum of the sensitivity scores of the present families. The average score per taxon (ASPT) was calculated by dividing the total SASS score by the total number of taxon. The results were interpreted based on the SASS5 score defined in *Table 8.5*. However, the use of SASS5 and ASPT, was included in this study as a **guide** to identify impacts as family tolerances have been shown to have similar trends throughout the world. It was only used as guide as these are wetland systems and are therefore not flowing rivers and no eco-region data is available for comparison.

MIRAI

The MIRAI was used in this study, as an alternative to the SASS5, to determine the Present Ecological Status (PES) of the macro-invertebrate community assemblage. The index integrates the ecological requirements of the invertebrate taxa in a community or assemblage and their response to modified habitat conditions, whilst comparing the present assemblage with a reference list (Thirion, 2008). No historical data was available for the macro invertebrates that occur in these aquatic systems. Therefore, the reference list for this study was compiled based on the macro-invertebrate preference to the biotopes found at the sampling sites. These included macro-invertebrates which occur in no and/or slow flowing water which also favour vegetation and/or GSM habitats. This excluded all species with a preference to fast flowing water and stone (in and out of current) biotope. In addition, the functional feeding groups and riverine continuum were considered when compiling the reference list. Due to the fact that the sites are connected, it was assumed that the species that occurred at one site should hypothetically also occur at the other sites. This method made it possible to compare each individual site to the predetermined reference conditions.

The MIRAI model makes a comparison between the expected macro-invertebrate families with the present assemblages obtained using SASS5 sampling protocol (Thirion, 2007). The habitat preferences for each of the macro-invertebrates were incorporated in terms of flow, habitat and water quality. Each component was rated within a metric in terms of how much the macro-invertebrate presence and abundances changed from reference, and were done for each of the metrics. After all of the metrics were scored, the model generated a MIRAI score for each site and was characterised into an EC as defined in *Table 8.5.*

C8.3.5 Fish

At each site, the fish were sampled according to standardised fish sampling methods (Kleynhans, 2008) which included seine-, cast- and fyke nets. The small seine net was used in shallower areas with overhanging vegetation by running the net out to the banks of the wetland. A minimum of five casts was done at the sites which had sufficient water depth. The small fyke net was positioned in the water for a minimum of two hours at each site. The sampled fish were identified to species level using Skelton (2001) and safely returned to the aquatic system before they were documented into the separate segments and habitat types. In the cases where fish could not be identified with certainty, specimens were sent to the Fishery Research Institute in Maputo, Mozambique. Photos of the species were taken and send to the South African Institute for Aquatic Biodiversity (SAIAB) for positive identification (Bills 2011, personal communication).

Multivariate statistical techniques have been widely used to assess biological community structures and patterns in various ecosystems, including fresh water fish community assemblages and other biological data sets. A principle component analysis (PCA) approach, by means of Canoco Version 4.5 was used to determine if there were any spatial or temporal differences between the various freshwater sites by overlaying the WQ on the fish species sampled during low and high flow. A Redundancy Analysis (RDA) was undertaken to determine the differences between the freshwater sampling sites to determine which environmental variables are possibly responsible for the differences.

C8.3.6 Ecological Integrity / Present Ecological Status

The present ecological status (PES) of the freshwater systems was determined by assessing the water quality, diatoms, habitat, macro-invertebrates and fish community integrity. Ecological categories (EC) were used to assist in the interpretation of this data because they define the ecological condition of a river or freshwater system in terms of the deviation of biophysical components from the natural reference condition (Kleynhans and Louw, 2008). These categories range over a continuum of levels of disturbance from the natural state of the ecosystem, from no disturbance or natural (Category A) to critically modified (Category F) and were represented by characteristic colours defined by Kleynhans and Louw (2008) in *Table 8.5*.

Table 8.5 ***Present Ecological Status Codes and Descriptions with Standardised Colour Coding***

Catergory	IHI (%), MIRAI (%), SASS5, VEGRAI	Short Description	Long Descriptions
A	90 – 100	Natural	Unmodified state with no impacts, conditions natural (Scores between 87.4 and 92 = A/B)
B	80 – 89	Largely natural	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged (Scores between 77.4 and 82 = B/C)
C	60 – 79	Moderately modified	Moderately modified - loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged (Scores between 57.4 and 62 = C/D)
D	40 – 59	Largely modified	Largely modified - a large loss of natural habitat, biota and basic ecosystem functions has occurred (Scores between 37.4 and 42 = D/E)
E	20 – 39	Seriously modified	Seriously modified - the loss of natural habitat, biota and basic ecosystem functions are extensive (Scores between 17.4 and 22 = E/F)
F	< 20	Critically modified	Critically/Extremely modified - modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible

Source: Modified from Kleynhans and Louw (2008); Kleynhans (1996; 1999) and in Kleynhans *et al.* (2007))

In some cases, there is an uncertainty as to which category a particular waterbody belongs. This situation falls within the concept of a "fuzzy" boundary, where a particular entity may potentially have membership of both classes and for practical purposes these situations are referred to as boundary categories and are denoted as for example B/C as depicted in *Figure 8.2*.

Figure 8.2 ***Illustration of the distribution of categories on a continuum as shown in Kleynhans and Louw (2008)***



In the current study, the results obtained from the index scores of the IHI measuring habitat and MIRAI scores (see *Section C8.3.1*) measuring macro-invertebrate integrity were assigned to the ECs outlined in *Table 8.5*. The SASS5 and ASPT scores could not be calculated by the method defined by Dallas (2007) where assigned ECs were used by calculated percentiles based on South African eco-regions. None of these ecoregions were present in this study and as such could not be utilised to predict the current status of the macro-invertebrate community structures. Eco-regions generally have similar ecological characteristics and are usually used to predict what the biotic structures would be composed of under natural circumstances and thus used to determine and interpret EC. Since these limitations were particularly problematic with the SASS5 and ASPT scores derived by Dallas (2007), a more general SASS scoring system by Thirion *et al*. (1995) was utilised (1). In terms of the WQ, measured variables were not assigned into an EC, as there are no recognised scores for water variables and they can therefore not be characterised into an index score.

C8.4 ESTUARINE ASSESSMENT

The three estuarine sites were assessed using the guideline for estuaries RDM Methods (version 3) with the procedures discussed in detail below and described in DWA (2010). Two of the sites (MOZ 4 and MOZ 6) were assessed at three points within each estuary (mouth, middle and upper reaches) (*Figure 8.3* and *Figure 8.4*). The third estuary (MOZ 12) was a small shallow system and samples were collected mainly at the estuarine mouth. In assessing the PES of the three estuaries the sediment, water quality, invertebrates, fish, microalgae and diatoms were assessed. Bird counts were also undertaken at two of the estuaries (MOZ 4 and MOZ 6) by Enviro-Insight, the data of which feeds into this report. The estuary site MOZ 4 and MOZ 6 were assessed in both high and low flow, with the third estuary (MOZ 12) only being assessed in June 2012, during the low flow assessment.

C8.4.1 Sediment

The techniques used to analyse the physical characteristics of the sediment of the two estuary sites are standard methods as defined by the United States Environmental Protection Agency (2001) and have been used successfully in Southern Africa (Cyrus *et al.* 2000). Two sediment samples (a – close to estuary mouth and b – close to middle reaches) were collected at each site in a polyethylene jar, and transported to the laboratory at the University of Johannesburg, South Africa, for analysis. The physical characteristics of the sediment analysed included moisture content, organic content and the grain size. The moisture content was determined by taking a known amount of sediment from each samples and drying it in an oven for four days at 60^{o}C. The organic content was determined by taking a known amount of dry sediment (accurate to 0.00001g) and incinerating the sample for six hours at

(1) Note that SASS5 and ASPT scores and their associated ecological categories were only used as a guide in this study (see *Section C8.3.4*)

600ºC. The samples were then reweighed to determine the percentage organic content in the sample.

Figure 8.3 Estuarine Sampling Site MOZ4

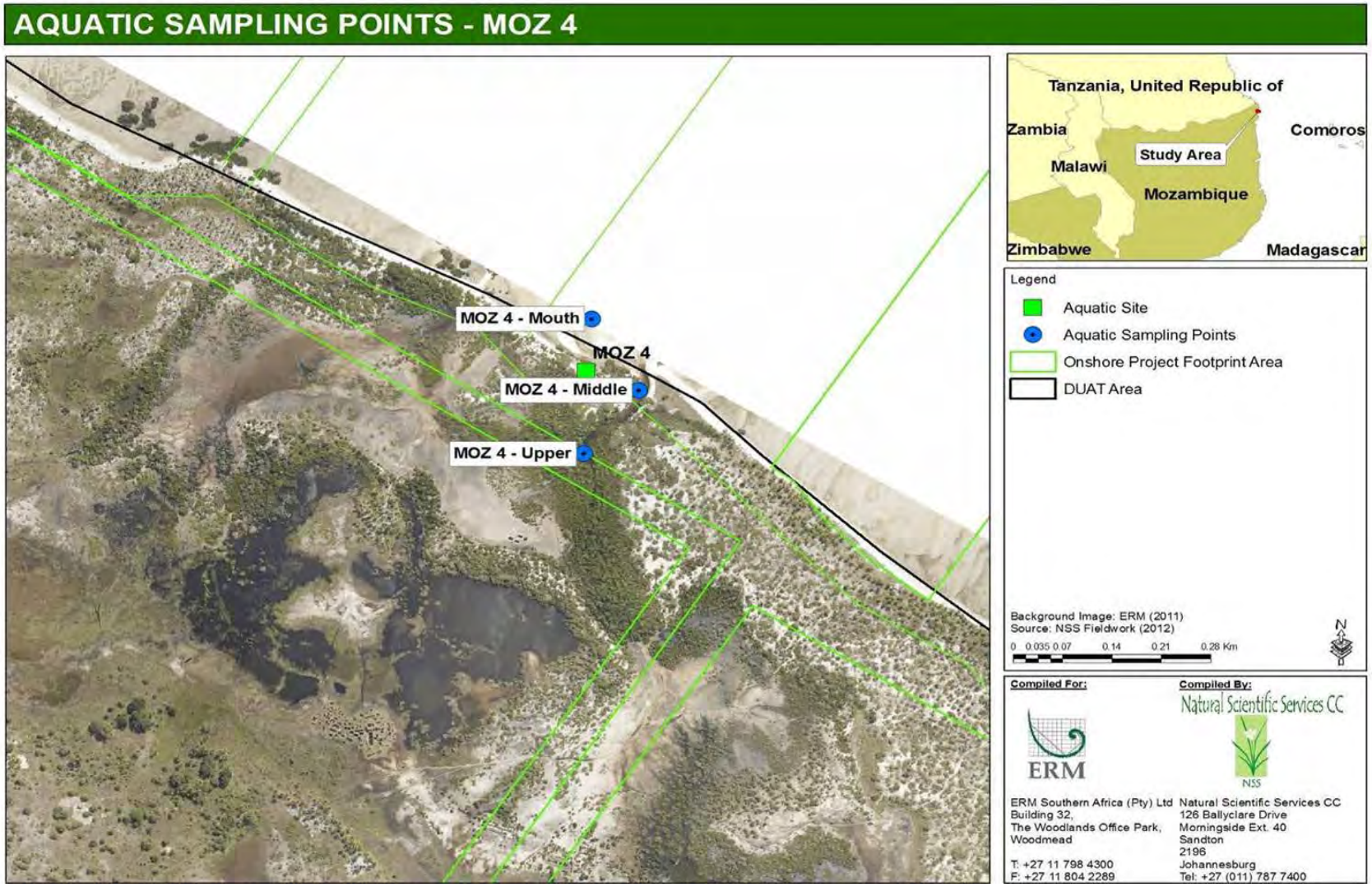
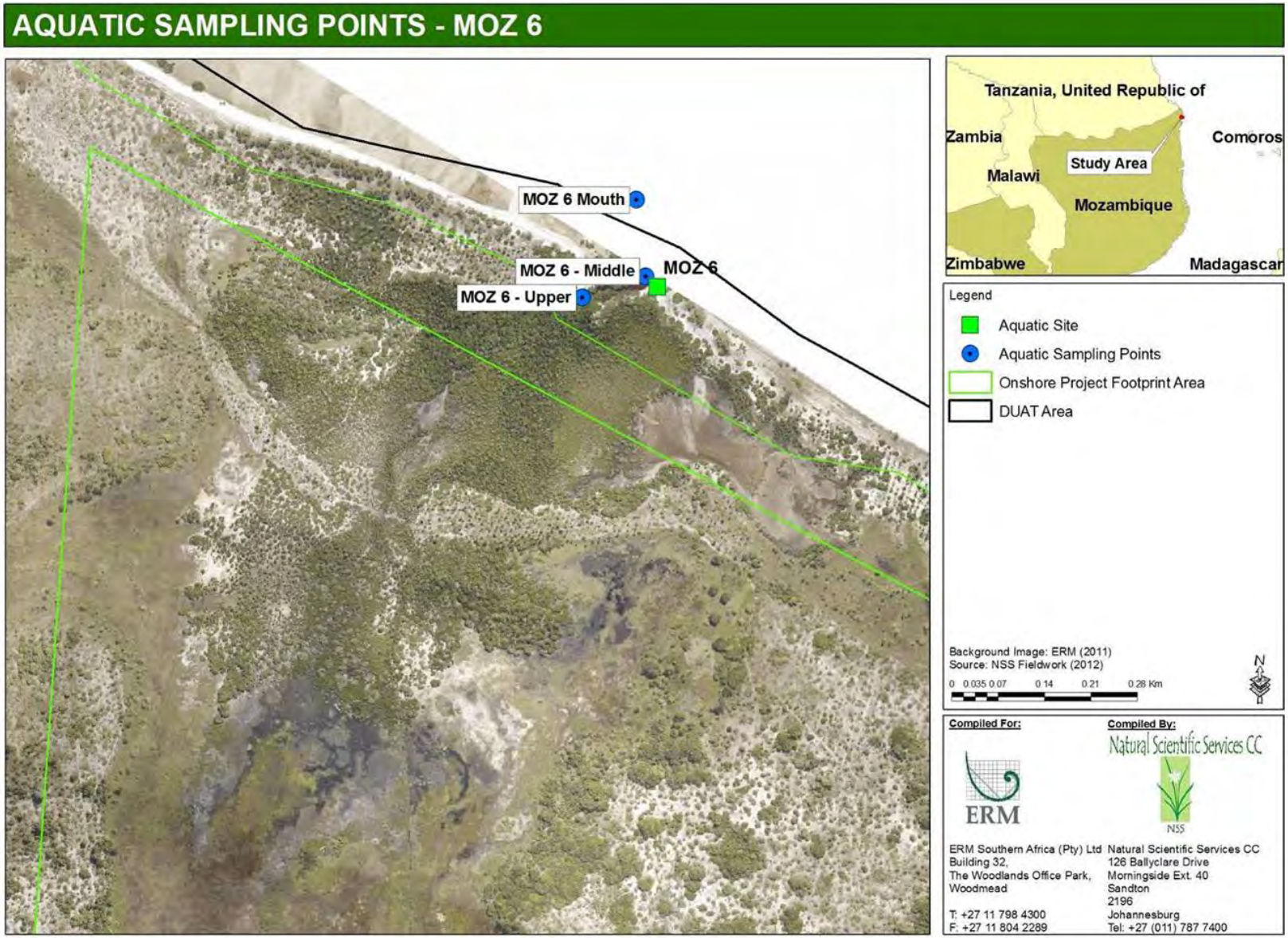


Figure 8.4 Estuarine Sampling Site MOZ6



The United States Environmental Protection Agency (2001) classifies the percentage organic content as follows:

Very low	=	< 0.05%
Low	=	0.05 – 1%
Moderately low	=	1 – 2%
Medium	=	2 – 4%
High	=	> 4%

The remaining dried sediment was used to determine the grain size of each sample by using an Endecott sieve system with various sieves ranging from > 4000 µm to 53 µm. The grain size categories that were used with their descriptions are summarized in *Table 8.6* (Cyrus *et al.,* 2000).

Table 8.6 ***Various Grain Size Categories and Average Phi Values used to assess the Grain Size Distribution of the Estuarine Sediment***

Grain Size Categories (µm)	**Average Phi (Φ) value**	**Description**
Larger than 4 000	-2	Gravel
4 000 - 2 000	-1.58	Very Coarse Sand
2 000 - 500	-0.32	Coarse Sand
500 - 212	1.49	Medium Sand
212 - 53	2.92	Very Fine Sand
Less than 53	4.24	Mud

In estuarine sediment assessments, sediment grain-size data is given in phi (Ø) intervals rather than in microns, millimetres, or inches. Phi diameter is computed by taking the negative log of the diameter in millimetres. The phi values were obtained by calculating the negative logarithm to the base 2 of the particle diameter ie $Ø = - \log_2 D$. Statistical computations and graphic presentations are much simpler when phi diameters are used. For the purposes of this assessment, the sediment grain size analysis was done by calculating the average phi values as well as the sorting coefficients for each site. By means of a cumulative curve, constructed by plotting substratum grain size percentage distributions of each site against the average phi values, the phi size for each of the following phi values at 5, 16, 25, 50, 75, 84 and 95 % respectively were determined (the % refers to the cumulative percent).

Consequently the sorting coefficients were calculated by using the following formula:

$$\sigma_I = \frac{\phi_{84} - \phi_{16}}{4} + \frac{\phi_{95} - \phi_5}{6.6}$$

The results were then plotted on a graph to determine how well the sediment was sorted. The various categories for how well the sediment is sorted were given below (Lewis and McConchie, 1994a):

< 0.25 Φ	very well sorted
0.35 – 0.5 Φ	well sorted
0.5 – 0.7 Φ	moderately well sorted
0.71 – 1.0 Φ	moderately sorted
1.0 – 2.0 Φ	poorly sorted
2.0 – 4.0 Φ	very poorly sorted

C8.4.2 Water Quality

The same constituents tested for freshwater were also tested in the estuaries. See *Section C8.3.1*.

C8.4.3 Microalgae and Diatoms

Microalgae biomass / abundance provide information on eutrophication (1) while changes in the dominant groups can indicate changes in the community due to water quality and quantity. Microalgae are important for the invertebrate and fish communities, particularly in large permanently open estuaries where benthic microalgae or phytoplankton are important primary producers. Ideally measurements should be taken under different flow conditions to establish natural variations. In shallow estuaries, situated close to the sea, or in the permanent open estuaries with large intertidal areas, the benthic microalgae are important primary producers. The characteristics of the microalgae community are important as they provide a better understanding of the invertebrate community (Gibson *et al*. 2000; WA, 2010). It is advantageous to analyse and characterise microalgae in baseline and impact monitoring as they have short life cycles which makes it easy to identify short term impacts and any influence in nutrient balance which affects their community. The use of microalgae as an indicator also carries some disadvantages: rapid distribution by wind and tides can mean they are not exposed to short term impacts, identification is difficult and time consuming, increased grazing by zooplankton can counteract higher microalgae biomass caused by nutrient enrichment, and indeterminate blooms by microalgae making characterization difficult (Gibson *et al*., 2000).

Microalgae were sampled at three different areas within site MOZ 4 and MOZ 6 (*Figure 8.3* and *Figure 8.4*) and at the estuarine mouth at MOZ 12. A water sample was taken to collect microalgae specimens. The sample was allowed to settle and a sub sample was taken for analysis under a light microscope (at 400x magnification). The different microalgae groups ie green algae, flagellates, dinoflagellates, diatoms and blue-green algae were identified and counted. Benthic microalgae were also collected at three areas within each estuarine site. The benthic microalgae layer on top of the sediment was collected using a small diameter pipe at approximately six different areas

(1) The process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates.

within a site. As was the case with the water microalgae, the benthic microalgae were identified and counted under a light microscope at the University of Johannesburg, South Africa.

The diatom community present at each of the estuarine sites was also sampled separately according to the protocol in *Section C8.3.2*.

C8.4.4 Invertebrates

Zooplankton

The zooplankton community is important in estuary systems as they are often closely related to the microalgal community function as well as any potential effects on the microalgal community. The zooplankton community has similar advantages for inclusion in an estuarine assessment as that of the microalgae, they have a rapid lifecycle that can provide fast responses to water quality changes or impacts, sampling equipment is inexpensive and easy to use and identification and sorting is easier than microalgae. Disadvantages include the lack of any substantial baseline or reference data for estuaries in Southern Africa, especially in northern Mozambique as well as the rapid lifecycles making cause and effect relationships difficult (Gibson *et al*., 2000).

The zooplanktonic community at each site was sampled using a 100µm mesh size plankton net (50 x 50cm 25 µm). The net was dragged through the water for approximately 15m at each of the three areas within site MOZ 4 and MOZ 6 and at the estuary mouth at site MOZ 12. The debris and plankton caught within the net was transferred to a polyethylene jar, fixed with ethanol and stained using a vital dye, Rose Bengal. The zooplankton was identified to the lowest possible taxonomic level at the laboratories of the University of Johannesburg, South Africa.

In addition, a light trap was set over night at sites MOZ 4 and MOZ 6 to sample zooplankton and micro-invertebrates (some zooplankton species only feed at night). The light trap is comprised of a plastic jar, a funnel and a light stick. The invertebrates are attracted to the light source during the night and enter the funnel at the jar's opening from which it cannot escape. In the morning the trap was removed and the invertebrates were transferred into a polyethylene jar, stained with Rose Bengal and fixed with ethanol. The invertebrates caught with this method were identified to the lowest possible taxonomic level at the University of Johannesburg.

Benthic Invertebrates

Benthic invertebrates were sampled by taking five random grab samples at the three areas within Site MOZ 4 and MOZ 6 using a grab sampler, and within the estuarine mouth at MOZ 12. The contents of each grab were emptied into separate buckets and a small amount of 10% formalin added to force invertebrates present to release their hold on any particulate matter. Each bucket was filled with water and the mixture thoroughly stirred. The suspended matter was then decanted through a 0.5mm mesh (conical net),

and the process repeated 5 times. The remainder of the sample was then transferred into a polyethylene jar. The fauna and debris retained were preserved in 10% formalin, and a biological stain (vital dye, rose bengal) was added to aid in sorting and counting the invertebrates in the laboratory at the University of Johannesburg, South Africa.

C8.4.5 Fish

The fish sampling at the two estuary sites was carried out using selected seine netting techniques. A medium seine net (35m length, 1.6m depth and a 16mm mesh size with a 2m deep bag) and a small seine net (5m length, 1.6m depth, with two 20mm x 1.8m wood poles attached at each end) were mainly used to sample the fish community in different parts of the estuary. Within the estuary, the medium seine net was pulled with the tide employing a "quarter sweep" method where one end of the seine is held on shore while the other end is fully extended perpendicular to the shore, and then pulled back into shore forming a semi-circle (USEPA, 2000). Precautions were taken upon approaching the site in order to avoid disturbance of the sampling area (USEPA, 2000). The small seine net was used to sample shallower areas and areas covered with overhanging vegetation by means of running the net out from the estuary. Additionally, a small fyke net was also used in each estuary as a passive sampling technique. The fyke net was deployed for a minimum of three hours at a time during the day. Fish species collected in the field were identified (*in* situ and confirmed in the laboratories of the Fisheries Research Institute in Maputo, Mozambique and at the University of Johannesburg in South Africa) using the following guides:

- Freshwater Fishes of Southern Africa (Skelton, 2001);
- Coastal Fishes of Southern Africa (Heemstra and Heemstra, 2004);

The conservation status of most estuarine fish species observed in the study could not be established as most of the captured species are not well documented in scientific literature or (data deficient), or have not been evaluated by the IUCN (2011). Therefore, the conservation status of fish was not used as a weighing factor in the assessment of the estuarine sites, and an alternative method was used (Elliot *et al*., 2007).

The fish community data can be structured in various functional guilds according to Elliot *et al*. (2007). The guild approach compares the fish community according to their community function rather than at a taxonomic level. A fish guild is defined as a group of species that exploits the same class of environmental resource in a similar way (Elliot *et al*. 2007). These categories of guilds provide information on the functioning, hierarchical structure and connectivity of an estuary. This classification can also be used to simplify the very complex estuarine ecosystem. The three guilds that are identified by Elliot *et al*. (2007) are:

- Estuarine Use (EUFG): the overall ecological use of an estuary by a given species – migratory and physiological tolerances.

- Feeding Mode (FMFG): the primary method of feeding used by a given species – feeding behaviour and body structure.

- Reproductive Mode (RMFG): indicates how and, in some cases, where an estuarine species reproduces

A statistical approach was taken to assess the two estuarine sites associated with the proposed development. No reference fish community data is available for this part of Mozambique making a PES calculation difficult. The statistical programme used to analyse the fish community data was Canoco 4.5 software for multivariate data analysis. A Redundancy Analysis (RDA) was completed to determine the differences between the two estuary sites as well as to determine which environmental variables are possibly responsible for the differences. RDA is derivative of PCA, where the values entered into the analysis are not the original data but the best-fit values estimated from a multiple linear regression between each variable in turn and a second matrix of environmental data. Interpretation of RDA is undertaken through biplots (Shaw, 2003), which is a *map* of the samples being analysed on a two dimensional basis, where the placements of the samples reflect the (dis)similarities between the samples; in this case the sampling sites.

C8.4.6 Bird Counts

Enviro-Insight undertook bird counts at sites MOZ 4 and MOZ 6 during the high flow assessment, to feed into the estuarine assessment. The bird counts were undertaken at the same three points, along each of the estuaries, as sampled in the aquatic assessment. The bird counts were undertaken for approximately 10 minutes at each site, with all birds seen within a 50m radius recorded. Wader species within the intertidal zone were also noted at each of the estuary sites.

C8.4.7 Vegetation

Using Turpie (2010) as a guideline, habitats along the estuary profiles were identified based on vegetation identified. These habitats were assessed for species richness, rareness and diversity.

C8.5 WETLAND ASSESSMENT

A detailed wetland assessment was undertaken as part of the high flow aquatic assessment carried out in 2012. The low flow assessment focused on the wetlands directly associated with the aquatic sampling points. The methodology for the overall wetland assessment (low and high flow) is described below.

Prior to any field investigations being undertaken, the area was surveyed at a desktop level which involved the analysis of aerial imagery and contour data to determine the layout and extent of potential wetlands in the Onshore

Project Footprint Area. An interim classification of the wetlands was then carried out, as described below, and later verified in the field.

C8.5.1 Wetland Classification

The first level of classification of wetlands in the Onshore Project Footprint Area was based the following descriptions by Van Ginkel *et al.* (2011) for the basic terminology relating to wetland types:

- Palustrine wetland systems. Wetland systems with a high ground water content but which tend to be dry during the dry season. Water accumulates during the wet season and obligate wetland plants are adapted to grow in these habitats.

- Lacustrine wetland systems. Wetlands with permanent wet conditions and may include water bodies and shallow pans. The systems typically have plants growing in the water although riparian zones or floodplain areas can become dryer during the dry season.

- Riverine systems. River systems that have perennial running water or are seasonally dry. The habitats include the seasonal floodplains along the river reaches.

- Estuarine systems. Systems with water varying from fresh to brackish to very saline, and often close to coastal areas.

A popular wetland classification method for Southern Africa found in the WET-EcoServices manual (Kotze *et al*. 2007) was subsequently used for classifying the freshwater wetlands in the Onshore Project Footprint Area. This method classifies wetlands into hydro-geomorphic units based on characteristics of the geomorphology; patterns of water movement and the landscape / topographic setting. Six hydro-geomorphic categories are recognized as illustrated and described in *Table 8.7*. Artificial wetlands are excluded from the classification.

Table 8.7 *Characteristic Wetland Hydro-Geomorphic Types Supporting Inland Wetlands in Southern Africa*

HYDRO-GEOMORPHIC WETLAND TYPES		SOURCE MAINTAINING WETLAND	
		Surface	Sub-surface
Floodplain		***	*
	Valley bottom areas with a well-defined stream channel, gently loped and characterised by floodplain features such as oxbow depressions and natural levees and the alluvial (by water) transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs occur from the main channel (when the channel banks overspill) and from adjacent slopes.		
Valley bottom with a channel		***	*/***
	Valley bottom areas with a well-defined stream channel but lacking the characteristic floodplain features. May be gently sloped characterised by the net accumulation of alluvial deposits, or may have steeper slopes and be characterised by the net loss of sediment. Water inputs occur from the main channel (when channel banks overspill) and from adjacent slopes.		
Valley bottom without a channel		***	*/***
	Valley bottom areas with no clearly defined stream channel, usually gently sloped and characterised by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs occur mainly from the channel entering the wetland and also from adjacent slopes.		
Hillslope seepage linked to a stream channel		*	***
	Slopes of hillsides which are characterised by colluvial (transport by gravity) movement of materials. Water inputs are mainly from sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel.		
Isolated hillslope seepage		*	***
	Slopes of hillsides which are characterised by the colluvial (transported by gravity) movement of materials. Water inputs mainly from sub-surface flow and outflow either very limited or through a diffuse sub-surface and/or surface flow, but no direct surface water flow connection to a stream channel.		
Depression (includes pans)		*/***	*/***

	A basin-shaped area with a closed elevation contour that allows for the accumulation of surface water (ie it is inward draining). It may also receive sub-surface water. An outlet is usually absent, and therefore this type is usually isolated from the stream channel network.	

Key: * = Contribution usually small; *** = Contribution usually important;
*/*** Contribution may be small or important depending on circumstances

Source: Kotze *et al*. (2007)

C8.5.2 Criteria for Determining Wetland Extent

The wetland delineation methods used in the field were based on the DWA field procedure for identification and delineation of wetlands and riparian areas (DWAF, 2005). The following four indicators described by DWAF (2005) were used to determine wetland extent:

- Terrain Unit Indicator: The topography of the area was used to determine where in the landscape wetlands were likely to occur, and determine their outer limits. Detailed digital contour data with a 1 meter interval was provided by AMA1 for the Afungi Peninsula and surrounding areas. This data indicated even relatively minor topographical changes that have been useful for determining wetland extent.

- Soil Form Indicator: Some soil forms such as Champagne, Katspruit, Willowbrooke and Rensburg soils (based on McVicar, 1991) display distinctive soil wetness characteristics and can be used as indicators of wetland conditions. Some soil forms may occur in seasonal and temporary wetland zones, such as Kroonstad, Longlands, Wasbank, Lamotte, Estcourt, Klapmuts, Vilafontes, Kinkelbos, Cartref, Fernwood, Westleigh, Dresden, Avalon, Glencoe, Pinedene, Bainsvlei, Bloemdal, Witfontein, Sepane, Tukulu, Montagu, Inhoek, Tsitsikamma, Houwhoek, Molopo, Kimberley, Jonkersberg, Groenkop, Etosha, Addo, Brandvlei, Glenrosa, Dundee (DWAF, 2005). Such soil forms require further investigation into evidence of soil wetness and/or vegetation indicators for determining wetland extent.

- Soil Wetness Indicator: The soil wetness and duration of wetness are indicated by the colour of the soil. A grey soil matrix such as a G-horizon is an indication of wetness for prolonged periods of time and mottles(1) indicate a fluctuating water table. These mottles are normally most prominent just below the A-horizon. In terms of the DWA guidelines (DWAF, 2005), signs of soil wetness must be found within the top 50 cm of the soil surface to classify as a wetland. It must be noted that mottles may occur in non-wetland soils that have a high chroma matrix, and the colour of the matrix must therefore always be considered in conjunction with the presence of mottles.

- Vegetation Indicator: Vegetation is also a key component of a wetland definition, and a useful indicator of wetness extent. The presence or absence of hydrophytes provides a useful additional criterion in determining the boundaries of wetlands.

- Riparian vegetation: Wetlands may be delineated based on the extent of riparian vegetation. Mackenzie & Rountree (2007) describe an approach for delineating the riparian vegetation for sites that support

(1) High Chroma mottles develop in a soil profile under conditions of fluctuating saturation levels. Conditions fluctuating between aerobic and anaerobic states cause iron in the soil to oxidize. These particles accumulate and form mottles that are consider

predominantly indigenous and naturally occurring vegetation. The procedure involves identifying species that show evidence of being obligatory riparian species. Determine the outer edges of these species. With an overview of soil wetness indicators as described above and geomorphology (shape of the channel and riverbanks), the selected locations based on riparian indicator species should be at or close to an inflection point (change of slope) between the riparian area and the upland (terrestrial) slopes. This site can be considered as the edge of the riparian zone.

C8.5.3 Riparian Present Ecological State (VEGRAI)

The Riparian Vegetation Response Assessment Index (VEGRAI) model was applied to assess the riparian vegetation at selected sites in the Survey Area. The VEGRAI model, developed by Kleynhans *et al.* (2007), is used for qualitative assessment of the response of riparian vegetation to impacts in a way that qualitative ratings translate into quantitative and defensible results. Being impact-based, the VEGRAI system provides an indication of the causes for riparian vegetation degradation.

The VEGRAI model separates the vegetation of a site into the Marginal, Lower and Upper zones. The three zones are distinguished based on changes in lateral elevation, geomorphic structure and plant species composition. *Table 8.8* provides an overview of criteria for separation of zones.

Table 8.8 Description of Riparian Vegetation Zones

Extent	Zone		
	Marginal Zone	**LowerZone**	**Upper Zone**
Extends from	Water level at low flow	Marginal zone	Lower zone
Extends to	Geomorphic features / substrates that are hydrologically activated (inundated or moistened) for the greater part of the year.	Usually a marked increase in lateral elevation.	Usually a marked decrease in lateral elevation
Characterized by	Moist substrates next to water's edge; water loving- species usually vigorous due to near-permanent access to soil moisture	Geomorphic features that are hydrologically activated (inundated or moistened) on a seasonal basis. May have different species than marginal zone	Geomorphic features that are hydrologically activated (inundated or moistened) on an ephemeral basis. Presence of riparian and terrestrial species with increased stature

The zones are individually assessed but their scores are integrated to provide an overall index value for a site. Several vegetation characteristics such as Abundance, Cover, Alien infestation and Species Composition are used to describe and rate the status of the riparian vegetation. Each characteristic is assessed (where appropriate) for both a woody and non-woody vegetation component. A six-point rating system is followed, where metrics are scored in terms of the degree to which they have changed compared to the natural or close-to-natural reference:

0 - No discernible change from reference/close to reference
1 - Small modification from reference
2 - Moderate modification from reference
3 - Large modification from reference
4 - Serious modification from reference
5 - Extreme modification from reference

The vegetation zones are weighted using a similar approach. These weights are summed and a proportional weight determined for each metric group to provide an integrated value that relates to the Ecological Category for the riparian vegetation from A to F (*Table 8.5* and *Figure 8.2)*.

C8.5.4 Ecosystem Services Assessment

The wetlands identified will be assessed in terms of their ecosystem services. The WET – EcoServices tool is a technique for rapidly assessing ecosystem services supplied by wetlands (Kotze *et al.,* 2007). This tool has been designed for inland palustrine wetlands, ie marshes, floodplains, vleis and seeps and has been developed to help assess the goods and services that individual wetlands provide to support planning and decision-making.

No systems are available for assessment of wetlands in Mozambique, the WET-EcoServices model developed for South African conditions is applicable to conditions in the Survey Area, and has thus been used. The wetland benefits included in the WET-EcoServices model were selected based on their importance, and how readily these can be assessed. Some benefits, for example groundwater recharge / discharge and biomass export may be important but are difficult to characterise at a rapid assessment level, and have thus been excluded. *Figure 8.5* identifies and describes the ecosystem services assessed during the rapid field assessment. Results are presented for each site using the standard spider charts produced by an Excel spreadsheet supplied with the model. Important ecosystem services are then briefly discussed.

Figure 8.5 ***Ecosystem Services Assessed using the WET-EcoServices Model (Kotze et al. 2007)***

Ecosystem Services supplied by Wetlands	Indirect Benefits	Regulating & supporting benefits	Flood attenuation	The spreading out and slowing down of floodwaters in the wetland, thereby reducing the severity of floods downstream
			Streamflow regulation	Sustaining streamflow during low flow periods
			Water quality enhancements: Sediment trapping	The trapping and retention in the wetland of sediment carried by runoff waters
			Water quality enhancements: Phosphate assimilation	Removal by the wetland of phosphates carried by runoff waters
			Water quality enhancements: Nitrate assimilation	Removal by the wetland of nitrates carried by runoff waters
			Water quality enhancements: Toxicant assimilation	Removal by the wetland of toxicants (e.g. metals, biocides and salts) carried by runoff water
			Water quality enhancements: Erosion control	Controlling of erosion at the wetland site, principally through the protection provided by vegetation
			Carbon storage	The trapping of carbon by the wetland, principally as soil organic matter
	Direct Benefits	**Biodiversity maintenance**		Through the provision of habitat and maintenance of natural process by the wetland, a contribution is made to maintaining biodiversity
		Biodiversity maintenance is not an ecosystem service as such, but encompasses attributes widely acknowledged as having potentially high value to society		
		Provisioning benefits	Provision of water for human use	The provision of water extracted directly from the wetland for domestic, agriculture or other purposes
			Provision of harvestable resources	The provision of natural resources from the wetland, including livestock grazing, craft plants, fish, etc.
			Provision of cultivated foods	The provision of areas in the wetland favourable for the cultivation of foods
		Cultural benefits	Cultural heritage	Places of special cultural significance in the wetland, e.g., for baptisms or gathering of culturally significant plants
			Tourism and recreation	Sites of value for tourism and recreation in the wetland, often associated with scenic beauty and abundant birdlife
			Education and research	Sites of value in the wetland for education or research

An addition to the above wetland ecosystem services, DWA has published a list of goods and services provided by estuarine systems (DWA, 2008). These goods and services have been listed in *Table 8.9* and have been taken into account in the current study as sample sites MOZ 4, MOZ 6 and MOZ 12 are all estuarine sites.

Table 8.9 Goods and Services Provided by Estuaries (DWA, 2008)

Goods and services	Examples
Biological Control	Maintaining the balance/diversity of plants/animals
Refugia/Migratory Corridors	Fish and crustacean nurseries and roosts for residential and migratory bird species
Sediment supply	Outputs of sediments which contribute to beaches, sand bars and sand banks
Erosion control	Soil retention by estuary vegetation, and by capturing soil in reed beds and mangroves
Soil formation	Accumulation of sediment and organic material on floodplains and in mangroves, beach replenishment
Nutrient supply and cycling	Nutrient supply, nitrogen fixation and nutrient cycling through food chains
Genetic Resources	Genes for mariculture, ornamental and fibre-producing species
Disturbance regulation	Flood control, drought recovery and refuges from natural and human induced catastrophic events (eg oil spills)
Living resources for food (or resale)	Line fishing, harvesting of inter-tidal invertebrates, beach and seine netting
Raw material for subsistence use (eg building material)	Harvesting of craftwork and house-building materials
Nature appreciation	Providing access to estuaries and associated wildlife for viewing and walking
Scenic views	Resort, residential houses, housing complexes and offices with scenic views, increasing value of properties with seaviews
Culture	Aesthetic, educational, research, spiritual, intrinsic and scientific values of estuary ecosystems
Sports fishing	Estuary fly-fishing, estuary and inshore conventional fishing
Water sports	Water sports: swimming, sailing, canoeing, skiing and kayaking
Waste treatment	Breaking down of waste and detoxifying pollution
Water supply and regulation	Fresh water supply to marine environment and water for mariculture
Mariculture (eg oysters, bait, etc.)	Production (natural and cultivated) of fish, crustaceans and worms
Commercial food production	Fishing
Raw material for commercial use	Diamond and titanium mining, sand winning and salt production
Transport services	Ports, harbours, marinas and ski boat launching sites

C8.5.5 Wetland Sensitivity

The sensitivity (1) of wetlands was compared utilising frogs as key indicator species.

(1) Significance assessed based on sensitivity, presence of Conservation Important species and current level of disturbance.

A variety of factors make frogs particularly sensitive to environmental deterioration (Du Preez and Carruthers, 2009). These factors include:

- Absorbent skin surface – the permeable skins of frogs readily absorb water and any solvents that it may contain;

- Accessibility – frogs are a convenient group to monitor, being visually and acoustically conspicuous and widely distributed in most environments. Various field guides have been published with distribution data to facilitate field identification.

- Food contaminants – many tadpole species feed at the bottom of a water body where they are susceptible to ingesting chlorinated compounds and heavy metals if present. Most adult frogs are terrestrial and partly fossorial, and may also swallow contaminated soil and plant material;

- Fragmented distributions – many amphibians have specific habitat requirements resulting in patchy distributions for many species. Loss of habitat may isolate surviving populations, placing them under increased risk of local extinction in certain areas;

- Sequestrated tissue contaminants – exposure to foreign hormones (or hormone-mimicking compounds) can disrupt the hormone-driven process of metamorphosis and the healthy development of tadpoles. The susceptibility of Xenopus (platanna frogs) to hormones was for many years exploited as a means of pregnancy testing.

- Temperature – frogs are small and unable to regulate their body temperature and are thus sensitive to extreme environmental temperatures which can adversely affect their biology;

- Amphibious lifestyle – frogs are dependent on both terrestrial and aquatic environments to maintain their life cycle. Deterioration in either of these habitats will result in a decline in the abundance and/or diversity of frogs.

- Trophic level – frogs are both voracious predators of invertebrate life and are themselves an important food source for a wide diversity of predators, particularly birds and reptiles. In either capacity, frogs are thus able to influence a wide ecological spectrum.

A species list for Mozambique was compiled prior to the site visit using a combination of sources (Channing 2001, Channing & Howell 2006, IUCN 2012). The probability of finding a particular species on site was estimated using a combination of distribution records and habitat preferences, in order to prioritize sampling strategy and active searching efforts towards detecting potential conservation important species during the site visit.

Frog species richness was assessed both diurnally and nocturnally through active searching and acoustic recording. Species were identified using field guides compiled by Du Preez and Carruthers (2009), Channing (2001) and Channing & Howell 2006.

Although frogs are sensitive to environmental change and meet the requirements for good indicator species further research is required to determine key indicator species based on measured responses to a wide range of anthropogenic stresses in order to develop a frog sensitivity response index.

Despite the limitations, a subjective method of describing wetland sensitivity based on the presence of frogs is explored here. Species were assigned a conservation importance rating (CI) based on the sum of the following variables:

- Population trend (PT)
- Number of records (NR)
- Distribution of records (DR)
- Habitat specificity (HS)
- IUCN Global Status (GS)

The wetland association (WA) of each frog species was assessed. This is defined as the degree to which the frogs are restricted to wet habitats throughout their adult lives. Spatial habitat use varies depending on the species as a general example *Xenopus sp*. are restricted to permanently aquatic habitats whereas various toads are able to make use of both terrestrial and aquatic habitats and move freely between such habitats.

A species sensitivity index (SI) was calculated by multiplying the CI rating with the wetland association (WA). The diversity of frogs was recorded for a wetland, and an Amphibian Wetland Significance (AWS) determined from the sum of the SI scores.

The Amphibian Wetland Significance can be summarised using the following formula:

$$AWS = \Sigma (WA \times (PT + NR + DR + HS + GS))$$

All wetlands are considered sensitive due to their ecological importance, however sites were allocated to one of three classes, namely Sensitive, Moderately Sensitive or Highly Sensitive based on a subjective assessment of the above criteria. In addition, discussions were held with the vegetation and herpetofauna specialists to agree on the wetland sensitivity classification.

C8.5.6 Buffer Requirements

A buffer is a strip of land surrounding a sensitive area in which activities are controlled or restricted to reduce the impact of adjacent land uses on the sensitive site. South African legal requirements (National Water Act of 1998), and similarly for many other countries, state that wetlands are to be

designated as sensitive and that buffers are necessary to protect wetlands against the harmful impacts of development but there is a lack of clarity on their specific extent. The basis for the determination of buffers used in this document is therefore guided by the following guidelines:

- Recently published wetland delineation guidelines (INR, 2011) stipulate that the determination of a wetland buffer should follow a holistic approach that incorporates the ecological state of aquatic systems, the level and sensitivity of biodiversity that is present and promote the continuity of ecological corridors. These attributes are to be determined at the discretion of appropriately qualified specialists that have conducted on-site assessments in these respective disciplines.

- Ezemvelo KZN Wildlife guidelines (2010) for buffer determination around wetland systems state the extent of a buffer is to be determined at the discretion of an appropriately qualified specialist, and increased under the following circumstances:
    - Steep slopes justify wider buffers;
    - Wider buffers are required around high impact developments;
    - Wider buffers are required where there is a greater pollution potential;
    - Wetlands of high conservation value deserve wider buffers.

This study does not include an in-depth assessment of terrestrial biodiversity (1), however the determination of buffer extent requires insights into the Present Ecological State (PES), the levels of biodiversity and the sensitivity of wetlands. Such assessments (described below) have been conducted at a variety of sites with emphasis on riparian vegetation, frogs and general sensitivity as a result of red data species and anthropogenic impacts as per methods described below. Results of these assessments have been combined with input from Enviro-Insight to develop a holistic perspective on determination of buffer extent.

C8.6 STUDY LIMITATIONS

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of natural ecosystems. The following limitations apply to the techniques and methodologies utilised to undertake the aquatic and wetland assessment:

- Mozambique experienced a civil war and there remains a threat of landmines in the DUAT Area. Demining of various areas of the DUAT Area has taken place, however a restriction of movement outside of cleared areas hindered the field procedures for accessing certain wetland portions. As the wetland delineation was largely desktop based this limitation is not significant.

(1) An assessment of the terrestrial biodiversity of the Afungi Project Site has been undertaken in a separate study by Enviro-Insight.

- No historical data (except aerial maps) was available for the aquatic and wetland systems assessed, the results of this investigation therefore serve as the baseline for the area.

- The watercourses mostly consisted of wetland systems, which lead to difficulty in interpreting the aquatic ecological status utilising standard riverine indices. The naturally lower numbers of sensitive taxa result in lower index scores, however, indices were incorporated into this study and utilised as a guide for future monitoring and impact identification.

- As no long term monitoring data is available for the Palma estuaries, a reference condition cannot be compared to the present ecological state of the system. For these reasons, assumptions have to be made based on a hypothetical natural state.

- At the time of this study there was insufficient record of historical rainfall history and estuary mouth conditions (regarding breaching of the open/closed system) for the Palma estuaries. The implications are that the influence of cyclical weather patterns on the estuarine vegetation could not be determined and the baseline hydrological status of the estuaries is unknown.

- The methodology used is largely intended for South African systems. It is possible that any components of the Palma estuaries that differ from the South African reference system may not be accounted for in this study.

- The degree of confidence, for a number of impacts, was assessed as Low due to limited information available. The results of a number of investigations were outstanding at the time of report compilation. The results of these studies will assist in finalising the impact assessment, for example the hydrology report.

C9 VEGETATION

C9.1 LITERATURE REVIEW AND DESKTOP STUDY

Prior to the start of site surveys planned for December 2011, a preliminary classification of the vegetation of the Study Area was made. This preliminary classification relied upon vegetation descriptions and maps presented in the report by Timberlake *et al.* (2010). This preliminary classification was updated based on the data gathered during the surveys conducted in December 2011 and March/April 2012.

For an initial and broad scale differentiation of vegetation units of the area, vegetation communities are identified using vegetation classification criteria. The Study Area boundaries are delineated from satellite imagery, from which homogenous topographic-physiognomic areas are identified and delineated. The differing patterns, variations or shades on the satellite images are used to define the homogenous unit boundaries. To refine these, further environmental factors are taken into account. Geological formations and land types are obtained from geological and land type maps. Geographic factors (such as terrain form, topography and drainage lines) as well as man-made factors (such as roads and villages) are obtained from topocadastral and hydrological maps. Superimposing the different layers on the satellite imagery shows a more detailed partitioning of homogenous vegetation communities and highlights potential driving forces in plant community development.

C9.2 FIELD SURVEYS

After homogenous plant communities have been identified from maps and satellite imagery, potential survey plots are chosen using a stratified random sampling method (1). Attempts were made to verify these potential survey plots in the field however, modification was required to avoid health and safety risks associated with the possible presence of UXOs. Survey plots were therefore restricted to areas accessible by use of existing roads and pathways.

Vegetation surveys were conducted during December 2011 and March/April 2012. An assessment of the dominant plant species and habitat features, were made at each 25m x 25m survey plot. All plant species within the survey plots were identified and a percentage canopy cover value allocated, which is required for the classification and description of the plant communities. Representative percentage estimates of the vegetation canopy cover were made of each structural layer (lower, intermediate and upper canopy covers).

During the December 2011 survey period 45 survey plots were surveyed. During the follow-up visit in March/April 2012 these plots were re-sampled to verify the presence or likely absence of Red Data plant species. Also during

(1) A randomly stratified sampling method distributes sampling plots evenly throughout the area to be surveyed.

this follow-up period, an additional 9 sample plots were surveyed, bringing the total to 54 survey plots.

A classification of the vegetation data was done with the TURBOVEG and MEGATAB computer programs (Hennekens & Schaminee 2001). Vegetation structure was analysed by calculating mean values (with standard deviation).

To visualise the relationship between the communities the floristic data were arranged using principal co-ordinates analysis (PCoA) (McCune & Grace 2002) in the SYN-TAX computer program (Podani 2001). Cover-abundance values were converted to percentages and the percentage values standardised using a natural logarithmic (loge) standardisation. The Bray-Curtis distance measure was applied for the ordination. An incremental sum of squares cluster analysis was also run in SYN-TAX using the log-transformed values and the Bray-Curtis distance measure (Podani 2001).The cluster analysis of the floristic data of all 54 survey plots clearly indicated the separation between the different plant communities.

C9.3 RED DATA FLORA ASSESSMENT

Because many countries in southern Africa do not have a list of endangered plant species one must attempt to gain this information elsewhere. It was assumed that if a species is on the red data list in a neighbouring country it is most likely also going to be rare in Mozambique. Therefore, baseline data from the National Herbarium Pretoria Computerised Information System PRECIS and data from the Red Data List of South African Plant Species were used to facilitate the identification of protected plant species. Verification of the presence or likely absence of these plant species was achieved by actively searching for these plant species. Proper identification of some species of Red Data plant relies on the identification of subtle differences in flower structure; when these species are not in bloom positive identification cannot be confirmed. In such instances emphasis was placed on the identification of potentially suitable habitat. This was done by comparing the habitat characteristics to known habitat types occupied by Red Data plant species.

During the December 2011 survey period 45 survey plots were surveyed for the occurrence of Red Data plant species. During the follow-up visit in March/April 2012 these plots were resampled to verify the presence or likely absence of Red Data plant species. Also during this follow-up period, an additional 9 sample plots were surveyed, bringing the total survey sites to 54.

C10 HERPETOFAUNA

C10.1 LITERATURE REVIEW AND DESKTOP STUDY

All available books providing information on distribution ranges and/or conservation status of Southern and Eastern African herpetofauna were utilized to make predictions of occurrence (see reference list). Limited herpetofauna reference material exists for northeast Mozambique; data related to geographic distribution ranges of herpetofauna show either Southern Africa (South of the Zambezi River, Mozambique) or Eastern Africa (North of the Rovuma river, Tanzania) distributions.

Consequently, there are no published geographic distribution ranges of herpetofauna for the portion of Mozambique on which the Survey Area is located. Extrapolation from existing geographic distributions was therefore performed in conjunction with habitat information obtained on-site to develop a list of herpetofauna predicted to occur within the Study Area. The precautionary principle was applied by including a species in the predictive list if the likelihood of occurrence was above an estimated 50% chance.

Reptile species nomenclature follows a field guide to the reptiles of East Africa (Spawls *et al.* 2004). A complete guide to frogs of Southern Africa (Du Preez & Carruthers 2009) and Amphibians of East Africa (Channing & Howell 2006) were used as the primary identification guides for amphibians and amphibian species nomenclature following the latter reference as well as that of AmphibiaWeb (www.amphibiaweb.org). It is important to note that the species nomenclature followed in the available references (Spawls *et al.* 2004; Channing & Howell 2006; AmphibiaWeb 2012) is outdated. Major taxonomic revisions have taken place and many new genus/species names now exist for some of these animals that are found in southern Africa (see SARCA 2012). For example, the genus *Bufo* no longer exists for African toad species (Du Preez & Carruthers 2009; IUCN 2012) but both Channing & Howell (2006) and AmphibiaWeb (2012) have retained this genus name. The outdated nomenclature is still preferable for the purposes of this report due to the lack of available literature on the updated nomenclature. However, in order to avoid confusion, the updated nomenclature is also provided where possible (eg verification by IUCN). The IUCN website (www.iucnredlist.org) was utilized to provide the most current account of the global conservation status of reptiles and amphibians. The Mozambique Forestry and Wildlife Law Regulation (Decree No. 12/2002) lists protected fauna in Mozambique and was consulted.

C10.2 FIELD SURVEYS

Data collection occurred over three distinct survey periods:

1. October 2011 – Scoping survey (no trapping) where herpetofauna were observed.

2. December 2011 – Main field survey with trapping.

3. March/April 2012 – Additional field survey with trapping.

The herpetofauna Study Area was restricted to the terrestrial environment and therefore no marine species or marine habitats were evaluated. The surveys were focused within the Afungi Project Site and concentrated in areas demarcated for infrastructure development. While observations were made outside of the Afungi Project Site, especially during driving to and from the site, it was not necessary to evaluate the herpetofauna in the regional context as their dispersal abilities are poor compared to birds and large mammals.

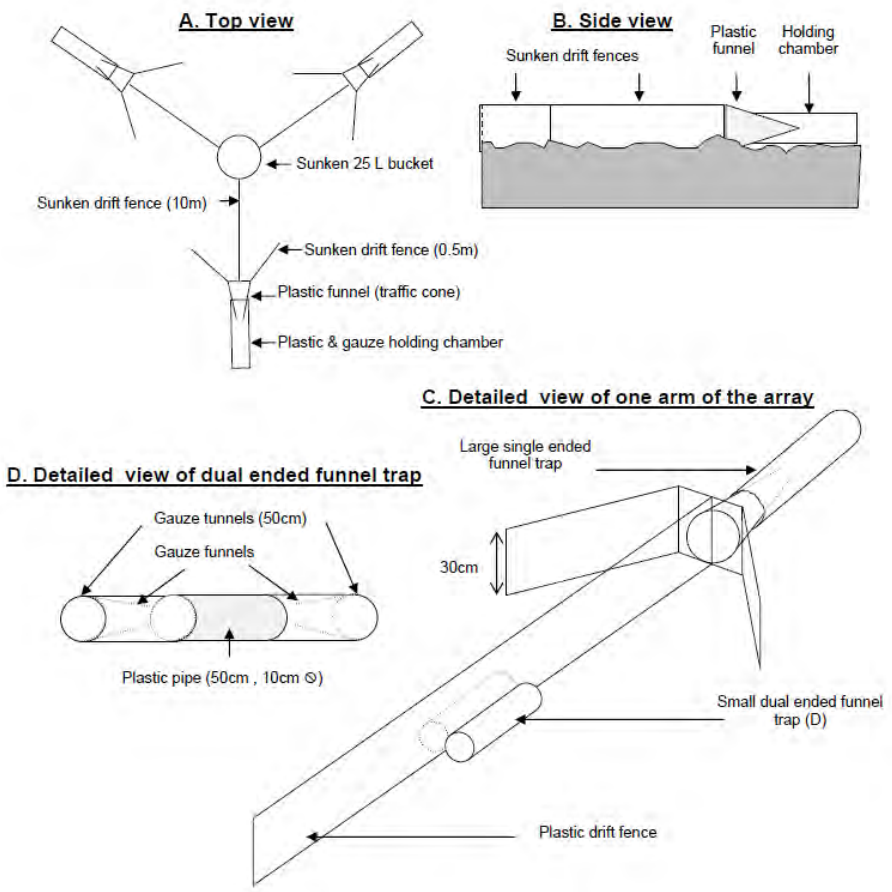
C10.2.1 Herpetofauna Traps

Trapping herpetofauna methods include the intercept drift fence principle where moving herpetofauna are diverted from their intended directional path along an impassable fence and into either a pitfall bucket or a specially designed funnel trap system. During the two field surveys (8-22 December 2011 and 28 March – 5 April 2012), a total of ten funnel trap drift fence arrays were placed in areas where herpetofauna diversity was expected to be greatest within a particular habitat. Trap array placement was also based on prevailing physical conditions, such as soil conditions and slope.

Each of the eight trap arrays deployed during the December survey were operational for 4 full nights, providing a total of 32 trap nights. The two traps deployed during the March/April survey were deployed for 7 and 6 nights each respectively, providing a total of 13 trap nights. The combined trapping effort was therefore executed over 45 trap nights. Traps were set at a particular location and then left active for a minimum of 4 trap nights before being re-deployed elsewhere. Each trap array was therefore active for 24 hours per day for a minimum of 4 nights. Traps were inspected each morning between 06:00-08:00 and all captured specimens were photographed and released away from the traps.

The general pitfall trap design is very effective in trapping herpetofauna, particularly lizards, small snakes and amphibians (Corn & Bury 1990; Branch 1998; Crosswhite *et al,*. 1999). However trap efficacy was increased by replacing the terminal 25 litre pitfall buckets with specialized terminal funnels (designed by L. Verburgt) and by the addition of funnel traps along the drift fences (eg Masterson *et al*., 2009) as shown in *Figure 10.1*. This design of the funnel trap/ drift fence arrays retained the center 25 litre bucket (for trapping fossorial herpetofauna) and the combination of the pitfall and funnel traps provides enhanced trapping success.

Figure 10.1 Funnel Trap Drift Fence Array used for the Capture of Herpetofauna



Source: Enviro-Insight 2012

C10.2.2 Climate Monitoring

Because all herpetofauna are ectothermic and their behavior is heavily influenced by the presence of humidity and rain it is necessary to present reptile survey data in the context of the prevailing climatic conditions. A DS1923 HygrochroniButton ® was placed at each funnel trap drift fence array to log the temperature and the relative humidity at 30 min intervals. Each iButton was placed inside an inverted ventilated polystyrene cup (*Figure 10.2*) to protect it against the effects of rain and direct solar radiation, and then fixed under a leafy tree at head-height in order to provide shade for the device over the duration of the day.

Figure 10.2 Climate Data Logger (Hygrochron Button)



Source: Enviro-Insight 2012.

C10.2.3 Active Searching

Reptiles were searched for on foot within the Survey Area during the day. Active sampling was focused on representative sites within each of the structural habitat types defined. Active searching for reptiles involved:

- photographing reptiles from a distance with a telephoto lens;
- searching under debris or rocks; which were returned to their original positions;
- removing exfoliating bark from trees;
- excavation of burrows that appeared to be in use;
- scanning for any signs of reptiles such as shed skins (the positive identification of which were taken as an observation of that species); and
- catching by hand where required.

Nocturnal reptiles were searched for by driving very slowly on the roads at night and shining with a spotlight on the road and surrounding vegetation. Nocturnal amphibians (frogs and toads) were searched for by torchlight at night along dam/pond edges and in wetland areas. Positive identification of amphibian acoustic signals (males call to attract females) was also used as a means of identifying amphibians. Where possible, acoustic signals were recorded with high-precision recording equipment and identification confirmed with existing recordings (Du Preez & Carruthers 2009). Furthermore, on several occasions acoustic signals were recorded at a location for the entire night by placing an automatically activated remote sound

recorded near the edge of a pond/wetland which was then retrieved the following day for data analysis.

C10.2.4 Opportunistic Sampling

Reptiles, especially snakes are very elusive and are consequently difficult to observe. Therefore, all possible opportunities to observe reptiles were taken in order to augment the standard sampling procedures described above. This was done to enhance the understanding of the herpetofauna species diversity within the broader Study Area. Methods employed include the following:

- During driving between the camp and Survey Area (minimum of 3 hours per day) the road was constantly scanned for active and killed (road collisions) reptiles. Driving speed was slower than normal to increase the chance of a successful observation. Once a reptile was observed the vehicle was brought to a halt and the observed reptiles would be photographed.

- People residing at the camp (AMA1 staff or other specialists) would on occasion take photographs of reptiles observed within the Afungi Project Site. These images were reviewed and, upon proper identification, added to the list of random observations.

C10.2.5 Interviews with Local Inhabitants

Interviews were conducted with three villages/ communities (Maganja, Quitupo and Senga) during the March/April survey. During these interviews, the village elders were asked (with the aid of an interpreter) to identify images of reptiles presented to them on a flash card (*Figure 10.3*) and answer several questions about these species. Flash cards were presented to interviewees in random order at each village. For each reptile species interviewees were asked the following questions:

- Do they kill the animal?
- Do they eat the animal?
- Is the skin used of this animal?
- Is any part of the animal used for traditional medicinal purposes?
- Has this animal bitten or spat at anyone?
- Has this animal killed anyone from this particular village?

All of the reptiles pictured on the flash cards are expected to occur in the Survey Area except for the Rattle Snake (North America) which served as a control to gauge whether the interviewees were being honest and were indeed capable of identifying a particular species correctly.

Figure 10.3 Photographic Flash Cards Presented to Local Inhabitants during Interviews on Herpetofauna



From left to right, top to bottom: Puff adder, African rock python, Rock monitor lizard, Nile crocodile, Mozambique spitting cobra, Leopard tortoise, Green Mamba, Forest Cobra, Gaboon Adder, Black mamba, Rattle Snake

Source: Enviro-Insight 2012

C10.3 LIMITATIONS AND ASSUMPTIONS

The complete lack of published geographic distribution information for herpetofauna in North-Eastern Mozambique is a limitation of great importance. Almost no sampling for herpetofauna by scientists has taken place in this region which makes the prediction of species likely to occur on the Study Area problematic. Nevertheless, great care has been taken to use all of the available information and carefully extrapolate probable geographic distribution ranges for herpetofauna based on the proximity to known distributions (eg southern Tanzania) and the availability and continuity of important habitat types.

Site access was a highly significant logistical hurdle to overcome during the surveys for two main reasons:

1. The distance (~45 km) and poor condition of the only access road between the staff camp and the Survey Area meant that a minimum of 3 hours was spent driving per day (1.5hr one-way). This combined with health and safety restrictions on night time driving placed limitations of the time available for fieldwork. However, this transport time was used to maximum efficiency by actively searching for herpetofauna in the road and along the road edges (see *Section C10.2.4* above).

2. Access on foot was restricted to areas that had been cleared of unexploded ordinances and existing roads, which are limited in the area. This presented many constraints because it was not possible to access all of the areas preselected for sampling or general visitation. Furthermore, the ecological integrity of the demined areas was compromised by the disturbance associated with the demining activity (ie the removal of

vegetation and undergrowth to allow for the sweeping of their metal detectors. These areas are therefore significantly disturbed.

3. Upon raising these issues with the Project Team, it was suggested that access can be gained on foot if walking was restricted to the clearly used paths of the local inhabitants and/or livestock. While this compromise provided much better access, it influenced the surveys due to the disturbance expected to be associated with well-trodden paths (eg noise, vibration, erosion, vegetation clearing and wood cutting etc.).

The results of these field surveys provide a snapshot of the herpetofauna community and are intended to be used as a guideline to understand the composition of this community and its interaction with the different available habitat types.

C11 MAMMALS

C11.1 LITERATURE REVIEW AND DESKTOP STUDY

Prior to the site visit, a desktop review of publically available data was conducted. The following reference sources were consulted to gain an understanding of the expected mammals of the region:

- Red-data mammal lists (global and for Mozambique) were obtained from the IUCN Red List of threatened species (IUCN, 2012).
- Lists of nationally protected species were obtained from article 43(5) of the Regulations of Law No. 10/99, of 7 July.
- Stuart and Stuart (1998) and Skinner and Chimimba (2007) were consulted in order to aid with the identification of small mammals.
- Liebenberg (2005) and Stuart (1998) were consulted to aid with identification of tracks and signs.
- Geographic distribution and general data were acquired from Skinner and Chimimba (2007) and The Mozambique Ministry for the Coordination of Environmental Affairs (2009) to provide a predictive focal point for the survey.

The Project Team provided a large amount of site-specific information prior to the field surveys. This information was used in the selection of the trapping and sampling sites and this provided some degree of focus for the field study. Information used included:

- Aerial imagery provided by Promap.
- Remote sensing imagery obtained from Google Earth (Google Corporation).
- Site shapefiles provided by the Project Team.
- Basic site infrastructure plan provided by the Project Team.

C11.2 FIELD SURVEYS

Three baseline studies were carried out between October 2011 and April 2012. As mammals are endothermic, temperatures in a perennially warm area such as the Cabo Delgado province will not represent a limiting factor in movements, activity or behaviour. Seasonal differences in mammalian activity and breeding may be influenced primarily by water availability. Water not only provides basic moisture resources, but directly influences

habitat structure (refugia) and forage (food) availability; annual grasses provide both these functions and are the most seasonably variable vegetation type. A two-season approach has become standard practice for baseline data collection; this is aligned with best-practice models used for other projects in similar environments. Although the Project footprint did increase significantly during the study, it was an assumption that the data gathered during the two wet-seasons site visits as well as the initial dry-season baseline study would be sufficient to extrapolate the dry season data based on habitat similarities.

C11.2.1 Timing

The initial winter-dry season sampling period took place between the 11th and 20th of October 2011.

The first summer-wet season sampling period took place between the 8th and 21st of December 2011.

The second summer-wet season sampling period took place between the 27th of March and the 5th of April 2012.

C11.2.2 Data Collection Methodology

Data collection to characterize the mammalian baseline of the Survey Area was accomplished by using four methods; these comprise small mammal trapping, camera trapping, nocturnal surveys, and spoor tracking. These methods are described in detail below:

Small Mammal Trapping

Site selection for trapping focused on the representative habitats within the Survey Area. General trapping locations were selected on the basis of GIS mapping and aerial imagery; the selection of the actual trap site was confirmed through ground truthing. Habitat types sampled included primary woodlands, drainage lines and wetlands as well as disturbed and semi-disturbed zones (cultivation, tree felling and livestock).

For all three sample periods, the traps were deployed in pre-selected areas as described above. Each trap line consisted of 15 large Sherman traps baited with a combination of peanut butter, oats, sardines and oil; *Figure 11.1* shows an example of the traps used. In order to adequately cover the entire Survey Area, not all of the trap locations were repeated over the sample periods. Non-productive traps were relocated to increase the effectiveness of the trapping effort.

Each trap line was deployed and left active for five nights. They were then and checked and re-baited each morning between 06:00-08:00. Traps were therefore active for 24 hours per day for a minimum of five nights. Captured animals were removed from the traps into clear plastic bags, identified, photographed and then released. The small mammal data collected was

limited to species trap successes and diversity in order to get a basic understanding of the small mammal assemblages in the area.

Figure 11.1 Sherman Trap



Source: Enviro-Insight 2012

Camera Trapping

Two infra-red camera traps were deployed in the Study Area for a period of 7 days, giving a total of 28 trap nights (4 traps x 7). *Figure 11.2* shows the typical trap set up for the camera stations. Traps were baited with dead goats in order to maximise the chances of any species in the area moving into the field of view to investigate.

Figure 11.2 Camera Trap



Source: Enviro-Insight 2012

Nocturnal Surveys

Eight night drive surveys took place during the three survey periods. Night drives were conducted after sunset to maximise the chances of encountering both crepuscular and fully nocturnal species. The routes taken were designed to encompass a representation of all the main habitat types. A one million candle power spotlight and smaller spotlights and torches were used to illuminate animals. The duration of these night surveys was between 2 and 3 hours each. Twice per season, a predator call-up was carried out in order to lure in large and medium sized carnivore species. A high powered amplifier was used and various sounds (dying animals, predator activity) were played for a period of three hours. In addition, baits were deployed in close proximity to the call-up site in order to maximise the chances of luring large predators to the area.

Spoor Tracking

Spoor tracking is considered to be the world's oldest science (Liebenberg 2005), enabling detailed sampling of mammalian species without the need for trapping or direct observation. All spoors, including footprints, scats, den sites, burrows, hairs, scrapings and diggings were documented through geo-referenced photography. The spoor tracking itself was focused on optimal tracking substrates, especially roads (in the early morning), drainage lines and wetland banks (where animal movements are focused). Liebenberg (2005) and Stuart and Stuart (1998) were the primary reference guides used for spoor tracking.

Interviews with Local Inhabitants

Throughout Mozambique, the acquisition of local knowledge has proved to be a highly useful method for obtaining data. A questionnaire was used in the interviews of the local communities. The information gathered from the questionnaire was used to provide focus on a number of issues concerning the mammalian fauna within both the Survey Area and the surrounding communities.

Sixteen sets of interviews were conducted during the three survey periods. Interviews were conducted both in Palma and in the villages of Quitupo, Maganja and Senga; additionally several random interviews of hunters and farmers were conducted. Rather than being randomly selected, the selection of villages surveyed was designed to be spatially representative in order to apply local knowledge to the specific areas within the habitats. The interviews were designed to provide information on:

- The extent of the current impacts on the mammalian fauna within the Survey Area (including poaching, human/wildlife conflict and use).
- The attitudes of the local communities towards the mammalian fauna.
- The mammalian assemblages, including density, diversity, preferred habitats and seasonality of various mammals.
- Occurrence of red-data species on the site (including the community awareness towards legislative protection of the protected species).

C11.3 LIMITATIONS

The objective of the field studies is to characterize the current mammalian baseline of the proposed Project Area. Sites were selected to represent habitat diversity as well as spatial representation. However, due to the potential for equipment theft (eg motion activated cameras) and restricted access due to the risk of unexploded ordinances, sample points were often positioned in sub-optimal zones. However, despite these limitations, it is deemed adequate coverage was achieved to characterize the mammalian baseline of the Survey Area.

C12 AVIFAUNA

C12.1 LITERATURE REVIEW AND DESKTOP STUDY

The following literature and published papers were consulted prior to the site visit:

- del Hoyo *et al.* (1992-2011) and Hockey *et al.* (2005) were consulted for general information on the life history attributes of relevant bird species.
- Distributional data (apart from those obtained during the surveys) was sourced from del Hoyo *et al.* (1992-2011) and Sinclair and Ryan (2010).
- Nomenclature, taxonomy, common names and the species order were used according to the IOC World Bird Names unless otherwise specified (see www.worldbirdnames.org; Gill & Donster, 2012).
- The conservation status of bird species was categorised according to the IUCN Red List of threatened species (IUCN, 2010), while their biogeographic affinities were obtained from Parker (2001).

C12.2 FIELD SURVEYS AND DATA ANALYSIS

As with other terrestrial baseline surveys, the avian baseline surveys encompasses two seasons. The dry season field studies were conducted 11-18 October 2011, while a wet season survey was performed during the periods of 8–20 December 2011 and 29 March - 5 April 2012.

During the surveys, bird species and their respective habitat types were identified, and where necessary, verified using Sinclair and Ryan (2010). The occurrence of certain bird species was also recorded by means of their calls and other signs such as nests, discarded egg shells (Tarboton, 2001), feathers and road kills. Particular attention was paid to suitable roosting, foraging and nesting habitat for threatened, near-threatened and endemic species.

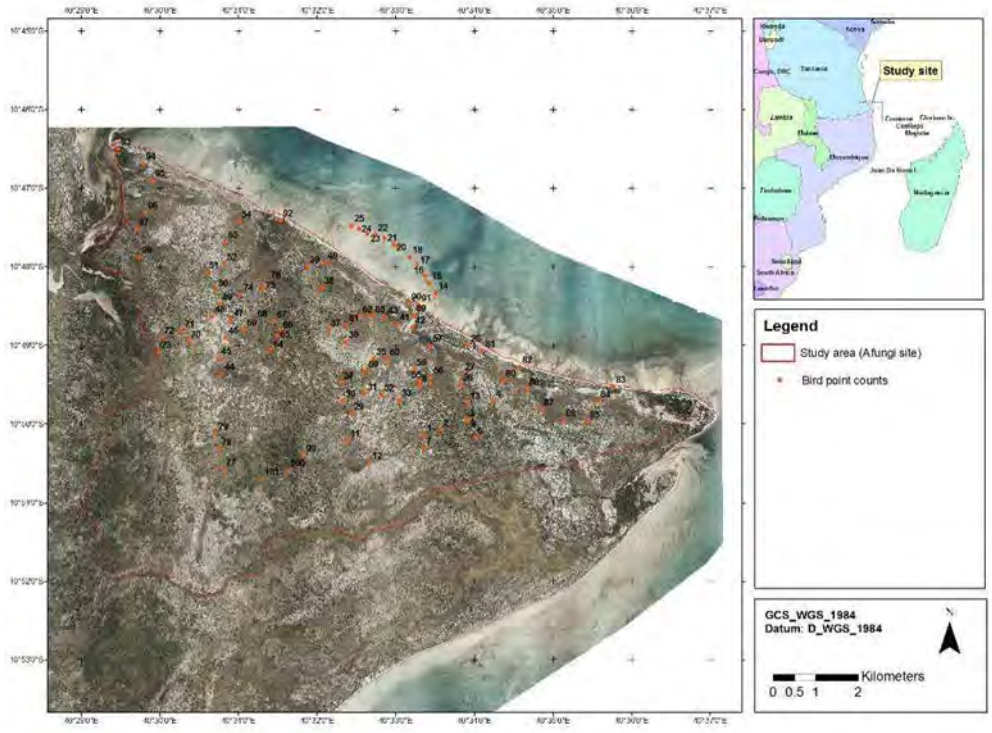
In addition, the expected occurrence of cryptic or elusive species was verified by the playback of their respective calls (eg African Broadbill (*Smithornis capensis*), Red-throated Twinspot (*Hypargos niveoguttatus*) and nocturnal/crepuscular taxa such as owls and nightjars).

Bird species were also recorded by means of random transect walks and during nocturnal road surveys. Inshore and pelagic seabird species was observed by means of a powered boat. Areas that were surveyed include the main bay area, the Cabo Delgado peninsula and the waters surrounding the two islands of Tecomaji and Rongui. These methods provide a continuous process of documenting bird species while moving between the different habitat types. These are effective methods to obtain a more complete list of

species but are not used to obtain data on abundances or dominance; point counts, described below, provide this data. However, point counts on their own will not provide a complete inventory due to the mobility birds and differences in habitat heterogeneity.

In order to obtain a statistically significant amount of information regarding the dominant/typical species, as well as the differences in community composition, an assessment was conducted whereby 101 point counts (see Buckland *et al.* 1993) were chosen. These point count locations represent the different habitat types on the Survey Area (eg closed and open woodland, dambos, mangrove forest and the inter-tidal littoral zone along the coastline) (*Figure 12.1*). Due to the smaller size of the intertidal area fewer locations were required to obtain a statistically significant data set. Therefore twelve point count locations were also dedicated to shorebird counts to evaluate the densities of wader species in the intertidal area.

Figure 12.1 Location of Bird Point Counts



During each point count, the number of bird species seen within a 50m radius (or 100m during shorebird counts) was recorded, as well as their respective abundances. Each point count lasted approximately 10-15 minutes and was at least 200m apart to ensure the independence of observations. The data generated from the point counts was analysed according to Clarke & Warwick (1994) and was based on the percentage contribution of each species to a particular habitat type including the consistency (calculated as the similarity coefficient ÷ standard deviation) of its contribution on the Survey Area.

Hierarchical Agglomerative Clustering - a cluster analysis based on group-average linkages (Clarke & Warwick, 1994) - was performed on calculated Bray-Curtis coefficients derived from the point counts. The bird count data was also subjected to fourth square-root transformation to allow for common as well as rare species to participate in the overall similarity analysis. A cluster analysis is used to assign associations between samples with the aim to objectively delineate groups or communities. Therefore, sampling entities that group together (being more similar) are believed to have similar compositions.

The use of point counts is advantageous since it suits areas of dense habitat (eg forest) and is preferred for cryptic or elusive species. In addition, it is the preferred method to line transects where access is problematic, or when the terrain appears complex. It is a good method to use, and very efficient for gathering a large amount of data in a short space of time (Sutherland, 2006).

Bird species richness was measured on each habitat type by means of rarefaction and selective diversity indices. Rarefaction adjusts the number of species expected from each sample if all were reduced to a standard size.

C12.3 LIMITATIONS AND ASSUMPTIONS

In order to obtain a comprehensive understanding of the dynamics of terrestrial communities, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. Therefore, the current document only provides a "snapshot" of the avifaunal composition and structure.

The analysis of the community structure and composition was primarily based on data collected during the two independent sampling surveys (although a preliminary survey was also initiated during October 2011). Therefore, the avifaunal richness on the Survey Area should be interpreted within these limitations. Certain species (eg Palaearctic and Intra-African migrants) may have been absent during part of the survey period.

The risk posed by unexploded ordnances prevented the field survey team from accessing certain locations within the Survey Area.

C13 MARINE MODELLING AND ECOLOGY

C13.1 OVERVIEW

The Marine Modelling study has been undertaken using a combination of numerical models including:

- Spectral wave refraction modelling.
- 2D Hydrodynamic modelling.
- 3D Hydrodynamic modelling and cohesive sediment transport models.
- Lagrangian particle tracking modelling for offshore drill cuttings.

Baseline conditions have been ascertained from available bathymetry, aerial photographs and hindcast wind and wave data. Based on this available hydrographic wind and wave data (~13 years) representative conditions have been used to force the models in order to determine the impacts on the physical environment caused by the construction and operation of the near shore infrastructure

The approach followed in the marine ecology assessment included:

- Field investigations and measurements in Palma Bay and the Golfinho and Prosperidade Gas Fields.

- Interrogation of the available peer and non-peer reviewed scientific literature.

- Based on the provided project details (*Chapter 4* of the EIA), an evaluation of the risks that the proposed LNG development project presents to marine ecology in the region.

The assessment was aided by companion surveys of bathymetry and seabed features in Palma Bay conducted by UWS, metocean measurements made by MSI and the detailed EIAs for earlier phases of the project (Impacto 2008, CSA 2007, 2008).

The marine modelling studies were used in the assessment of the potential impacts on the marine ecology. These include the fate and dispersion of fines released during the dredging operations associated with the construction of the facility, the dispersion of expected marine discharges including desalination brine concentrates and process water, the dispersion of drilling cuttings, etc.

The impact assessment is guided by the methodology outlined in *Chapter 3* of the EIA however some deviations and specificities have been made and these are detailed in *Section C13.5* below.

C13.2 ASSUMPTIONS, LIMITATIONS AND UNCERTAINTIES

Predictions made in this assessment are constrained by the facts that:

- The simulation modelling results used are theoretical until monitoring has been done to test them.
- Cumulative marine effects cannot be predicted with confidence as it is unclear how the offshore and onshore hydrocarbon industry, and associated developments, in the central east African region will be co-ordinated.
- As it is proposed, with the current development being built by various construction and installation contractors using equipment and methodologies yet to be identified, details cannot be assessed at this stage.

Accordingly, in addition to using the results of fieldwork done on site by Lwandle, this assessment draws on specialist opinion and experience with environmental work in the oil and gas industry.

The host environment of the proposed development is described below in two overlapping parts; the offshore gas field and the nearshore development site in Palma Bay. The descriptions are drawn from previous environmental assessments for the exploration phases (eg Impacto Lda 2008), contributions by Mozambican specialists on ecology and fisheries, observations made during site visits to Palma Bay in June and November 2011 and March 2012, and an oceanographic survey of the offshore Prosperidade and Golfinho gas fields in June 2012.

C13.3 DATA COLLECTION –OFFSHORE AREA

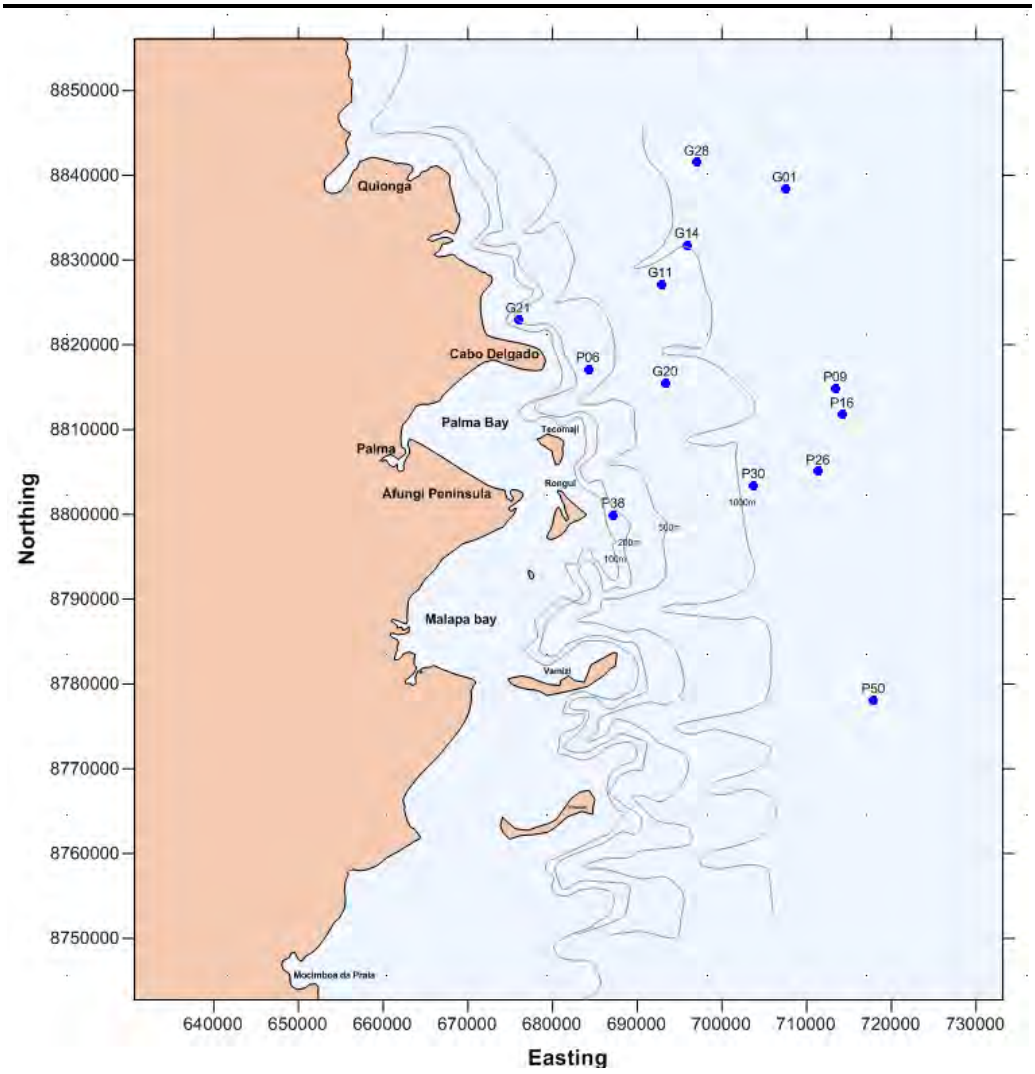
Data for the Offshore Project Area was drawn from available secondary information including previous environmental assessments for the exploration phases of the Project (eg Impacto Lda 2008), contributions by Mozambican specialists on ecology and fisheries, and an oceanographic, plankton and sediment survey of the offshore Prosperidade and Golfingho Gas Fields undertaken by Lwandle in June 2012 on the Rylan-T cruise commissioned by AMA1. The surveys undertaken in the offshore are detailed further below.

C13.3.1 *Oceanography*

To gain information on the oceanography of the offshore gas field development area, upper water column profiles of temperature, conductivity (= salinity), dissolved oxygen concentrations, turbidity, chlorophyll fluorescence (= chlorophyll a) and UV fluorescence were measured in June 2012 on the Rylan-T cruise with Lwandle marine specialists present.

The measurement locations are shown in *Figure 13.1*. The main features of the acquired data are presented below.

Figure 13.1 Conductivity-Temperature- Depth (CTD) Survey Sampling Locations in the Offshore Study Area, June 2012



Source: Lwandle, 2012. Data collected during June 2012 survey.

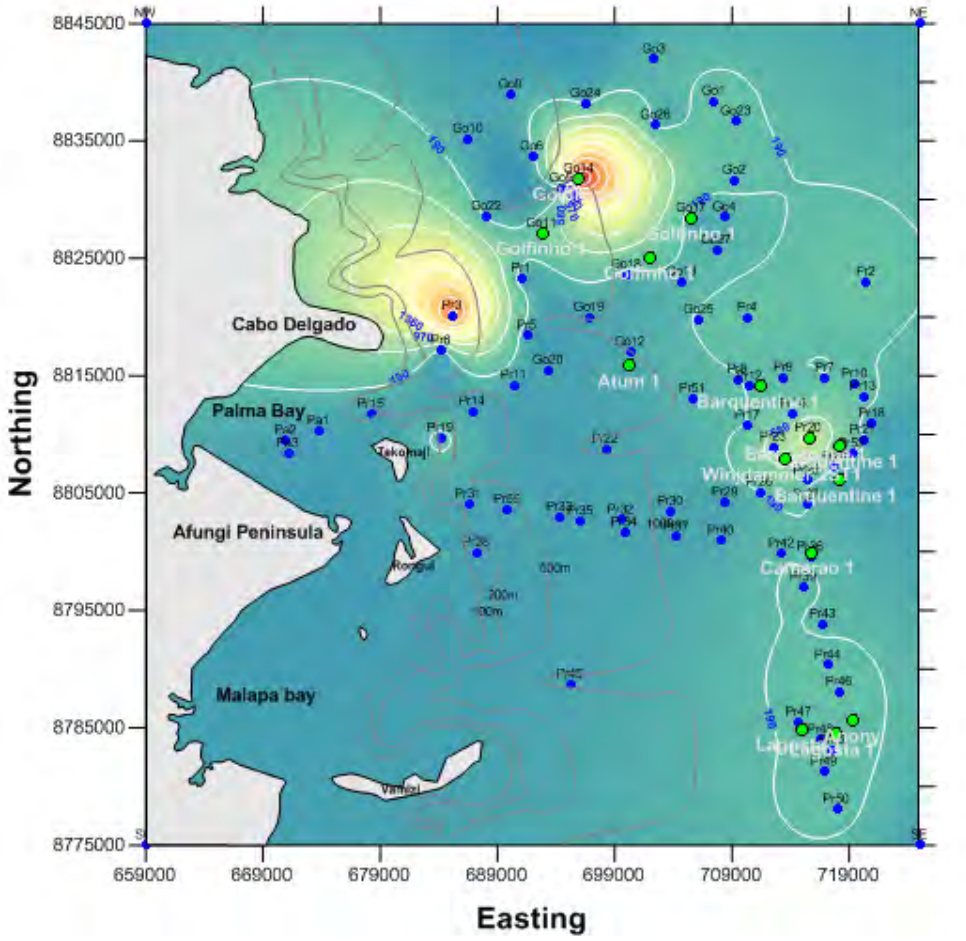
C13.3.2 Plankton

Water samples collected from the offshore CTD sampling stations in June 2012 (see *Section C13.3.1*) were analysed for chlorophyll fluorescence and composite profiles.

C13.3.3 Sediment

Surficial sediment sampling in the offshore gas fields and pipeline corridors was conducted by box core (deep water sites) and Day grab (shallow water sites) on the Rylan-T cruise in June 2012 to determine sediment properties. The locations of sediment sampling stations are shown in *Figure 13.2*. Sediments from 75 samples were analysed for particle size distributions and texture, and heavy metal concentrations.

Figure 13.2 Sediment Survey Sampling Locations in the Offshore Study Area, June 2012



Key: Blue dots: locations of sediment sampling locations. Green dots: known locations of drilled wells. White Line: distribution of the barium concentrations in mg/kg.
Source: Lwandle 2012. Data collected during June 2012 survey.

C13.3.4 ***Benthos***

Benthos samples were taken by box core at the locations shown in the figure above. For each station approximately 12 litres of sediment was filtered through a 0.5 mm aperture mesh sieve on a Wilson's autosiever. The retained benthos was preserved in 4% formalin neutralised with sodium borate and delivered to a laboratory for processing.

In the laboratory, benthos specimens were identified to the lowest taxonomic level possible and counted. Wet biomass was estimated by blot-drying the specimens on absorbent tissue for a standard period of time and weights recorded per species per sample using an analytical balance. Taxa retained on the 0.5 mm screen that traditionally are considered to be meiofauna (eg nematodes, copepods, ostracods and foraminifera) were not included in counts, biomass measurements or subsequent analyses. This is in line with other studies on deep sea macrofauna (eg Levin et al. 2000, Gallardo et al. 2004).

Diversity indices (eg number of species, abundance, biomass per 0.1m^2, richness, evenness, and Shannon-Wiener diversity) were computed for all samples (PRIMER v6, Clarke & Warwick 2001). The Shannon-Wiener diversity index is a measurement of biodiversity taking into account the number of species and the evenness of the species (evenness expresses how evenly the individuals are distributed among the different species, in other words whether a community is dominated by individuals of one or few species (low evenness) or whether all species contribute evenly to the abundance (high evenness)). The unit-less index is increased either by having additional unique species, or by having a greater species-evenness.

The computer package PRIMER 6 & PERMANOVA+ was used to analyse the benthic data following the multivariate analysis procedures described by Clarke & Warwick (2001), Clarke & Gorley (2006), and Anderson et al. (2008, and other references therein). All data were 4th-root transformed, and a Bray-Curtis resemblance matrix computed. This was followed by hierarchical cluster analysis and multi-dimensional scaling (MDS). The latter is an ordination 'map' in two dimensions, where the distances between the samples represent their dissimilarity; i.e. the closer the samples are depicted in the MDS, the more similar they are. The stress value gives a measure of how well the two-dimensional picture may represent the sample relationship, a stress value >0.25 indicates that a higher dimensional projection may be more appropriate and that patterns discerned in the two dimensional plot should be treated circumspectly.

C13.3.5 Reef Structures

CSA as part of their gas field exploration and simulation modeling for drill cuttings and mud discharges, analysed ROV seabed video surveys around five sites in the Golfinho gas field in 2012. Lwandle augmented the findings of this study with Remotely Operated Vehicle (ROV) video records from five current meter deployment sites off Palma Bay. The locations of these and the water depths for each and types of transects deployed are listed in *Table 13.1*.

Table 13.1 Seabed ROV Video Surveys in the Gas Fields Offshore of Palma Bay

Site	Approximate Location (WGS 1984 UTM Zone 37S)		Water Depth (m)	No. of transects	Transect lengths and layout
	X	Y			
Golfinho 1	694835	8835250	1010	17	400 m, grid
Golfinho G	692805	8827130	845	8	400 m, radial
Golfinho M	705570	8828395	1290	8	400 m, radial
Golfinho N	694820	8841230	1075	8	400 m, radial
Golfinho O	686515	8835175	730	8	400 m, radial
CM8	693024	8812646	655	4	~500 m, orthoganal
CM9	685690	8805685	390	4	~500 m, orthoganal
CM10	692767	8798344	515	4	~500 m, orthoganal
CM11	709885	8820012	1459	4	~500 m, orthoganal
CM13	716142	8806133	1510	4	~500 m, orthogonal

Source: Lwandle 2012. Data from CSA (2012) and MSI (2012 in litt.).

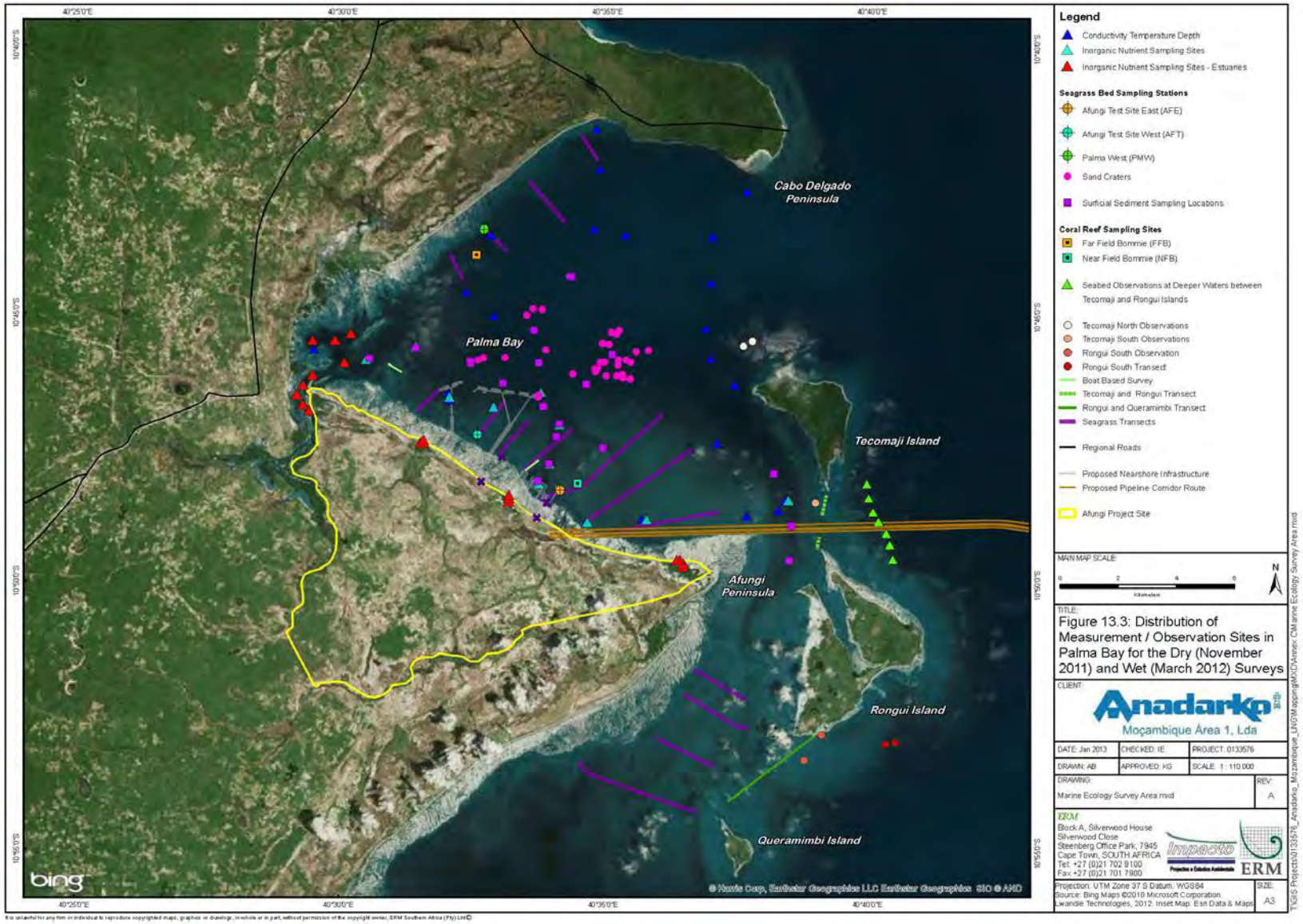
C13.4 DATA COLLECTION -PALMA BAY AND AFUNGI PENINSULA

Location specific information and data for Palma Bay are sparse. Therefore as part of the LNG Facility site selection process, and subsequent environmental baseline data gathering and design data procurement, intensive investigations of the area have been carried out. These include bathymetric and sub-bottom profiling (UWS), metocean measurements within the bay and offshore (MSI) and dry (November 2011) and wet season (March 2012) marine ecology surveys (Lwandle). The results of these surveys are discussed in *Chapter 7* of the EIA Report with the main focus being on marine ecology surveys which are augmented by contributions on the marine ecology of the region (Adriano Macia) and fish and fisheries (Emídio André and Atanasio Brito).

The marine ecology surveys undertaken in Palma Bay by Lwandle comprised water column measurements of temperature, salinity, dissolved oxygen, turbidity and pH, water sampling for dissolved inorganic nutrients concentrations, distributions, and surveys on seagrass, coral and sandy beach ecology. The survey and analysis methods used are detailed in Sections *C13.4.1* to *C13.4.7* below.

Figure 13.3 provides a schematic view of the distribution of measurement stations and observation sites surveyed in Palma Bay in relation to the marine facilities planned for the LNG Facility.

Figure 13.3 Distribution of Measurement / Observation Sites in Palma Bay for the Dry (November 2011) and Wet (March 2012) Surveys



C13.4.1 Palma Bay Water Column Properties

Various physical parameters were measured within Palma Bay including:

- temperature and salinity;
- dissolved oxygen;
- turbidity;
- pH;
- organic nutrients;
- inorganic nutrients; and
- chlorophyll.

The location of the sampling sites are shown in *Figure 13.3*. Each of these parameters were measured in the dry (November) and wet (March) seasons in Palma Bay with the exception of inorganic nutrients which were only observed during the wet season.

C13.4.2 Sediment Properties and Seabed Features

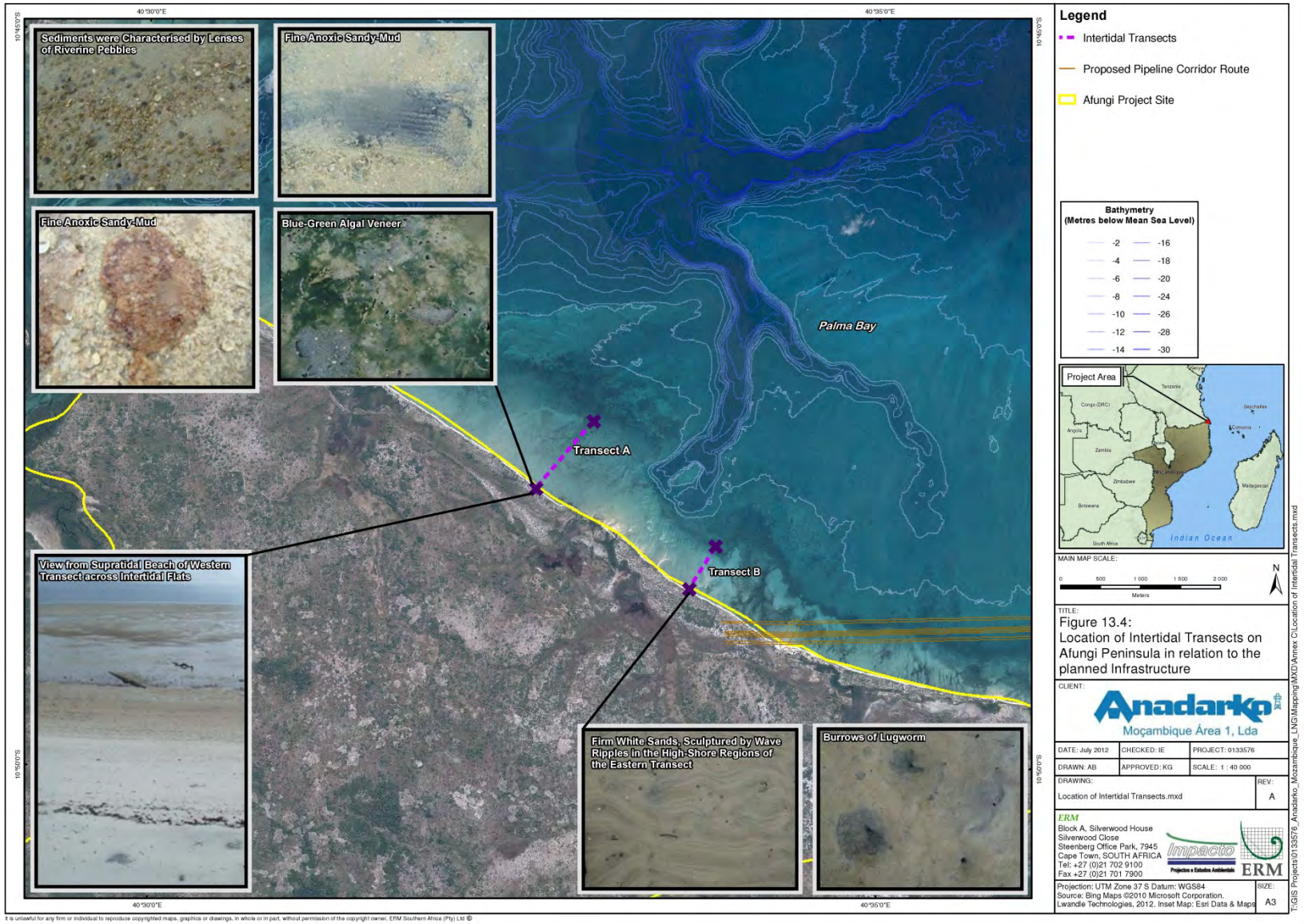
Surficial sediment samples were taken from various locations within the bay (see *Figure 13.3)* during the wet season survey.

C13.4.3 Intertidal Sand Beaches

The extensive sandy beach area on the northern shore of the Afungi Peninsula was inspected during the wet season survey in March 2012. Qualitative assessments of beach type and the major biological features were made on two transects extending from the primary dune to the bottom of the intertidal zone *(Figure 13.4*).

The inspection involved collecting both video footage and photographs along the transects. Samples of seagrass and dead shells were collected in limited quantities for subsequent identification.

Figure 13.4 Location of Intertidal Transects on Afungi Peninsula in relation to the planned Infrastructure



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C13.4.4 Seagrass Distribution

Three sampling sites were selected for the quantitative seagrass bed survey; two 'test' or 'impact' sites in the extensive Afungi seagrass bed bordering the proposed development area and one 'reference' site on the western shore of Palma Bay (*Figure 13.3*).

Sites Afungi Test Site West (AFT) and Afungi Test Site East (AFE) are directly west and east of the area that will be dredged for the construction of the jetty and to deepen the entrance channel for vessels, and may thus be potentially affected by the dredging activity. The reference site Palma West (PMW) is located in the seagrass bed on the western shore of Palma Bay, >8 km away from the proposed development site on Afungi peninsula.

At each of the three sites, five 40 m long transects (A-E) were placed parallel to the shore at distance intervals of approximately 100 m. Positioning of the transect lines was random, but care was taken that all transects were in comparable water depths (1-1.50 m), both within a site as well as among sites. The GPS positions of the starting points were recorded.

Starting at 0 m, a 50 x 50 cm quadrat (0.25 m^2) was placed every 5 m along the transect line, resulting in 8 quadrats per transect line. In principle, the survey method followed the seagrass bed survey manual developed by Short et al. (2004), and included the following observations and measurements for each quadrat:

- A photo of the sea bottom in the quadrat;
- Per cent cover of all seagrass plants in the quadrat, and cover of each species separately. Cover in this study was defined as the fraction of the total quadrat area that is obscured by a particular species (or the sum of all plants) when viewed directly from above;
- Shoot density of all seagrass species counted in a smaller 25 x 25cm (0.0625 m^2) quadrat that was positioned in the right hand corner of the larger quadrat towards the transect line;
- Canopy height of the dominant species. For large species, this was done by selecting a clump of seagrass blades from within the quadrat, extending the leaves to their maximum height, and measuring from the substrate to the leaf end, but ignoring the tallest 20% of leaves. For small species that were widely distributed, the length of five individual shoots was measured and the average height calculated; and
- A biomass core (10-cm diameter or 0.00785 m^2) from an area outside the quadrat that was representative to the species assemblage inside the quadrat. If not all species present could be covered with one biomass core, a second core targeting the desired species was taken. The sediments were washed from the core sample, shoot density per species counted and the

plant material separated into leaves, sheath/stem and root-plus-rhizome. Due to logistical limitations, plant material could not be dried to constant weight for determination of dry weight, and thus only wet-weight biomass could be estimated. Each plant section was blot-dried on absorbent paper towels and weighed to the nearest 0.1 g.

For each transect, the average (n = 8 quadrats) total %cover, %cover per species (per 0.25m^2), shoot density per species (no/0.0625 m^2), and canopy height of dominant seagrass species (per 0.25 m^2) was calculated. Per species biomass was calculated by dividing the biomass per species by the number of shoots per species collected in each core sample. Species biomass was then calculated by multiplying species specific per-shoot-biomass by the number of shoots counted in the 0.0625 m^2 quadrat. Biomass was divided into total above-ground (leaves-plus-sheaths/stems) and below-ground biomass (roots-plus-rhizome) and expressed per 0.0625 m^2.

C13.4.5 Shallow Coral Reefs and Outcrops

Count, visual and photographic observations of coral reef features were undertaken at two locations within Palma Bay, a nearfield site, which is situated sufficiently close to the proposed marine facilities area to be exposed to potential dredging effects, and a far-field site in the same depth range but at a distance unlikely to be impacted by the dredging (*Figure 13.3*).

C13.4.6 Fringing Coral Reef

The fringing coral reef areas around and between the three islands in and immediately south of Palma Bay were surveyed to provide comparative information to be used in the selection of a gas import pipeline corridor. The surveys comprised surface and diver based inspections of the shallower areas (<15m depth) and ROV video coverage of the outer reef area between Tecomaji and Rongui Islands to ~50m depth. The sites/transects surveyed are shown in *Figure 13.3.*

Inter-Island Transects

- Rongui – Queramimbi Islands: Fifty individual observations of coral reef and associated or isolated coral bommies were made along the 3.8 km long transect between these two islands.

- Tecomaji – Rongui Islands: This transect was relatively short at 2.04 km and 19 observations of seabed types were made across the transect.

Island Transects

- Rongui South Transects: Three 100 m length transects were surveyed. Underwater still photography was used to aid the interpretation of the video records per transect.

- Tecomaji South Transects: Three 100 m length transects were surveyed. Underwater still photography was used to aid the interpretation of the video records per transect.

- Tecomaji North Observations: Visual and photographic observations of coral reef features were undertaken towards the seaward drop-off at two locations to the north of Tecomaji Island (Tecomaji North Deep: ~7 m and Tecomaji North Shallow: ~5 m). No video transects were conducted at these sites.

- Rongui South Observations: Visual and photographic observations of coral reef features were similarly undertaken at two locations offshore the Rongui south video transects and west of the southern point of Rongui Island (Rongui South Deep: ~6 m and Rongui South Shallow: ~4 m). Again, no video transects were conducted at these sites.

Coral and Seabed Features in Deeper Water between Tecomaji and Rongui Islands

During the wet season survey (March 2012) ROV video footage was obtained between the approximated depths of 5m and 70m at seven locations between Tecomaji and Rongui Islands. This area was selected for inspection as the Project Engineers had determined that it was the most suitable area for the gas import pipeline corridor.

The video record was examined and the seafloor broadly classified according to whether it comprised well developed reef, patchy sand and reef, or sand in 5m depth bands (depth record taken from ROV pressure sensor). The criterion used was whether the seafloor in the depth band could be readily classified into one of the three categories.

C13.4.7 Fish

There are no survey data available for fish within Palma Bay. However, being part of the Quirimbas Archipelago it is probable that the fish species recorded for coral reef and seagrass biotopes to the south of Palma Bay will occur in the bay. The larger pelagic species listed in Section 4.3.1 of the Marine Ecology Assessment (2012) are wide ranging and will certainly occur in the area, even if confined to deeper waters at the entrance to Palma Bay.

Data related to fish associated with coral reefs and seagrass beds are based mainly on data derived from the Darwin/Frontier Mozambique Quirimbas Archipelago Marine Research Programme (April 1996 to December 1997).

C13.5 ADJUSTED IMPACT ASSESSMENT METHODOLOGY

The impact assessment criteria used are as specified in *Chapter 3* of the EIA Report. Where feasible, specific standards or guidelines are used to determine the acceptability of impacts, and any key gaps in knowledge are mentioned. For the purpose of assessing the potential impacts, natural components of the

nearshore marine and Palma Bay environment are assessed separately from impacts on natural components of the offshore/ deep-water environment. The dividing line used to separate these environments for impact assessment purposes is illustrated in *Figure 13.5*; this line approximately follows Mozambique's Maritime Baseline designating its internal waters (Law of the Sea, 4 of 1996).

Figure 13.5 Maritime Baseline (white dotted line) between Off/On-Shore Areas of Impact Assessment, (set at ~1.5 km east of the islands)



Source: Lwandle, 2012.

C13.5.1 Nearshore/ Palma Bay Environment

For the Palma Bay/ nearshore assessment the "scale/extent" criterion used is as illustrated in *Figure 13.6* below.

Figure 13.6 *Indicative Divider (white dotted lines) Between areas of Impact Assessed for the Inshore Marine Environment*



Source: Lwandle, 2012.

On-site means impacts are restricted to inside a block drawn around the marine facility construction area (approximately 1 km east of the gas import line shore crossing point).

Local means impacts are restricted to within the Internal Waters of Palma Bay inside the Maritime Baseline approximately 1.5 km east of the Islands, between Cabo Delgado Peninsula and a line through Queramimbi Island.

Regional means impacts are restricted to within the Internal Waters of Cabo Delgado Province, ie to a line approximately 1.5 km east of the easternmost islands (*Figure 13.6*).

National means impacts are restricted to within Mozambique's EEZ which in this area possibly means about ~30 km to the north (Tanzania EEZ) and ~70 km to east (Comoros potential EEZ)(1)).

International means impacts extend into adjacent States' Maritime Zones (ie Comoros and Tanzania), or affects internationally valued resources.

Furthermore, Lwandle have added a "**medium term**" of 7 years to the duration criteria to provide for a reasonable marine recovery period after construction and commissioning.

C13.5.2 Offshore Environment

The criteria used to assess the significance of potential impacts in the offshore area are the same as those used for the inshore area under *Section C13.5.1* above except that, because the gas fields are in the open ocean, **'extent'** is defined in km^2 around the source of the impact as follows:

On-site = <5 km^2
Local = 5-50 km^2 (~7x7 km)
Regional = 50-500 km^2 (~22x22 km)
National = ~30 km to the north (Tanzania EEZ) and ~70 km to east (Comoros potential EEZ).
International = beyond Mozambique's EEZ.

(1) Because of an agreement with Tanzania and potential claims by Comoros (refer Section 5.4.1: International Maritime Boundaries)

C14 LANDSCAPE AND VISUAL

C14.1 ASSESSMENT METHODOLOGY

The following references were used to inform the methodology and assessment process:

- The Landscape Institute and Institute of Environmental Management and Assessment (2002) Guidelines for Landscape and Visual Impact Assessment: Second Edition.

- United Kingdom Department of Trade and Industry(DTI) (2005) Guidance on the Assessment of the Impact of Offshore Wind Farms: Seascape and Visual Impact Report, DTI, London.

- CCW (2001) Guide to best practice in seascape assessment. CCW, Brady Shipman Martin and University College Dublin.

Key definitions of relevance to this study are presented below as follows:

- Seascape is defined in the above referenced guidance by DTI as the coastal landscape and adjoining areas of open water, including views from land to sea, from sea to land and along the coastline. Every seascape has three components. These include an area of sea (the seaward component), a length of coastline (the coastline component) and an area of land (the landward component).

- Landscape is the land based element only. It starts at the coastline and extends inland.

- Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people.

There are no standardised seascape assessments covering the coastline of Mozambique. Guidance on this topic is currently in use in the United Kingdom, specifically the above referenced DTI (2005) Guidance. This defines National Seascape Units as 'an extensive section of the coast with an overriding defining characteristic such as coastal orientation or landform, defined by major headlands of national significance'. The same methodology for defining seascape is used in this assessment, applied to the local landscape of the study area.

Similarly there is no available landscape character data covering the landscape of the site at Mozambique. The baseline addresses also the landscape character of the study area with reference to the above mentioned guidance.

C14.2 STUDY AREA

A study area for the assessment was defined based on the main large scale elements of the proposal which include the LNG Storage Tanks (45m height), Flare Stack (140m height), Airport Control Tower (6m height), and the Near Shore Project components (two LNG export jetties (hereafter referred to as the 'LNG Export Jetty'), Pioneer Dock and MOF). The study area for the elements of the proposal includes an area with a 30km radius measured from the centre of the site as shown in *Chapter 6*. The study area has been defined in the absence of specific guidance in relation to this type of development and has been selected based on professional judgement in the belief that all significant landscape, seascape and visual effects would be captured within this 30 km radius range.

C14.3 METHODOLOGY – KEY STEPS

The key steps in the methodology were:

- Zones of Theoretical Visibility (ZTVs) were defined for the main potentially visible elements of the scheme. These include the LNG Storage Tanks (45m height), Flare Stack (140m height), Airport Control Tower (6m height), and the Near Shore Project components (LNG Export Jetty, future jetty, Pioneer Dock and MOF). The ZTVs show the theoretical visibility of the scheme covering the landscape and seascape of the study area. The visibility is measured as theoretical. It is based on bare earth reflecting existing topography only and excludes screening provided by vegetation and buildings. The ZTVs are illustrated in *Chapter 12* of the EIA Report.

- The landscapes and seascapes of the study area were defined and characterised as part of the baseline study. A written account of the characteristics of each landscape and seascape is presented in the baseline derived from studies undertaken by the project ecologist and the findings of site visits. The sensitivity of each area to development of the type and scale proposed was determined.

- Viewpoints across the ZTVs were selected as representative of the range of views and types of viewer likely to be affected by the Scheme and the sensitivity of each viewpoint was determined.

- Photomontage images of the scheme from five viewpoint locations were prepared. These are illustrated in *Chapter 12* of the EIA Report.

- The sensitivity of each landscape, seascape and visual receptor was assessed.

- The magnitude of change in each landscape and seascape character area was determined. Similarly the magnitude of change at each viewpoint was predicted.
- the level of significance of impact on each landscape and seascape character area and each viewpoint was evaluated as negligible, minor, moderate and major. Significance is determined based on the sensitivity of the impact and the magnitude of change as described below.

The landscape, seascape and visual impact assessment was informed by data gathered from the following sources:

- ordnance Survey maps made available from AMA1;
- field surveys undertaken in January 2012;
- aerial photography and satellite imagery;
- computer generated ZTVs;
- computer modelled photomontages; and
- consultations with statutory bodies undertaken as part of the social impact assessment baseline specifically in regard to tourism and landscape quality of the study area.

C14.3.1 Sensitivity of Landscape and Seascape

The sensitivity of a landscape or seascape is judged based on the extent to which it can accept change of a particular type and scale without adverse effects on its character. Sensitivity varies according to the type of development proposed and the nature of the landscape or seascape: its individual elements, key characteristics (land use, pattern and scale of landscape, enclosure/openness), inherent quality, condition, presence of detracting elements (eg pylons), value and capacity to accommodate change, and any specific values such as designations that apply. A landscape or seascape which is highly sensitive to change is one which is at greater risk of having their key characteristics fundamentally altered as a result of the LNG Facility, leading to a different landscape or seascape character.

Landscape or seascape sensitivity is also informed by other criteria such as *value* and *quality*. Value is concerned with the relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses national or local consensus, because of its quality, special features including perceptual aspects such as scenic beauty, tranquillity or wildness, cultural associations or other conservation issues.

Quality is based upon judgements about the physical state of the landscape, its condition and its intactness from visual, functional, and ecological

perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.

C14.3.2 Sensitivity of Viewers at Viewpoint Locations.

The purpose of the visual impact assessment is to determine the visibility of the proposed development and to assess the visual impact of the proposals from a range of representative viewpoints within the study area.

A wide variety of viewer types (visual receptors) will be potentially affected by the proposed LNG Facility. These receptors will vary considerably depending on the intricacies of the coastline and will include local residents, those travelling through the area and those visiting the area for recreational and amenity purposes. Most of these will be onshore receptors, but there is potential for offshore receptors such as those travelling or working on boats. It is acknowledged that one person can fall into more than one category of receptor.

Each viewpoint was selected to represent a typical view from the immediate area which it represents. Viewpoint sensitivity depends on a number of factors including the context of the viewpoint, the current occupation (residents, recreational visitors, passers by, workers) and viewing opportunity of the groups of people being considered, and the number of people affected. The sensitivity of a viewpoint also depends upon the extent to which the viewers it represents are affected by changes in their view together with the quality of the existing view.

Viewer sensitivity is defined as Low, Medium or High.

C14.3.3 Magnitude of Change

The magnitude of change affecting landscape, seascape or visual receptors depends on the nature, scale and duration of the particular change that is envisaged in the landscape or seascape and the overall effect on a particular view. In a landscape or seascape, this will require consideration of the loss of or change in any important characteristic or feature, the proportion of the landscape or seascape that is affected, and any change in the backdrop to, or outlook from, the landscape or seascape affected.

The magnitude of change in views will depend on the scale of the development and the distance from the viewpoint, the angle of view occupied by the development, the extent of shielding by intervening features, the degree of obstruction of existing features, the degree of contrast with the existing view and the frequency or duration of visibility.

Magnitude of Change of an impact on a receptor is regarded as: Negligible, Low, Medium or High.

C14.3.4 Significance of Impacts

No established, measurable technical thresholds of significance exist for landscape, seascape and visual impacts, as is the case for some other EIA disciplines such as air quality or noise. Significance is therefore determined by considering the sensitivity of the landscape or visual receptor and the magnitude of change expected as a result of the development. Professional judgement and experience are applied on a case by case basis in order to identify broad levels of significance for each receptor. Each case is assessed on its own merits as factors unique to each circumstance need to be considered.

There are, however, general principles which can be used as a guide to this process and these are set out in *Sections C14.3.1, C14.3.2* and *C14.3.3.* Following these the level of significance of impact is described as being *Negligible, Minor, Moderate,* or *Major*. This is however recognised as a continuum and, where impacts lie on the borderline, impacts may be described as *minor to moderate* for example.

Impacts which are graded as being *major* are those which ought to be given greatest weight in decision making. They usually concern immediate landscapes or seascapes around the site and close views from sensitive visual receptors. *Moderate* levels of impact are also considered significant, but they are of progressively reducing importance. Impacts graded as *minor* still constitute effects which warrant being brought to the attention of the decision-maker, but the team considers these should carry little if any weight in the decision. Impacts that are less than *minor* are considered to be *not significant*, the assessment team considers these impacts should carry no weight in the decision making process.

C15 WASTE

C15.1 STUDY APPROACH

A waste management review was undertaken which entailed essentially a desk study and used information about the Project provided by the Engineering Team during the pre-FEED design. Where data/information about waste generation from Project activities was not available, estimates have been made based on similar projects (developed in similar environments) to determine the likely types and quantities of waste that may be generated.

The final detailed design information for the Project is not available yet as it will be developed as part of the FEED stage. Hence, in many cases, specific waste treatment/disposal methods/routes are not yet known. In these cases assumptions have been made based on AMA1's stated policies and recommendations have been included as to how the Project should manage particular waste streams in compliance with applicable Mozambican regulations and IFC guidance.

The following steps were undertaken to inform the impact assessment process.

- Review of the Mozambique Regulatory Requirements and required International Standards as they impact management of the Project's wastes.

- Review of the types and quantities of waste that are anticipated will be generated during the construction, operational and decommissioning phases of the Project including available estimates of non-hazardous and hazardous wastes generated by different aspects of the Project (offshore, onshore, nearshore).

- Assessment and evaluation of the current plans for the management of Project wastes.

- Development of recommendations for how wastes generated by the different Project activities should be managed in order to minimise the potential environmental and social impacts.

C16 SOCIO-ECONOMICS

C16.1 OVERVIEW

The socio-economic study was conducted in five key phases using a number of research methods and tools in order to obtain a broad understanding of the socio-economics characteristics of the Study Area. These phases are outlined below in *Section C16.4*.

C16.2 SITE SELECTION- PRELIMINARY SITE VISITS AND MAPPING

Two preliminary site visits were undertaken during the site selection process (between May and August, 2011). During the visits, general information was gathered about the Afungi Peninsula and more specifically about the Afungi Project Site. Exploratory interviews were conducted with households in Quitupo village, the agricultural production zones and various fishing centres located along the coast. The field visit allowed the consulting team to draft maps of the villages and surrounding settlements as well as fishing centres within the 3,400 ha area.

C16.3 DESK BASED PREPARATION FOR THE SOCIO-ECONOMIC SURVEYS

Desk-based research was undertaken in preparation for the study (field documents and logistics). Activities undertaken are outlined below.

- Preparation of study protocol: drafting of the questionnaires for the household survey, focus group discussions with local leaders, men and women as well as a checklist for interviews with local government officials and NGOs.

- Identification of field workers to undertake the household surveys: the field workers were recruited from the Cabo Delgado Province specifically Pemba City.

- Preparation for the primary logistical aspects of the study.

C16.4 FIELD VISITS, INTERVIEWS AND SURVEYS

The socio-economic team visited Palma District during two field trips. Activities undertaken are detailed below.

C16.4.1 Phase 1 of the Socio-economic Study – November, 2011

In November 2011, the team visited the Palma District and the Afungi Project Site. The main results achieved during this phase include:

- hiring of field workers to conduct the household surveys, field work training and testing of questionnaires in the Quiwia village;

- completion of the mapping work of the amended Afungi Project Site, following on from mapping undertaken during the site selection;

- administration of 140 household questionnaires;

- seven focus group discussions conducted with local leaders, men and women in Quitupo, Maganja, Nsenga villages and the Milamba Fishing Zone/Centre; and

- key informant interviews with the Administration of Palma District, District services and village leaders.

C16.4.2 Phase 2 of the Socio-economic Study – January, 2012

This phase of the study was conducted in Pemba City and in Palma District in January 2012. The main results achieved during this phase included:

- key informant interviews in Pemba and Palma with NGOs working in Palma District;

- additional key informant interviews with the Administration of Palma District and District services;

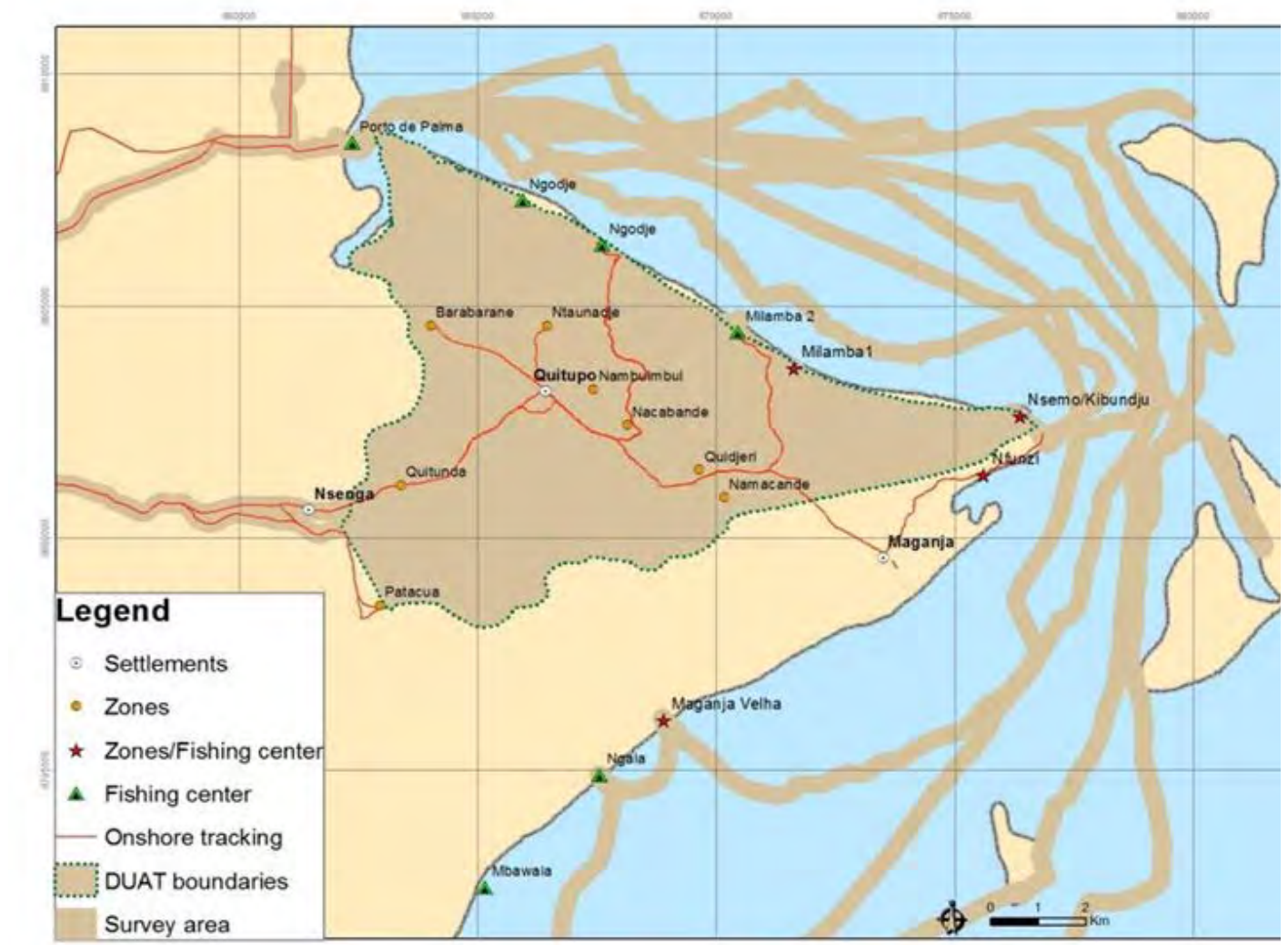
- interviews with fishermen in the main fishing centres within the Afungi Project Site and other sites in the Locality of Mute;

- mapping of the main villages in Mute Locality; and

- mapping of the main fishing areas on the coastline near Palma, the Afungi Project Site and the fishing centres in the Locality of Mute, as reported by the fishermen.

Figure 16.1 shows the tracks of the survey team, onshore and offshore, in November 2011 and January 2012.

Figure 16.1 Socio-economic Survey Team Tracks, November 2011 and January 2012



C16.5 PREPARATION OF THE SOCIAL BASELINE AND IMPACT ASSESSMENT

During this phase of the socio-economic study, the main activities undertaken included the following:

- preparation of a questionnaire database;
- questionnaire data cleaning and analysis;
- analysis of focus group discussion reports;
- analysis of statistical reports and data from the main sectors (tourism, fishing, agriculture) of the Province of Cabo Delgado and Palma District; and
- write-up of findings.

C16.6 DATA GATHERING TOOLS

Several data gathering tools were designed for use in the field and the objectives of each of these are discussed below.

C16.6.1 Household (HH) Questionnaire

The survey was administered in 140 households in three villages and two settlement zones. The objective of the survey was to collect information regarding the composition of the households, their social and demographic characteristics, household infrastructure, use of natural resources, primary strategies for their survival and development, as well as their perceptions and expectations about the Project.

C16.6.2 Focus Groups Discussions (FGD)

FGDs were conducted with men, women and local leaders in order to obtain a more detailed and qualitative understanding of socioeconomic receptors and community issues such as access to land, use of natural resources, household survival strategies, local cultural practices and traditions, local history, as well as expectations related to the Project.

C16.6.3 Semi-structured Key Informant Interviews

Interviews were conducted with members of the local government such as the Administrator, Permanent Secretary, Heads of District Services, Local Village Leaders, and Fishermen. This was done to gather data about the administration and the Study Area.

C16.7 SAMPLING DESIGN

Sample Selection

There was a lack of reliable population data for the area as the National Institute of Statistics (INE) and the District Administration was unable to provide data at a village level. To select the locations of villages in which to conduct interviews, cluster sampling was undertaken based on knowledge of the area and the various sub-groupings. The clusters selected are outlined below.

- *Village of Quitupo*: the main settlement in the Afungi Project Site.
- *Areas Surrounding Quitupo*: scattered settlements located in the 'production zones' which have a mixture of permanent and seasonal residents.
- *Coastal Zone:* settlements located along the coast of the Afungi Project Site (ie Ngodje, Milamba 1 and 2 and N'semo/Quibundju).
- *Village of Senga*: a village located on the boundary of the Afungi Project Site; whose residents use agricultural and coastal areas inside the Afungi Project Site.
- *Village of Maganja*: an important village located near the boundary of the Afungi Project Site; its population may use the agricultural and coastal areas in the Afungi Project Site.

Selection of households within each sampled village was done using a systematic sampling method. Based on the density of the houses in each sampling/cluster location (1), an appropriate sampling interval was calculated. The field workers applied this interval when selecting households.

Sample Size

The sample size consisted of 140 households (approximately 14 percent) of all households residing in the area. The numbers of the households interviewed in each of the locations is shown in *Table 16.1*

Table 16.1 Number of Questionnaires Administered in the Locations Selected for Sampling

Location where the survey was conducted	No. of questionnaires
Village of Quitupo	52
Areas Surrounding Quitupo	16
Coastal Zone	22
Senga	20
Maganja	30
Total	140

(1) Upon arriving at a village or settlement, the Consultant and the enumerators mapped the village in conjunction with local leaders, selecting the addresses to follow and using a systematic selection interval based on the density of the houses.

C17 HEALTH IMPACT ASSESSMENT METHODOLOGY

C17.1 HIA METHODOLOGY

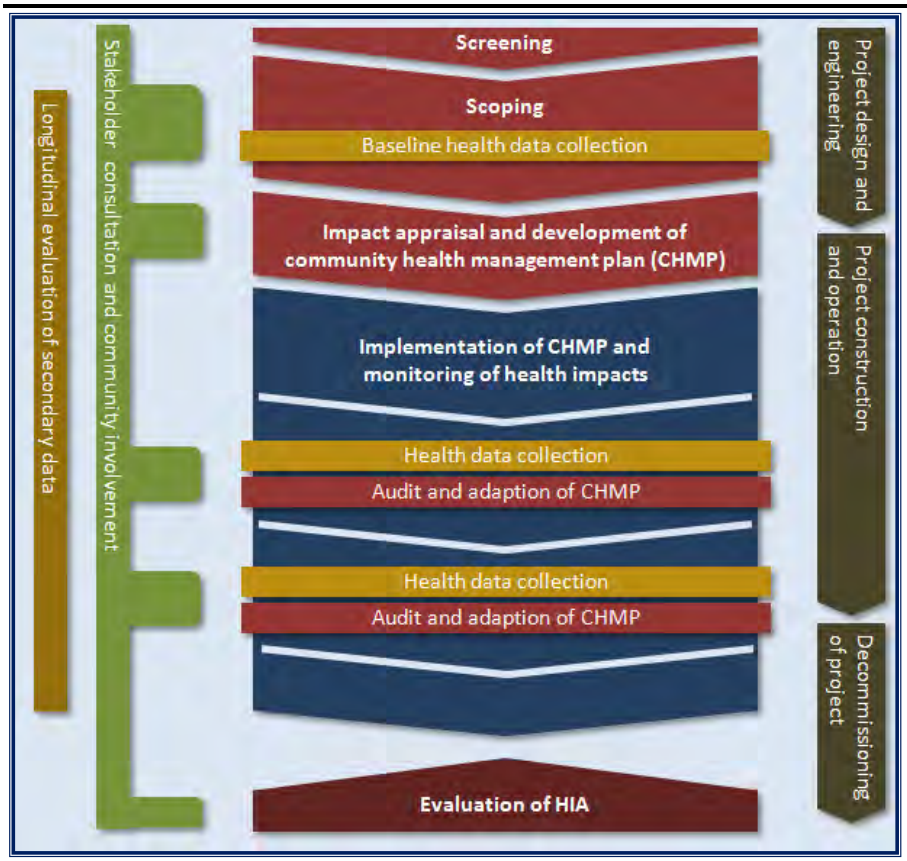
To ensure compliance with the IFC performance standards the methodology outlined in the GPN for HIA from the IFC was followed. The main elements of the GPN are discussed briefly, so the context and methodology of the HIA process is understood.

It is important that a distinction is made between HIA and Health Risk Assessment (HRA). HRA is concerned with the identification of hazards and risks to the workforce which relate to occupational health and safety and engineering design. Generally, HRA is "within the fence" while HIA is "outside the fence" but there are distinct overlaps with HIA often taking a central position as workplace activities can effect community health and existing community health needs or disease burdens can effect workplace health. It is thus important that these assessments should not be placed into individual elements but integrated to support an overall strategic plan for the Project.

C17.1.1 Form and Nature of Health Impact Assessment

Figure 17.1 presents the framework that is commonly used for HIA and which follows a 6-step process, which is based on a similar approach as adopted in environmental and social impact assessments (ESIA). This approach has been used to support effective integration of the health component in the environmental, social and health impact assessments ESHIA process and the development of the SEMP for the Project.

Figure 17.1 HIA Flow Chart



HIAs are generally divided into three main levels as described in *Table 17.1*. These levels generally consider the following; (i) the range and magnitude of potential health impacts; (ii) the social sensitivity of the potentially affected communities; and (iii) the definition of the Project and its areas of influence (project footprint) which can include direct and indirect impacts. The different phases of the Project also need to be considered in the consideration of impacts.

Table 17.1 Levels of HIA

Level of HIA	Characteristics
Desktop/Scoping HIA	• Provides a broad overview of possible health impacts. • Analysis of existing and accessible data. • No new project specific survey data collection.
Rapid Appraisal HIA	• Analysis of existing data. • Stakeholder and key informant analysis. • No new project specific survey data collection.
Comprehensive HIA	• Provides a comprehensive assessment of potential health impacts. • Robust definition of impacts. • New project specific survey data collection. • Participatory approaches involving stakeholders and key informants.

A rapid appraisal HIA was chosen as the preferred methodology to support the Project, as by definition no new primary quantitative data was collected.

C17.1.2 Environmental Health Areas

The IFC methodology uses 12 environmental health areas (EHAs) to support the systematic analysis of health considerations. These are summarized in *Table 17.2*. The set of EHAs provides a linkage between Project-related activities and potential positive or negative community-level impacts and incorporate a variety of biomedical and key social determinants of health (reductionist approach). In this integrated analysis, cross-cutting environmental and social conditions that contain significant health components are identified instead of an HIA focusing primarily on disease-specific considerations. While every EHA may not be relevant to a given project, it is still important to systematically analyse the potential for project-related impacts (positive, negative or neutral) across the various EHAs.

Table 17.2 Environmental Health Areas

	Environmental Health Areas
1	Communicable diseases linked to poor environmental and socio-economic conditions, housing design and occupancy – Transmission of communicable diseases (eg acute respiratory infections, pneumonia, tuberculosis, meningitis, plague, leprosy, etc.) that can be linked to inadequate housing design, overcrowding and housing inflation. It also considers indoor air pollution related to use of biomass fuels.
2	Vector-related diseases – Mosquito, fly, tick and lice-related diseases (eg malaria, dengue, yellow fever, lymphatic filariasis, rift valley fever, human African trypanosomiasis, onchocerciasis, etc.).
3	Soil-, water- and waste-related diseases – Diseases that are transmitted directly or indirectly through contaminated water, soil or non-hazardous waste (eg diarrheal diseases, schistosomiasis, hepatitis A and E, poliomyelitis, soil-transmitted helminthiases, etc.).
4	Sexually-transmitted infections, including HIV/AIDS – Sexually-transmitted infections such as syphilis, gonorrhea, chlamydia, hepatitis B and, most importantly, HIV/AIDS. Linkages of TB will be discussed where relevant under HIV, but often linked to EHA1.
5	Food- and nutrition-related issues – Adverse health effects such as malnutrition, anemia or micronutrient deficiencies due to eg changes in agricultural and subsistence practices, or food inflation; gastroenteritis, food-borne trematodiases, etc. This will also consider feeding behaviors and practices. Access to land plays a major role in developing subsistence farming contexts
6	Non-communicable diseases – Cardiovascular diseases, cancer, diabetes, obesity, etc.
7	Accidents/injuries – Road traffic or work-related accidents and injuries (home and project related); drowning.
8	Veterinary medicine and zoonotic diseases – Diseases affecting animals (eg bovine tuberculosis, swinepox, avian influenza) or that can be transmitted from animal to human (eg rabies, brucellosis, Rift Valley fever, Lassa fever, leptospirosis, etc.).
9	Exposure to potentially hazardous materials, noise and malodors – This considers the environmental health determinants linked to the project and related activities. Noise, water and air pollution (indoor and outdoor) as well as visual impacts will be considered in this biophysical category. It can also include exposure to heavy metals and hazardous chemical substances and other compounds, solvents or spills and releases from road traffic and exposure to mal-odors. There is a significant overlap in the environmental impact assessment in this section.
10	Social determinants of health – Including psychosocial stress (due to eg resettlement, overcrowding, political or economic crisis), mental health, depression, gender issues, gender based domestic violence, suicide, ethnic conflicts, security concerns, substance misuse (drug, alcohol, smoking), family planning, health seeking behaviors, etc. There is a significant overlap in the social impact assessment in this section.

Environmental Health Areas	
11	Cultural health practices – Role of traditional medical providers, indigenous medicines, and unique cultural health practices.
12	Health services and systems infrastructure and capacity – Physical health infrastructure (eg capacity, equipment, staffing levels and competencies, future development plans) and institutional capacity within health service.
13	Program management delivery systems - coordination and alignment of the project to existing national and provincial level health programs, (eg, TB, HIV/AIDS, malaria), and future development plans.

C17.1.3 Community Profiling

To identify and quantify potential health impacts an accurate population profile is required and it is important to distinguish between differences in exposure and susceptibility. Thus, besides a demographic profile of the at-risk population and the identification of the most vulnerable groups, it is crucial to understand how the development, construction and operational activities are likely to impact at an individual, household and community level.

The key aspects when considering the potential influence of the Project to the potentially affected communities (PACs) is the exposure pathway of the potential health determinant, which consider the following key elements:

- is there a hazard;
- who or what may be exposed to this hazard;
- the mode (air, water, food, vector, social determinants etc.) and route (inhalation, ingestion, vector borne, sexually transmitted etc.) of exposure;
- what is the risk of exposure based on a likelihood and consequence analysis (magnitude, duration and length)- the impact assessment and modelling phase; and
- how sensitive or vulnerable is the receptor to the potential hazard or impact.

As part of the analysis, the relevant overall population is stratified into PACs. A PAC is a defined community within a clear geographical boundary where Project-related health impacts may reasonably be expected to occur. PACs are inherently prospective and simply represent best professional judgments, with the potential that these may change over time. Findings of social and economic assessments, resettlement plans and influx management plans need to be carefully updated as this allows linkage between the PACs and key demographic determinants such as age structure and population numbers.

Mitigation strategies may also require specific considerations for the different PACs. On the one hand, not all the EHAs may be of concern for mitigation for the individual PACs. On the other hand a separate risk analysis for a PAC may be indicated due to a particular susceptibility to a specific health impact.

C17.1.4 Risk Assessment and Impact Categorization

This process analyses, models and ranks the potential impacts associated with the Project and their potential influence on PACs through the different life cycle stages of the Project. It includes the analysis of potential negative impacts and their management measures, but also the discussion of potential positive impacts and measures to enhance these. This is based on the evidence presented in the baseline health description, the project activities and information obtained from the ESHIA process and other specialist reports/studies which were available.

A standardized risk assessment model was followed for the modelling of impacts and includes:

- identification of health related issues where Project activities may impact on a variety of receptors;

- a prediction of what may happen to the PACs and environment as a result of the direct and indirect activities of the Project- the impact definition/assessment. The precautionary principle was adopted in analysing and modelling the impact definition ;

- the impact evaluation which considers the significance of the health impacts based on a consequence and likelihood modelling. This initial inherent ranking considers the risks at baseline (no-go situation/ present health status of communities, or the existing health needs) and the Project related impacts without mitigation; and the residual risks consider the significance of risks after the successful implementation of mitigation measures.

The evaluation of the significance of the impacts will also consider the confidence/uncertainty of the assessment. This will occur for both inherent and residual risks with the following considerations:

- the uncertainty analysis for the assessment of inherent risks will present the confidence of the assessor in determining the potential of the impacts to occur based on the evidence to hand; and

- the uncertainty analysis for the assessment of residual risks will present the confidence of the assessor in determining how likely the mitigation measures are to succeed if properly implemented, as well as the ease and practicality of the proposed mitigation measures and the potential for them to be effectively sustained.

C17.1.5 Direct Versus Indirect Impacts

There are two general categorizations of impact effects, namely (i) direct and (ii) indirect. A direct (primary) effect demonstrates a specific cause-and-effect relationship. An indirect effect is a secondary by-product of an interaction among multiple variables and may be a consequence of a direct effect.

Indirect effects are often of equal or greater significance than the more obviously observable direct impacts. The HIA analyses both potential direct and indirect effects.

Theoretically, there are virtually a limitless number of indirect effects that could be hypothesized, and in order to manage this situation the following approach is considered:

- a set of most likely indirect effects will be constructed on the basis of past relevant experiences at similar projects; and

- a sufficiently robust monitoring and evaluation system will be developed in a CHMP such that early detection of significant indirect effects is possible.

C17.1.6 Cumulative Impacts

In this HIA, cumulative impacts will be considered, but only in a qualitative fashion, as there is no formal agreed definition for cumulative impacts from an HIA perspective. For the purpose of this HIA, cumulative impacts are considered to be generated by multiple causes and pathways and may arise on a human receptor at any scale.

C17.1.7 Management and Mitigation

Impact Evaluation and Mitigation

As part of the impact categorization and evaluation a range of mitigation/management measures are generally proposed. Mitigation refers to measures which avoid, minimize, or eliminate an adverse effect, or maximize a potential benefit. Although mitigation is presented as the final phase of the HIA, it should be viewed as an on-going process, beginning as the Project is being conceptualized and designed, and ending only when impacts from the Project operations and final decommissioning have concluded.

Recommendations for mitigation/management will focus on identification of measures that can be taken to reduce potential impacts to as low as reasonably practicable (ALARP) both from a technical and financial perspective. These are generally presented based on a hierarchy of controls with avoidance as the priority where possible, as presented in the following (in order of importance) list:

- avoid at source – remove the source of the impact;
- abate at source – reduce the source of the impact;
- attenuate – reduce the impact between the source and the receptor;
- abate at the receptor – reduce the impact at the receptor;
- remedy – repair the damage after it has occurred; and

- compensate – replace a lost or damaged resource with a similar or a different resource of equal value.

The measures described above promote pre-execution advice to the Project which can be incorporated in the design phase and support the use of HIA as a decision making tool. This can include a range of alternatives for example location of specific project infrastructure and selection of equipment, social development priorities etc. It is easier to propose changes at the front end rather than promoting challenging and expensive retrofits.

For the purposes of the project, mitigation measures have been divided into three categories based on the focus of the intervention, namely:

- Project impact mitigation: Interventions required in order to mitigate the future health impacts of the project on the communities. These are required by the project and are not voluntary contributions. The precautionary principle will apply when analysing these. These are also generally regulatory requirements.

- Occupational health and safety: Interventions aimed at ensuring a healthy, safe and productive workforce. In addition, it considers aspects that can be controlled in the workforce to prevent community health impacts.

- Strategic community investments: Interventions suggested that will improve the existing health status of the communities. These can be in the form of negotiated commitments made by the project proponents as well as extended benefits which should bring about health benefits and improve social license to operate in the receptive communities. It should also promote project sustainability if developed based on sustainability principles.

The current HIA will have limited focus on these strategic community investments as it is anticipated that these will be developed as part of a community development management framework, which sits out of the scope of the current HIA. It is however noted that there is often an overlap between required mitigation measures and extended benefits which are generally based on negotiated commitments to maximize potential health benefits in the affected communities.

The management and mitigation measures proposed in the impact assessment will form part of the framework ESMP.

C17.1.8 Stakeholder Consultation

Stakeholder engagement and consultation is a crucial element of the HIA process. Stakeholder consultation in an impact assessment improves the quality and relevance of the findings by providing insights into the likely positive and negative health impacts both from stakeholder experience of the locality, as well as their experiences of other projects . Stakeholders can inform

the Project about what they value, as well as recommending, and hopefully partnering in the implementation of the most acceptable ways of mitigating, enhancing and monitoring the potential health and well-being impacts of a project.

C18 ARCHAEOLOGY

C18.1 OVERVIEW

The study was based on both desktop studies and fieldwork investigation undertaken in October 2011, as discussed below.

C18.1.1 Desktop Study

A desktop study was conducted to collect, analyse, and collate existing secondary data and information to establish an understanding of the archaeological and cultural heritage of the wider area. The desk based study also included discussions with local informants and research into the following for the Study Area:

- The list of declared monuments protected by the National Board of Cultural Heritage (NBCH).
- The list of sites of cultural heritage identified by the NBCH or Department of Archaeology and Anthropology of Eduardo Mondlane University (EMU).
- Publications on local historical, architectural, anthropological, archaeological and other cultural studies.
- Any other unpublished archaeological investigation and excavation reports kept by the NBCH.
- Cartographic and aerial photographic records from National Directorate of Geography and Cadastre (DINAGECA).
- Existing Geotechnical information.

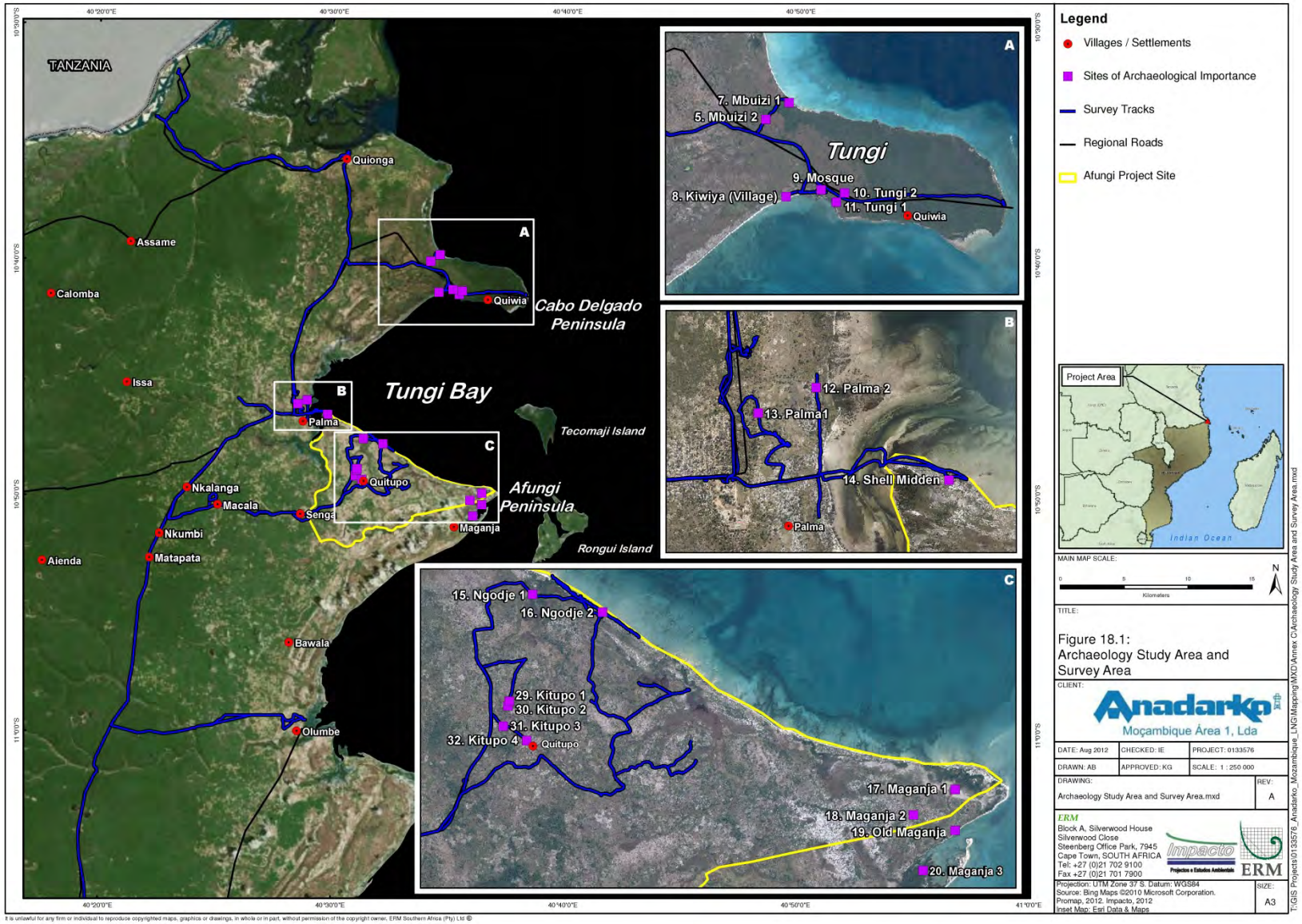
Discussions with local informants were undertaken.

C18.1.2 Field Investigations

A systematic field survey of the Study Area was conducted by the archaeologist Prof. Leonardo Adamowicz and a field assistant (Ercídio J. J. Nhatule) between 20 and 30 October 2011.

A field survey was conducted which was focused in the Afungi Peninsula, around Palma Town and within the Cabo Delgado Peninsula as shown in *Figure 18.1* these areas may be potentially directly or indirectly affected by the Project. In addition, areas from Quionga to the Rovuma River, and to Olumbi in the south were included in the investigation in order to determine the significance of the archaeological and historical heritage in these areas.

Figure 18.1 Archaeology Study Area and Survey Area



It should be noted, that some sites, particularly those in the Maganja area of Afungi Peninsula, were surveyed in detail and recorded during a previous study in 2008 (1).

During the field investigation undertaken for the LNG Project, the following tasks were undertaken:

- Identification of archaeological and cultural heritage sites.
- Location, mapping and classification of the archaeological and historical heritage sites in the area.
- Detailed description of the archaeological and historical environment.
- The identification of structures and artefacts of archaeological and historical value with georeferenced locations (2).

All collected information and material were documented and recorded (eg potsherds and shell midden) on site specific inventory sheets. On these sheets the following were recorded:

- Description of each site and its immediate environment; and technical drawing of boundaries and configuration of the site, photographic, cartographic and GPS geo-referencing (also registering the brand and model of the device, and the margin of error).
- Organization of the photographic records according to the occurrence to which they belong and their surroundings.

Archaeological remains from each collection unit were separated and packed according to the type of raw material for analysis.

A controlled-exclusive surface survey was carried out, where sufficient information exists on an area to make solid and defensible assumptions and judgments about where (heritage resource) sites may and may not be and these included an inspection of the ground floor, wherever the floor was visible, with no substantial attempt to clear brush, deadfall, leaves or other material that may cover the surface and with no attempt to look beneath the surface beyond the inspection of rodent burrows, cut banks and other exposed areas that are observed.

No excavations or extensive sampling were undertaken, since a permit from the National Board of Culture Heritage is required to disturb a heritage

(1) Undertaken in conjunction with the League of Scouts of Mozambique (LEMO), in collaboration with United Nations Educational, Scientific and Cultural Organization (UNESCO) and ICOMOS (International Council on Monuments and Sites).

(2) Some sites, particularly those in Maganja area were recorded in previous visit of author in frame of ICOMOS/UNESCO/LEMO project in 2008. Survey was done by author leading Circle of Interest of Cultural Heritage of the League of Scouts of Mozambique shortly before sponsored by UNESCO camp at Ibo Island in 2008. Other sites were recorded during trip from Palma to Pemba. Most of recorded site were sacred places.

resource. The value and significance of heritage resources was assessed as per definitions in the 10/88 Heritage Protection Law and the criteria described below. Cultural heritage was assessed according to rules established by the Department of Archaeology and Anthropology of Eduardo Mondlane University (UEM) and included:

- a comprehensive inventory of the archaeological sites, historic buildings and structures within the proposed project area, which include:
  - all sites of archaeological interest;
  - all pre-1950 buildings and structures;
  - selected post-1950 buildings and structures of high architectural and historical significance and interest; and
  - landscape features, including sites of historical events or providing a significant historical record or a setting for buildings or monuments of architectural or archaeological importance, historic field patterns, tracks and fish ponds and cultural elements such as sacred places and graves.

- Identification of the direct and indirect impacts on the site of cultural heritage at the planning stage in order to prevent any negative effects.

Various provincial databases were consulted, including historical, archaeological and geological sources and a limited literature review was undertaken.

Annex D

Tabulated ESMP

Design	Refers to Front End Engineering and Design when contractors design the Project based on inputs from the Proponents's engineering team and from the EIA Team
Construction	Refers to the phase during which the Project's various components are being constructed, including wellfield development
Operations	Refers to the phase of the Project when gas is pumped in from the wellfield, processed onshore and pumped to LNG vessels for export

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Marine Ecology						
11.4	Impact on offshore benthos and deepwater reef organisms	Discharge of treated drill cuttings and residual muds.	Construction and Operations	Minimise disturbance to benthos and reef organisms by employing a subsurface discharge chute extending to approximately 10-15m depth for overside disposal of treated drill cuttings and residual mud such that the size of the deposition footprint that is >1mm is reduced.	Contractor	ROV surveys to be performed before and after drilling activities to monitor the visible impacts on the seabed on a well by well basis.
				Restrict discharges of drill cuttings and residual mud to distances of >500m from deepwater high relief reefs, as determined by ROV survey.	Contractor	
11.5	Water quality impacts on offshore marine ecology	Discharge of treated drill cuttings and residual muds.	Construction and Operations	The drill rigs willbe designed in accordance with Good International Industry Practice (GIIP) to have an efficient solids control and mud recirculation system, including shakers, mud cleaners, dryers and centrifuges.	Contractor	
				Water based muds (WBMs) and low toxicity additives will be used whenever possible (eg concentrations of mercury and cadmium in the barite will not exceed 1mg/l and 3mg/l respectively).	Contractor	Require and maintain MSDS for SBMs and chemicals used in drilling muds.
				Synthetic based muds (SBMs) that are low in toxicity, biodegradable and do not bioaccumulate willbe used (eg polyaromatic hydrocarbon (PAH) content of less than 0.001 percent and a total aromatic content of less than 0. 5 percent). All chemicals used will conform with Cefas's Offshore Chemical Notification Scheme (OCNS) and OSPARs PLONOR (pose little or no risk) list of substances.	Contractor	
				Cuttings discharged will have a maximum oil concentration by weight of dry cuttings in accordance with Good International Industry Practice.	Contractor	Standard testing prior to discharge.
11.6	Water quality impacts on offshore marine ecology	Discharge of hydrotest water	Construction	Prepare a hydrotest disposal procedure that considers point of discharge, rate of discharge, chemical use and dispersion.	Contractor	To be specified by the hydrotest disposal procedure.

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
11.7	Impact of increased marine noise, light and vessel movement	Project activities will result in greater disturbance (noise, light and vessel movement)	Construction and Operations	Develop a Marine Mammal Observation Procedure (MMOP) that addresses, at least, the need for trained marine mammal observors, record keeping, vessel movement, light, noise, avoidance strategies and helicopter traffic.	Proponents and Contractor	
				Keep any disoriented but otherwise unharmed seabirds found on vessels at night in dark containers and release during daylight. Any ringed/banded birds found on vessels willbe reported to the appropriate ringing/banding scheme.	Proponents and Contractor	
				Prohibit all crew members from killing or causing injury to marine fauna (any crew members found to have deliberately killed or caused injury to marine fauna shall be dismissed immediately and removed to shore).	Proponents and Contractor	
				Undertake environmental awareness training of all crew members, which includes training on the conservation status of cetaceans and turtles.	Proponents and Contractor	
11.8	Impact of habitat changes on offshore seabed	Introduction of subsea infrastructure	Design and construction	Survey proposed locations of subsea infrastructure (eg subsea production equipment and pipelines) by ROV in order to avoid to the extent practical intercepting deepwater reefs.	Contractor	
11.9 and 11.10	Impact of turbidity on near shore environment	Dredging in Palma Bay.	Construction and Operations	Develop separate dredging plans for construction and maintenance dredging that considers at least turbidity and light levels.	Contractor	Monitor turbidity levels in the Zone of Moderate Impact as per prcedure described in the EIA.
		Dredging between Rongui and Tecomaji	Construction	Prior to commencement of dredging between Tecomaji and Rongui, undertake a pilot test of the selected dredge technique to check whether the action of the chosen dredging technique, eg CS Dredger head, on the coral basement and corals in the pipeline corridor is likely to generate plumes of very fine material.	Contractor	
				Develop separate dredging plans for construction and maintenance dredging that considers at least turbidity and light levels.	Contractor	Monitor turbidity levels in the Zone of Moderate Impact as per prcedure described in the EIA.
11.11	Impact of settling of residual fine dredged material on the near shore marine ecology	Dredging in the bay may result in burial of near shore benthos	Construction	Selection of dredging equipment by the contractor will be appropriate to the depths and meterial types to be dredged, and to minimise the creation of plumes.	Contractor	
11.13	Impact of sea bed modification on near shore marine ecology	Dredging will alter the sea bed	Design	Align the pipeline trench as far south in proposed corridor between Tecomaji and Rongui Islands, as is possible, within the constraints of engineering feasibility.	Contractor	
				Reduce the width of the pipeline corridor to as low as practically possible, targetting approximately 100m.	Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
			Construction	Enhance recolonisation and regrowth of seagrass by providing suitable substrate wherever practical.	Contractor	
				Align the pipeline to avoid as much impact to the coral bommies to the extent practical. Where bommies are significantly impacted, place either concrete blocks or quarried stone in 'clumps' in the disturbed areas, where practical.	Contractor	
				Where practical, place pipeline support structures designed to enhance coral recolonisation in the fringing reef between Tecomaji and Rongui.	Contractor	
11.14	Impact of disposal of dredged material at the head of the canyon on the near shore environment	Disposal of dredged material	Construction	Record the locations of dredge material disposal and avoid dredge material disposal beyond the designated dredge placement area.	Contractor	
			Operations (maintenance dredging)	To be developed as part of the maintenance dredging plan.	Contractor	To be specified by the plan.
11.15	Impact to sand beach communities from disruption of physical and biological coastal processes.	The installation of jetties, MOF and other near shore infrastructure and activities.	Design, Construction and Operation	Includes placement of bridging/culverts within the causeways and adequate water/particulate matter exchanges.	Contractor	
11.16	Impact of habitat modification on marine ecology	Installation of the jetties, MOF and other port structures will introduce hard substrate into a sandy (soft substrate) environment	Design and Construction	Any protection employed for the footwall will be suitable for colonisation by corals, sponges and associated organisms. This can either be concrete, so-called eco-blocks or large quarried stone for example.	Contractor	
11.17	Impact of noise on near shore marine organisms	Pile driving for near shore structures	Construction	The Marine Mammal Observation Procedure should allow for a 'soft start' procedure when megafauna are present in the bay. Where feasible, the soft start will last for approximately 20 minutes prior to operating at the full cycle rate for percussion piling. This will provide the opportunity for megafauna specifically to move out of range of disturbance.	Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
11.18	Impact of ballast water discharges and introduction of alien species	Vessels discharging ballast water	Operations	A ballast water management plan for all vessels entering Palma Bay that are linked in any way to the Project are to comply with current IMO regulations concerning ballast water discharge and treatment.	Proponents and Contractor	
				All slow moving craft such as barges entering the area from non-east African ports are to have hull inspections for 'hitch-hiking' sessile alien species, eg barnacles, mussels, sponges etc. If these are found then controls are to be instituted to reduce associated risks of these escaping to the Palma Bay marine environment. This willinclude requirements for hull inspection certificates prior to barge departures from their loading ports.	Contractor	
11.19	Impact of discharges from the desalinisation plant and sewage treatment plant on marine ecology	Discharge of brine and treated sewage effluent	Construction and Operations	Ensure that brine and treated sewage effluent discharges into Palma Bay operate at optimum efficiency in line with the Project Water Resources and Wastewater Management Plan through auditable maintenance schedules and meet all water quality related effluent parameters. Treated sewage effluent will comply with all applicable standards and Regulations (national and international).	Proponents and Contractor	
11.20	Impact of discharged treated produced water on marine ecology	Discharge of treated produced (formation water) into the bay	Operations	In line with the Water Resources and Wastewater Management Plan, combine the flow of the treated produced water with the discharges from the desalinisation plant and sewage treatment plant.	Proponents or Contractor	
11.21	Impact of stormwater dicharge on marine ecology	Discharge of stromwater into the bay	Construction	Establish a Water Resources and Wastewater Management Plan to implement Good International Industry Practice for stormwater management.	Contractor	
			Operations	Establish a Water Resources and Wastewater Management Plan with stormwater retention dam(s) sufficient to capture the first-flush of stormwater. Treat any stormwater that may be impacted by hydrocarbons prior to disposal or discharge.	Proponents or Contractor	
11.22	Impact of infilling the estuary in Catchment B	Depositing dredged material to infill the estuary at Catchment B	Construction	Infill from the top of the remaining estuary towards the bay to allow motile organisms, eg fish, crabs to escape to the downstream water Palma Bay water body and shoreline.	Contractor	
11.24	Impact on near shore marine fauna and sea birds	Operational discharges from ships	Construction	Prior to the establishment of the Port Reception Facilities in Palma Bay (ie during the construction phase) vessels associated with the EPC Contractor will comply with MARPOL 73/78 at a minimum and utilise MARPOL compliant waste facilities elsewhere for offloading wastes	Proponents and Contractor	
			Operations	All Project vessels will comply with MARPOL 73/78 at a minimum. This will, inter alia, necessitate the provision of Port Reception Facilities for vessels based at the facility ie support vessels and tugs, as well as effective waste disposal.	Proponents and Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Air Quality and GHG Emissions						
12.2.2	Project Contribution of SO_2 to the atmosphere	Operation of LNG Trains	Design	Investigate the feasibility of changing turbine technology to reduce SO_2 emissions or stack height to reduce ambient concentrations of SO_2.	Contractor	
12.2.2	Contribution to Mozambique's GHG emissions	Greenhouse Gas Emissions	Design, Construction and Operations	Design facility to minimise fugitive emissions. Contractor to survey facilities for fugitive emissions prior to turnover to the Proponents. Implement leak detection and repair programme for potential fugitive emissions from valves, flanges, seals and connectors associated with LNG processing and storage.	Proponents and Contractor	Monitor for leaks and fugitive emissions as part of an Air Emissions Management Plan.
				Contractor to select and use best available technology to the extent practical Use energy efficient vehicles/ machinery and maintain them in good working condition to reduce fuel consumption.	Proponents and Contractor	Develop a GHG monitoring and reporting plan that is consistent with Mozambique and IFC requirements.
			Design and Construction	Reduce electricity consumption and GHG emissions at camps and other buildings using Good International Industry Practice as far as practical.	Contractor	Develop a GHG monitoring and reporting plan that is consistent with Mozambique and IFC requirements.
Visual						
12.5.4 to 12.5.8	Impacts to landscape, seascape and visual amenity	Construction activities (vegetation clearance, lighting, vehicles and equipment) and operational activities (presence of onshore and nearshore buildings and infrastructure).	Design	Design the Project to: - be consolidated within the boundaries of the Revised Project Footprint Area (*Figure 10.3* of the EIA) - align fencing to follow natural contours wherever practical - use colours that blend in with surrounding environment as far as practical - have lighting that avoids 'light spill' The Project will develop a landscaping plan that allows for visual screening by indigenous vegetation.	Contractor	
			Construction	Implement the Soils, Erosion Control and Reinstatement Management Plan to: - Ensure vegetation clearance is minimised - revegetate temporary use areas	Contractor	
				Dust suppression procedures will be implemented as per the Soils, Erosion Control and Reinstatement Management Plan.	Contractor	
			Construction and Operations	Restrict lighting outside normal working hours to the minimum required for safety and security.	Proponents and Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Noise						
12.4.2 and 12.4.3	Noise impact on Noise Sensitive Receptors	Construction activities, LNG processing, Shipping, Use of airstrip	Construction and Operations	Where possible, minimise construction activities during the night time.	Proponents and Contractor	Measure ambient noise levels at identified noise sensitive receptors (*Figure 12.6* in Chapter 12) every 6 months. Measure noise levels when complaints regarding noise are received.
				Ambient noise levels at identified receptors (communities outside the Afungi Project Site) should not exceed 45dB(A) at night and 55dB(A) during the day.	Proponents and Contractor	
				Ambient noise levels at the nearest receptor location offsite should not increase by more than 3dB.	Proponents and Contractor	
				The Project will develop aviation procedures that will address: - night flights - flight paths	Proponents and Contractor	
Soil						
12.6.2	Impact on land capability	Vegetation clearance, compaction of soil, soil erosion	Construction	Develop and implement a Soils, Erosion Control and Reinstatement Plan, which will inter alia address the following mitigation measures: - site clearance and revegetation - erosion and stockpiling management - dust suppression	Contractor	To be specified by the plan.
12.6.3	Impact on soil quality	Minor spills and leaks of fuel or oils	Construction and Operations	The Project's Polution and Hazardous Materials Management Plan and Emergency Response Plan will address spill prevention, clean up and response.	Proponents and Contractor	Specified in the Emergency Response Plan.
Groundwater						
12.8	Impact on community wells and on surface water ecology	Abstraction of groundwater	Construction and Operations	Pump water at the rate defined by the groundwater model for a sustainable yield such that the dynamic groundwater level does not fall below 3m amsl.	Proponents and Contractor	Implement groundwater monitoring as per the Water Resources and Wastewater Management Plan
			Construction	At the end of Year 2 of the Project, the groundwater model should be validated using actual monitoring data from the construction phase of the Project and if necessary re-calibrated.	Proponents or Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Surface Water						
12.9.2 to 12.9.5	Impact on Wetland Habitat and Ecosystem Functions provided by these Wetlands	Site Clearance and Reclamation of Wetlands Changes to water quantity and water quality	Design/ Construction	The Project will develop a Wetland Management Plan which will include: - Wetland avoidance areas, including buffer zones. - Minimisation of impacts to wetlands within the Revised Project Footprint area (refer to figure *10.3* in the EIA). - Guidance on design of structures that cross wetlands or interfere with surface water hydrology. - Guidance on site clearance. - Demarcation of buffer zones. - Procedures for offset, rehabilitation, restoration and revegetation of impacts areas. - Construction of semi-permeable surfaces wherever possible. - Design of dredge material storage areas. - Strategy for reclaiming the wetland in catchment B. - The design and construction of a diversion channel to divert freshwater inflow at Catchment B to the estuary in Catchment E (see *Figure 12.33* of the EIA). - Stormwater runoff to surface water, in line with the Water Resources and Wastewater Management Plan - Chemical and waste storage facilities will be consistent with Good International Industry Practice such as bunding. The Project has developed an Emergency Response Plan that includes spill containment and clean up kits. The Project will develop a Soils, Erosion Control and Reinstatement Plan that will include erosion and sediment control measures (eg silt traps, cut off berms or intercepting channels) where required to minimise sedimentation of surface water courses. The Project has developed a draft Decommissioning and Rehabilitation Plan that will include measures to minimise impacts to surface water ecology on closure.	Contractor	The wetland management measures will specify monitoring requirements, specifically they will address monitoring (for physical, biological and chemical parameters) for wetlands in catchments A, C, D and E (refer to *Figure 12.33* in the EIA). Monitoring will begin prior to construction.

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Terrestrial Ecology						
12.11.5 , 12.12.5 and 12.13.5	Impact of influx of people (Project Induced In-Migration and Project workforce)	Influx of people resulting in excessive natural resource use, site clearing, hunting and increase in pests (eg rats).	Pre-Construction	The Project will undertake a Project Induced In-migration Management study to address environmental and social issues related to anthropogenic encroachment.	Proponents	
			Construction and Operation	Investigate the potential to use mobile fire control units to extinguish brush fires in the vicinity of the Project.	Proponents and Contractor	
				The Project should implement strict controls for food transport, storage and waste (food waste should be addressed as per the Waste Management Plan).	Proponents and Contractor	
				Employ early pest eradication steps at the outset of camp establishment in line with the Project's Soils, Erosion Control and Reinstatement Management Plan.	Proponents and Contractor	
12.10.2, 12.11.2, 12.12.2 and 12.13.2	Impact of Habitat Loss and Fragmentation	Site clearance	Design and Construction	The Project footprint area has been revised; see the Revised Onshore Project Footprint Area (*Figure 10.3* in the EIA).	Contractor	
				Within the Revised Onshore Project Footprint Area (Figure 10.3 of the EIA) restrict site clearance activities to the minimum area required.	Contractor	
				Implement the Environmental and Social Training and Awareness Programme as part of induction training. This training will include information on identified sensitive areas, the location of the Revised Onshore Project Footprint Area and buffer zones.	Contractor	
				Develop a site management strategy. This strategy will include the following measures to reduce impact to vegetation: - Minimize removal of vegetation to the extent practicable. - Minimises unnecessary removal of protected plant species such as baobab and mangrove species. - If possible, clear vegetation from the coastline towards the interior to allow fauna to move safely away. - Retain a corridors of undistrurbed vegetation to connect to habitats outside of areas to be cleared to allow fauna to move away. The Project will develop a landscaping plan that allows for connections of fragmented habitats.	Contractor	
			Pre-Construction	Undertake additional biodiversity studies to inform the Project's Biodiversity Strategy and Action Plan.	Proponents	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Vegetation						
12.10.3	Impact of Invasive Plant Species	Site clearing coupled with construction vehicles coming into the site from elsewhere in the country	Construction	The Project will implement procedures to control alien invasive plants.	Proponents and Contractor	
			Construction and Operations	Use indigenous species and/ or non-invasive species for landscaping and gardens in accordance with the Soils, Erosion Control and Reinstatement Management Plan.	Proponents and Contractor	Should monitoring indicate the spread of invasive species, in situ control and eradication measures will be implemented
Herpetofauna						
12.11.2	Impact of site clearance on sensitive herpetofauna habitat	Site clearance	Before construction begins	Herpetologist to undertake additional field studies prior to construction to determine the habitat extent for the potentially new species of skink. The results of these field surveys are to be considered prior to site clearance activities.	Proponents	
12.11.3	Mortality, Displacement and Disturbance of Herpetofauna	Site clearance, vehicle movement, light pollution	Design and Construction	Design and construct culverts under roads for use as underpasses by herpetofauna. Culverts to be located close to drainage channels and wetlands t o the extent practical.	Contractor	
				Pipelines will either be raised approximately 50cm above the ground or buried at least 30cm below the ground surface.	Contractor	
				If fencing is to be electrified, the lowest electrified strand willbe at least 20 cm above the ground surface.	Contractor	
				Excavated trenches willbe left open for as short a time as possible to avoid entrapment. Open excavated trenches should have periodic breaks.	Contractor	
				Restrict lighting outside normal working hours to the minimum required for safety and security. Use non-ultraviolet (UV) lights, where possible.	Proponents and Contractor	
12.11.4	Impact of water pollution	Potential alteration of water quality due to physical or chemical constituents	Construction and Operation	Chemical and waste storage facilities will be consistent with Good International Industry Practice such as bunding.	Proponents and Contractor	
				Use slow release fertilisers for landscaping and re-vegetation in line with the Project's landscaping plan.	Proponents and Contractor	The wetland management measures will specify monitoring requirements, specifically they will address monitoring (for physical, biological and chemical parameters) for wetlands in catchments A, C, D and E (refer to Figure 12.33 in the EIA). Monitoring will begin prior to construction.

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for Mitigation	Monitoring
Avifauna						
12.12.3	Impact of Displacement and Disturbance on Sensitive Bird Species	Night time light associated with construction and operations	Design, Construction and Operation	Design lighting strategies that address or minimise items such as degree of spill light, use of "up lights" and use of lights with red wavelengths. Down lighting is preferred as is lights with blue or green wavelengths.	Proponents and Contractor	
12.12.4	Disruption of Flyways and Migration Corridors	General construction and operational activities	Design and Construction	The construction of roads in wetland systems or through natural drainage routes will be avoided to the extent practical in order to keep water flow as close as possible to baseline conditions. In the event that this is not practicable, the following mitigation measures will be implemented. - Minimise and consolidate the number of crossings of natural drainage channels. - Minimise the width of roadways to that necessary for safe transport of personnel and equipment.	Contractor	
Mammals						
12.13.3	Impact of Mortality and Disturbances	Site clearance and vehicle movement	Construction	Where practical, construct roads that avoid areas of high sensitivity mammalian habitat (*Figure 12.42*). Where roads do cross these areas, implement measures to minimise mammal mortality.	Proponents and Contractor	
				Project site inductions will include information on protection of mammals.	Proponents and Contractor	
12.13.4	Habitat fragmentation and disruption of Natural Migration Patterns	Construction of roads, fences and other linear infrastructure	Design and Construction	Where roads and fences cross sensitive habitat, allow unhindered passage of mammals to the extent practical.	Contractor	
			Construction	Fences will be constructed in a systematic fashion, from the ocean inland in order to avoid entrapment within the fence line.	Contractor	
				Larger mammals trapped within the fence line will either be removed by a mammal expert/veterinarian trained in animal trapping and/or chemical immobilization (in the case of large predators, medium-size predators and larger ungulates). Culling is a last resort.	Contractor	
				Excavated trenches will be left open for as short a time as possible. They will have periodic breaks to allow animals to climb out. Where practical, the edges of trenches willbe raised slightly to create a barrier to prevent animals from running directly into the trench.	Contractor	Monitor open trenches for stranded animals.

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for mitigation	Monitoring
Socio-economics						
13.2	Physical and economic displacement	Loss of land and physical infrastructure Loss of collective natural resource areas Disruption of land-based economic livelihoods Disruption of marine-based economic livelihoods	Design, Construction and Operation	Develop and implement Resettlement Action Plan (RAP) to address permanent physical displacement and temporary economic displacement associated with Project activities in accordance with Mozambican legislative requirements and the Project's resettlement principles. This will include consultation, compensation, income restoration, support for relocation and re-establishment, special assistance for the vulnerable, procedures for monitoring/ evaluation and implementing corrective measures, support of continued fishing activities (inluding migrant fishers), assisting with identifying alternative routes. points of passage, and safe passage of carriers.	Proponents	Annual qualitative and quantiative audits and review of implementation progress
14.2	Physical and economic displacement	Disruption of marine-based livelihoods	Pre-construction	Undertake additional fisheries studies to deepend the Project's understanding of fisheries and implications for marine-based livelihoods. This infomration will inform inform the RAP process.	Proponents	
13.3	Impacts on tourism	Disruption of tourism activities	Design, Construction and Operation	• Ensure design minimises the visual intrusion of the development on tourism receptors. • Ongoing engagement with affected tourism operators and communicate parameters of safety exclusion zones, and community grievance mechanism	Proponents	
13.3	Impacts on tourism	Increased demand for accommodation and leisure establishments	Design, Construction and Operation	• Facilitate ongoing engagement between Government and private sector stakeholders regarding tourism, recreation and economic development opportunities for the region • Support tourism initiatives by encouraging Government investment of Project revenue into the Cabo Delgado Province, and specifically Palma District • Raise awareness internally among project staff on the available tourism facilities and excursions (including diving and fishing) in the area	Proponents	
13.4	Project Induced In-Migration (positive impact)	In-migration of people	Design, Construction and Operation	• Work with government/ NGOs/ donors to encourage revenue distribution to the Cabo Delgado Province and Palma District in support of regional and provincial government capacity building, governance, and civil society empowerment. • Facilitate representative local and regional development forums to identify development initiatives and potential implementing partners, driven by Provincial and District level development plans and objectives • Implement national content strategies	Proponents and Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for mitigation	Monitoring
13.4	Project Induced In-Migration	In-migration of people	Design, Construction and Operation	Develop a Project Induced In-migration Study from which will specify approriate mitigation measures including community liaison, capacity building, closed camp policy, traffic management, health services, and recruitment and selection practices.	Proponents and Contractor	
13.5	Health and safety of the workers and communities	Spread of communicable diseases	Design, Construction and Operation	• Implement environmental health programs to reduce the potential risk of airborne pollutants • Implement a TB management policy and program for the workforce (including contractors), including screening at recruitment, adequate referral/ support for on-going treatment • Implement a risk-based vaccination program for all employees, contractors, and visitors • Provide adequate housing to the workforce to avoid overcrowding	Proponents and Contractor	Develop and implement a health monitoring programme for workers and communities.
		Vecor related diseases	Design, Construction and Operation	• Develop a robust baseline of local malaria burden • Consider health systems strengthening (HSS) in the Palma District • Implement an integrated malaria and vector control management plan includes chemical or physical control programmes, case management and bite prevention awareness-raising	Proponents and Contractor	Review and audit of implementation of vector control programme including schedules, awareness raising records
		Soil, water and waste related diseases	Design, Construction and Operation	• Implement Project water and waste management plans • Develop and implement a RAP, including effective water and sanitation programs • Design effective wastewater and sewerage treatment • Undertake awareness raising among staff and communities on proper water use, hygiene, and sanitation • Provide sufficient potable water facilities at the worker camp	Proponents and Contractor	Evaluate opportunities to develop an effective surveillance system to monitor the impacts of water and sanitation conditions in partnership with the local authorities Conduct monitoring and surveillance activities to ensure water is potable
		Sexually-transmitted infections and high risk sexual practices, including HIV/aids	Design, Construction and Operation	• Operate a closed camp for workers • Update baseline on reproductive health and STI statisitics, knowledge, practices and behaviors in the Project area • Develop a clear HIV and STI management program in the workplace. Contractors will also be required to have awareness raising programmes. • Prevent the development of spontaneous camps or expansion of existing communities (camp-follower communities) by speculative migrants (see mitigation for PIIM) • Evaluate opportunities to support specific HSS activities in the district • Encourage widespread availability and social marketing of condoms in the workplace	Proponents and Contractor	Develop and implement a health monitoring programme for workers and communities.

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for mitigation	Monitoring
		Food and nutrition-related issues	Design, Construction and Operation	• Perform a baseline nutritional and micro-nutrient deficiency survey in the study area • Monitoring to track potential challenges related to food production and food security. • Consider supporting local awareness-raising programs in the surrounding communities (integrated with water and sanitation and malaria programs) • Support programs promoting improved farming techniques • Programmes in the workplace to promote proper feeding practices to prevent obesity and non-communicable diseases.	Proponents and Contractor	Develop and implement a health monitoring programme for workers and communities.
		Accidents/ injuries	Design, Construction and Operation	• Develop and effectively communicate a policy and Emergency Response Plan to communities • Mobile equipment and machinery will be included in the overall health and safety management plan, including requirements for driver fitness to work and medical surveillance • Strict enforcement of no drug and alcohol policy (including contractors) • Driver training, rest periods, vehicle roadworthiness, speeding as part of vehicle requirements (including contractors)	Proponents and Contractor	Develop and implement a health monitoring programme for workers and communities.
		Social Determinants of Health	Construction and Operations	• Effective RAP implementation • Evaluate opportunities for local development support for vulnerable groups • Clear communication with local communities of level of responsibility and expectations of the operator.	Proponents and Contractor	Develop and implement a health monitoring programme for workers and communities.
		Health care services and infrastructure Health programmes and systems	Design, Construction and Operation	• Engage and partner with the Ministry of Health and consider supporting access to health care services in the study area, including upgrading of Palma hospital to district hospital • Occupational Health and Safety Management Plan to include site-based medical service managed by a reputable medical service • Consider vulnerability of local health systems before recruiting medical staff recruitment.	Proponents and Contractor	Develop and implement a health monitoring programme for workers and communities.

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for mitigation	Monitoring
13.6	General economic impacts (positive impact)	Increased government revenue Employment, training and skills development Procurement of local goods and services Economic development and economic diversification	Design, Construction and Operation	• The Project will work alongside government, and the NGO and donor community throughout the life of the Project to encourage accountability and revenue distribution to provincial and district level government within the Project area. • the Project will facilitate ongoing engagement between relevant stakeholders to encourage revenue distribution to the Cabo Delgado Province and Palma District in support of regional and provincial government capacity building, governance, revenue management and civil society empowerment. • The Project will undertake a Revenue Management Study to better understand the Mozambican economy, encourage accountability and suggest means of increasing potential revenue distribution. • Develop a National Content Strategy consistent with discussions with government that will address measures to maximise local employment and procurement. Develop policies and procedures to support the strategy. Contractors will also be required to support and implement the national content strategy and policies/ procedures that support it. • Encourage transparency and accountability in the management of Project revenue used to support local development initiatives.	Proponents	
13.6	General economic impacts	Unmet expectations for local employment and procurement of goods and services	Design, Construction and Operation	Develop a National Content Strategy consistent with discussions with government that will address measures to maximise local employment and procurement. Develop policies and procedures to support the strategy. Contractors will also be required to support and implement the national content strategy and policies/ procedures that support it. The Stakeholder Engagement Plan s will be implemented to ensure fair recruitment from different communities. A Grievance Mechanism will be implemented to address community grievances around local employment and procurement.	Proponents	
13.7	Impacts to Shipping and Navigation: Risks of Collisions	Increased vessel movements in Palma Bay and futher offshore. Increased vessel movements in Palma Bay and further offshore resulting in disruption of commercial fishing activities	Construction and Operations	• All project vessels to operate in accordance with GIIP and compliance with national and international maritime legislation. • Conduct routine maintenance of navigation equipment and all navigation aids (buoys , lights) on all project vessels • Develop a Traffic and Transport Procedure (all Project phases) in liaison with the relveant maritime authority, including a Navigation Warning Scheme, schedule of vessel movements, speed limits as well as the size and duration of the exclusion zones • Engage and share information on Project activities and commercial fishing activities with relevant stakeholders, including the Maritime Authority • the Project will collaborate with Maritime Authorities to establish a grievance procedure for reporting grievances related to maritime activities through appropriate communication and engagement with relevant stakeholders	Proponents and Contractor	

EIA Ref	Risk/ Impact	Activity/ Aspect	Project Phase in which mitigation will be implemented	Mitigation/ Enhancement Measures	Responsibility for mitigation	Monitoring
13.7	Impacts to Shipping and Navigation	Impact of the Project Vessels and Activity on National and Regional Cabotage	Construction and Operations	• Develop a Traffic and Transport Procedure (all Project phases) in liaison with the relveant maritime authority, including a Navigation Warning Scheme, schedule of vessel movements, speed limits as well as the size and duration of the exclusion zones • Ensure dredging and construction vessels are equipped with navigation equipment and suitable aidsto minimise interference with other vessels and always maintain high visibility • Develop and use marine terminal systems, protocols and procedures aligned with national and international industry standards and maritime legislation. Revises these as operations change (eg increased LNG carrier traffic into the Export Terminal facilities) in collaboration with the Maritime Authority (INAMAR) and INAHINA • Ongoing engagement with shipping national and regional cabotage stakeholders regarding maritime activities, and to communicate specific Project information, eg exclusion zones. • the Project and INAMAR will develop mechanisms for regular Project communication regarding safety procedures.	Proponents and Contractor	
13.8 and 13.9	Impacts to Archaeology and Cultural Heritage	Onshore archaeology and cultural heritage sites	Construction	• Develop a Chance Finds Procedure in line with national laws and regulations, local customs and traditional norms and including training and awareness material, procedures for contractor reporting, and communicate this to local communities. The plan will outline strategies for liaising with communities in a culturally appropriate way, appointing an archaeologist during the construction phase, to train staff and contractors on the chance find procedure, including procedures for identification and relocation of possible significant finds. • The Project will investigate methods for commemorating any artefacts or sites identified, including erecting and maintaining a plaque with information on the sites • Undertake a detailed archaeological rescue investigation of Ngodje 1 (site 15) to determine future archaeological management of the site.	Proponents	
13.8 and 13.9	Impacts to Archaeology and Cultural Heritage	Offshore archaeology and cultural heritage sites	Construction	• Use an Autonomous Underwater Vehicle (AUV) or ROV to examine the seabed int he near shore and offshore prior to drilling or laying of the subsea infrastructure or pipelines to identify and where possible, avoid the cultural heritage artefact • Implement a Chance Finds Procedure, including mapping of the artefact, scanning and visual inspection • An experienced archaeologist will be engaged to advise and monitor on offshore construction activities and train staff/ contractors on chance finds procedure.	Proponents	

Annex E

Waste Management Plan

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ABBREVIATIONS

AMA1	Anadarko Moçambique Área 1, Lda
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMS	Environmental Management System
eni	Eni East Africa S.p.A
LNG	Liquefied Natural Gas
MARPOL	International Convention for the Prevention of Pollution from Ships
MSDS	Material Safety Data Sheets
OBMs	Oil Based Muds
OGP	International Association of Oil and Gas Producers
PPE	Personal Protective Equipment
WBMs	Water Based Muds
WEEE	Waste Electrical and Electronic Equipment
WMP	Waste Management Plan
WTN	Waste Transfer Note (Manifest)

E1 INTRODUCTION

E1.1 PURPOSE

This Waste Management Plan (WMP) has been developed to facilitate evaluation and assessment of the Liquefied Natural Gas (LNG) Project (the Project) impacts associated with the generation of waste and to outline how all wastes generated during all phases of the Project will be managed in accordance with Mozambican laws and regulations and recognised good international industry practice to the extent reasonable and the Project's general environmental and waste management policies. Since FEED has not been completed, there may be some changes to the Project design after the completion of the WMP. Therefore, the WMP makes certain 'conservative assumptions' regarding the waste to be generated, treated, stored and ultimately disposed of so that the resulting EIA will address an overestimation of the potential impacts. In all cases, FEED will investigate the optimal solutions for managing waste. As the Project details and specific elements of the design become more certain, the WMP will be revised or amended to reflect more precisely the actual methods of handling, storage, treatment and disposal of all waste streams.

E1.2 OBJECTIVES

The WMP is intended to achieve the following objectives:

- Minimize waste generation:
  - in all phases of the Project; and
  - through emphasis on the Waste Hierarchy illustrated in *Figure 1.1* and discussed in *Section E1.4*, which focuses on waste reduction, segregation, treatment, recycling and material reuse, to the extent reasonable.

- Minimize impacts to the environment from waste by:
  - ensuring appropriate treatment of wastes to reduce toxicity and/or volume; and
  - ensuring responsible disposal at authorised facilities.

- Ensure compliance with all applicable laws and regulations and this WMP by:
  - providing proper education and training on the WMP to all Project personnel and contractors;
  - auditing contractors for compliance with the WMP; and
  - including contractor management provisions in Project contracts.

E1.3 SCOPE

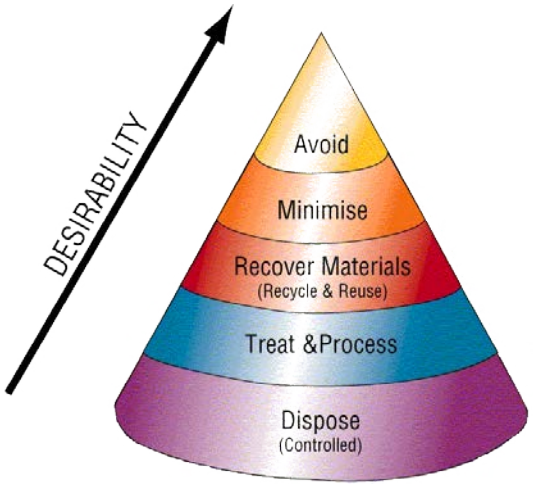
The WMP applies to the management of all wastes generated by the Project, including wastes generated during the construction (including but not limited to development drilling), operation and decommissioning phases.

E1.4 GENERAL PRINCIPLES

E1.4.1 Adoption of the Waste Hierarchy

Where reasonable and appropriate, waste management activities will be performed in accordance with the internationally recognised waste management hierarchy as shown in *Figure 1.1*.

Figure 1.1 Waste Management Hierarchy



In order of preference, the aim will be to:

- Reduce the amount of waste generated;
- Re-use materials, where appropriate;
- Recycle wastes, where appropriate;
- Recover as many materials as practical from the remaining waste;
- Treat wastes as necessary to render them less hazardous and/or to enable them to be reused or recycled; and
- Dispose of residual wastes responsibly at authorised facilities.

The application of the above principles will be addressed during the procurement of goods and services for the Project and will be taken into consideration when reviewing waste storage and disposal methods throughout the Project's life.

E1.4.2 Implementation

All wastes will be managed in accordance with the principles of the Waste Hierarchy. Project contracts will include the following requirements:

- Minimisation of waste generation at all stages of the contract;
- Preparation and implementation of a materials Reuse and Recycling Plan;
- All residual waste to be treated in order to reduce its toxicity and/or volume for subsequent disposal; and
- Treated waste to be disposed of at appropriate, authorised facilities.

E2 REGULATORY FRAMEWORK

E2.1 MOZAMBICAN LAWS AND REGULATIONS

For a comprehensive list of relevant Mozambican laws see *Chapter 2* of the EIA Report, but the main laws and regulations relating to the management of waste in Mozambique are as follows:

- Regulation on Waste Management, Decree 13/2006 of 15 June, published in the Boletim da República No. 24, 1st Series, of the 15 June 2006
- Regulation on Bio-Medical Waste Management, Decree No 8/2003, of 18th February 2003
- Environmental Law, Law No. 20/97, published in the Boletim da República No. 40, 1st Series, 3rd Supplement, of 7th October 1997

In addition, the following laws and regulations include provisions that are relevant to the management of Projects wastes:

- Environmental Regulations, Decree 18/2004 of 2 June, published in the Boletim da República No. 22, 1st Series, Supplement of the 2 June 2004.

- Petroleum Law No. 3/2001, of 21 February 2001, is published in the Boletim da República No. 8, 1st Series, Supplement, of 21st of February 2001.

- Petroleum Regulations, Decree No. 24/2004 is published in the Boletim da República No. 33, 1st Series, 2nd Supplement, of the 20 of August 2004.

- Law of the Sea (Law No. 4/96 of 4th January 1996, published in the Boletim da República No. 1, 1st Series, of the 4 of January 1996.

- Regulation for the Prevention of Pollution and Protection of the Marine and Coastal Environment, published in the Boletim da República N.º 48, 1st Series, Supplement of 30 November 2006.

E2.2 INTERNATIONAL GUIDANCE AND CONVENTIONS

A complete list of relevant international guidance and conventions are included in *Chapter 2*. The following international conventions and guidance relate to the management of the Project's waste:

- International Convention for the prevention of pollution from ships (MARPOL, 1973/1978), published in the Boletim da República No. 7, 1st Series, 3rd Supplement, of 25th February 20. The MARPOL convention places various restrictions and requirements on the disposal of waste from ships and to the marine environment.

- The Basel Convention, to which Mozambique has acceded, controls the movement, storage, transport, treatment, reuse, recycling, recovery and final disposal of hazardous waste as well as requiring producers of hazardous waste to dispose of their waste in an environmentally responsible manner close to where it is generated. Any transboundary movements of hazardous waste must be pre-notified to the authorities of the prospective States of import and transit. The movement may only proceed if and when all the States concerned have given their written consent to the movement.

- The Bamako Convention is supplementary to the Basel Convention and specifically covers the movement of hazardous waste into or between signatory African countries.

- The International Association of Oil and Gas Producers (OGP) Waste Management Guidelines provide advice and examples of good practice for how wastes from oil and gas exploration and production activities should be managed.

- IFC EHS Guidelines (General Guidelines and those specific to Oil and Gas and LNG developments).

E3 ROLES AND RESPONSIBILITIES

E3.1 RESPONSIBILITIES FOR WASTE MANAGEMENT

Table 3.1 summarises the responsibilities of different organisations with respect to the management of wastes generated by the Project.

Table 3.1 Waste Management Responsibilities

Organisation	Responsibilities
AMA1 and eni	• Ensure Project waste is managed in a manner consistent with Mozambican laws and the framework in this WMP • Development and custodianship of this WMP including: o collection, compilation and analysis of waste management performance statistics to ensure compliance; o driving continual improvements; o reporting, as required, internally to AMA1/eni management, as described in *Chapter 17* of the EIA Report; o communication of changes in the WMP to AMA1/eni Staff, contractors and Mozambique authorities, as required; and. o communication of waste management procedures to site personnel and contractors including provision of waste awareness training to site staff and contractors. • Preparation of contracts that include requirements to manage Project waste in accordance with this WMP (including requirements listed below) • Monitoring waste management performance of Project contractors by undertaking audits. o Ensure all Project waste management facilities (AMA1/eni owned or third party owned) are operated in accordance with licences ; and • Evaluate new waste treatment / disposal facilities as part of AMA1/eni commitment to continual improvement.
General Contractors	Ensure all wastes are managed in accordance with this WMP and Contract requirements including: • compliance with Mozambican and any other relevant legislative requirements; • development and implementation of Waste Minimisation and Management Plan and Reuse and Recycle Plan • store waste in accordance with this Plan (segregation, containers, labelling) • provide assurance to AMA1/eni that Project wastes are being properly managed and disposed through provision of waste generation and waste management data; and • training of staff in Project waste management procedures and requirements of this WMP.
Waste Management Contractors	• Manage wastes in accordance with Contract requirements • Manage all Project wastes in accordance with site authorisation or licence and Mozambican laws • Complete waste transfer notes and return a copy to AMA1/eni as evidence of receipt of Project wastes • Provide information and data to AMA1/eni regarding Project wastes managed • Allow AMA1/eni access to audit waste management facilities and operations

E3.2 TRAINING

All Project personnel (including contractors and subcontractors) will receive waste management awareness training as part of the site induction process. Toolbox talks, team briefings, safety meetings and periodic poster campaigns will be used to ensure an ongoing awareness of and compliance with correct waste management procedures as outlined herein.

The general waste management training discussed above, will be supplemented for certain personnel involved in waste treatment or disposal by additional waste management training provided by waste equipment suppliers, such as training in operation of the incinerators.

While wastes will be generated in each of the different phases of the Project and the estimations of the anticipated types and volumes of waste to be generated during each of these phases can be found in *Chapter 4* of the EIA Report (Project Description), the following addresses how these wastes will be managed and ultimately disposed of.

E4.1 WASTE IDENTIFICATION AND CLASSIFICATION

All wastes generated by the Project will be classified in accordance with the Mozambique Regulation on Waste Management (Decree No. 13/2006, dated June 15). Essentially this requires wastes to be classified as either hazardous or non-hazardous based on specific characteristics as listed in Appendix III of the decree, or as medical waste (based on its origin).

If any waste from an unidentified source is discovered, it will be treated as hazardous (taking a precautionary approach) until an investigation is carried out so as to enable the correct characterization and handling of the materials and a suitable management route identified (see below).

E4.1.1 Hazardous Wastes

Mozambican law defines hazardous wastes as wastes that can potentially be harmful to human health and/or could potentially damage the natural environment if not managed and disposed of appropriately. They include wastes which have any of the following characteristics:

- explosive;
- flammable;
- toxic;
- infectious;
- carcinogenic;
- radioactive;
- release flammable or toxic gases on contact with water; and
- organic peroxides and other Styron oxidants.

The full range of characteristics that define a waste as being "hazardous" may be found in Appendix III of Decree No. 13/2006.Despite being hazardous, several types of hazardous wastes can and should be recycled, to the extent practical (eg waste oils).

Naturally Occurring Radioactive Materials (NORM) originate in subsurface formations, and can be brought to the surface in formation water produced in conjunction with gas. Because the levels are typically so low, NORM in natural gas is typically not a problem unless it becomes concentrated. Produced waters may co-precipitate with barium sulfate scale or scale-bearing

sludge, forming coatings or sediment in oil field equipment, including pipes, casings, fittings, tanks and basins. These solids become sources of oil and gas NORM-contaminated equipment and waste.

Furthermore, accumulation of NORM in gas stream sections of plant might occur due to the deposition of lead-210 which is a decay product of radon-222 contained in the natural gas. NORM with relatively high concentration of lead-210 might be found in gas filters and sludge produced during pipeline pigging.

Periodic NORM monitoring is recommended at a minimum frequency of prior to major facility maintenance shutdowns. NORM can then be removed in during maintenance shutdown events. If NORM is found to consistently accumulate at hazardous levels, more frequent monitoring of selected equipment is recommended. At this time, it is assumed scale removal would be required for facility performance, and that the presence of NORM is not the driving factor. The scales together with any other radioactive waste will be managed in accordance with Mozambican law and good international industry practice. If there are no appropriately designed and operated facilities in Mozambique, any radioactive waste will be disposed of via an appropriately licensed third party waste management contractor.

E4.1.2 Bio-Medical Wastes

Mozambican law defines bio-medical waste as wastes resulting from human medical and veterinary activities of diagnosis, treatment and research, such as the waste that would originate from the Project clinic(s) which will be classified and managed according to the Regulation on Bio-Medical Waste Management, Decree No 8/2003, of 18th February. This Decree indicates how bio-medical waste should be separated, identified, stored, removed, transported and disposed of/treated.

Specifically, in accordance with the decree, bio-medical waste will be separated into the following types:

- infectious waste;
- "sharps" (needles, knives etc);
- anatomical waste;
- ordinary waste; and
- other sorts of waste.

E4.1.3 Non-hazardous Wastes

Non-hazardous wastes are those that do not exhibit any hazardous properties and are relatively low risk to human health and the environment. This includes a wide range of materials that may be recycled. Examples of non-hazardous wastes include domestic type wastes, such as food, packaging, plastics, various metals and wood.

It should be noted that some products are considered non-hazardous prior to their intended use (eg activated carbon or oil stained wood), however they may become hazardous wastes once used and may contain a range of hazardous chemicals or contaminants.

E4.1.4 Other Characteristics

For the purposes of managing the Project's different waste streams, it will be necessary to categorize wastes according to their disposal route. Examples of how some wastes may be categorized based on their disposal route are as follows:

- recyclable materials (hazardous and non-hazardous) may be recycled provided this can be done in a safe and environmentally sound manner (ie if appropriate facilities are available);
- non-hazardous combustible wastes and specific hazardous wastes may be incinerated;
- bio-medical wastes will be treated (e.g. disinfected), properly stored and eventually burned in an on-site incinerator;
- non-hazardous, non-combustible, wastes may be deposited at the Project landfill site;
- specific waste types (typically the more hazardous types of waste) may require specialized treatment and/or disposal. Some wastes may need to be stored temporarily while the most appropriate treatment or disposal facility is identified; and
- occasionally, and as a last resort, some waste for which an appropriate treatment and/or disposal option is not available in-country may have to be stored until authorized transboundary shipment for appropriate treatment or disposal can be arranged.

E4.2 PREFERRED MANAGEMENT ROUTES

A preliminary list of the types of waste the Project is expected to generate is presented in *Table 4.1* together with the provisional classification for each waste and its preferred management route(s). The range of wastes, together with individual classifications, will be reviewed and a revised WMP with project specific detailed information will be submitted prior to start of Project construction. Also, the management routes for the individual wastes will be reviewed and revised, as necessary, during the Project.

Table 4.1 Anticipated Waste Streams and Preferred Management Options

Waste stream	Origin/ Source	Estimated Quantities		Classification	Preferred treatment/ disposal options
		Construction (t)	Operation (t/year)[6]		
Drill cuttings - WBM	Offshore drilling	1950 per well [8]	-	Non-hazardous	Due to the absence of a riser system during the drilling of the uppermost portions of a well, drill cuttings and the WBMs will be discharged directly to the seabed
Drill cuttings - LTOBM	Offshore drilling	465 [8]	-	Hazardous	Removal of oil and discharge to sea [(1)] or sent to shore for treatment and disposal or for management by an appropriately licensed Third Party waste management contractor.
Drilling mud – WBM	Offshore drilling	1,800 per well [8]	-	Non - Hazardous	Due to the absence of a riser system during the drilling of the uppermost portions of a well, drill cuttings and the WBMs will be discharged directly to the seabed
Drilling mud - LTOBM	Offshore drilling	270 [8]	-	Hazardous	Recirculation and then waste mud is either returned to supplier for reconditioning and reuse or transferred to Third Party waste contractor
Oil-contaminated rags	Offshore drilling	6 [7]	-	Hazardous	Ship incineration Transfer to authorized wastes facilities (e.g. Muxara) Project Incinerator or Third Party contractor
Unused/out of date chemicals	Offshore drilling	3 [7]	-	Hazardous	Return unused portion to supplier Specialist treatment/hazardous landfill[(4)]
General solid waste	Offshore drilling (including support vessels)	1215	-	Non-hazardous	Project incineration (combustibles) Project landfill (non-combustibles) or Transfer to authorized wastes facilities (e.g. Muxara) or Third Party contractor
Wood or vegetation	Site clearance, wooden pallets from equipment shipments	185	-	Non-hazardous, combustible	Reuse/ Recycle Compost (smaller vegetation)
Inert wastes - concrete rubble, grit	Construction activities, demolition (after decommissioning),	5,000	-	Non-hazardous	Recycle (e.g. road construction) Project landfill

Waste stream	Origin/ Source	Estimated Quantities		Classification	Preferred treatment/ disposal options
		Construction (t)	Operation (t/year)[6]		
	sand blasting				
Containers (metal, plastic)	Supply of materials	295	4 [7]	Non-hazardous,	Clean & crush: reuse/recycle Project landfill
Process chemicals and reagents (including molecular sieve and alumina)	Feed gas dehydration, LNG process	-	45	Hazardous	Return unused portion to supplier Specialist treatment and/or stabilization/solidification/hazardous landfill(3)
Oil and sludge	LNG process, oil interceptors around site, vehicle maintenance	375	35	Hazardous	On site incineration or Third Party waste contractor
Activated Carbon	LNG process	-	4.4	Hazardous	Recycled (returned to supplier)/ On site incineration or Third Party waste contractor
Food waste	Accommodation areas, offices	6,600	82	Non-hazardous	Composting/On site incineration/Third Party contractor
	Offshore rigs and vessels	200 – 270	-	Non-hazardous	Maceration and disposal to sea
Miscellaneous combustible waste	Packaging, general waste	21 - 27(offshore) 480 (onshore)	8	Non-hazardous, combustible	On site incineration
Textiles	Accommodation areas, offices	21 - 27(offshore)	8	Non-hazardous	Recycling/ Project landfill/Third Party contractor
Paper and cardboard	Accommodation areas, offices	62 - 82(offshore) 3,500 (on-shore)	50	Non-hazardous	Recycling/ On site incineration/Third Party contractor
Plastics	Accommodation areas, offices	41 - 55 (offshore) 1,100 (on-shore)	16	Non-hazardous	Recycling/ Project landfill/Third Party contractor
Glass	Accommodation areas, offices	21 - 27 (offshore) 580 (on-shore)	8		Recycling/ Project landfill
Metals	Construction, maintenance, decommissioning	470 (offshore) 760 (on-shore)	8	Non-hazardous	Recycling
Miscellaneous non-combustible	Accommodation areas, offices	21 - 27 (offshore)	8	Non-hazardous	Project landfill
Kitchen oil / grease	Accommodation areas	4 - 6(offshore)	2	Non-hazardous	On site incineration, solidification and landfill
Printer cartridges	Offices	-	0.2	Hazardous	Recycling (return to supplier) Or hazardous landfill (Third Party contractors)

Waste stream	Origin/ Source	Estimated Quantities		Classification	Preferred treatment/ disposal options
		Construction (t)	Operation (t/year)[6]		
Hazardous wastes (e.g. small batteries, Fluorescent and sodium lamps)	Accommodation areas, offices	0.2 [7]	0.1	Hazardous	Specialist treatment/hazardous landfill (Third Party contractors)
Medical wastes	First aid/medical treatment centres	0.2 – 0.3(offshore) 10 (on-shore)	0.5	Biomedical	On site biomedical incineration, then landfill
Tyres	Vehicles	85	0.8	Non-hazardous, inert	Recycling/ Project landfill
Lead-acid batteries	Vehicles, mobile plant	20	0.8	Hazardous	Recycling/ Specialist treatment/hazardous landfill (Third Party contractors)
Waste oil	Vehicles, mobile plant	10 [7]	0.7	Hazardous	Recycling
Oil filters	Vehicles, mobile plant	8	0.1	Hazardous	On site incineration, hazardous landfill, or project landfill if non-hazardous
Air filters	Vehicles, mobile plant	100		Non-hazardous	On site incineration/ Project landfill
Welding rods	Construction	80	-	Non-hazardous	Project landfill
Paint, solvents	Construction/maintenance works	3 [7]	0.5	Hazardous	On site incineration/Third Party landfill
Hydrostatic test water	Pressure testing of pipelines	63,000	-	Non-hazardous	Settlement of solids via sedimentation pond and then discharge to sea (4)
Brine and filter backwash	Desalination Plant	7.8 million	540,000 – 815,000	Hazardous	On-site treatment and discharge to sea
Produced water	Gas wells	-	186,000	Hazardous	On-site treatment and discharge to sea
Process wastewater	LNG process	-	44,000	Hazardous	On-site treatment and discharge to sea
Stormwater run-off	Hardstanding areas around the Project site	(54,000 – potentially contaminated)	(35,000 – 70,000 potentially contaminated)	Non-hazardous or hazardous	Potentially contaminated stormwater treatment facility, discharge to sea
Sewage	Accommodation areas, offices	2.2 million [7]	30,000 – 130,000	Hazardous	On-site treatment
	Offshore rigs and vessels	60,000 – 80,000	-	Hazardous	Maceration/on-board treatment and discharge to sea
Sewage sludge	Sewage treatment	14,900	36 - 160	Hazardous	Incineration or Third Party landfill
Incinerator Ash	On-site incinerators	500	10	Non-hazardous	On site landfill (if classified as non-hazardous) or Third Party landfill (if hazardous)

Waste stream	Origin/ Source	Estimated Quantities		Classification	Preferred treatment/ disposal options
		Construction (t)	Operation (t/year)[6]		
Tank bottoms	Storage of oil	0.001 – 0.01% of volume of oil handled [9]		Hazardous	Incineration or Third Party waste contractor
Wastewater treatment tank bottoms	Sedimentation	800	100	Hazardous (to be confirmed)(5)	On site landfill (if classified as non-hazardous) or Third Party landfill (if hazardous)

Notes
(1) In compliance with discharge limits.
(2) Muxara is an existing AMA1 facility which manages exploration drilling wastes under current onshore EIA, EMP and WMP
(3) May require transport to more distant/international facilities
(4) The Marine Ecology Study considers potential impacts and mitigation measures associated with hydro test water.
(5) Depends on characterization of waste based on analytical testing
(6) m_3/year in the case of aqueous wastes
(7) ERM estimate based on similar projects
(8) Based on previous Anadarko drilling offshore Mozambique – (Impacto, 2008: Offshore Area 1 Volume II, Part A: Environmental Impact Study)
(9) USEPA, 2000: Crude Oil tank Bottoms and Oily Waste (http://www.epa.gov/osw/nonhaz/industrial/special/oil/tb.pdf)

Section E8 provides further details on specific treatment/disposal options.

E4.3 PROCEDURES FOR UNIDENTIFIED WASTE

Where materials of unknown type or composition are identified, they will be presumed to be hazardous waste until further investigation (which may include sampling) can be undertaken to provide sufficient information about the composition or origin of the material so as to enable a decision about its appropriate management.

If the material is determined to be waste and the risks have been assessed, the integrity of the storage container, if any, will be evaluated and the waste will be transferred to an appropriate management area within the nearest Project waste storage area where it can be properly managed and/or disposed of.

E5 WASTE MINIMISATION, REUSE AND RECYCLING

E5.1 WASTE MINIMISATION

At all stages of the Project, the first priority, in terms of waste management, will be to minimise the amount and toxicity of all waste streams generated. Waste reduction can be achieved by careful Project planning and design, as well as by ensuring the implementation of good site practices. Reducing the volume and toxicity of waste generated will reduce the potential impacts associated with the handling, storage, transport, treatment and disposal of the waste as well as reducing the amount of raw materials consumed.

Measures that will be implemented to reduce the amount and toxicity of waste that is generated include:

- during all phases of the Project, but especially during the planning and design phase, contractors will be required to verify that they have taken into consideration waste reduction techniques and strategies as part of their bid for purchasing and management;
- contractors will be required to have a Reuse/Recycle Plan for their portion of the Project work;
- all wastes will be segregated so as to minimize the volume of toxic waste by avoiding comingling of wastes; and
- where practicable, all materials will be ordered in bulk in reusable packaging that can be returned to the suppliers.

Tender documents and Contracts developed for the Project will include the above requirements. Contractors' proposals for minimising waste generation and proper management of waste will be key criteria used in the award of Project contracts.

E5.2 REUSE AND RECYCLING

For materials that have served their purpose and are destined to be waste or wastes which are unavoidable, the priority will be their proper segregation, containment, and storage until their reuse, recycle or return potential is determined. Wherever possible, unused or partially used materials which are surplus will be returned to the original suppliers.

There are local markets for some recyclable materials such as plastic, metals, and tyres. There may also be markets for paper and cardboard; however, there may not be suitable facilities for more complex materials such as dry cell batteries, lead acid batteries, computer or electronic waste and fluorescent light tubes. Due to the difficulty in locating proper recycling or disposal

options for these materials, where possible, they will be returned to the suppliers for recycling or proper disposal or stored until they can be properly transported out of the country (transboundary) to proper facilities.

E6 WASTE STORAGE/ONSITE HANDLING

E6.1 GENERAL

Hazardous and non-hazardous wastes will be stored in separate, designated, storage areas and incompatible wastes will be segregated so as to prevent inadvertent contact in the event of leakage from a container. Waste storage areas will be indicated on facility site plans. Wastes will be stored in a manner to prevent:

- contact with rain or stormwater (eg covered storage areas, as needed);
- accidental spillage or leakage;
- impact of accidental spillage or leakage;
- loss of container integrity from accidental collision, corrosion or weathering;
- theft by people (eg by provision of fencing and/or other security measures);
- scavenging by animals, pests and rodents; and
- spread of infectious diseases (eg from medical waste).

Containers used for storing wastes will be compatible with their contents and appropriate in terms of volume and shape (for filling/emptying the material that is being stored). Only containers in good condition will be utilised. Bungs and lids will be securely fastened or other forms of covering will be provided. Waste storage containers will also be clearly labelled, indicating the characteristics of the contents, date of containerising or packing, and data on toxicity and/or other potential hazards.

Storage of waste will be carried out in accordance with the material safety data sheet (MSDS) for each waste, in a designated area, with a suitable surface and a method to contain any leakage or contaminated runoff water. MSDS records will be kept at waste storage areas for all hazardous wastes being stored on site.

E6.2 NON-HAZARDOUS WASTES

All project sites/accommodation areas will have sufficient, clearly labelled containers for the waste types shown below.

Where feasible, non-hazardous wastes will be segregated into different types of waste in accordance with Decree No. 13/2006 as follows:

- paper and cardboard;
- plastic;
- glass;
- metal;
- rubbish;
- metal scrap;
- organic matter; and
- other.

Separate containers will be provided for collection of each of these waste types, as appropriate, at points where waste is generated.

The open burning (as opposed to incineration) of any waste at Project construction sites, permanent project sites or workers' accommodation camps will be prohibited apart from in special circumstances following risk assessment and approval by the Project.

E6.3 HAZARDOUS WASTES

Hazardous wastes will be handled and stored so as to avoid potentially dangerous incidents due to escape of the wastes or mixing of incompatible wastes and to ensure that hazardous wastes do not enter the non-hazardous waste stream.

Storage areas for hazardous wastes will be:

- clearly labelled and used solely for the storage of hazardous wastes;
- covered and enclosed on at least 3 sides;
- in the case of liquid wastes:
  - have an impermeable floor and bunding, of capacity to retain 110% of the volume of the largest container or 25% by volume of the chemical waste stored in that area, whichever is the greatest;
  - have adequate ventilation; and
- organised so that incompatible materials are appropriately segregated and kept adequately separated.

Containers used for the storage of hazardous wastes will:

- be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- display a label in Portuguese, English and other local languages, if applicable, to state clearly the nature of the waste, any hazards which it

may pose and contact numbers of persons that can provide additional information in the case of an emergency; and

- display the appropriate hazard warning symbol as specified in Appendix V of Decree 13/2006.

During the operation of the LNG facility, one or more centralised locations may be used for the accumulation of recyclable materials and specific hazardous wastes collected from around the site and the accommodation facilities to make the onward transport for recycling or treatment more cost effective.

E7 WASTE COLLECTION AND TRANSFER

E7.1 GENERAL

AMA1 and eni recognise that any waste generated during or as a result of the Project must be collected, handled and transferred safely and in accordance with legal requirements and the IFC guidelines, to the extent practical, whether this activity is conducted by AMA1/eni or a contractor.

All waste will be collected and transferred:

- only by persons or entities that are duly authorized by the government of Mozambique.

- in a manner that ensures materials are properly packaged for transportation and that all waste containers are appropriately labelled for storage and transportation purposes.

- using a system of signed waste transfer notes (see below) to document the details of each individual load of waste. Each transfer note (manifest) will provide a written description of the waste load that will enable anyone receiving the load to dispose of it or handle it safely.

  records will be maintained of all the Project wastes transferred from the Project sites – see *Section E9.2*.

Relevant MSDS sheets will accompany waste during transportation by road or sea.

E7.2 CONTAINERS AND LABELLING

Each waste container leaving a Project site will be:

- clearly labelled to describe the waste it contains. Any old labels or markings on the container (e.g. from its original use) will be completely removed or totally obscured to avoid confusion as to the contents of the container;
- in good condition and not leaking;
- appropriate to the waste it contains;
- appropriately sealed (eg with a lid or bung); and
- not emitting any harmful gases or generating heat.

E7.3 WASTE TRANSFER NOTE (MANIFEST) SYSTEM

In order to confirm the proper transport and transfer of each load of waste from the point of leaving the site until final disposal at an authorised facility, a

'waste transfer note' (WTN) system will be adopted. For each load of waste that leaves the site, a paper consignment / transfer note (form) will be completed that details exactly what the waste comprises in terms of type and quantity of waste. To ensure consistency, the general format required for Consignment Notes that need to accompany hazardous waste as specified in Decree 13/2006 will be adopted for all WTNs – see *Appendix A*.

A copy of the WTN will be retained at the Project site and the WTN will accompany the consignment of waste as it is transported. At each point that it is handed from one authorised handler to another, the person receiving the waste must sign the form to acknowledge safe receipt and the person handing over the waste will retain a copy. At the point of final treatment/disposal the form will be signed by an authorised person at the licensed facility and a copy of the form returned to the Project site as evidence of the safe receipt of the consignment at the intended final location. In accordance with Decree 13/2006, in the case of hazardous wastes, following receipt at the final treatment/disposal site, a copy of the WTN will be sent to the Ministry for the Coordination of Environmental Affairs and to its Provincial Directorate in Pemba.

E7.4 VEHICLES AND CONTRACTORS

Only waste contractors that can demonstrate they have the necessary authorisation from the Ministry for the Coordination of Environmental Affairs (MICOA) for transporting the particular type of waste will be considered for the transport of the Project's waste. The capability and track record of waste collectors will be assessed and may be confirmed with the regulatory agencies prior to the appointment of any contractors.

When a contractor collects waste from any of the Project sites, the collection vehicle will be checked to ensure that it is appropriately designed for the type of waste and containers to be transported (ie it is 'fit for purpose'), that it is carrying any necessary emergency equipment (eg spill containment kits) and that it is roadworthy and legally compliant (eg tyres in good condition and lights functioning). If not, waste will not be loaded onto the vehicle.

All waste will be suitably covered during transport to avoid windblown litter.

Contractors will be required to ensure that only qualified and trained drivers operate collection vehicles and to ensure that drivers have suitable documentation as evidence of their training. The driver's documentation will be checked when he collects the waste from the Project site and if there is any doubt about his qualifications or training, the driver will not be allowed to take the waste.

Those wastes which cannot be avoided, reused or recycled will be treated and/or disposed of in the most environmentally sound manner to minimise any potential human health and environmental impacts. Exact waste treatment and disposal methods will be determined as the Project design progresses and following an evaluation of different waste management options. The specific arrangements for the transport and disposal of the different waste types will be detailed in the finalised Waste Management Plan (WMP) at the end of the FEED.

E8.1 OFFSHORE WASTES

E8.1.1 Drill Muds and Cuttings

Drilling muds will be separated from the cuttings using shale shakers and returned to the drilling fluid system. The cuttings will then discharged to the sea unless site-specific drilling and cuttings dispersion modelling indicates unacceptable environmental impacts or the discharge limits, outlined below, cannot be met in which case the cuttings would be sent to shore for treatment and disposal or for management by an appropriately licensed Third Party waste management contractor.
The optimum alternative solution for the final disposal of cuttings will be further investigated and GIIP will be applied.

As a minimum, the Project will comply with the following for discharges greater than 12nm (approximately 22km) from shore:

- Maximum concentration of metals in barite:
  - Mercury 1mg/kg (dry weight)
  - Cadmium 3mg/kg (dry weight)

- Maximum oil concentration by weight of dry cuttings in accordance with GIIP.

- Maximum discharge rate of 1,000 bbls/hour.

Following the deterioration of recirculated muds, the waste muds are either returned to supplier for reconditioning and reuse or transferred to Third Party waste contractor.

E8.1.2 Sewage

Sewage from boats and vessels will be treated prior to discharge. Sewage discharges will be in compliance with all the applicable standards, regulations (national and international) and/or approval or authorization. Specifically, sewage will be treated/disinfected using an

approved process and discharged at a sufficiently low rate so as to cause no nuisance (floating solids, discoloration etc) or will be discharged at a distance greater than 12nm from land.

E8.1.3 Other Wastes

Other wastes generated at offshore from vessels will be disposed of in accordance with Annex V of MARPOL 73/78 (1) or, as appropriate, incinerated in on-ship incinerator using an incinerator that meets the MARPOL Standard Specification for Shipboard Incinerators (3). Specifically, only food waste that has been ground to a particle size of less than 25mm will be discharged to sea and only if the vessel or rig or is more than 12nm from shore. All other waste that cannot be properly discharged or incinerated will be stored and shipped to the Muxara facility, the Project Site or another authorized waste facility for recycle/reuse, treatment and/or disposal (2).

All on-board drilling wastes will be properly segregated and stored in appropriate, labelled, containers until they can be transported to shore. Different types of waste will be segregated and stored separately as discussed in *Section E6* to ensure that any recyclables are kept separate from other wastes and other wastes are segregated according to how they will be subsequently managed. Drilling wastes brought to shore that cannot be recycled will be transported to either Pemba/Muxara, the LNG Project Facility or other authorized waste facilities (dependent upon where the supply vessels are based) for treatment and/or disposal. In addition, some of the drilling wastes may be treated or disposed by an appropriately licensed Third Party waste management contractor. Waste and waste management impacts related the management of exploration drilling wastes at to the Pemba/Muxara facility have been addressed in the existing licensed Onshore EIAs and are covered by this site's EMP and WMP. The management of the additional development drilling wastes from the LNG Project at authorized wastes facilities (e.g. the Muxara Facility) is not expected to result in a significant net increase in the volume or type of wastes or impacts from the waste management currently being handled by such facility since by the time development drilling occurs it is expected that offshore exploration drilling will be completed or reduced.

E8.2 ONSHORE WASTES

E8.2.1 Sewage Treatment

Sewage and grey water from the accommodation camps and other Project sites will be collected and treated (see *Section E8.3.3*) before discharge to avoid impact to the surrounding areas. All discharges will be in compliance with all applicable standards, regulations (national and international) and/or approval or authorization. The condition of the sewage treatment system and

(1) International Maritime Organisation, MARPOL 73/78 Annex V - Prevention of Pollution by Garbage from Ships [www.imo.org]
(2) Marine Environment Protection Committee, Resolution MEPC 76(40)

tanks will be checked regularly and any accumulated sludge will be pumped out and dried. Dried sludge will be incinerated with other wastes using the on-site incinerator(s).

E8.2.2 Stormwater Management

Run off from the LNG processing areas will be directed to one or more internal collection systems. This potentially contaminated stormwater will be drained to the stormwater retention basin and inspected. If deemed acceptable, the water will be discharged directly into Palma Bay. If deemed unacceptable for discharge, the stormwater will be treated onsite prior to discharge into Palma Bay.

A regular cleaning and maintenance programme for all site drainage systems, sumps and/or oil interceptors will be implemented.

E8.2.3 Brine, Process Wastewater and Produced Water

Wastewater from the LNG process together with produced water from the MEG unit will be treated to meet all applicable standards, regulations (national and international) and/or approval or authorization and discharged into the bay together with brine from the desalinisation plant. This discharge will be subject to monitoring.

The optimum alternative solution for the management of effluent discharges will be further investigated during FEED.

E8.2.4 Co-discharge

Treated sewage effluent, process wastewater, produced water, desalination plant brine and stormwater runoff from the LNG process area will be co-mingled and discharged into the bay through a single discharge point (outfall). The quality of the effluent discharge will be in compliance with all standards, regulations (national and international) and/or approval or authorization.

E8.2.5 Other Wastes

Wastes that cannot be avoided, recycled/reused and which are not suitable for incineration or disposal at the Project landfill (see *Section E8.3*) will be temporarily and properly stored while an appropriate management route is identified.

Options for recycling materials, such as used engine oils and solvents will be investigated and, if necessary, these materials will be transported to an appropriate facility within Mozambique or, if necessary, properly exported to other countries that have authorized and suitable recycling facilities. Wastes which cannot be recycled will be stored until sufficient quantity has been accumulated to make export for treatment economic and environmentally

feasible. Any export of waste will be undertaken in full compliance with national and international legislation (eg Basel and Bamako Conventions).

The feasibility of composting food waste and any other biodegradable (organic) materials such as vegetation from site clearance and maintenance works will be investigated and facilities will be developed on the Afungi Project Site or a nearby location as appropriate.

E8.3 PROJECT WASTE MANAGEMENT FACILITIES

E8.3.1 Incinerators

During the construction phase containerised multi-purpose incinerators (see specifications in Chapter 4 of the EIA report) may be used for the treatment of non-hazardous combustible wastes as well as certain hazardous wastes. During the operational phase, the incineration capacity will be adjusted to cope with the ongoing rate of waste generation.

The incinerators will be procured from specialist manufacturers and will be designed to meet all applicable GIIP. In particular, they are likely to have a two stage combustion system to ensure efficient destruction of the waste and minimal emissions to air.

All necessary approvals and operating permits will be obtained from the MICOA for these facilities. The incinerators will selected to be capable of processing mixed residual domestic type wastes and small quantities of hazardous waste including oil impacted rags, oil filters, sludges, spill kits, paint cans and medical wastes. Incinerators will be specifically chosen to provide as much flexibility as possible in terms of the range of wastes that can be burned. They will be used for treating any combustible wastes that cannot be reused, recovered or recycled and which are compatible with the particular equipment and covered by the licence.

The incinerators will be operated in accordance with the manufacturer's procedures and will be maintained in accordance with the manufacturer's recommended maintenance schedules. All staff involved in operating the incinerators will be suitably qualified and appropriately trained. The incinerators will be specified to meet current international best practice and any Ministry permitting and emissions performance standards.

The potential impacts from the operation of multiple incinerators were evaluated based on the estimated volumes of waste to be incinerated. The number and size of incinerators that are used by the Project may be varied to provide flexibility to cope with variable amounts of waste that need to managed at different times but care will be taken not to exceed the assumed emissions.

While the Project anticipates that the bottom ash from the Project incinerator(s) will be non-hazardous, the bottom ash from the incinerators will

be analysed to determine whether it falls within the Mozambican definition of non-hazardous waste. If it is non-hazardous, it will be deposited at the Project landfill. If it is classified as hazardous it will be disposed of at a properly authorized Third party hazardous waste disposal facility.

E8.3.2 Project Landfill

Due to lack of adequate landfill /disposal facilities in the vicinity of the Project, it is likely that the Project will require the construction of at least one landfill designed to receive certain Project wastes. For the purpose of assessing potential impacts, it has been assumed that at least one non-hazardous landfill will be constructed on the Project Site. The precise design and specifications of the landfill will determined during FEED and submitted to MICOA for approval, as appropriate. The Project will attempt to minimize any potential environmental nuisance associated with the landfill. It will be designed and operated with appropriate environmental controls, including measures for pollution prevention of the underlying soil and groundwater and management of stormwater run-off.

The Project will apply to the MICOA for an appropriate authorization. The design, construction and operation criteria will take into consideration the requirements contained in Appendix 1 of Decree13/2006, to the extent they apply, and the conditions that may be applied by MICOA. The design, construction and operation of the landfill will be in accordance with GIIP.

E8.3.3 Wastewater and Sewage Treatment Facilities

Arrangements for the treatment of all the wastewater streams will be developed as part of the FEED. In the case of sewage treatment facilities, for example, proprietary and packaged systems are readily available if required. In each case the facilities will be designed to comply with Mozambican discharge standards and also international standards for such facilities.

E8.3.4 Other Waste Management Facilities

As noted above, Third Party contractors will be used for managing a range of wastes generated by the Project. During the FEED, a detailed review will be undertaken of the options for managing all of the anticipated waste streams and, if necessary, additional waste treatment or disposal facilities will be included in the overall Project design.

E9 WASTE TRACKING, DATA MANAGEMENT AND REPORTING

E9.1 WASTE TRACKING

As explained in *Section E7.3*, a waste tracking system will be implemented whereby a consignment or transfer note accompanies each load of waste that is transferred off site for disposal. This system, which will include a written or electronic acknowledgement from the final disposal point that the waste has been safely received and handled, will provide assurance that all wastes are being properly managed and disposed. In the event that a final disposal acknowledgement is not received for a particular load of waste, Anadarko will undertake an investigation to determine what has happened to the consignment of waste and will:

- track down the particular load and ensure it has been properly disposed or, if necessary, arrange for its proper disposal (if feasible); and

- identify the reasons why the tracking system/designated management arrangements failed and put in place measures to help ensure that a similar problem does not occur again.

A similar tracking system will be employed for transfer of waste from one Project site to another for disposal of wastes at the Project's own incinerators and landfill site with final disposal being formally recorded.

E9.2 WASTE REGISTER

The data on the quantities of the different types of waste that are generated at the Project sites and the treatment/disposal method that is used, as recorded on the waste transfer notes, will be collated and kept in a register or database. These records will be kept for a minimum of five years in accordance with the requirements of Decree 13/2006.

A designated member of staff will maintain the waste register (waste log) and copies of all consignment notes (WTNs) that have been produced from the site. The waste register will be maintained as an electronic database to facilitate analysis and it will also serve as an index for all WTN consignments. Hard copies of WTNs will be kept as back up evidence of the disposal of individual waste loads.

The Waste Register will include the following information:

- information on each waste stream;
- source of wastes (eg LNG plant, accommodation blocks, offices);
- detailed waste description;
- classification of waste (hazardous/non-hazardous);
- quantity (by mass or volume);

- disposal/treatment site;
- disposal/treatment method;
- unique WTN reference number;
- dates of transfer; and
- dates of receipt at disposal/treatment site.

E9.3 WASTE MANAGEMENT CONTRACTORS

Any waste management contractor employed by the Project will be required to keep records of the Project waste consignments that they have transported, treated or disposed for at least five years.

Audits will be conducted of all the waste contractors and waste disposal facilities:

- prior to using them for the first time – to ensure that they meet the Project's standards and expectations in terms of their environmental controls and health and safety standards; and

- at regular intervals thereafter – the frequency depending on the nature of wastes being handled and the results of previous audits.

Appendix A – Copy of Consignment Note for Transportation and Deposition of Hazardous Waste as Specified in Appendix VII of Decree 13/2006

Producer of Waste A	Company's Registration Number	

Name of the Institution :……..
Address:……
……..
Tel. No……Fax…… Telex No:……..

Name of waste……..Code of waste | **H** | | **Y** | |

Waste's main components……..

Type of waste

☐ Solid ☐ Sludge ☐ Liquid

Type of containers.

☐ Pallet container ☐ Drums ☐ Dustbin (25 l) ☐ Others (specify)……

Quantity (Kg)……
Name and address of final destination ……
Date of delivery……/……./……..

Signature of the person in charge,

_____

Transporter B	Company's Registration Number	

Name……
……..
Address……Tel……..Fax……
Driver's Name……Vehicle Number plate……

Provisional storage ☐ No ☐ Yes, address……
Date of Receipt ……/……./……I hereby confirm the signature of the driver……

Storage/treatment/reclamation/ deposition/operator of the facility C	Company's Registration Number	

Company's name……
…
Address……Tel……..Fax……..
Type of operation

☐ Storage ☐ Assembling ☐ Recovery ☐ Landfill ☐ Safe landfill

☐ Physical/Chemical treatment ☐ Incineration ☐ Others (specify)……
Received quantity……..
Receipt date……/……/……

Signature,

_____

Anadarko Moçambique Área 1, Lda

Annex F

Decommissioning and Rehabilitation Plan

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GLOSSARY

"Decommissioning" is the process by which options for the physical removal, of structures at the end of their working life are assessed and implemented, including dismantling, removal / recycling and disposal.

"Rehabilitation" is defined as the return of disturbed land or seabed to a stable and productive condition.

"Closure" is defined as the period after the end of commercial gas extraction and LNG processing. During this phase of the Project, decommissioning and rehabilitation activities are conducted, sometimes over a period of several years.

F1 DECOMMISSIONING AND REHABILITATION PLAN

F1.1 PURPOSE

This Decommissioning and Rehabilitation Plan (DRP) is a set of guidelines and actions aimed at ensuring that decommissioning and rehabilitation activities will be undertaken in a manner that minimizes environmental, health and safety and social (EHSS) risk. Some aspects of the DRP will be implemented during construction and operation as various disturbed areas are rehabilitated (1) but the bulk of the commitments in this plan will be implemented when operations cease.

In accordance with legislative requirements and in the light of the lengthy period of time between when the environmental permit is granted (or Project sanction) and decommissioning, the requirement for an updated detailed DRP is deferred until two years before closure and decommissioning activities are due to commence. This document should therefore be considered as a framework DRP.

F1.2 OBJECTIVES

The Plan is intended to achieve the following objectives:

- To comply with Mozambican legislative and regulatory requirements for a decommissioning and rehabilitation plan.
- To identify measures to rehabilitate land disturbed during construction and operation.
- To identify measures to rehabilitate land once the Project is decommissioned.
- To investigate possible measures to manage materials and waste arising (including any hazardous wastes) from decommissioning activities.

F1.3 SCOPE

This plan applies to the area of influence of the Liquefied Natural Gas (LNG) Project (hereinafter referred to as the "Project"). The area of influence for the decommissioning activities includes the onshore Project area (the LNG Facility and associated infrastructure) and the offshore Project area which encompasses the Golfinho, Prosperidade and Mamba Gas Fields (the subsea pipelines, wells, trees and manifolds).

(1) In many cases there are opportunities for progressive rehabilitation rather than all rehabilitation taking place at the same time after project closure.

F1.4 THE PROJECT PROPONENT

AMA1 and eni are joint proponents for the Project . Anadarko Moçambique Área 1, Lda (AMA1), a wholly-owned subsidiary of Anadarko Petroleum Corporation (APC), is a commercial entity duly registered under the Republic of Mozambique Laws. AMA1 holds exploration rights to explore, develop and produce natural gas reserves in Area 1 Offshore in the Rovuma Basin. Likewise, eni holds rights to explore and develop natural gas reserves in Area 4 of Rovuma Basin. eni East Africa S.p.A (eni) is an affiliate of eni S.p.A., an Italian company and has a branch in Mozambique with offices in Maputo and Pemba.

These areas are positioned adjacent to one another and a number of gas reservoirs or gas fields have been discovered within each of the areas. The Proponents will develop these reserves in compliance with the applicable Mozambican laws and regulations.

F1.5 ENVIRONMENTAL CONSULTANT

The Project has commissioned ERM Southern Africa (Pty) Ltd in association with Impacto, Projectos e Estudos Ambientais Lda (Impacto) to undertake an Environmental Impact Assessment (EIA) for the LNG Project which includes the requirement for a DRP.

F1.5.1 Project Management Team

The key Project Management Team responsible for the management of the EIA process is outlined in *Table 1.1*.

Table 1.1 Project Management Team

Role	Name	Organisation
Partner in Charge	Andrew Bradbury	ERM
Partner in Charge	Antonio Emilio Leite Couto	Impacto
Project Manager	Kamal Govender	ERM
Assistant Project Manager	Uke Overvest	Impacto
Assistant Project Manager	Isobel Evans	ERM
Assistant Project Manager	Chris Zeisloft	ERM

F2.1 MOZAMBICAN LEGAL FRAMEWORK

F2.1.1 Overview

As discussed in *Chapter 2* of this EIA Report, the Project will comply with Mozambican regulatory requirements specific for petroleum (oil and gas) operations; including:

- Petroleum Law (Law no. 3/2001 of 21 February);
- Regulations on Petroleum Operations (Decree no. 24/2004 of 20 August);
- Environmental Regulations for Petroleum Operations (Decree no. 56/2010 of 22 November);and
- Regulation for the Licensing of Petroleum Installations and Activities (Ministerial Diploma no. 272/2009 of 30 December).

The preparation of a Rehabilitation and Decommissioning Plan is a requirement of each of these legal documents. The Project will undertake all activities in accordance with the applicable Mozambican legislation. The specific requirements are set out below.

Petroleum Law- Law no. 3/2001 of 21 February

> Article 17e) of the Petroleum Law requires the proponent to '*submit a Decommissioning Plan to the competent entity, not later than two years before the planned termination of production*'. Under the Petroleum Law, a decommissioning plan is defined as: '*A plan for the closure of Petroleum Operations including the removal and disposal of all installations*'.
>
> The Law does not detail the requirements for rehabilitation, however in Article 23.1e) it states that operators must: '*Clean up the sites after the closure of Petroleum Operations and comply with the environmental restoration requirements*'.

Regulation of Petroleum Operations- Decree no. 24/2004 of 24 August

Article 25.2d) of the Regulation of Petroleum Operations states that the operator must submit a 'Decommissioning Plan' to the Minister with authority over the petroleum industry. Furthermore, according to Article 24 of the same Decree, the same Minister has powers to approve such a plan.

The decree regulates both the removal of installations (primarily concerning safety of navigation and other use of the sea) and disposal of materials from decommissioned infrastructure (primarily aimed at pollution prevention).

Article 32 of the Regulation of Petroleum Operations refers that '*a detailed Decommissioning Plan shall be prepared in consultation with the National Petroleum Institute, and submitted, no less than 2 years prior to the date on which production operations are expected to cease, for the approval of the Minister with the authority over the petroleum industry*'. The following items should be included in the update to the DRP two years before closure:

a) *'Tail-end production schedules and the economic threshold for termination of operations;*
b) *Alternatives for continuing Petroleum Operations;*
c) *Further use or subsequent disposal of facilities;*
d) *Plans for plugging and abandonment of production wells;*
e) *Schedule for decommissioning activities and description of equipment needed for the restoration of land sites and/or seabed;*
f) *Inventory of dangerous material and chemicals existent in the facilities and plans for their removal;*
g) *Evaluation of environmental impact of termination and abandonment activities'.*

Environmental Regulations for Petroleum Operations- Decree no. 56/2010 of 22 November

A Rehabilitation and Decommissioning Plan (DRP) is a requirement of the Environmental Regulations for Petroleum Operations. According to Article 14 of this Decree, the DRP (which should be submitted with the EIA Report) should contain at least the following:

a) *'Identification and professional domicile of the proponent;*
b) *Identification of the environmental consultant registered or certified by the EIA Authority, as well as the team responsible for the prospective drafting of the EIS and their respective functions;*
c) *Non-technical summary in respect of the main issues considered, conclusions and proposals;*
d) *A description of the effects which removal, collection, disposal and decommissioning activities may have on the environment and commercial aspects in the Area of Influence;*
e) *Description of the working methods and techniques for carrying out discharges and emissions related to the disposal of substances harmful to the Environment, in order to cure or attenuate any damage or negative effect;*
f) *Description of the Areas of Influence;*
g) *Description of the techniques for preventing hazards to human life and to the marine environment in the case of decommissioning of offshore facilities;*
h) *Description of the treatment and disposal to be given to chemical and hazardous materials to be found in the facilities; and*
i) *Restoration of the area and possible future uses'.*

Regulation for the Licensing of Petroleum Installations and Activities - Ministerial Diploma no. 272/2009 of 30 December

A Decommissioning License is required for the decommissioning of petroleum infrastructure under the Regulation for the Licensing of Petroleum

Installations and Activities. The license is granted by a competent entity for the licensing of petroleum installations. This entitles its holder to initiate the closure of its activities, removal or re-use of the petroleum installations and restoration of the sites which were affected by or at which petroleum operations were carried out.

In accordance with Chapter IV of this Ministerial Diploma, an application must be addressed to the President of the National Institute of Petroleum 120 days prior to the commencement of demobilisation activities and must include an approved decommissioning plan which considers alternatives assessed.

F2.2 INTERNATIONAL CONVENTIONS, STANDARDS AND GUIDELINES

The process of decommissioning is also regulated by international conventions to which Mozambique is a signatory. There is a framework of international conventions which, in turn, influence national legislative requirements.

The primary conventions concerned are UNCLOS, the United Nations Convention on the Law of the Seas, 1982 and the 1972 London Convention (and the subsequent 1996 Protocol). In addition, various international organisations including the International Maritime Organisation (IMO) and the International Association of Oil & Gas Producers (OGP) set standards and guidelines for the removal of offshore installations worldwide. These are further detailed in *Table 2.1*.

Table 2.1 Key International Conventions and Organisations, Decommissioning

International Conventions	
the United Nations Convention on the Law of the Seas, 1982 (UNCLOS)	Article 5.5 of the United Nations Convention on the Continental Shelf 1958 states that: *'Any installations which are abandoned or disused must be entirely removed'*, however this was revised by the requirement of Article 60(3) of UNCLOS 1982 (1) which states: *'Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations of structures not entirely removed.'*
London Convention, 1972	The 1972 London Convention (and the subsequent 1996 Protocol) made the provision of generic guidance for any wastes that can be dumped at sea. New guidelines were adopted in 2000, to specify different classes of waste, including platforms and other man-made waste.
Organisations	

(1) http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf

International Conventions	
International Maritime Organisation (IMO)	The International Maritime Organisation (IMO), headquartered in London, sets out guidelines and minimum global standards for the removal of offshore installations. The IMO published guidelines and standards in 1989 addressing the decommissioning of oil and gas facilities (excluding pipelines), which served to effectively establish the agency as the competent international organization within the context of UNCLOS. The guidelines cover a range of areas, including those associated with the removal of offshore installations, and the circumstances in which all or part of an installation may remain on the sea-bed. While the 1989 guidelines are influential, they are non-binding legal principles unless otherwise given effect by member states in their national legislation, or through some other mechanism (eg, regional conventions).
International Oil & Gas Producers Association (OGP)	The OGP have established a Decommissioning Committee to address the challenges of handling offshore structures in a safe, environmentally protective and cost-efficient manner, taking into account prevailing regulatory requirements. The Committee aims to establish programmes to study environmental consequences of decommissioning, technology development, the sharing of best practices and benchmarking.

F3 DECOMISSIONING AND REHABILITATION ACTIVITIES

F3.1 OVERVIEW

The construction and operation of the LNG Facility and associated infrastructure will require removal of vegetation, disturbance of seabed and consequent loss or impact to terrestrial and marine habitats, flora and fauna as assessed in *Chapters 11* to *14* of the EIA Report. Thus, it is important to undertake rehabilitation activities during the life of the Project and at the end of the Project's life span.

Decommissioning will be carried out in compliance with the relevant national legislation and international guidelines and standards, and will be in compliance with Project policies. Areas can also be decommissioned during the operational phase when particular infrastructure is no longer required for the development, eg when a well has been exhausted.

In certain circumstances infrastructure judged pertinent for the development of the district and province may be left *in-situ* rather than being dismantled, for example this may include buildings or jetty infrastructure which local communities may want to use. This will be reviewed on a case by case basis and agreed with the Ministry responsible for approving the DRP and granting a decommissioning permit. The Project will review and update this plan at two years before closure.

These proposed decommissioning activities are discussed further below with suggested measures for rehabilitation of the affected areas both onshore and offshore.

F3.2 POTENTIAL ENVIRONMENTAL OR SOCIAL RISKS

The decommissioning and closure phase of the Project can present some environmental or social risks including:

- Release of hazardous materials or wastes into the environment.
- Health and safety risks associated with demolition activities and/or poor rehabilitation (open pits, hazardous material or equipment).
- Release of untreated effluents into the environment.
- Pollution of adjacent wetlands.
- Further disturbance to terrestrial and marine habitats.
- Potential risks to fisheries.

- Visual impacts associated with a poorly rehabilitated site.

The following sections describe how these risks will be eliminated or minimised.

F3.3 PREPARATION FOR DECOMMISSIONING AND GENERAL PRINCIPLES

Decommissioning procedures will generally entail the following activities:

- Operating processes both onshore and offshore will be systematically shut down in a safe manner.

- Liquids and wastes will be removed for treatment and disposal. This includes flushing and cleaning all pipelines (onshore and offshore) and tanks to remove hydrocarbons.

- Treatment and disposal of all hazardous materials or wastes (to be detailed when this plan is updated two years before closure when there will be a greater understanding of types and volumes of hazardous substances).

- The fate of the emptied and cleaned structures and equipment will be decided taking into account the best international practices of the oil and gas sector as well as national legislation at the time of decommissioning; recycling will be considered to the maximum extent possible.

Principles for rehabilitation or decommissioning of onshore facilities include:

- Plan the abandonment of facilities in consultation with statutory authorities, local community and other interested parties.

- Consult with local authorities and communities to determine which infrastructure can remain. Possible conflicts between local, district and provincial interests regarding the use of the rehabilitated roads will be solved by the competent Government authorities.

- Where required, formally transfer responsibility (for maintenance and legal compliance) for remaining infrastructure and facilities to identified third parties. Verify the recipient of any infrastructure is properly instructed in the safe operating methods and appropriate maintenance of the equipment.

- Consider the social/community implications when decommissioning.

- Identify suitable waste treatment, recycling and disposal sites for the equipment and materials that are dismantled;

- No equipment should be left or abandoned on site without the express approval of the relevant regulatory authorities and affected landholders.

- Surface infrastructure shall be incorporated into the final landscape through de-compaction, shaping, levelling, dressing with topsoil and vegetating with indigenous species. Where appropriate, a flora specialist should be employed to assist to planning for re-vegetation.

- The promotion of re-vegetation should be done through the encouragement of the natural secondary succession process. The accumulated reserves of surface soil should be introduced again in the cleaned area in the correct order and the original surface contours of the site should be re-created as far as possible. Any areas where surface vegetation has not been removed but has been compacted should be ploughed to allow the establishment of pioneer vegetation.

- Remove any alien/exotic vegetation.

- Any waste disposal facilities (if applicable) shall be reclaimed.

For near shore and offshore facilities, early planning for decommissioning is required to determine regulatory requirements and potential community use. Considerations to be taken into account prior to decommissioning activities include:

- Needs and views of other marine/resource users, natural resource managers and affected community groups.

- Current and likely future values and uses of the area.

- Potential to reuse or recycle material and equipment before considering disposal.

F3.4 NEAR SHORE AND OFFSHORE DECOMMISSIONING AND REHABILITATION

The general objective of the decommissioning process is to carry out the partial or total dismantling of the gas field infrastructure. The gas fields will be progressively decommissioned and rehabilitated as core exploration, appraisal and production wells and associated infrastructure are no longer required.

Currently it is envisaged that typical decommissioning of the subsea system would encompass flushing the pipelines and umbilical tubes clean, removing subsea manifolds and plugging the wells and retrieving the subsea tree and jumpers. As many components as possible, particularly metal fittings, would be retrieved for reuse or recycling. The pipelines and umbilicals will be capped and left *in-situ* on the seabed. They will be secured to prevent them from being shifted by currents on the seabed and damage benthos (or become a hazard to navigation). Flexibles would be retrieved for disposal to landfill.

Notices to mariners would warn vessels to avoid the area during decommissioning.

The potential for reuse of the pipeline in connection with further hydrocarbon developments should be considered before decommissioning. If reuse is considered viable, suitable and sufficient maintenance of the pipeline must be detailed. This will avoid additional disturbance to the seabed thus considered to reduce negative impacts associated with decommissioning activities.

Wells will be cased, plugged, sealed and abandoned in accordance with industry standards and regulatory requirements. All waste materials and equipment generated from decommissioning will be managed in accordance with the waste management plan.

Near shore and offshore installations and structures will be addressed as follows(1):

- Remove structures which may snag or entangle fishing gear or anchors.
- Remove structures which may present a collision hazard to shipping.
- Removal to be performed in such a way as to minimize any adverse impacts on navigation or the marine environment.
- Where structures remain above sea level, develop plans for their maintenance.
- Verify that all structures not completely removed are brought to the attention of the appropriate authorities to be recorded on nautical charts.

Rehabilitation of the seabed is not envisaged at this stage.

F3.5 ONSHORE DECOMMISSIONING AND REHABILITATION

For the onshore infrastructure, decommissioning entails demolition of buildings, removal of infrastructure, rehabilitation and re-vegetation. Decommissioning and demolition will also be influenced by the needs of local communities. Where buildings or infrastructure (eg roads or buildings) can be used by local communities, they will be left intact in agreement with the District authorities. All other infrastructure will be demolished and removed. All areas disturbed by the Project will be rehabilitated to a stable landform with a self-sustaining vegetation cover, with progressive rehabilitation commencing within one year of when areas become available for rehabilitation purposes. The land will be shaped, scarified and re-vegetated as appropriate.

(1) These provisions are based on the Australian Petroleum Production and Exploration Association (APPEA Code of Environmental Practice, 1996) which are in turn based on the IMO Guidelines and Standards for the Removal of Offshore Installations and Structures.

F3.5.1 Surface and Subsurface Infrastructure

Surface and subsurface infrastructure will be addressed as follows:

- Areas disturbed during the construction phase that are no longer needed for operational phase activities will be scarified, shaped and re-vegetated during the operational phase; ie disturbed areas will be rehabilitated progressively.

- The feasibility of possible transfer of fixed assets with beneficial reuse to third parties will be considered.

- Surface infrastructure that has no beneficial reuse potential will be decommissioned and dismantled.

- Any wells (cased boreholes) for drinking water will be closed and sealed, with the exception of some which will be used for monitoring the ground water per and post decommissioning. A formal request will be made to the local authorities to allow any monitoring boreholes to remain post decommissioning.

- Demolition waste will be removed and disposed of at an appropriate, authorised waste disposal facility.

- Areas from which infrastructure has been removed will be shaped, levelled and re-vegetated. Hydrologists and surface water ecologists will inform shaping and contouring plans.

- Pipelines may be left in place or, if they are above ground and interfere with human activities, removed for reuse, recycling or disposal. Pipelines left in place will be disconnected and isolated from all potential sources of hydrocarbons and sealed.

- All litter, parts and equipment will be removed and disposed of at approved disposal sites.

- All machinery will be disassembled and removed from the site.

- Access roads and airstrips of no further use will be stripped as required, however consideration will firstly be given to whether these will be useful for the district or region.

- Contour banks and energy dissipating structures will be constructed as necessary to protect disturbed areas from erosion prior to stabilisation.

- Disturbed areas will be re-contoured to approximate pre-existing contours and natural drainage restored as far as possible.

- Compacted areas will be scarified to promote rainwater infiltration.

- An appropriate seeding program will be undertaken (as agreed with the regulatory authority).

- Indigenous species compatible with the surrounding habitat will be used for re-vegetation.

- Storm water and drainage infrastructure associated with the storm water drainage channels and drains will be removed and disposed of

- Channels and drains will be shaped to smooth slopes and integrate into the natural drainage pattern.

- The transfer of roads to third parties for future use and maintenance will be considered.

- Access roads with no beneficial reuse potential will be removed by deep ripping, shaping and levelling after the removal and disposal of any culverts, drains, ditches and/or other infrastructure. Any removal process will restore the natural drainage pattern as far as possible.

There is potential for land to be contaminated by hydrocarbons, sewage or general wastes. Sites contaminated by operational activities will be identified, contained and managed during the operational phase. A contaminated land assessment will be conducted upon decommissioning and any hazardous materials or wastes will be removed for the site or remediated in accordance with Mozambican legislation and good industry practice.

F3.6 SOCIOECONOMIC CONSIDERATIONS FOR DECOMMISSIONING

Significant positive employment and economic benefits are expected as a result of the Project, including:

- Creation of significant direct and induced employment during the life of the LNG Facility.

- Stimulation of local business.

- Decreased social vulnerability and increased household income due to employment.

- Significant contribution of the Project to the Mozambican Gross Domestic Product (GDP) locally and nationally.

The closure of any major project can present socioeconomic challenges for the local community. For example, loss of direct or indirect local business and work opportunities due to end of the Project operations can lead to increased unemployment and secondary negative economic impacts. Therefore the Final DRP will consider the potential effects resulting from Project

decommissioning and identify measures to minimise these are far as practically and economically viable. For example, working closely with the local communities to reduce the negative impacts associated with employee termination during the operational phase by:

- Building community capacity to manage opportunities and impacts arising from the operational, decommissioning and post-decommissioning phases of the Project.

- Providing capacity building and training aimed at diversifying local skills beyond construction and operational activities.

- Providing training to build local skills tailored to Project decommissioning and post-decommissioning activities (equipment dismantling, rehabilitation activities, monitoring, etc). This will promote local communities (local labour) benefits from some employment opportunities created during decommissioning and post-decommissioning phases.

- Provide training to transfer Project-learned skills to alternative and secondary industries tailored to respond to market economy.

The Project will confirm that the Final DRP considers the potential future uses for the Project area and that these have been identified through discussions with the local authorities.

F3.7 POST-CLOSURE MONITORING, AUDITING AND REPORTING

F3.7.1 Post-Closure Monitoring

Following decommissioning and rehabilitation activities, a suitable monitoring program will be developed and submitted to the relevant Ministry with the final DRP for approval.

The monitoring programme will include review of all decommissioning activities along with monitoring around vegetation growth, erosion and groundwater quality post closure. Monitoring of vegetation growth shall be undertaken at regular intervals with each area that has been re-vegetated. For the onshore rehabilitated areas, the monitoring programme will comprise mainly a photo register of the regeneration status of the vegetation at regular periods (but at least two seasons per year). The programme would allow the verification of the regeneration process and the implementation of alternative measures such as planting and use of mulch wherever deemed necessary.

Monitoring may include an assessment of the following:

- Species abundance and basal cover.
- An estimation of biomass yield.
- An index of plant species diversity within the rehabilitated plant community.

Rehabilitated areas will be inspected annually to identify:

- Occurrence of surface erosion.
- Vegetation die-back.
- Contamination (physical or chemical) of the soil surface and water bodies.
- Fertility status of rehabilitated land.
- The emergence of alien/exotic vegetation.

F3.7.2 Reporting and Auditing

Although reporting is not mandatory according to the Petroleum Law and Regulations or by the Environmental Regulations for Petroleum Operations, annual environmental reporting to MICOA and other relevant departments is proposed to continue for at least three years post- decommissioning.

In addition, in accordance with the Regulation for the Licensing of Petroleum Installations and Activities - Ministerial Diploma no. 272/2009 of 30 December, the National Institute of Petroleum shall audit the decommissioning activities until the rehabilitation is complete.

This DRP presents the likely activities to be undertaken by the Project for decommissioning, and rehabilitation of all the areas affected by the LNG Facility and associated onshore, near shore and offshore infrastructure. This DRP will be updated in conjunction with regulatory agencies at least two years prior to closure in accordance with Mozambican legislation. Decommissioning and Rehabilitation activities will not commence until a Decommissioning Licence is granted.

The updating process for the decommissioning and rehabilitation planning shall include the following activities:

- Review of current industry good practice on decommissioning
- Liaison with Mozambican regulators;
- Identification of key environmental, safety and socioeconomic concerns;
- Risk ranking of these concerns;
- Undertaking additional work to consider the feasibility of decommissioning and rehabilitation options if required;
- Identification of key stakeholders and engagement with them around the DRP; and
- Preparation of the Final DRP.

The process leading to approval of a DRP by the relevant Ministry should be transparent and subject to public consultation.

Anadarko Moçambique Área 1, Lda

Annex G

Baseline Support Material

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G1 SOCIAL BASELINE

G1.1 INTRODUCTION AND STRUCTURE

This annex provides additional socioeconomic information to support *Chapter 9* of the EIA Report. It is structured into three sections as follows:

- *Section G1.2: Background of Administrative and Political Organization in Palma District*
- *Section G1.3: Fisheries Sector Policy and Strategies*
- *Section G1.4: Additional Socioeconomic Data*

G1.2 BACKGROUND OF ADMINISTRATIVE AND POLITICAL ORGANIZATION IN PALMA DISTRICT

G1.2.1 *Administrative Organisation in Palma District*

After the Peace Agreements of 1992 in Mozambique, the State started the process of decentralising the competencies and operations of State bodies to the local level and reinforcing their links with the community authorities.

This process was implemented after 2000, when the State defined the principles and standards of organisation, competencies and operations of the State bodies at local level, recognising traditional leaders as community authorities as well as recognising other parties from modern and traditional society as community authorities. For example "*Secretaries of the districts and villages and other legitimised leaders … who play some economic, social, religious, or cultural role as accepted by the social groups to which they belong*" (1). Community authorities may be of 1st, 2nd or 3rd level, depending on the geographical area of intervention (2).

Other parties have been incorporated into the decentralisation process, assuming delegated responsibilities, including:

- Local Forums (structure of the civil society at the District or Administrative Post level);
- Consulting Councils (at the District, Administrative Post, and Locality level); and

(1) The three main instruments are (1) Decree No. 15/2000, which defines the integration between the local State bodies and the community authorities, (2) the Ministerial Diploma 107-A/2000, which establishes the respective regulation, and (3) the Guião das Instituições de Participação e Consulta Comunitária (IPCCs: Guide for Community Participation and Consulting Institutions) published by the Diploma dated October 13, 2003 by Ministro da Administração Estatal e do Plano e Finanças (Minister of State Administration and Planning and Finances), BR No. 42, I Series, October 15, 2003.
(2) The first level is occupied by community leaders whose responsibility is within a wider area of the district (sometimes more than the area of a locality or of an administrative post), while the third level refer to leaders acting at the lowest level of a village or a neighbourhood).

- Community Councils or Committees (generally at the level of a village or groups of villages).

The term 'community' is often used to designate a village or a group of villages. At community level, authority is exercised by 'community authorities', which may be the Village Secretary, Neighbourhood Secretary or for a group of ten houses, the Village Leader, the Régulo (traditional leader), or his or her representatives

In Palma District, the position of traditional leader (the Régulo) is no longer in existence or observed. The position of the Régulo dates back to the customary society, where the position was acquired through heredity and belonging to a specific lineage and clan. Thus, position of the Régulo is conferred upon by a blood link with the group recognised as the traditional leadership and descendant from a person acknowledged as being the founder of the lineage or clan.

Today, village leadership within the Palma District is assumed by a Village Leader elected by the community of the respective village and endorsed by an Assistant and a Notary (registrar), recognized and legitimised by State bodies at District level (1). This dates back to the recent historical events in Mozambique and Palma District in particular, as described below (2).

G1.2.2 Political Organisation and Historical Context

The war of independence led by the Frente de Libertação de Moçambique (Frelimo Mozambique Liberation Front (referred to as Frelimo)) against the Portuguese army and its colonial rule began in the Cabo Delgado and Niassa provinces. Strongly supported by the rural population, Frelimo established in parts of the Cabo Delgado Province, installing its own administration inspired by the ideals of socialism, referring to these areas as 'liberated areas'.

After Independence, the Frelimo-led government chose socialism inspired by Marxist-Leninist ideology, with an economy based on central planning. Within the project of building a 'modern' post-colonial State, the government radically opposed the power of traditional society represented by the régulos, which were considered an appendix of the colonial system.

The 'liberated areas' of Cabo Delgado and Niassa provinces were presented as a 'laboratory or model' where the socialist ideals had proved that it was possible to build a 'new society'. One of the examples was the creation of community villages following independence, which had a strong deployment in the Cabo Delgado Province. Another example was the election of the people's assemblies in 1977, by means of which deputies were elected at national, provincial, and locality levels (3). These assemblies were rooted "*in*

(1) They are recognized as 3rd level community authorities because they act at village level.
(2) During the field survey for the socioeconomic assessment, the Consultant investigated why the village leader is recognised as the community authority at a village level and why traditional leaders are absent. Information obtained revealed that village leaders were installed after independence.
(3) Law No. 1/77 for the Election of the Assemblies of the People in the People's Republic of Mozambique in 1977.

the tradition of democratic life created during the People's War for Independence...", [1] with the candidates for deputies of the people's assemblies at the locality level being proposed by the political structures of the respective level and sanctioned by universal suffrage in popular public meetings.

Today, the District of Palma follows the organisational model that is applied throughout the country. This is based on the administrative division of the country into provinces, municipalities, districts, administrative posts, localities, and villages. Except for the Mayors of the Municipalities, who are elected, the other bodies of local government are appointed in accordance with the rules of the State. These are considered positions of political trust, and therefore, there is a strong link and connection (formal but not defined in legal terms) between the party in power and these four levels of formal local State government.

G1.3 FISHERIES SECTOR POLICY AND STRATEGIES

G1.3.1 Introduction

The Fisheries Law (*Lei de Pescas*) No. 3/90 of 26 September classifies fishing activities according to the purpose of the fishery (eg subsistence, for market etc) and is based on thetype of fishing gear used as follows:

a) *Subsistence fishing* - undertaken by fishers who fish for household consumption.

b) *Artisanal fishing* - carried out by communities along the coast and around inland water bodies. Catches are for both subsistence and for market.

c) *Semi-industrial fishing* - undertaken by locally owned companies employing mid-size (<20m) boats, mainly involved in shallow-water shrimp fisheries at the Sofala Bank, Limpopo river mouth and Maputo bay and linefishing inshore southern Mozambique. This sector also targets the small pelagic fish; Kapenta, on Cahora Bassa Dam in Tete Province. Catches are used for both local consumption and regional export.

d) *Industrial fishing* - undertaken on larger vessels (longer than 20 m) and fish for shallow water shrimps at Sofala Bank, deep water shrimps offshore central Mozambique and fish species (mainly tuna) in deeper waters of the northern Economic Exclusive Zone. Catches are used mainly for export.

e) *Scientific research and experimental fishing* – includes fishing authorized by the State Fishing Secretary (*Secretaria de Estado das Pescas*) in coordination with the Fisheries Research Institute (IIP) for research purposes.

f) *Recreational and sports fishing* – non-profit fishing activities within fishing contests (sports fishing) or outside fishing contests (recreational).

(1) Ibid.

More recently, in 2009, the *Ministério das Pescas* (MdP: Mozambican Ministry of Fishing) identified six subsectors with important roles in the development of fisheries in Mozambique in a '*Master Plan for the Fisheries Sector for the period 2010-2019*'. These are:

(1) Small-Scale Fishing;
(2) Semi-Industrial Fishing;
(3) Industrial Fishing;
(4) Industrial Aquaculture;
(5) Small scale Aquaculture; and
(6) Processing.

This Master Plan established the following objectives for the industry for the period from 2010 to 2019:

1. To enhance the contribution of the sector in improving food security and nutrition for the population.
2. To improve the living conditions of fishing communities and those associated with small scale fish farms.
3. To increase the contribution of fisheries and aquaculture to achieve national goals of economic and social development.
4. To increase the net financial contribution of the sector in the country.

The main written guidelines for the strategy of the Mozambican fisheries sector and its subsectors are:

- The *Lei de Pescas* (Fisheries Law) No. 3/90, which provides the legal framework for fishing in the country;

- The *Política Pesqueira e Estratégias de Implementação* (Fishing Policy and Implementation Strategies), Resolution No. 11/96;

- The *Regulamento Geral da Pesca Marítima* (General Regulation of Offshore Fishing), Decree No. 43/2003, which regulates fishing activities at sea;

- The *Regulamento da Pesca nas Águas Interiores* (Regulation of Fishing in Inland Waters), Decree No. 57/2008;

- The *Regulamento de Funcionamento dos Comités de Co-gestão da Pesca* (Regulation of Operation of the Fishing Co-Management Committees), Ministerial Diploma No. 147/2007;

- The *Plano Director das Pescas 2010-2019* (PDPII) (Fisheries Masterplan 2010-2019 (PDP 2010-219)), which defines the long-term vision and the development goals of the sector, the target group and other indirect beneficiaries, the contribution of the six fishing subsectors to the PDD II goals and even the transversal aspects which impact and have an effect on the development and promotion of fishing activities (MP a).

- The *Plano Estratégico do Subsector da Pesca Artesanal* (PESPA) (Strategic Plan of the Small-Scale Fishing Subsector), prepared in 2007, which defines a vision for small-scale fishing with a ten-year horizon and a period of implementation of 5 years, to be implemented by the *Instituto de Desenvolvimento da Pesca de Pequena Escala* (IDPPE): Mozambican Institute for the Development of Small-Scale Fishing).

- The *Plano Estratégico de Desenvolvimento da Pescaria de Atum em Moçambique* (PEDPA) (Strategic Development Plan for Tuna Fisheries), approved on July 2013 (1), has been aligned with the 2010-2019 Fisheries Master Plan, as well as other relevant policies and strategies. The Strategic Plan aims at maximizing the benefits of the tuna industry to the economy of Mozambique, through better use and control of the tuna fisheries in the Exclusive Economic Zone (EEZ) and participation in the strenghtening of the management of tuna in the Indian Ocean. This Strategic Plan defines priority actions as well as general actions for the management of tuna fisheries, small scale fisheries and industrial fishing activities. The Ministry of Fisheries is responsible for the implementation of this strategy at a national level.

It is estimated that, between 2009 and 2010, in Mozambique, the fishing sector contributed 2 percent to the GDP, whereas the fishing production in offshore and inland waters reached 151,000 tonnes, representing 452 million USD (Ministério das Pescas, (a)).

The sector significantly contributes to the countries domestic and export markets, although the significance of the latter is declining due to a reduction in demand by international markets. During the period from 2008 through 2009, for example, the export of prawns dropped by 64 to 24 million USD and, in 2009, only represented 1.3 percent of exports, after losing importance compared with the export of other primary products such as cotton (1.4 percent), sugar (3.1 percent), and tobacco (8.3 percent), according to the *Instituto de Promoção das Exportações* (IPEX: Mozambican Institute for the Promotion of Exports). Production for the domestic market is very significant insofar as it ensures the supply of the coastal regions and areas in the interior. Most of the fish is processed as dry or smoked fish.

The subsector of **small-scale fishing** contributes significantly to food security for communities residing along the coast and within the Afungi Project Site and Surrounds (including Senga and Maganja). Whether artisanal fishermen are directly involved in fishing activities or not, the yields from small-scale fishing provide nutrition for household consumption by families involved in fisheries or for those buying fish in the internal market that is supplied by the sale of surplus, or even production for sale by the more market orientated small-scale fishing sector. In 2009, the subsector of small-scale fishing produced 86 percent of the 151,000 tonnes of the production volume that year (MP a).

(1) At the 22nd Ordinary Session of the Council of Ministers.

PESPA 2007 defines the target group of the small-scale fishing development goal, as the poorest strata of the Mozambican population who receives a part of the income generated by the fishing administration and who is supplied with fish of a higher quantity and quality. At the level of the immediate goal target groups, the PESPA defines two groups (MP b):

- "households of more impoverished communities depending on small-scale subsistence fishing activities"; and

- "small-scale fishers engaged in commercial fishing activities, including at open sea".

As a result of the definition of the development goal and of the immediate goal target groups, the PESPA 2007 also included a revised definition of the two types of small-scale fishing, in particular subsistence fishing and small-scale commercial fishing. These are detailed below:

- **Subsistence fishing** previously included the poorest families who engaged in fishing, with more rudimentary equipment and without using vessels, salaried fishers, collectors, processors, and small traders. This group now includes fishers with vessels such as canoes or rowing or sailing boats which use a variety of fishing gear. This group is incipiently and poorly linked with the market.

- **Small-scale commercial fishing** uses more complex fishing techniques and motor boats with support of other equipment such as winches and pullers and is specifically market oriented. Based on a vision of development by stages, the small-scale commercial fishing may use more traditional techniques such as propulsion by sail. Its close link with the market is the factor that makes the difference between these two types of fishing.

The five main pillars of the PESPA 2007 summarise the strategic approach of the small-scale fishing subsector for the period from 2007 through 2012, and include:

- improved social conditions in the fishing communities;

- growing income for small-scale fishers;

- marketing of the fish catches brings more favourable results for small-scale fishers;

- financial services aimed at the small-scale fisheries are accessible to and easier to obtain by a larger number of fishers; and

- institutions that are dedicated to the development and management of small-scale fishing are strengthened and improved.

G1.4 ADDITIONAL SOCIO-ECONOMIC DATA

Table 1.1 Types of Roads (in kilometres) in Cabo Delgado Province

Class	Paved (km)	Compacted (km)	Earth (km)	Total (km)	%
Primary	414			414	14.6
Secondary	259	133		392	13.9
Tertiary	374	884	361	1619	57.2
Feeder Road		16	387	403	14.3
Total (km)	1047	1033	748	2828	
%	37.0	36.5	26.4		

Source: National Roads Administration, 2011

Table 1.2 Economic sectors in Cabo Delgado Province in 2010 (MZN/USD) and its contribution to the Province Global Production

Sectors of Activity	MZN	USD @36 as of October 31, 2010	%
Agriculture and Livestock	3.762.240.500	104.506.681	52.1
Fishing	461.111.000	12.808.639	6.4
Transforming Industry	663.410.423	18.428.067	9.2
Agro-Industry	482.809.250	13.411.368	6.7
Electric Power	116.515.645	3.236.546	1.6
Construction	19.348.696	537.464	0.3
Transportation	1.208.844.467	33.579.013	16.8
Tourism	500.049.774	13.890.272	6.9
Total	7.214.329.755	200.398.049	100.0

Source: Government of the Province of Cabo Delgado (a) 2010

Table 1.3 Small Scale Fisheries Sub-Sector Catches, Fish Effort and Rates in Cabo Delgado Province and Palma District (2009-2011)

Cabo Delgado Province									
FISHING GEARS	**Catches (tonnes)**			**Effort (days)**			**CPUE* (kg/fishing gear. Day)**		
	2009	**2010**	**2011**	**2009**	**2010**	**2011**	**2009**	**2010**	**2011**
Beach seine	5,909	6,057	7,033	90,076	101,487	80,539	66	60	87
Hand line	2,541	2,524	2,414	204,880	223,589	187,166	12	11	13
Drifting gill net	2,582	2,645	3,586	92,461	101,561	86,270	28	26	42
Set net (anchored)	527	675	664	66,670	21,491	13,232	8	31	50
Spear fishing	-	-	609	-	-	52,970	-	-	11
Encircling gill net/ surrounding pursing net	-	-	3,754	-	-	26,082	-	-	144
Total	**11,558**	**11,902**	**18,059**	-	-	-	-	-	-
Palma District									
Beach seine	1,024	481	1,197	10,710	6,306	10,646	36	76	-
Hand line	666	420	382	36,717	30,368	33,068	18	14	-
Drifting gill net	284	336	322	10,867	12,107	6,194	26	28	-
Set net (anchored)	27	69	-	14,534	930		42	74	-
Spear fishing	-	-	37	-	-	3,658	-	-	-
Encircling gill net/ surrounding pursing net	-	-	-	-	-	-	-	-	-
Total	**2001**	**1306**	**1,939**	-	-	-	-	-	-

*CPUE: Catch per Unit Effort

Source: Mozambique National Fisheries Research Institute (IIP)

Table 1.4 Structure of Palma District Government (2012)

Services	**Composition/Structure**	**Number of Technicians**	**Comments**
District Planning and Infrastructure Services (SDPI)	Department of Planning, Territorial Organization, and Urbanization Department of Environmental Management Department of Public Works, Infrastructures, and Equipment Department of Administration, Planning, and Human Resources		Has been under the long-term stewardship of the District Administration, and only recently separated from this function. Currently includes a Director, a Human Resources Department, Accounting, and a General Secretary.

Services	Composition/Structure	Number of Technicians	Comments
District Education, Youth, and Technology Services (SDSMAS)	Department of General Education	1 MT	
	Department of Technical-Professional Education and Technology	1 MT	
	Department of Culture, Youth, and Sports	1 BT	
	Department of Administration and Planning	1 MT	
	Department of Human Resources	1 MT	
District Health, Women, and Social Affairs Services (SDMAS)	Department of Disease Control and Health Promotion	1 MT	Currently only the Department of Disease control
	Department of Medical Assistance		
	Department of Women's Affairs and Social Action	1 MT	
	Department of Administration and Planning	1 BT of Accounting	
	Department of Human Resources	2 MT	
	Department of Public Health	1 Public Health MT	
	Department of SMI	1SMI MT – Maternal-Children Health	
	Department of General Nursery	1 District Nursery Supervisor 1 District Health Chief 1 MT	
District Economic Activity Services (SDAE)	Department of Agriculture and Fishing *INCAJU *Forests and Wildlife *Agrarian Extension *Fisheries	1BT and MT of Incaju 4 Forestry and Game Inspectors 2 Agricultural Extension technicians; IDPP extension technicians; 2 Fishery Inspectors	The four Forestry and Wildlife Inspector roles depend on maintaining provincial level service support.
	Department of Promotion and Development of Entrepreneurship		

Services	Composition/Structure	Number of Technicians	Comments
	Department of Licensing and Monitoring of Economic Activities		
	Department of Administration, Planning, and Human Resources	1 MT of Human Resources and 1 BT of Administration 2 service agents (1 Driver, 1 guard)	The two service agents have been engaged using PROAGRI funds and are not permanent members of the SDAE team.

Legend: MT: Medium skilled technician and BT: Basic skilled technician.

Source:Impacto, 2012

Table 1.5 Profile of Non-Governmental Organisations (NGOs) Operating in Palma District (2012)

Organization	National/International	Geographical Scope		Funding	Area of Intervention and Target Group	Partners (Province, District)	Timeframe of the Project	Contact Persons
		Country, Province	District					
NGO Elizabeth Glazier	International	Maputo; Gaza; Cabo Delgado	Entire District of Palma	Centres for Disease Control and Prevention/ (USA Government)	Technical assistance and funding of SDSMAS activities in the field of HIV/AIDS.	Province: DPS; DPA; DPOPH; Solidar Man, Pathfinder, Vilas Reis (NGOs). District: District Health, Women and Social Action Services.	1st phase; 2006 – 2011 2nd phase: 2012 -2013	Dr, Gregório – Coordinator cell:827691846 Dr Cláudio – Clinical Advisor cell: 827324400 cmachalela@ceds ads.org.mz cmachalela@gm ail.com

Organization	National/International	Geographical Scope		Funding	Area of Intervention and Target Group	Partners (Province, District)	Timeframe of the Project	Contact Persons
		Country, Province	District					
NGO FH Food for the Hungry	International	Sofala; Cabo Delgado (Palma, Mocimboa, Nangade)	15 communities (all Administrative Posts)	United States Agency for International Development (USAID)	Multi Year Assistance Program with the following lines of action: Creation of capacities within the community (CCB). Health and nutrition (water and sanitation). Agriculture. Saving and credit groups.	DPA; DPS; DPOPH; SDAE; SDSMAS; SDPI	2008 – 2011 1st phase 2012 – 2013 2nd phase	Alaíce Omolo: Project Director Cabo Delgado Province; Jordão Choé (Project Team Leader, Palma) José Sunça – 829896440 & 27221737 – Manager of the Community Training Program, Palma
Private company Cowater	International	Nampula; Cabo Delgado (Palma, Mecufi, Metunge, Mocímboa, Nangade; Chiure)	30 communities (all Administrative Posts)	Millennium Challenge Account Mozambique (MCA – Mozambique)	Water and sanitation in rural communities	DPOPH; SDPI	2009 – 2013	Lino – Field Technician - 825318326
NGO JAM	International	Sofala; Cabo Delgado (Palma, Mocímboa da Praia, Nangade)	15 communities (all Administrative Posts)	FH	Water and sanitation in rural communities	DPOPH; SDPI	2010 - 2012	Paulo – Coordinator Field Activities – 843080880

Table 1.6 Level of Education Completed by the Population 15 Years and Older in Palma District (2007)

Level of Education Completed	Level of Education Completed		Province (%)
	Number of Residents	%	
Total	24,418	100.0	100.0
No Level	21,520	88.1	81.3
Literacy Level	190	0.8	0.3
Primary Education Degree 1 (EP1)	1,693	6.9	10.9
Primary Education Degree 2 (EP2)	589	2.4	2.5
General Secondary Education Cycle 1 (ESG1)	280	1.2	3.3
General Secondary Education Cycle 2 (ESG2)	92	0.4	1.3
Elementary Technical Education (ETE)	1	0.0	0.0
Basic Technical Education (ETB)	11	0.0	0.1
Secondary Technical Education (ETM)	3	0.0	0.1
Instructor Training	37	0.2	0.1
Superior Education	2	0.0	0.1
Unknown	100	0.4	0.4

Source: National Institute of Statistics (Palma District Census Data), 2010.

Table 1.7 Main Professional Activity of the Head of Surveyed Household in Afungi Project Site and Surrounds by Percent

Professional Activity	Quitupo %	Quitupo Settlements (*production zones*) %	Coastal Zone %	Senga %	Maganja %
Works for Others	3.8	-	9.1	-	6.7
Self Employed/small industry	7.7	6.3	-	5.0	-
Self Employed/food preparation	3.8	-	-	-	3.3
Self Employed/construction materials	5.8	6.3	9.1	-	-
Self Employed/commerce	3.8	-	22.7	-	16.7
Farmer	50.0	68.8	13.6	95.0	36.7
Fisher with boat/net	21.2	6.3	31.8	-	36.7
Fisher without boat/net	3.8	12.5	-	-	-
Other	-	-	5.6	-	-

Source: Impacto, 2012.

Table 1.8 Main Crops Grown by Surveyed Households in Afungi Project Site and Surrounds

Main Crops	% Producing Family Units	Coastal Zone	Maganja	Quitupo	Quitupo Settlements (*production zones*)	Senga
Corn	28.6	4.5	13.3	26.9	43.8	70.0
Sorghum	21.4	4.5	16.7	21.2	31.3	40.0
Cassava	88.6	72.7	96.7	86.5	93.8	95.0
Cowpea	20.0	4.5	16.7	23.1	18.8	35.0
Bambara Nuts	31.4	18.2	23.3	40.4	31.3	35.0
Rice	42.9	54.5	50.0	28.8	56.3	45.0

Source: Impacto, 2012.

Table 1.9 Marketed Crops by Surveyed Households in Afungi Project Site and Surrounds

Main Crops	Sold by % of HH	Coastal Zone	Maganja	Quitupo	Quitupo Settlements (*production zones*)	Senga
Corn	35.9	-	50.0	35.7	42.9	30.8
Sorghum	30.0	-	20.0	45.5	40.0	12.5
Cassava	13.6	12.5	17.2	15.2	13.3	5.3
Cowpea	35.7	-	20.0	41.7	33.3	42.9
Bambara Nuts	40.0	25.0	28.6	45.5	80.0	14.3
Rice	25.0	41.7	20.0	26.7	50.0	11.1

Source: Impacto, 2012.

Table 1.10 Types and Numbers of Trees Owned by Surveyed Households in Afungi Project Site and Surrounds

F	Total Households (n=140)	Coastal Zone	Maganja	Quitupo	Quitupo Settlements (*production zones*)	Senga
Cashew Nut Tree						
% Households	63.6	46	53.3	78.8	68.8	55.0
Average Number of Trees	94	171	64	83	123	79.0

F	Total Households (n=140)	Coastal Zone	Maganja	Quitupo	Quitupo Settlements (*production zones*)	Senga
Range of Variation	2 – 600	9 – 600	5 – 200	2 – 410	4 – 500	7 – 300
Coconut Tree						
% Households	46.4	45.5	56.7	46.2	56.3	40.0
Average Number of Trees	59	196	33	24	76	5.
Range of Variation	1-1000	10-1000	2-280	1-110	1-460	1-24
Mango Tree						
% Households	45.0	40.9	33.3	51.9	56.3	25.0
Average Number of Trees	7	7	6	7	8	10
Range of Variation	1-50	1-30	1-10	1-50	1-20	1-20

Source: Impacto, 2012.

Table 1.11 Processing and Marketing of Fruit and Income Obtained by Surveyed Households in Afungi Project Site and Surrounds

	Total HH	Coastal Zone	Maganja	Quitupo	Quitupo Settlements (*production zones*)	Senga
Cashew Nut Tree						
Owned by %	63.6	45.5	53.3	78.8	68.8	55.0
Sold by %	18.0	30.0	12.5	24.4	9.1	-
Processed by %	2.2	-	-	2.4	9.1	-
Average Income Most Recent 12 Months in meticais (MZN)	2,750	2,433	4,000	2,771	1,000	-
Coconut Tree						
Owned by %	46.4	45.5	56.7	46.2	56.3	40.0
Sold by %	50.8	70.0	70.6	25.0	55.6	60.0
Processed by %	4.6	-	-	-	-	60.0
Average Income Most Recent 12 Months in MZN	3,032	5,821	2,100	1,933	3,160	2,233

Source: Impacto, 2012.

Table 1.12 Use of the Commercial Network by Surveyed Households According to Area of Residence

Area of Residence	Coastal Zone	Maganja	Quitupo	Quitupo Settlements (*production zones*)	Senga
Milling (%)					
In the village	-	-	-	-	60
Palma Town	90.9	90.9	100	100	40
Neighbouring Village	9.1	9.1	-	-	-
Other Administrative Post	-	-	-	-	-
Other District	-	-	-	-	-
Shop (%)					
In the village	9.1	9.1	1.9	-	20
Palma Town	90.9	90.1	98.1	100	80
Neighbouring Village	-	-	-	-	-
Other Administrative Post	-	-	-	-	-
Other District	-	-	-	-	-
Informal Stand (%)					
In the village	59.1	59.1	90.4	50	60
Palma Town	22.7	22.7	9.6	50	40
Neighbouring Village	18.7	18.7	-	-	-
Other Administrative Post	-	-	-	-	-
Other District	-	-	-	-	-
Store buying farm products (%)					
In the village	-	-	1,9	-	-
Palma Town	100	100	98,1	100	100
Neighbouring Village	-	-	-	-	-
Other Administrative Post	-	-	-	-	-
Other District	-	-	-	-	-

Source: Impacto, 2012.

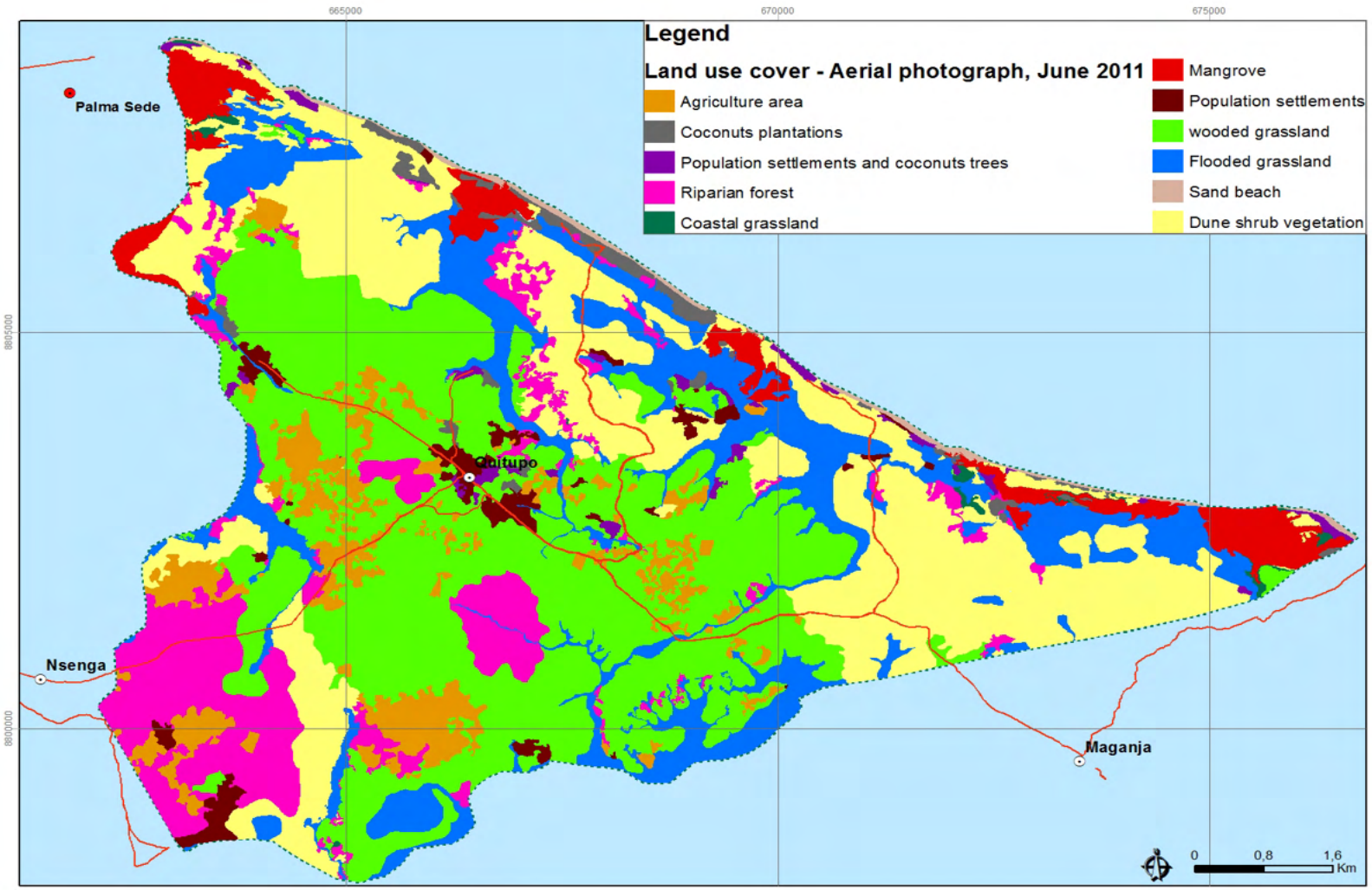
Table 1.13 Location of Plots 1 and 2 According to Ownership by Surveyed Households in Afungi Project Site and Surrounds

Total of Lots/Location	Total Family Units of the Sample	Quitupo	Quitupo Settlements (*production zones*)	Coastal Zone	Maganja	Senga
% Family Units with Plot 1	**98.6**	**100.0**	**100.0**	**90.9**	**100.0**	**100.0**

High Zone	65.2	78.8	43.8	40.0	56.7	85.0
Low Zone	34.8	21.2	56.3	60.0	43.3	15.0
% Family Units with Plot 2	**55.0**	**59.1**	**12.5**	**59.1**	**43.3**	**70.0**
High Zone	61.0	74.3	100.0	23.1	46.2	71.4
Low Zone	39.0	25.7	-	76.9	53.8	28.6

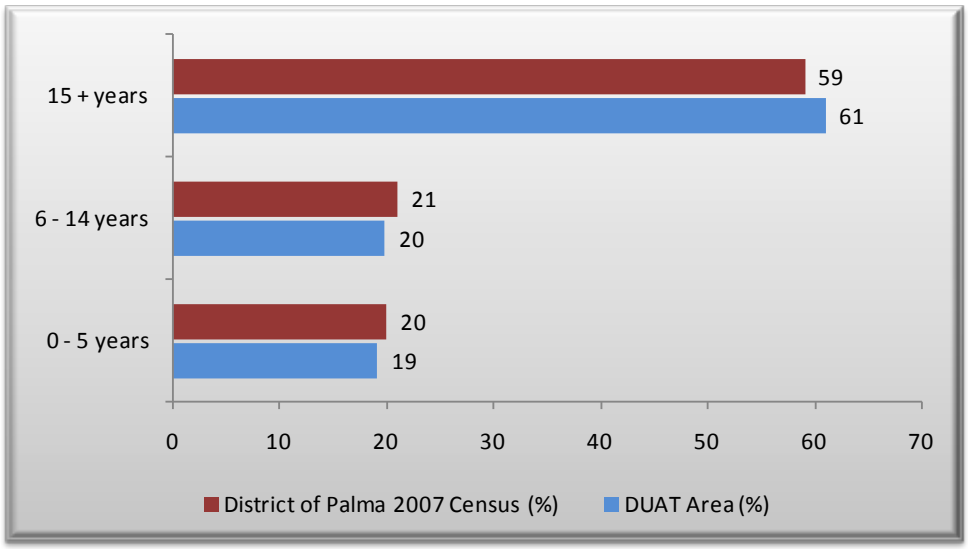
Source: Impacto, 2012.

Figure 1.1 Land Cover in Afungi Project Site



Source: Impacto, 2012.

Figure 1.2 *Age Distribution of Surveyed Households in Afungi Project Site Compared to Palma District*



Source: Impacto, 2012 and National Institute of Statistics, 2010.

G2.1.1 Pumping Rates and Schedules

The portion of the total Project water demand for domestic use that needs to be supplied by borehole water is between 80 and 600m³/d. The peak demand of 600m³/d is needed in Year 2 from Project inception for 12 months, where after the desalination plant will be operational and supplying most of the Project water demand for domestic use.

This section details the modelling results in terms of pumping rates and schedules.

Scenario 1 – Recommended Maximum Pumping Rates

A steady-state scenario was run to determine the recommended maximum pumping rates in order to maintain a dynamic groundwater level of ≥ 3mamsl. This safety buffer of 3m water column above sea level is considered sufficient to avoid saline intrusion, given the maximum permissible pumping rates determined are not exceeded.

Table 2.1 presents the recommended maximum pumping rates, which vary from 2 to 14m³/hour (1 to 4L/s) on a 24-hour pumping schedule per day. Each of the recommended pumping rates is lower than the corresponding permissible pumping rate with regards to upconing of saline groundwater.

However, for the borehole LNG-W003 the installed 4½" OD casing will be limiting the capacity of a submersible pump that can be installed in the borehole (5.4m³/hour or 1.5L/s) as described above. An alternative pump system can, however, be installed to deliver the recommended pumping rate for this borehole.

Table 2.1 Recommended Maximum Pumping Rates (24-Hour Pumping Rates)

Borehole ID	Casing Outer Diameter (inch)	Available Drawdown (m)	Modelled Drawdown (m)	Permissible Pumping Rates Upconing (m³/hour)	Recommended Maximum Pumping Rates (m³/hour)
LNG-W001	4½	2.1	2.0	20	5
LNG-W002	5	3.5	3.3	70	4
LNG-W003	4½	10.4	10.2	3 460	14
LNG-W004	5	9.4	9.1	10	5
LNG-W005	4½	8.5	8.1	30	2
LNG-W006	6½	8.7	8.5	310	7

Scenario 2 – Least Number of Boreholes to Meet Borehole Water Demand

This scenario determined the smallest number of boreholes required to meet the peak demand of 600m³/d and quantified associated impacts using

transient modelling. It was further assumed that the water is needed at the planned *Pioneer Camp* and therefore only boreholes located in the vicinity of the camp were considered. This also presents the safer option with regard to possible saline intrusion *viz.* pumping inland further away from the coast decreases the potential for saline intrusion to occur.

Based on the maximum pumping rates from *Scenario 1*, the demand can be met by pumping solely from borehole LNG-W006 in Year 1 and 3 to 35 (end of operation). In order to meet the peak demand in Year 2, it is recommended to pump from additional two boreholes, LNG-W003 and LNG-W004, all of which are located in proximity of the planned *Pioneer Camp*. The borehole locations are depicted in *Annex C*.

Recommended pumping schedule and rates are detailed in *Table 2.2* and range from 2.5 to 12.9m^3/hour (0.7 – 3.6L/s). However, for borehole LNG-W003 the installed 4½" OD casing will be limiting the capacity of a submersible pump that can be installed in the borehole (5.4m^3/hour or 1.5L/s) as described above. Therefore, *Scenario 3* was modelled to determine the smallest number of boreholes only using feasible pumping rates with regards to the installed casing assuming submersible pumps will be used.

Table 2.2 Recommended Pumping Schedule (24-Hour Pumping Rates) - Scenario 2

Years	Months	Project Phase	Water Demand (m^3/d)	Water Demand (m^3/hour)	LNG-W006 (m^3/hour)	LNG-W003 (m^3/hour)	LNG-W004 (m^3/hour)
1	0 – 6	Construction	80	3.3	3.3	-	-
1	6 – 12	Construction	150	6.3	6.3	-	-
2	12 – 24	Construction	600	25.0	6.7	12.9	5.4
3 – 6	24 – 72	Construction and Operation	60	2.5	2.5	-	-
7 - 34	72 - 408	Operation	150	2.5	6.3	-	-

Scenario 3 – Meet Borehole Water Demand, Feasible Pumping Rates (Submersible Pumps)

For this scenario it was assumed that submersible pumps installed in boreholes equipped with 4½" OD casing can deliver a maximum of approximately 5.4m^3/hour (1.5L/s), whereas pumps that fit in larger diameter boreholes with 5-6½" OD casing can deliver up to approximately 14.4m^3/hour (4L/s).

Based on the maximum pumping rates from *Scenario 1*, the demand can be met by pumping solely from borehole LNG-W006 in Year 1 and 3 to 35 (end of operation). In order to meet the peak demand in Year 2, it is recommended to pump from additional four boreholes, LNG-W003 and LNG-W004, which are located in proximity of the planned *Pioneer Camp* and LNG-W001 and LNG-W002, located in the LNG Processing Area closer to the coast. The borehole locations are depicted in *Annex C*.

Recommended pumping schedule and rates are detailed in *Table 2.3* and range from 2.5 to 6.7m^3/hour (0.7 – 1.9L/s).

Scenario 4 and 5 – Aquifer Capacity to Sustain Total Domestic Water Demand

These two scenarios represent theoretical scenarios to investigate whether the entire domestic water demand can be provided by borehole water. The results of these scenarios provide an indication of the overall aquifer capacity in the Project area.

The total Project water demand for domestic use is between 80 and 3 000m^3/d. The peak demands of 1 500 - 3 000m^3/d would be needed in Years 3 - 4 and 5 – 6 respectively.

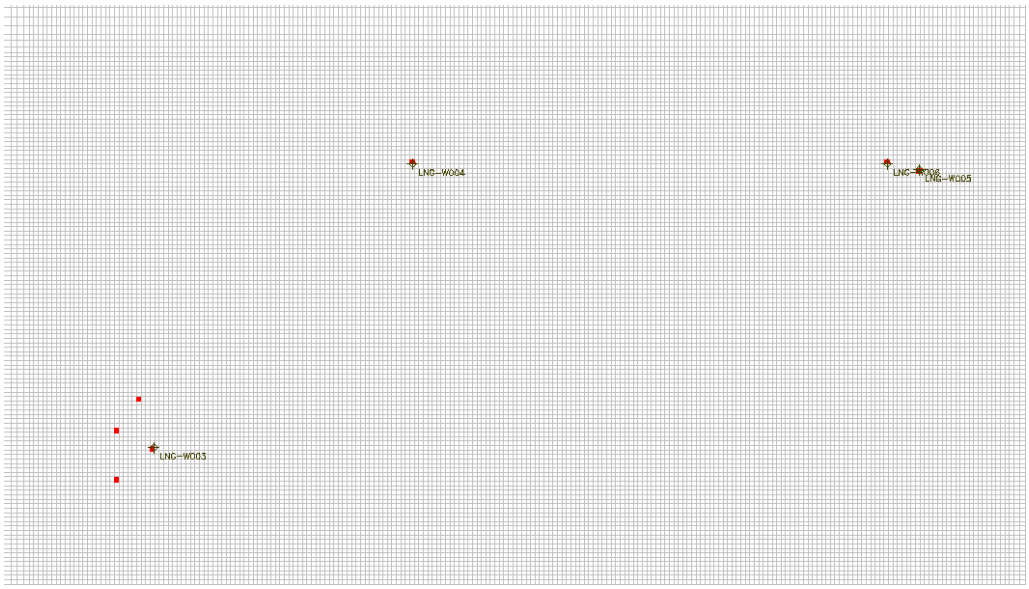
Scenario 4 was run, pumping the entire demand from borehole LNG-W006, to assess the theoretical maximum possible impact in terms of drawdown (*Section G2.1.2*). However, realistically borehole LNG-W006 cannot deliver the pumping rate of 63 - 125m^3/d required to achieve 1 500 - 3 000m^3/d (the borehole would go dry).

Therefore, *Scenario 5* was modelled subsequently, investigating the potential of delivering the peak demand sustainably using each of the existing boreholes (LNG-W001 to LNG-W006) at their maximum pumping rate determined in *Scenario 1* and additional boreholes. The existing boreholes can deliver up to 880m^3/d sustainably. The remaining 620 – 2 120m^3/d would have to be delivered by additional boreholes.

Assuming average pumping rates of 5 – 9.2m^3/hour (1.4 – 2.6L/s), additional 3 to 11 boreholes would be needed to deliver the total demand sustainably. For the purpose of this scenario modelling the additional boreholes were placed in the vicinity of borehole LNG-W003 and LNG-W006, that yielded the highest transmissivities in the aquifer tests indicating increased aquifer capacity. The location of the additional boreholes is depicted in *Figure 2.1*. The pumping schedule modelled in S*cenario 5* is detailed in *Table 2.4*.

Figure 2.1 Location of Additional and Existing Boreholes (Red Dots)

Additional Boreholes Year 3 & 4



Additional Boreholes Year 5 & 6

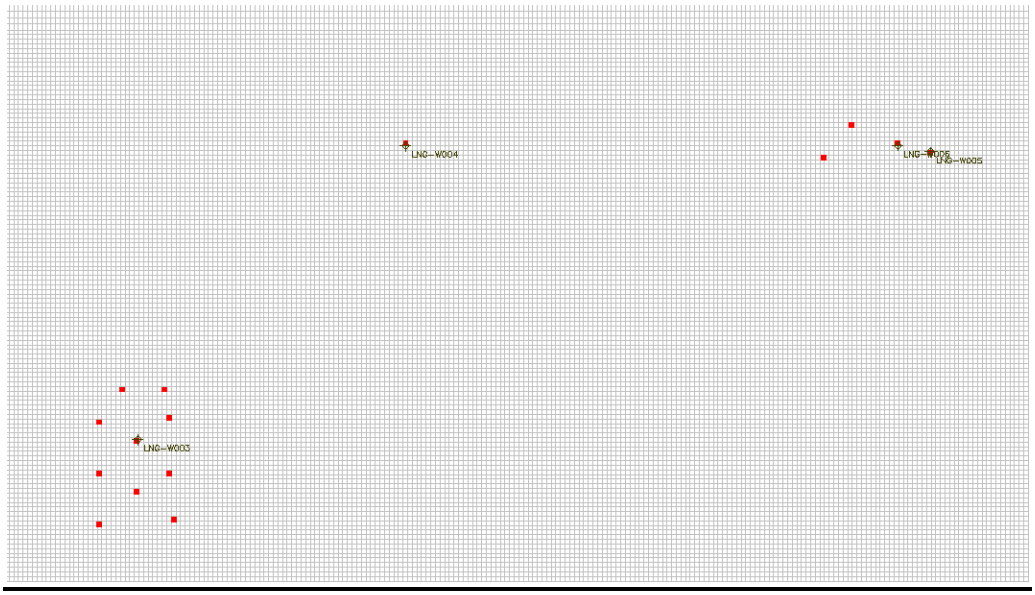


Table 2.3 Recommended Pumping Schedule (24-Hour Pumping Rates) - Scenario 3

Years	Months	Project Phase	Water Demand (m^3/d)	Water Demand (m^3/hour)	LNG-W006 (m^3/hour)	LNG-W001 (m^3/hour)	LNG-W002 (m^3/hour)	LNG-W003 (m^3/hour)	LNG-W004 (m^3/hour)
1	0 – 6	Construction	80	3.3	3.3	-	-	-	-
1	6 – 12	Construction	150	6.3	6.3	-	-	-	-
2	12 – 24	Construction	600	25.0	6.7	4.2	3.3	5.4	5.4
3 – 6	24 – 72	Construction and Operation	60	2.5	2.5	-	-	-	-
7 - 34	72 - 408	Operation	150	2.5	6.3	-	-	-	-

Table 2.4 Pumping Schedule Existing Boreholes (24-Hour Pumping Rates) - Scenario 5

Years	Months	Project Phase	Total Water Demand (m^3/d)	Water Demand (m^3/hour)	LNG-W001 (m^3/hour)	LNG-W002 (m^3/hour)	LNG-W003 (m^3/hour)	LNG-W004 (m^3/hour)	LNG-W005 (m^3/hour)	LNG-W006 (m^3/hour)
1	0 – 6	Construction	80	3.3	-	-	-	-	-	3.3
1	6 – 12	Construction	150	6.3	-	-	-	-	-	6.3
2	12 – 24	Construction	600	25.0	-	-	12.9	5.4	-	6.7
3 – 4	24 – 48	Construction and Operation	1 500	62.5	4.2	3.3	13.8	5.4	2.1	6.7
5 – 6	48 - 72	Construction and Operation	3 000	125.0	4.2	3.3	13.8	5.4	2.1	6.7
7 - 34	72 - 408	Operation	150	2.5	-	-	-	-	-	6.3

Notes: Year 3 & 4: Additional two (2) boreholes pumped at 8.3m^3/d and one (1) borehole at 9.2m^3/d in the vicinity of LNG-W003.
Year 5 & 6: Additional nine (9) boreholes pumped at 8.3m^3/d in the vicinity of LNG-W003 and two borehole in the vicinity of LNG-W003at 5.0m^3/d and 8.3 m^3/d respectively.

G2.1.2 Drawdown

Maximum modelled (corrected) drawdowns in the different production boreholes are detailed in *Table 2.5* for each scenario and compared to the available drawdowns as detailed in *Annex C*. Calculated drawdowns were corrected using the formulas presented in *Annex C*.

Maximum drawdowns occur at the end of the peak demand period as follows:

- End of Year 2 for *Scenarios 2& 3*; and
- End of Year 6 for *Scenarios 4 & 5*.

Table 2.5 Modelled Drawdowns in Metres

Borehole ID	Available Drawdown (m)	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
LNG-W001	2.1	2.0	NP	1.6	NP	2.0
LNG-W002	3.5	3.3	NP	2.9	NP	3.3
LNG-W003	10.4	10.2	9.4	3.9	NP	11.1
LNG-W004	9.4	9.1	8.8	8.8	NP	9.2
LNG-W005	8.5	8.1	NP	NP	NP	8.2
LNG-W006	8.7	8.5	8.3	8.3	156.0	8.7

Notes: NP Not pumped

Modelled drawdowns are all smaller than the corresponding available drawdowns with two exceptions:

1. In *Scenario 5* the modelled drawdown for LNG-W003 exceeded the available drawdown by 0.7m. This is due to the cumulative impact of the additional pumping boreholes located in the vicinity of this borehole. However, the exceedance is more or less within the model accuracy of 0.5m; and
2. In *Scenario 4*, a maximum theoretical drawdown of 156m was calculated for LNG-W006.

Drawdown Extent

The extent of the modelled drawdowns in excess of 1m remains very localised around the pumping boreholes for all scenarios. Even for the theoretical maximum impact scenarios (*Senario 4 & 5*), the calculated maximum extent of the drawdown cone (> 1m) is less than 250m from LNG-W006 and LNG-W003 respectively.

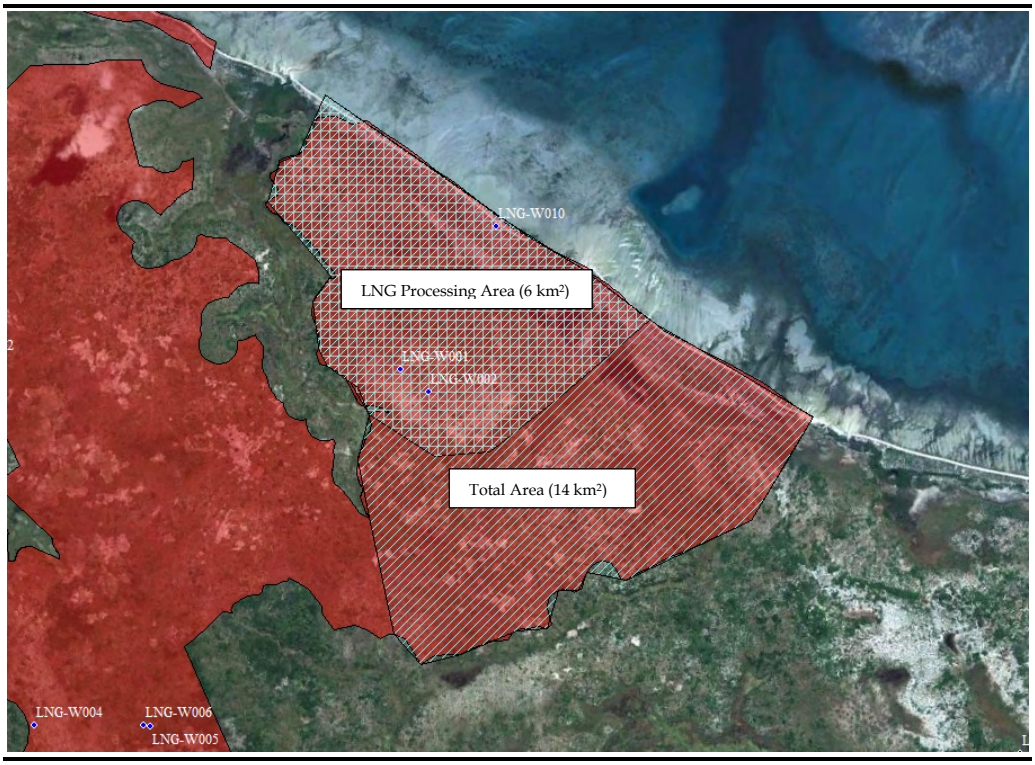
The closest private water users (community boreholes HC4 and HC5) are located just under 1km away from LNG-W001 and will therefore not be impacted by any of the planned and modelled extraction of groundwater.

G2.1.3 Surface Sealing Scenarios

The final footprint of the LNG Processing Area is currently not yet determined. Therefore, this assessment was based on two different surface areas (*Figure 2.2)*:

1. *Scenarios 6 & 7:* LNG Processing Area (6km²); and
2. *Scenarios 8 & 9:* Total Revised Footprint in the proposed LNG Processing Area (14km²).

Figure 2.2 Sealing Scenarios



Notes: The red area indicates the Revised Project Footprint

It was assumed that the entire area will be sealed and therefore no groundwater recharge occurs. For each surface area detailed above, the impacts of reduced groundwater recharge were quantified first (*Scenarios 6 & 8)* and then a in a second model run, the filling in of estuaries, wetlands and streams in the sealed areas was added (*Scenarios 7 & 9)*. This allowed for the separate interpretation of the induced impacts.

Constant Head and *Drain* cells representing estuaries, wetlands and streams in layer 1 were subsequently removed to simulate the filling in of these surface water features. These scenarios were modelled in steady-state to give an indication of the long-term impacts.

Impact on Groundwater Levels

Reduced groundwater recharge due to surface sealing results in groundwater level drawdowns in the order of tens of centimetres which is considered insignificant.
Combined with filling-in of estuaries, wetlands and streams the groundwater levels for both scenarios rise due to the decrease in groundwater discharge. Modelling results suggest that groundwater levels will rise between 1 and 1.3m for *Scenario 7 & 9* respectively.

Groundwater levels will exceed ground surface, based on the corrected topography (see *Annex C*), by up to 1m and this will result in flooding of the filled-in estuary and surroundings if the ground surface is not raised during construction (*Figure 2.3* and *Figure 2.4*).

Figure 2.3 ***Scenario 7 - Flooded Area in Blue***

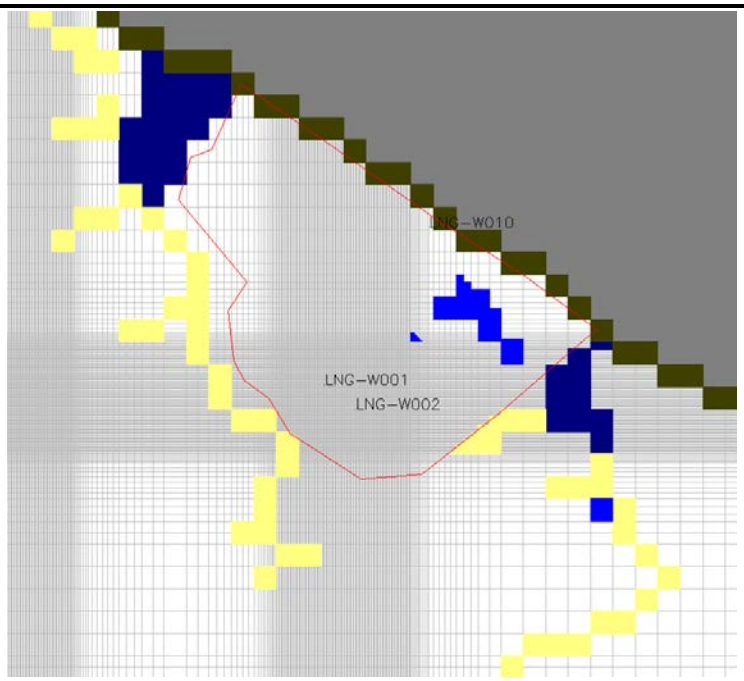
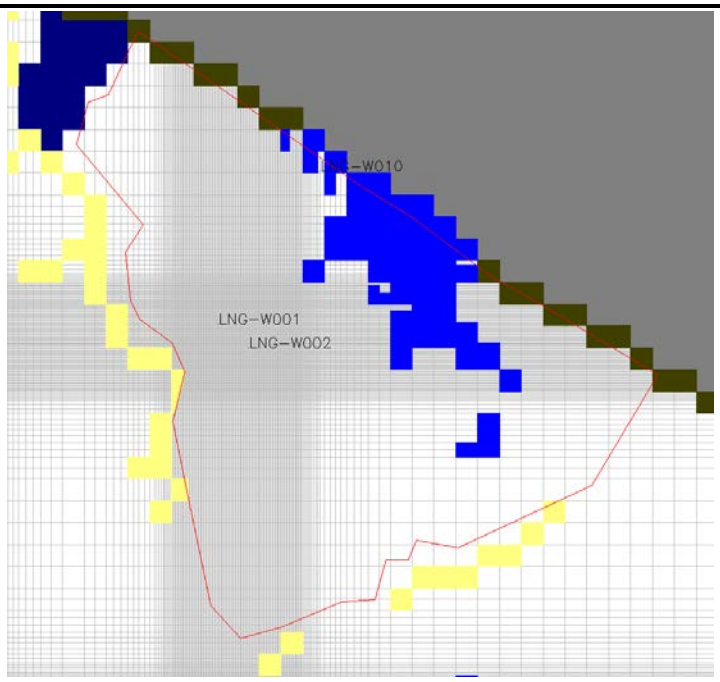


Figure 2.4 Scenario 9 - Flooded Area in Blue



G2.1.4 Groundwater Budget

Groundwater Abstraction Scenarios

First a steady-state simulation was run using the refined model (3 layers) in order to be able to compare the calculated fluxes. The different scenarios were then compared to this steady-state groundwater budget (*Table 2.6*).

Scenario 1 (steady-state) was used to determine recommended pumping rates. The model groundwater budget describes the long-term impact of the recommended pumping rates on the modelled groundwater flows. Pumping (total of 880m^3/d) leads to slight reductions in groundwater discharge to Palma Bay (-110m^3/d), to estuaries (-330m^3/d) and to wetlands and streams (-390m^3/d) and increases groundwater recharge from estuaries (+40m^3/d). However, compared to the total fluxes, these changes remain in the order of a few percent and are therefore insignificant.

The other scenarios, representing time-dependent impacts of groundwater extraction, were modelled in transient mode, which allowed monitoring the recovery of the groundwater system after the extraction had ceased. Budget snapshots were extracted at the end of the peak demand period as follows:

- End of Year 2 for *Scenarios 2& 3*; and
- End of Year 6 for *Scenarios 4 & 5*.

In all of these scenarios, most of the extracted water comes from groundwater storage (88 – 98%). This means that the extracted water is released by the formation within the cone of depression of the extraction boreholes as a result of the groundwater level lowering. Groundwater levels recovered within a

very short time (less than one month). Therefore, there is no long-term impact on the groundwater system.

Scenario 2 did not induce any change in flux to and from Palma Bay, estuaries, streams and wetlands. *Scenario 3* reduced the groundwater discharge to estuaries by 0.6% (-50m^3/d) and to wetlands and streams by 0.03% (-10m^3/d).

Scenario 4 reduced the outflow to Palma Bay by 0.1% (-20m^3/d), discharge to estuaries by 1.7% (-120m^3/d) and to wetlands and streams by 0.6% (-170m^3/d). The influx from estuaries was increased by 1.3% (+10m^3/d).

Scenario 5 reduced the outflow to Palma Bay by 0.1% (-20m^3/d), discharge to estuaries by 1.7% (-150m^3/d) and to wetlands and streams by 0.4% (-130m^3/d). The influx from estuaries was increased by 2.5% (+20m^3/d).

Table 2.6 Groundwater Budgets - Groundwater Extraction Scenarios (in m^3/d)

Boundary	Steady State 3 Layers		Scenario 1		Scenario 2		Scenario 3		Scenario 4		Scenario 5	
	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)
Wells				880		600		600		3000		3000
Storage					590		530		2690		2680	
Palma Bay (Ocean)		22 450		22 340	0	22 450	0	22 450	0	22 430	0	22 430
Western Boundary	9 530		9 530		9 530		9 530		9 530		9 530	
Estuaries	800	8 640	840	8 310	800	8 640	800	8 590	810	8 530	820	8 490
Recharge	51 220		51 220		51 220		51 220		51 220		51 220	
Drains		30 460		30 070		30 460		30 450		30 290		30 340
Sums	**61 540**	**61 560**	**61 590**	**61 600**	**62 140**	**62 150**	**62 080**	**62 090**	**64 250**	**64 250**	**64 250**	**64 260**
Discrepancy		0.02%		0.02%		0.02%		0.02%		0.02%		0.02%

Notes: All values are in m^3/d

Surface Sealing Scenarios

The different scenarios are compared to the steady-state solution of the refined model with three layers in *Table 2.7*. The surface sealing scenarios were run in steady-state to quantify long-term impacts on the groundwater system.

Sealing of the LNG Processing Area results in a reduction of groundwater recharge of 2 050m^3/d (- 4%), whereas sealing of the Total Footprint results in a reduction of 4 510m^3/d (- 8.8%). If the estuaries, wetlands and streams are left in place, there is a reduction of groundwater discharge into Palma Bay of 190 – 630m^3/d (- 0.8% to – 2.8%). Discharge into streams and wetlands are reduced by 240 – 810m^3/d and discharge into estuaries are reduced by 1 320 – 2 470m^3/d (- 15.3% to – 28.6%). Groundwater recharge from estuaries increases by 280 – 590m^3/d (+ 35% to + 73.8%).

The infilling of estuaries, wetlands and streams combined with surface sealing results in an increased groundwater discharge into Palma Bay of 170 – 810m^3/d (+ 0.8% to + 3.6%), which is a positive impact with regards to the potential threat of saline intrusion. However, the volumes are small and therefore the positive impact is insignificant.

Table 2.7 Groundwater Budgets - Surface Sealing Scenarios (in m^3/d)

Boundary	Steady State 3L		Scenario I		Scenario II		Scenario III		Scenario IV	
	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)	In-Flux (m^3/d)	Out-Flux (m^3/d)
Palma Bay (Ocean)		22 450		22 620		22 260		23 260		21 820
Western Boundary	9 530		9 530		9 530		9 530		9 530	
Estuaries	800	8 640	290	6 010	1 080	7 320	190	3 480	1 390	6 170
Recharge	51 220		49 170		49 180		46 710		46 710	
Drains		30 460		30 380		30 220		29 690		29 650
Sums	**61 540**	**61 560**	**58 990**	**59 010**	**59 780**	**59 800**	**56 420**	**56 430**	**57 620**	**57 630**
Discrepancy		0.02%		0.02%		0.02%		0.02%		0.02%

Notes: All values are in m^3/d

Table 3.1 List of Plant Species used in Identification of Vegetation Units

Common Name	Scientific Name	Conservation Status*
White thorn	*Acacia seyal*	
Brooms and brushes	*Acalypha villicaulis*	
Orchid	*Acampe pachyglossa*	
Baobab	*Adansonia digitata*	
Pod mahogany	*Afzelia quanzensis*	Least Concern
Sisal	*Agave sisaliana*	(Alien plant species)
No Common Name	*Agelanthus zizyphifolius*	
Bitter false-thorn	*Albizia amara*	
Common false thorn	*Albizia harveyi*	
Pigweed	*Amaranthus hybridus*	
Cashew nut	*Anacardium occidentale*	(Alien plant species)
Hairy blue grass	*Andropogon chinensis*	
Snowflake grass	*Andropogon eucomus*	
Blue aneilema	*Aneilema dregeanum*	
Wild custard-apple	*Annona senegalensis*	
Madeira vine	*Anredera cordifolia*	
Spreading three-awn	*Aristida barbicollis*	
Broom asparagus	*Asparagus virgatus*	
Asystasia	*Asystasia gangetica*	
White mangrove	*Avicennia marina*	Least Concern
Needle bush	*Azima tertacantha*	
Small bush violet	*Barleria repens*	
Coffee neat's foot	*Bauhinia petersiana*	
Sand ivory	*Berchemia discolor*	
None	*Berlinia orientalis*	Vulnerable/ Endemic species
Sorel	*Biophytum umbraculum*	
Spiderling	*Boerhavia diffusa*	
Msasa	*Brachystegia spiciformis*	
None	*Brachystegia tamarindoides*	
Yellow peeling plane	*Brackenridgea zanguebarica*	
Black mangrove	*Bruguiera gymnorrhiza*	Least Concern
Sedge	*Bulbostylis burchellii*	
Sodom apple	*Calotropis gigantea*	
None	*Cassia afrofistula*	
Horsetail tree	*Casuarina cunninghamiana*	(Alien plant species)
Coast bone-apple	*Catunaregam spinosum*	
None	*Centimopsis gracilenta*	
Indian mangrove	*Ceriops tagal*	Least Concern
Fishbone dwarf cassia	*Chamaecrista mimosoides*	
Red milkweed	*Chamaesyce hirta*	
Creeping milkweed	*Chamaesyce inaequilatera*	
Bush tick-berry	*Chrysanthemoides monilifera*	
Grape vine	*Cissus phymatocarpa*	
Horsewood	*Clausena anisata*	
Coconut palm	*Cocos nucifera*	(Alien plant species)
Four-leaved bushwillow	*Combretum adenogonium*	
Flame creeper	*Combretum paniculatum*	
Large-fruited bushwillow	*Combretum zeyheri*	
Ecklon's blue commelina	*Commelina eckloniana*	
Blue commelina	*Commelina erecta*	Least Concern
None	*Commelina zambesiaca*	
Hairy corkwood	*Commiphora africana*	

Common Name	Scientific Name	Conservation Status*
Common corkwood	*Commiphora pyracanthoides*	
Forest corkwood	*Commiphora woodii*	
River lily	*Crinum macowanii*	
Moore's crinum	*Crinum moorei*	
Sand crown-berry	*Crossopteryx febrifuga*	
Sickle grass	*Ctenium concinnum*	
Wild cucumber	*Cucumis hirsutus*	
Dodder	*Cuscuta campestris*	(Alien plant species)
Octopus cabbage tree	*Cussonia aborea*	
Doll's powderpuff	*Cyanotis speciosa*	
None	*Cyperus crassipes*	
Winged sedge	*Cyperus denudatus*	
None	*Cyperus exaltatus*	
White sedge	*Cyperus hemisphaericus*	
White-flowered sedge	*Cyperus obtusiflorus*	
Dwarf papyrus	*Cyperus prolifer*	
Purple nut sedge	*Cyperus rotundus*	Least Concern
None	*Cyperus vestitus*	
Wild grape	*Cyphostemma cirrhosum*	
None	*Cyphostemma natalitium*	
Hairy grape bush	*Cyphostemma woodii*	
Common crowfoot	*Dactyloctenium aegyptium*	
Zebrawood	*Dalbergia arbutifolia*	Least Concern
Zebrawood flat-bean	*Dalbergia melanoxylon*	Near-Threatened
Dalechampia	*Dalechampia capensis*	
Devil's weed	*Datura stramomium*	(Alien plant species)
Marsh desmodium	*Desmodium dregeanum*	
Devil's-thorn	*Dicerocaryum zanguebaricum*	
Finger grass	*Digitaria eriantha*	
Wild yam	*Dioscorea cotinifolia*	
Wild yam	*Dioscorea sansibarensis*	
Green dipcadi	*Dipcadi longifolium*	
Swamp grass	*Diplacne fusca*	
Dissotis	*Dissotus debilis*	
Dwarf dissotis	*Dissotus phaeotricha*	
Wild pear	*Dombeya kirkii*	
None	*Dorstenia psilurus*	
Kei-apple	*Dovyalis hispidula*	
None	*Drimiopsis burkei*	
Sundew	*Drosera sp*	
Common saffron	*Elaeodendron croceum*	
Natal milkplum	*Englerophytum natalense*	
Sea-bean	*Entada wahlbergii*	
Natal guarri	*Euclea natalensis*	
Dune myrtle	*Eugenia capensis*	
None	*Eulophia livingstoneana*	
None	*Eulophia seleensis*	
None	*Eulophia speciosa*	
Rubber euphorbia	*Euphorbia tirucalli*	Least Concern
None	*Fimbristylis obtusifolia*	
None	*Fuirena hirsuta*	
African mangosteen	*Garcinia livingstonei*	
Wild gardenia	*Gardenia ternifolia*	
Flame lily	*Gloriosa superba*	
Batchelor's button	*Gomphrena celosioides*	
Coastal Raisin bush	*Grewia glandulosa*	
White cross-berry	*Grewia pachycalyx*	
Small copalwood	*Guibourtia conjugata*	
Copalwood	*Guibourtia schliebenii*	Vulnerable

Common Name	Scientific Name	Conservation Status*
Common spike-thorn	*Gymnosporia buxifolia*	
False gardenia	*Heinsia crinita*	
None	*Helixanthera kirkii*	
Common dwarf wild hibiscus	*Hibiscus aethiopicus*	
Prickly tree hibiscus	*Hibiscus diversifolius*	
Prickly wild hibiscus creeper	*Hibiscus surattensis*	
Bladder hibiscus	*Hibiscus trionum*	
Orange bird berry	*Hoslundia opposita*	
Perdekloutjies	*Hydrocotyle bonariensis*	
Red-heart tree	*Hymenocardia ulmoides*	
Gardenia	*Hypericanthus sp*	
Yellow thatching grass	*Hyperthelia dissoluta*	
Northern lala palm	*Hyphaene petersiana*	(Endemic plant species)
None	*Hyptis suaveolens*	
Cottonwool grass	*Imperata cylindrica*	
None	*Indigofera eriocarpa*	
None	*Indigofera schimperi*	
Water ipomoea	*Ipomoea aquatica*	
Small pink ipomoea	*Ipomoea magnusiana*	
Dune morning glory	*Ipomoea pes-caprae*	
Munondo	*Julbernardia globiflora*	
None	*Juncus rigidus*	
Climbing turkey-berry	*Keetia gueinzii*	
Sausage tree	*Kigelia africana*	
White button sedge	*Kyllinga alata*	
False marula	*Lannea schweinfurthii*	
Lantana	*Lantana camara*	(Alien plant species)
Common ledebouria	*Ledebouria revoluta*	
Sand nightstar	*Leptactina delagoensis*	
Tonga mangrove	*Lumnitzera racemosa*	Least Concern
Mango	*Mangifera indica*	(Alien plant species)
Zulu milkberry	*Manilkara concolor*	
Forest milkberry	*Manilkara discolor*	
Pepper and salt	*Manulea parviflora*	
None	*Maprounea africana*	
None	*Mariscus solidus*	
Natal red top	*Melinis repens*	
Miniature morning glory	*Merremia tridentata*	
Giant sensitive plant	*Mimosa pigra*	
Milkwood	*Mimusops obtusifolia*	
African cucumber	*Momordica trifoliolata*	
Dwaba-berry	*Monanthotaxis caffra*	
Cork bush	*Mundulea sericea*	
None	*Murdannia simplex*	
Murdunnia	*Murdannia simplex*	
Kooboo-berry	*Mystroxylon aethiopicum*	
None	*Nervilia bicarinata*	
Blue waterlily	*Nymphaea nouchali*	Least Concern
Cape plane	*Ochna aborea*	
Sand plane	*Ochna kirkii*	
Plane tree	*Ochna mossambicensis*	
Natal plane	*Ochna natalitia*	
None	*Oldenlandia herbacea*	Least Concern
Starstalk	*Oxygonum buchananii*	
African resin tree	*Ozoroa insignis*	
Broad-leaved resin tree	*Ozoroa obovata*	
White buffalo grass	*Panicum coloratum*	
Guinea grass	*Panicum maximum*	
Mobola plum	*Parinari curatellifolia*	

Common Name	Scientific Name	Conservation Status*
None	*Pentodon pentadrus*	
Cat's tail	*Perotis patens*	
Knotweed	*Persicaria madagascariensis*	
Knotweed	*Persicaria salicifolium*	
None	*Platycoryne buchananiana*	
None	*Plectranthus gracillimus*	
Kudu-berry	*Pseudolachnostylis maprouneifolia*	
Guajava	*Psidium guajava*	(Alien plant species)
None	*Psorospermum febrifugum*	
Black bird-berry	*Psychotria capensis*	
Quar	*Psydrax livida*	
Stink bushwillow	*Pteleopsis myrtifolia*	
Forest burr	*Pupalia lappacea*	
None	*Pycreus nitidus*	
None	*Pycreus polystachyos*	Least Concern
Red mangrove	*Rhizophora mucronata*	Least Concern
Bushman's grape	*Rhoicissus tridentata*	
None	*Rhynchosia caribaea*	
None	*Rhynchosia minima*	Least Concern
None	*Rourea orientalis*	
Glasswort	*Salicornia pachystachya*	
Mother-in-law's-tongue	*Sanseviera hyacinthoides*	
Spikey mother-in-law's-tongue	*Sansevieria canaliculata*	
Fire-ball lily	*Scadoxus multiflorus*	
Marula	*Sclerocarya birrea*	
Glossy currant	*Searcia lucida*	
Large-flowered sebaea	*Sebaea grandis*	
None	*Senna sangueana*	
Wing-seeded sesame	*Sesamum alatum*	
Flannel weed	*Sida cordifolia*	
White milkwood	*Sideroxylon inerme*	
Thorny rope	*Smilax anceps*	
Bitter apple	*Solanum incanum*	(Alien plant species)
Poison apple	*Solanum panduriforme*	
Star-apple mangrove	*Sonneratia alba*	Least Concern
None	*Stathmostelma pedunculatum*	
African star-chestnut	*Sterculia africana*	
Chestnut tree	*Sterculia appendiculata*	(Endemic plant species)
Large witchweed	*Striga elegans*	
Witchweed	*Striga junodii*	
Black monkey orange	*Strychnos madagascariensis*	
Green monkey-orange	*Strychnos spinosa*	
Snake bean	*Swartzia madagascariensis*	
None	*Synaptolepis kirkii*	
Woodland umdoni	*Syzygium guineense*	
Tall khaki weed	*Tagetes minuta*	(Alien plant species)
Mistletoe	*Tapinanthus gracilis*	
Mistletoe	*Tapinanthus kraussianus*	
Natal mistletoe	*Tapinanthus natalitius*	
Climbing tarenna	*Tarenna junodii*	
Red grass	*Themeda triandra*	
None	*Tetracera boiviniana*	
Lagoon tulip tree	*Thespesia populnea*	
Giant spear grass	*Trachypogon spicatus*	
Pigeonwood	*Trema orientalis*	
None	*Triainolepis africana*	

Common Name	Scientific Name	Conservation Status*
Devil's-thorn	*Tribulus terrestris*	
Jackal coffee	*Tricalysia coriacea*	
Narrow-leaved mahobohobo	*Uapaca nitida*	
Lesser mahobohobo	*Uapaca sansibarica*	
Wild medlar	*Vangueria infausta*	
White ironwood	*Vepris lanceolata*	
Lowveld bitter-tea	*Vernonia colorata*	
Narrow-leaved wild sweetpea	*Vigna vexillata*	
Black plum	*Vitex doniana*	
Plum finger-leaf	*Vitex ferruginea*	
Chocolate berry	*Vitex payos*	
Wing bean	*Xeroderris stuhlmannii*	
Sourplum	*Ximenia caffra*	
Mangrove mahogany	*Xylocarpus moluscensis*	
African-dogrose	*Xylotheca tettensis*	
Common xyris	*Xyris capensis*	Least Concern
Couch grass	*Cynodon dactylon*	
Old man's beard	*Usnea sp*	

* The conservation status is based on the IUCN Red List of Threatened Species (2012), unless given in brackets.

Table 4.1 List of Expected Reptile Species

Common Name	Scientific Name	Conservation Status	Species Identified
Black-necked Tree Agama	*Acanthocercus cyanogaster / atricollis*	Least Concern	
Mozambique Agama	*Agama mossambica*		11
Katanga purple-glossed snake	*Amblyodipsas katangensis*		
Common purple-glossed snake	*Amblyodipsas polylepis*		
Lindi Sharp-snouted Worm Lizard	*Ancylocranium barkeri*		
Sharp-snouteded Worm Lizards	*Ancylocranium ionidesi*		
Cape centipede-eater	*Aparallactus capensis*	Least Concern	1
Black centipede-eater	*Aparallactus guentheri*		
Reticulated centipede-eater	*Aparallactus lunulatus*		
Usambara centipede-eater	*Aparallactus werneri*		
Bibron's burrowing asp	*Atractaspis bibronii*		
Puff adder	*Bitis arietans*		1
Gaboon vip	*Bitis gabonica*		
Loggerhead sea turtle	*Caretta caretta*	Endangered	
Snouted night adder	*Causus defilippi*		
Flap-necked Chameleon	*Chamaeleo dilepis*	Least Concern	4
Meller's Chameleon	*Chamaeleo melleri*		2
Green sea turtle	*Chelonia mydas*	Endangered	
Butler's two-headed snake	*Chilorhinophis butleri*		
Mbanja Worm Lizard	*Chirindia ewerbecki*		
Nchingidi Worm Lizard	*Chirindia rondoensis*		
Swynnerton's Worm Lizard	*Chirindia swynnertoni*		
Tropical Spinytail Lizard	*Cordylus tropidosternum*		
Nile crocodile	*Crocodylus niloticus*	Lower Risk/ Least Concern	4
Herald Snake	*Crotaphopeltis hotamboeia*		18
Tornier's cat snake	*Crotaphopeltis tornieri*		
Snake-eyed Skink	*Cryptoblepharus boutonii*	Data Deficient	5
Zambezi Soft-shelled Turtle	*Cycloderma frenatum*	Lower Risk/ Near Threatened	
East African Egg-eating Snake	*Dasypeltis medici*		2
Rhombic Egg Eating Snake	*Dasypeltis scabra*	Least Concern	
Common Mamba	*Dendroaspis angusticeps*		
Black Mamba	*Dendroaspis polylepis*	Least Concern	
Leatherback Sea Turtle	*Dermochelys coriacea*	Critically Endangered	
Court Tree Snake	*Dipsadoboa aulica*		
Cross-barred Tree Snake	*Dipsadoboa flavida*		
Shreve's Tree Snake	*Dipsadoboa shrevei*		
Boomslang	*Dispholidus typus*		
Boulenger's Garter Snake	*Elapsoidea boulengeri*		1
Hawksbill Sea Turtle	*Eretmochelys imbricata*	Critically Endangered	
Keelbelly Ground Lizard	*Gastropholis vittata*		
Leopard tortoise	*Geochelone pardalis (Stigmochelys pardalis)*		

Common Name	Scientific Name	Conservation Status	Species Identified
Rough-scaled Plated Lizard	*Gerrhosaurus major*		
Black-lined Plated Lizard	*Gerrhosaurus nigrolineatus/flavigullaris*		29
Wood Slave	*Hemidactylus mabouia*		6
Flathead Leaf-toed Gecko	*Hemidactylus platycephalus*		7
Bark Snake	*Hemirhagerrhis nototaenia*	Least Concern	
East African Fringe-Tailed Forest Lizard	*Holaspis guentheri / laevis*		
Common Rough-scaled Lizard	*Ichnotropis squamulosa*		
Bell's Hinged Tortoise	*Kinixys belliana*		
African House Snake	*Lamprophis fuliginosus (Boaedon capensis)*		2
Johnston's Long-tailed Lizard	*Latastia johnstoni*		
Emin Pasha's Worm Snake	*Leptotyphlops emini*		
Long-tailed thread snake	*Leptotyphlops longicaudus*		
Shielded Blind Snake	*Leptotyphlops scutifrons*		
Round-Snouted Worm Lizard	*Loveridgea ionidesi*		
Wolf Snake	*Lycophidion capense*	Least Concern	
Flat-snouted Wolf Snake	*Lycophidion depressirostre*		
Angola Dwarf Gecko	*Lygodactylus angolensis*		
Cape Yellow-headed Gecko	*Lygodactylus capensis*		9
Yellow-headed Dwarf Gecko	*Lygodactylus luteopicturatus*		21
Peters' Eyelid Skink	*Lygosoma afrum*		4
Sundevall's Writhing Skink	*Lygosoma sundevalli (Mochlus sundevalli)*	Least Concern	
Cape File Snake	*Mehelya capensis (Gonionotophis capensis)*	Least Concern	
Nyassa File Snake	*Mehelya nyassae (Gonionotophis nyassae)*	Least Concern	2
Semiornate snake	*Meizodon semiornatus*		
Loveridge's Limbless Skink	*Melanoseps loveridgei*		
Rondo Limbless Skink	*Melanoseps rondoensis*		
Forest Cobra	*Naja melanoleuca*		
Mozambique Spitting Cobra	*Naja mossambica*		1
Blackneck Spitting Cobra	*Naja nigricollis*		
Olive Marsh Snake	*Natriciteres olivacea*	Least Concern	
Forest Marsh Snake	*Natriciteres sylvatica*		
Uganda Savannah Lizard	*Nucras boulengeri*		
Ornate Scrub Lizard	*Nucras ornata*		
Zambezi Thick-toed Gecko	*Pachydactylus tetensis (Elasmodactylus tetensis)*	Least Concern	
Turner's Thick-toed Gecko	*Pachydactylus turneri (Chondrodactylus turneri)*		
Wahlberg's Snake-eyed Skink	*Panaspis wahlbergii (Afroablepharus wahlbergii)*		15
Yellow-bellied sea snake	*Pelamis platurus*	Least Concern	
Yellow-bellied mud turtle	*Pelusios castanoides*	Lower Risk/ Least Concern	
Serrated hinged terrapin	*Pelusios sinuatus*		
Angola green snake	*Philothamnus angolensis*		
Green water snake	*Philothamnus hoplogaster*		
Usambara Green Snake	*Philothamnus macrops*		
Spotted Green Snake	*Philothamnus punctatus*		7
Spotted Bush Snake	*Philothamnus semivariegatus*		

Common Name	Scientific Name	Conservation Status	Species Identified
Spotted Flat Lizard	*Platysaurus maculatus*		
Pitman's Shovelsnout Snake	*Prosymna pitmani*		
East African Shovel-Snout	*Prosymna stuhlmanni*		2
Dwarf Sand Snake	*Psammophis angolensis*		
Olive Grass Snake	*Psammophis mossambicus*		6
Eastern Stripe-Bellied Sand Snake	*Psammophis orientalis*		16
Striped Skaapsteker	*Psammophylax tritaeniatus*	Least Concern	
Southern African Python	*Python natalensis*		
Brahminy Blind Snake	*Ramphotyphlops braminus*		
Rufous Beaked Snake	*Rhamphiophis rostratus*		1
African Stumptail Chameleon	*Rhampholeon brachyurus*		
Bearded leaf chameleon	*Rhampholeon brevicaudatus*		
Schlegel's beaked blind snake	*Rhinotyphlops mucroso*		11
Litipo Sand Skink	*Scolecoseps litipoensis*		
Four-fingered Skink	*Sepsina tetradactyla*		
Tiger snake	*Telescopus semiannulatus*		
Eastern Twig	*Thelotornis mossambicanus*		2
Boulenger's Mabuya	*Mabuya boulengeri (Trachylepis boulengeri)*		1
Speckle-lipped Skink	*Mabuya maculilabris (Trachylepis maculilabris)*		11
African Rock Blue Tail Skink	*Mabuya mageritifer (Trachylepis mageritifer)*		
Striped Skink	*Mabuya striata (Trachylepis striata)*	Least Concern	1
Variable Skink	*Mabuya varia (Trachylepis varia)*		19
Rondo Worm Snake	*Typhlops rondoensis*		
None	*Typhlops tanganicus*		
None	*Typhlosaurus/Acontias spp. nov.*		4
White-throated Monitor	*Varanus albigularis*		4
Nile Monitor	*Varanus niloticus*		3
	Unidentified amphisbaenian		5
Total number of species identified during fieldwork			**36**
Total number of individuals identified during fieldwork			**238**

* The conservation status is based on the IUCN Red List of Threatened Species (2012).

Table 4.2 List of Expected Amphibian Species

Common Name	Scientific Name	Conservation Status *	Species Identified
Snoring Spiny Reed Frog	*Afrixalus crotalus*	Least Concern	1
Delicate Spiny Reed Frog	*Afrixalus delicatus*	Least Concern	5
Fornasini's Spiny Reed Frog	*Afrixalus fornasini*	Least Concern	5
Dwarf Squeaker Frog	*Arthrleptella xenodactyloides*		
Common Squeaker	*Arthroleptis stenodactylus*	Least Concern	21
Common Rain Frog	*Breviceps adspersus*	Least Concern	1
Mozambique rain frog	*Breviceps mossambicus*	Least Concern	4
Garman's toad	*Bufo garmani (Amietophrynus garmani)*	Least Concern	1
African Common Toad	*Bufo gutturalis (Amietophrynus gutturalis)*	Least Concern	
Dar es Salaam Toad	*Bufo lindneri (Mertensophryne lindneri)*	Least Concern	3
Hallowell's toad	*Bufo maculatus (Amietophrynus maculatus)*	Least Concern	24
Black-chested Dwarf Toad	*Bufo taitanus (Mertensophryne taitanus)*	Least Concern	1
Grey Foam-nest Treefrog	*Chiromantis xerampelina*	Least Concern	2
Guinea Snout-burrower	*Hemisus guineiensis*		
Marbled Snout-burrower	*Hemisus marmoratus*	Least Concern	55
Southern Ornate Frog	*Hildebrandtia ornata*	Least Concern	1
Galam White-lipped Frog	*Hylarana galamensis*	Least Concern	14
Sharp-nosed Reed Frog	*Hyperolius acuticeps*	Least Concern	1
Argus reed frog	*Hyperolius argus*	Least Concern	2
Painted reed fro	*Hyperolius marmoratus taeniatus*	Least Concern	5
Mitchell's Reed frog	*Hyperolius mitchelli*	Least Concern	
Parker's Reed Frog	*Hyperolius parkeri*	Least Concern	4
Spotted Reed Frog	*Hyperolius puncticulatus*	Endangered	
Translucent Tree Frog	*Hyperolius pusillus*	Least Concern	1
Five-lined Sedgefrog	*Hyperolius quinquevittatus*	Least Concern	
Green Reed Frog	*Hyperolius tuberilinguis*	Least Concern	4
Red-Legged Kassina	*Kassina maculata*	Least Concern	5
Senegal Running Frog	*Kassina senegalensis*	Least Concern	43
Bagamoyo Forest Tre	*Leptopelis argenteus*	Least Concern	
Bocage's Frog	*Leptopelis bocagii*	Least Concern	
Broadley's Forest Treefrog	*Leptopelis broadleyi*	Least Concern	7
Yellow-spotted Treefrog	*Leptopelis flavomaculatus*	Least Concern	
Loveridge's snouted toad	*Mertensophryne micranotis*	Least Concern	
Zanzibar puddle frog	*Phrynobatrachus acridoides*	Least Concern	13
Dwarf Puddle Frog	*Phrynobatrachus mababiensis*	Least Concern	1
Common puddle frog	*Phrynobatrachus natalensis*	Least Concern	14
Red-Banded Rubber Frog	*Phrynomantis bifasciatus*	Least Concern	9
Anchieta's Ridged Frog	*Ptychadena anchietae*	Least Concern	2
None	*Ptychadena guinea*		71
Mascarene Frog	*Ptychadena mascareniensis*	Least Concern	2
Mozambique Ridged Frog	*Ptychadena mossambica*	Least Concern	4
Sharp-nosed Frog	*Ptychadena oxyrhynchus*	Least Concern	4
Schilluk Ridged Frog	*Ptychadena schillukorum*	Least Concern	1
Small Ridged Frog	*Ptychadena taenioscelis*	Least Concern	2
Edible Bullfrog	*Pyxicephalus edulis*	Least Concern	6
African Red Toad	*Schismaderma carens*	Least Concern	
None	*Spaeleophryne methneri*		
Loveridge's forest toad	*Stephopaedes loveridgei*	Least Concern	
Muller's clawed frog	*Xenopus muelleri*	Least Concern	3

Common Name	Scientific Name	Conservation Status *	Species Identified
Total number of species identified during fieldwork			**36**
Total number of individuals identified during fieldwork			**342**

* The conservation status is based on the IUCN Red List of Threatened Species (2012).

Table 5.1 List of Expected Protected Birds

Common Name	Scientific Name	Conservation Status*
Blue Quail	*Coturnix adansonii*	Locally Threatened
Southern Ground-Hornbill	*Bucorvus leadbeateri*	Vulnerable
Barn Owl	*Tyto alba*	Least Concern
Southern White-faced Scops-Owl	*Ptilopsus granti*	Least Concern
Spotted Eagle-Owl	*Bubo africanus*	Least Concern
Verreaux's Eagle-Owl	*Bubo lacteus*	Least Concern
African Wood-Owl	*Strix woodfordii*	Least Concern
African Barred Owlet	*Glaucidium capense*	Least Concern
Wattled Crane	*Grus carunculatus*	Vulnerable
Eurasian Curlew	*Numenius arquata*	Near Threatened
Madacascar Pratincole	*Glareola ocularis*	Vulnerable
African Skimmer	*Rynchops flavirostris*	Near Threatened
Caspian Tern	*Sterna caspia*	Least Concern
Lesser Crested Tern	*Sterna bengalensis*	Least Concern
Swift Tern	*Sterna bergii*	Least Concern
Common Tern	*Sterna hirundo*	Least Concern
Little Tern	*Sterna albifrons*	Least Concern
Osprey	*Pandion haliaetus*	Least Concern
African Cuckoo Hawk	*Aviceda cuculoides*	Least Concern
European Honey-Buzzard	*Pernis apivorus*	Least Concern
Black-shouldered Kite	*Elanus caeruleus*	Least Concern
Black Kite	*Milvus [migrans] migrans*	Least Concern
Yellow-billed Kite	*Milvus [migrans] parasitus*	
African Fish-Eagle	*Haliaeetus vocifer*	Least Concern
Palm-nut Vulture	*Gypohierax angolensis*	Least Concern
Black-chested Snake-Eagle	*Circaetus pectoralis*	Least Concern
Brown Snake-Eagle	*Circaetus cinereus*	Least Concern
Southern Banded Snake-Eagle	*Circaetus fasciolatus*	Near Threatened
Bateleur	*Terathopius ecaudatus*	Near Threatened
African Harrier-Hawk	*Polyboroides typus*	Least Concern
Lizard Buzzard	*Kaupifalco monogrammicus*	Least Concern
Dark Chanting Goshawk	*Melierax metabates*	Least Concern
African Goshawk	*Accipiter tachiro*	Least Concern
Shikra	*Accipiter badius*	Least Concern
Little Sparrowhawk	*Accipiter minullus*	Least Concern
Black Sparrowhawk	*Accipiter melanoleucus*	Least Concern
Steppe Buzzard	*Buteo vulpinus*	Least Concern
Steppe Eagle	*Aquila nipalensis*	Least Concern
Ayres's Hawk-Eagle	*Aquila ayresii*	
Wahlberg's Eagle	*Aquila wahlbergi*	Least Concern
Martial Eagle	*Polemaetus bellicosus*	Near-Threatened
Long-crested Eagle	*Lophaetus occipitalis*	Least Concern
Dickinson's Kestrel	*Falco dickinsoni*	Least Concern
Sooty Falcon	*Falco concolor*	Near Threatened
Eurasian Hobby	*Falco subbuteo*	Least Concern
Black Heron	*Egretta ardesiaca*	Least Concern
Little Egret	*Egretta garzetta*	Least Concern
Yellow-billed Egret	*Egretta intermedia*	
Great Egret	*Egretta alba*	
Western Reef Heron	*Egretta gularis*	Least Concern
Dimorphic Egret	*Egretta dimorpha*	

Common Name	Scientific Name	Conservation Status*
Grey Heron	*Ardea cinerea*	Least Concern
Black-headed Heron	*Ardea melanocephala*	Least Concern
Purple Heron	*Ardea purpurea*	Least Concern
Cattle Egret	*Bubulcus ibis*	Least Concern
Squacco Heron	*Ardeola ralloides*	Least Concern
Malagasy Pond-Heron	*Ardeola idae*	Endangered
Rufous-bellied Heron	*Ardeola rufiventris*	Least Concern
Green-backed Heron	*Butorides striata*	Least Concern
Black-crowned Night-Heron	*Nycticorax nycticorax*	Least Concern
Little Bittern	*Ixobrychus minutus*	Least Concern
Yellow-billed Stork	*Mycteria ibis*	Least Concern
African Openbill	*Anastomus lamelligerus*	Least Concern
Woolly-necked Stork	*Ciconia episcopus*	Least Concern
Saddle-billed Stork	*Ephippiorhynchus senegalensis*	Least Concern
Plain-backed Sunbird	*Anthreptes reichenowi*	Near-Threatened
Red-headed Quelea	*Quelea erythrops*	Least Concern (Locally Threatened)
Locustfinch	*Paludipasser locustella*	(Locally Threatened)

* The conservation status is based on the IUCN Red List of Threatened Species (2012), unless given in brackets.

Table 5.2 Biome Biome-restricted Species (according to Parker, 2001)

Common Name	Scientific Name	Biome Type	Habitat
Dickinson's Kestrel	*Falco dickinsoni*	Zambezian	Palm savannah
Southern Banded snake-eagle	*Circaetus fasciolatus*	East African Coast	Dense Berlinia orientalis woodland - limited by large trees
Brown-hooded Parrot	*Poicephalus cryptoxanthus*	East African Coast	Open woodland with fruit trees
Mangrove Kingfisher	*Halcyon senegaloides*	East African Coast	Mangrove forest and adjacent dense woodland
Brown-breasted Barbet	*Lybius melanopterus*	East African Coast	Most habitat types, and mangrove trees invested with mistletoes
Fischer's Greenbul	*Phyllastrephus fischeri*	East African Coast	Closed Berlinia orientalis woodland/forest
Gorgeous Bush Shrike	*Telophorus quadricolor*	East African Coast	Mainly coastal thicket and dense woodland
Chestnut-fronted Helmet-shrike	*Prionops scopifrons*	East African Coast	Mature broad-leaved woodland and Berlinia orientalis forest
Pale Batis	*Batis soror*	East African Coast	All woodland habitat types
Plain-backed Sunbird	*Anthreptes reichenowi*	East African Coast	Mature woodland
Grey Sunbird	*Cinnyris veroxii*	East African Coast	Closed woodland and mangrove forest
Lesser Seedcracker	*Pyrenestes minor*	East African Coast	Mature woodland and adjacent dambos
Zanzibar Red Bishop	*Euplectes nigroventris*	East African Coast	Wetlands
Black-bellied Starling	*Lamprotornis corruscus*	East African Coast	Closed woodland
Kurrichane Thrush	*Turdus libonyana*	Zambezian	Dense woodland

Common Name	Scientific Name	Biome Type	Habitat
Stierling's Barred Warbler	*Calamonastes stierlingi*	Zambezian	Open woodland
White-bellied Sunbird	*Cinnyris talatala*	Zambezian	Varied
Broad-tailed Paradise Whydah	*Vidua obtusa*	Zambezian	Broad-leaved woodland

Table 5.3 List of Bird Species Identified During Baseline Surveys (Conducted on 11-18 October 2011, 08-20 December 2011 and 29 March - 05 April 2012)

Family	Common Name	Scientific Name	Conservation Status *
Phasianide	Crested (Kirk's) Francolin	*Dendroperdix sephaena rovuma*	
	Natal Spurfowl	*Pternistis natalensis*	
	Red-necked Spurfowl	*Pternistis afer*	
	Harlequin Quail	*Coturnix delegorguei*	Least Concern
	Blue Quail	*Coturnix adansonii*	
Numididae	Crested Guineafowl	*Guttera edouardi*	
	Helmeted Guineafowl	*Numida meleagris*	Least Concern
Dendrocygnidae	White-faced Duck	*Dendrocygna viduata*	Least Concern
	White-backed Duck	*Thalassornis leuconotus*	Least Concern
Anatidae	Egyptian Goose	*Alopochen aegyptiaca*	Least Concern
	Spur-winged Goose	*Plectropterus gambensis*	Least Concern
	African Pygmy-goose	*Nettapus auritus*	Least Concern
	Red-billed Teal	*Anas erythrorhyncha*	Least Concern
Turnicidae	Kurrichane Buttonquail	*Turnix sylvaticus*	Least Concern
Indicatoridae	Scaly-throated Honeyguide	*Indicator variegatus*	Least Concern
	Greater Honeyguide	*Indicator indicator*	Least Concern
	Lesser Honeyguide	*Indicator minor*	Least Concern
Picidae	Speckle-throated Woodpecker	*Campethera scriptoricauda*	
	Golden-tailed Woodpecker	*Campethera abingoni*	Least Concern
	Green-backed Woodpecker	*Campethera cailliautii*	Least Concern
	Cardinal Woodpecker	*Dendropicos fuscescens*	Least Concern
Lybiidae	Yellow-rumped Tinkerbird	*Pogoniulus bilineatus*	Least Concern
	Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*	Least Concern
	Black-collared Barbet	*Lybius torquatus zombae*	
	Brown-breasted Barbet	*Lybius melanopterus*	Least Concern
Bucerotidae	Crowned Hornbill	*Tockus alboterminatus*	Least Concern
	African Grey Hornbill	*Tockus nasutus*	Least Concern
	Trumpeter Hornbill	*Bycanistes bucinator*	Least Concern
	Silvery-cheeked Hornbill	*Bycanistes brevis*	Least Concern
Bucorvidae	Southern Ground-Hornbill	*Bucorvus leadbeateri*	Vulnerable
Upupidae	African Hoopoe	*Upupa africana*	
Phoeniculidae	Green Wood-Hoopoe	*Phoeniculus purpureus*	Least Concern
Rhinopomastidae	Common Scimitarbill	*Rhinopomastus cyanomelas*	Least Concern
Trogonidae	Narina Trogon	*Apaloderma narina*	Least Concern
Coraciidae	Lilac-breasted Roller	*Coracias caudatus*	Least Concern
	Purple Roller	*Coracias naevius*	
	Broad-billed Roller	*Eurystomus glaucurus*	Least Concern
Alcedinidae	Malachite Kingfisher	*Alcedo cristata*	Least Concern
	African Pygmy-Kingfisher	*Ispidina picta*	Least Concern
Dacelonidae	Grey-headed Kingfisher	*Halcyon leucocephala*	Least Concern
	Woodland Kingfisher	*Halcyon senegalensis*	Least Concern
	Mangrove Kingfisher	*Halcyon senegaloides*	Least Concern
	Brown-hooded Kingfisher	*Halcyon albiventris*	Least Concern
	Striped Kingfisher	*Halcyon chelicuti*	Least Concern

Family	Common Name	Scientific Name	Conservation Status *
Cerylidae	Giant Kingfisher	*Megaceryle maximus*	
	Pied Kingfisher	*Ceryle rudis*	Least Concern
Meropidae	White-fronted Bee-eater	*Merops bullockoides*	Least Concern
	Little Bee-eater	*Merops pusillus*	Least Concern
	Swallow-tailed Bee-eater	*Merops hirundineus*	Least Concern
	Blue-cheeked Bee-eater	*Merops persicus*	Least Concern
	Madagascar Bee-eater	*Merops superciliosus*	Least Concern
	European Bee-eater	*Merops apiaster*	Least Concern
Coliidae	Red-faced Mousebird	*Urocolius indicus*	Least Concern
Cuculidae	Red-chested Cuckoo	*Cuculus solitarius*	Least Concern
	Black Cuckoo	*Cuculus clamosus*	Least Concern
	Common Cuckoo	*Cuculus canorus*	Least Concern
	African Cuckoo	*Cuculus gularis*	Least Concern
	Barred Long-tailed Cuckoo	*Cercococcyx montanus*	Least Concern
	Klaas's Cuckoo	*Chrysococcyx klaas*	Least Concern
	African Emerald Cuckoo	*Chrysococcyx cupreus*	Least Concern
	Diderick Cuckoo	*Chrysococcyx caprius*	Least Concern
Centropodidae	Green Malkoha	*Ceuthmochares aereus*	Least Concern
	Black Coucal	*Centropus grillii*	Least Concern
	Burchell's Coucal	*Centropus burchellii*	
Psittacidae	Brown-headed Parrot	*Poicephalus cryptoxanthus*	Least Concern
Apodidae	African Palm-Swift	*Cypsiurus parvus*	Least Concern
	Common Swift	*Apus apus*	Least Concern
	Little Swift	*Apus affinis*	Least Concern
	White-rumped Swift	*Apus caffer*	Least Concern
Musophagidae	Livingstone's Turaco	*Tauraco livingstonii*	Least Concern
	Purple-crested Turaco	*Gallirex porphyreolophus*	
	Grey Go-away-bird	*Corythaixoides concolor*	Least Concern
Tytonidae	Barn Owl	*Tyto alba*	Least Concern
Strigidae	Southern White-faced Scops-Owl	*Ptilopsus granti*	
	Spotted Eagle-Owl	*Bubo africanus*	Least Concern
	Verreaux's Eagle-Owl	*Bubo lacteus*	Least Concern
	African Wood-Owl	*Strix woodfordii*	Least Concern
	African Barred Owlet	*Glaucidium capense*	Least Concern
Caprimulgidae	Fiery-necked Nightjar	*Caprimulgus pectoralis*	Least Concern
	Square-tailed Nightjar	*Caprimulgus fossii*	Least Concern
	European Nightjar	*Caprimulgus europaeus*	Least Concern
Columbidae	Laughing Dove	*Streptopelia senegalensis*	
	Cape Turtle-Dove	*Streptopelia capicola*	Least Concern
	Red-eyed Dove	*Streptopelia semitorquata*	Least Concern
	Emerald-spotted Wood-Dove	*Turtur chalcospilos*	Least Concern
	Tambourine Dove	*Turtur tympanistria*	Least Concern
	African Green-Pigeon	*Treron calvus*	Least Concern
Oditidae	Red-crested Korhaan	*Lophotis ruficrista*	
	Black-bellied Bustard	*Lissotis melanogaster*	
Gruidae	Wattled Crane	*Grus carunculatus*	
Rallidae	Red-chested Flufftail	*Sarothrura rufa*	Least Concern
	African Rail	*Rallus caerulescens*	Least Concern
	African Crake	*Crecopsis egregia*	Least Concern
	Black Crake	*Amaurornis flavirostris*	
	African Purple Swamphen	*Porphyrio madagascariensis*	
	Allen's Gallinule	*Porphyrio alleni*	Least Concern
	Lesser Moorhen	*Gallinula angulata*	Least Concern
Scolopacidae	Bar-tailed Godwit	*Limosa lapponica*	Least Concern
	Common Whimbrel	*Numenius phaeopus*	
	Eurasian Curlew	*Numenius arquata*	
	Marsh Sandpiper	*Tringa stagnatilis*	

Family	Common Name	Scientific Name	Conservation Status *
	Common Greenshank	*Tringa nebularia*	
	Green Sandpiper	*Tringa ochropus*	
	Wood Sandpiper	*Tringa glareola*	
	Terek Sandpiper	*Xenus cinereus*	
	Common Sandpiper	*Actitis hypoleucos*	
	Ruddy Turnstone	*Arenaria interpres*	
	Sanderling	*Calidris alba*	
	Little Stint	*Calidris minuta*	
	Curlew Sandpiper	*Calidris ferruginea*	
	Ruff	*Philomachus pugnax*	
Jacanidae	African Jacana	*Actophilornis africanus*	
	Lesser Jacana	*Microparra capensis*	
Burhinidae	Water Thick-knee	*Burhinus vermiculatus*	
Recurvirostridae	Black-winged Stilt	*Himantopus himantopus*	
Charadriidae	Grey Plover	*Pluvialis squatarola*	
	Common Ringed Plover	*Charadrius hiaticula*	
	Kittlitz's Plover	*Charadrius pecuarius*	
	Three-banded Plover	*Charadrius tricollaris*	
	White-fronted Plover	*Charadrius marginatus*	
	Lesser Sand Plover	*Charadrius mongolus*	
	Greater Sand Plover	*Charadrius leschenaultii*	
	Blacksmith Lapwing	*Vanellus armatus*	
	Senegal Lapwing	*Vanellus lugubris*	
	Crowned Lapwing	*Vanellus coronatus*	
Dromadidae	Crab Plover	*Dromas ardeola*	
Glareolidae	Bronze-winged Courser	*Rhinoptilus chalcopterus*	
	Collared Pratincole	*Glareola pratincola*	
	Madacascar Pratincole	*Glareola ocularis*	
Rhynchopidae	African Skimmer	*Rynchops flavirostris*	
Laridae	Caspian Tern	*Sterna caspia*	
	Lesser Crested Tern	*Sterna bengalensis*	
	Swift Tern	*Sterna bergii*	
	Common Tern	*Sterna hirundo*	
	Little Tern	*Sterna albifrons*	
Accipitridae	Osprey	*Pandion haliaetus*	
	African Cuckoo Hawk	*Aviceda cuculoides*	
	European Honey-Buzzard	*Pernis apivorus*	
	Black-shouldered Kite	*Elanus caeruleus*	
	Black Kite	*Milvus [migrans] migrans*	
	Yellow-billed Kite	*Milvus [migrans] parasitus*	
	African Fish-Eagle	*Haliaeetus vocifer*	
	Palm-nut Vulture	*Gypohierax angolensis*	
	Black-chested Snake-Eagle	*Circaetus pectoralis*	
	Brown Snake-Eagle	*Circaetus cinereus*	
	Southern Banded Snake-Eagle	*Circaetus fasciolatus*	
	Bateleur	*Terathopius ecaudatus*	
	African Harrier-Hawk	*Polyboroides typus*	
	Lizard Buzzard	*Kaupifalco monogrammicus*	
	Dark Chanting Goshawk	*Melierax metabates*	
	African Goshawk	*Accipiter tachiro*	
	Shikra	*Accipiter badius*	
	Little Sparrowhawk	*Accipiter minullus*	
	Black Sparrowhawk	*Accipiter melanoleucus*	
	Steppe Buzzard	*Buteo vulpinus*	
	Steppe Eagle	*Aquila nipalensis*	
	Ayres's Hawk-Eagle	*Aquila ayresii*	
	Wahlberg's Eagle	*Aquila wahlbergi*	
	Martial Eagle	*Polemaetus bellicosus*	

Family	Common Name	Scientific Name	Conservation Status *
	Long-crested Eagle	*Lophaetus occipitalis*	
Falconidae	Dickinson's Kestrel	*Falco dickinsoni*	
	Sooty Falcon	*Falco concolor*	
	Eurasian Hobby	*Falco subbuteo*	
Podicipedidae	Little Grebe	*Tachybaptus ruficollis*	
Sulidae	Red-footed Booby	*Sula sula*	
Phalacrocoracidae	Reed Cormorant	*Phalacrocorax africanus*	
Ardeidae	Black Heron	*Egretta ardesiaca*	
	Little Egret	*Egretta garzetta*	
	Yellow-billed Egret	*Egretta intermedia*	
	Great Egret	*Egretta alba*	
	Western Reef Heron	*Egretta gularis*	
	Dimorphic Egret	*Egretta dimorpha*	
	Grey Heron	*Ardea cinerea*	
	Black-headed Heron	*Ardea melanocephala*	
	Purple Heron	*Ardea purpurea*	
	Cattle Egret	*Bubulcus ibis*	
	Squacco Heron	*Ardeola ralloides*	
	Malagasy Pond-Heron	*Ardeola idae*	
	Rufous-bellied Heron	*Ardeola rufiventris*	
	Green-backed Heron	*Butorides striata*	
	Black-crowned Night-Heron	*Nycticorax nycticorax*	
	Little Bittern	*Ixobrychus minutus*	
Scopidae	Hamerkop	*Scopus umbretta*	
Treshkiornithidae	Hadeda Ibis	*Bostrychia hagedash*	
	African Sacred Ibis	*Threskiornis aethiopicus*	
Plataleidae	African Spoonbill	*Platalea alba*	
Ciconidae	Yellow-billed Stork	*Mycteria ibis*	
	African Openbill	*Anastomus lamelligerus*	
	Woolly-necked Stork	*Ciconia episcopus*	
	Saddle-billed Stork	*Ephippiorhynchus senegalensis*	
Fregatidae	Greater Frigatebird	*Fregata minor*	
Erylaimidae	African Broadbill	*Smithornis capensis*	
Oriolidae	Eurasian Golden Oriole	*Oriolus oriolus*	
	African Golden Oriole	*Oriolus auratus*	
	Black-headed Oriole	*Oriolus larvatus*	
Dicruridae	Square-tailed Drongo	*Dicrurus ludwigii*	
	Fork-tailed Drongo	*Dicrurus adsimilis*	
Monarchidae	Blue-mantled Crested Flycatcher	*Trochocercus cyanomelas*	
	African Paradise-Flycatcher	*Terpsiphone viridis*	
Malaconotidae	Brubru	*Nilaus afer*	
	Black-backed Puffback	*Dryoscopus cubla*	
	Black-crowned Tchagra	*Tchagra senegalus*	
	Brown-crowned Tchagra	*Tchagra australis*	
	Tropical Boubou	*Laniarius aethiopicus*	
	Orange-breasted Bush-Shrike	*Telophorus sulfureopectus*	
	Gorgeous Bush-Shrike	*Telophorus quadricolor*	
	Grey-headed Bush-Shrike	*Malaconotus blanchoti*	
	White-crested Helmet-Shrike	*Prionops plumatus*	
	Retz's Helmet-Shrike	*Prionops retzii*	
	Chestnut-fronted Helmet-Shrike	*Prionops scopifrons*	
	Black-and-white Flycatcher	*Bias musicus*	
	Chinspot Batis	*Batis molitor*	

Family	Common Name	Scientific Name	Conservation Status *
	Pale Batis	*Batis soror*	
	Short-tailed Batis	*Batis sp. nr. B. mixta reichnowi*	
	Eastern Black-headed Batis	*Batis minor*	
	Black-throated Wattle-eye	*Platysteira peltata*	
Corvidae	Pied Crow	*Corvus albus*	
Laniidae	Red-backed Shrike	*Lanius collurio*	
Campephagidae	White-breasted Cuckooshrike	*Coracina pectoralis*	
	Black Cuckooshrike	*Campephaga flava*	
Paridae	Grey Penduline-Tit	*Anthoscopus caroli*	
	Southern Black Tit	*Parus niger*	
Hirundinidae	Brown-throated Martin	*Riparia paludicola*	
	Barn Swallow	*Hirundo rustica*	
	Wire-tailed Swallow	*Hirundo smithii*	
	Greater Striped Swallow	*Hirundo cucullata*	
	Lesser Striped Swallow	*Hirundo abyssinica*	
	Mosque Swallow	*Hirundo senegalensis*	
	Common House-Martin	*Delichon urbicum*	
	Eastern Saw-wing	*Psalidoprocne orientalis*	
Pycnonotidae	Dark-capped Bulbul	*Pycnonotus tricolor*	
	Sombre Greenbul	*Andropadus importunus*	
	Yellow-bellied Greenbul	*Chlorocichla flaviventris*	
	Terrestrial Brownbul	*Phyllastrephus terrestris*	
	Fischer's Greenbul	*Phyllastrephus fischeri*	
	Eastern Nicator	*Nicator gularis*	
Sylviidae	Livingstone's Flycatcher	*Erythrocercus livingstonei*	
	Eurasian Reed-Warbler	*Acrocephalus scirpaceus*	
	Marsh Warbler	*Acrocephalus palustris*	
	Lesser Swamp-Warbler	*Acrocephalus gracilirostris*	
	Yellow-bellied Eremomela	*Eremomela icteropygialis*	
	Green-capped Eremomela	*Eremomela scotops*	
	Red-faced Crombec	*Sylvietta whytii*	
	Willow Warbler	*Phylloscopus trochilus*	
	Arrow-marked Babbler	*Turdoides jardineii*	
Zosteropidae	African Yellow White-eye	*Zosterops senegalensis*	
Cisticolidae	Red-faced Cisticola	*Cisticola erythrops*	
	Singing Cisticola	*Cisticola cantans*	
	Rattling Cisticola	*Cisticola chiniana*	
	Croaking Cisticola	*Cisticola natalensis*	
	Neddicky	*Cisticola fulvicapilla*	
	Short-winged Cisticola	*Cisticola brachypterus*	
	Zitting Cisticola	*Cisticola juncidis*	
	Tawny-flanked Prinia	*Prinia subflava*	
	Red-winged Warbler	*Heliolais erythropterus*	
	Yellow-breasted Apalis	*Apalis flavida*	
	Green-backed Camaroptera	*Camaroptera brachyura*	
	Stierling's Wren-Warbler	*Calamonastes stierlingi*	
Alaudidae	Flappet Lark	*Mirafra rufocinnamomea*	
Muscicapidae	Kurrichane Thrush	*Turdus libonyanus*	
	Pale Flycatcher	*Bradornis pallidus*	
	Southern Black Flycatcher	*Melaenornis pammelaina*	
	Spotted Flycatcher	*Muscicapa striata*	
	Ashy Flycatcher	*Muscicapa caerulescens*	
	Grey Tit-Flycatcher	*Myioparus plumbeus*	
	White-browed Robin-Chat	*Cossypha heuglini*	
	Red-capped Robin-Chat	*Cossypha natalensis*	
	Collared Palm-Thrush	*Cichladusa arquata*	
	Bearded Scrub-Robin	*Cercotrichas quadrivirgata*	

Family	Common Name	Scientific Name	Conservation Status *
	White-browed Scrub-Robin	*Cercotrichas leucophrys*	
Sturnidae	Black-bellied Starling	*Lamprotornis corruscus*	
	Violet-backed Starling	*Cinnyricinclus leucogaster*	
Nectariniidae	Plain-backed Sunbird	*Anthreptes reichenowi*	
	Western Violet-backed Sunbird	*Anthreptes longuemarei*	
	Olive Sunbird	*Cyanomitra olivacea*	
	Grey Sunbird	*Cyanomitra veroxii*	
	Amethyst Sunbird	*Chalcomitra amethystina*	
	Scarlet-chested Sunbird	*Chalcomitra senegalensis*	
	Collared Sunbird	*Hedydipna collaris*	
	Variable Sunbird	*Cinnyris venustus*	
	White-bellied Sunbird	*Cinnyris talatala*	
	Purple-banded Sunbird	*Cinnyris bifasciatus*	
Ploceidae	Spectacled Weaver	*Ploceus ocularis*	
	Yellow Weaver	*Ploceus subaureus*	
	Golden Weaver	*Ploceus xanthops*	
	Southern Brown-throated Weaver	*Ploceus xanthopterus*	
	Village Weaver	*Ploceus cucullatus*	
	Dark-backed Weaver	*Ploceus bicolor*	
	Red-headed Quelea	*Quelea erythrops*	
	Red-billed Quelea	*Quelea quelea*	
	Black-winged Bishop	*Euplectes hordeaceus*	
	Southern Red Bishop	*Euplectes orix*	
	Zanzibar Red Bishop	*Euplectes nigroventris*	
	Fan-tailed Widowbird	*Euplectes axillaris*	
	White-winged Widowbird	*Euplectes albonotatus*	
	Red-collared Widowbird	*Euplectes ardens*	
Estrildidae	Locustfinch	*Paludipasser locustella*	
	Orange-breasted Waxbill	*Amandava subflava*	
	African Quailfinch	*Ortygospiza atricollis*	
	Common Waxbill	*Estrilda astrild*	
	Lesser Seedcracker	*Pyrenestes minor*	
	Blue Waxbill	*Uraeginthus angolensis*	
	Red-throated Twinspot	*Hypargos niveoguttatus*	
	Orange-winged Pytilia	*Pytilia afra*	
	Red-billed Firefinch	*Lagonosticta senegala*	
	African Firefinch	*Lagonosticta rubricata*	
	Bronze Mannikin	*Spermestes cucullatus*	
	Red-backed Mannikin	*Spermestes bicolor*	
Viduidae	Village Indigobird	*Vidua chalybeata*	
	Dusky Indigobird	*Vidua funerea*	
	Pin-tailed Whydah	*Vidua macroura*	
	Long-tailed Paradise-Whydah	*Vidua paradisaea*	
	Broad-tailed Paradise-Whydah	*Vidua obtusa*	
Passeridae	House Sparrow	*Passer domesticus*	
	Northern Grey-headed Sparrow	*Passer griseus*	
	Yellow-throated Petronia	*Petronia superciliaris*	
Motacilidae	African Pied Wagtail	*Motacilla aguimp*	
	Yellow-throated Longclaw	*Macronyx croceus*	
	African Pipit	*Anthus cinnamomeus*	
Fringilidae	Yellow-fronted Canary	*Serinus mozambicus*	
	Brimstone Canary	*Serinus sulphuratus*	
	Reichard's Seedeater	*Serinus reichardi*	
	Golden-breasted Bunting	*Emberiza flaviventris*	

Family	Common Name	Scientific Name	Conservation Status *

* The conservation status is based on the IUCN Red List of Threatened Species (2012).

Table 6.1 List of Expected Red-Data Mammals and Conservation Status

Common Name	Scientific Name	Conservation Status*
CARNIVORA		
African wild dog	*Lycaon pictus*	Endangered
Brown hyaena	*Parahyaena brunnea*	Near Threatened
Cheetah	*Acionynx jubatus*	Vulnerable
Leopard	*Panthera pardus*	Near Threatened
Lion	*Panthera leo*	Vulnerable
PHOLIDOTA		
Pangolin	*Manis temminckii*	Least Concern
PERRISIDACTYLA		
White rhinoceros	*Ceratotherium simum*	Near Threatened
Black rhinoceros	*Diceros bicornis*	Critically Endangered
WHIPPOMORPHA		
Hippopotamus	*Hippopotamus amphibius*	Vulnerable
RODENTIA		
Vincent's bush squirrel	*Paraxerus vincenti*	Endangered
Checkered sengi	*Rhynchocyon cirnei*	Near Threatened
Delectable soft-furred mouse	*Praomys delectorum*	Least Concern
Malawi galago	*Galagoides nyasae*	Data Deficient
Dusky elephant shrew	*Elephantulus fuscus*	Data Deficient
Arend's golden mole	*Carpitalpa arendsi*	Vulnerable
RUMENANTIA		
Giraffe	*Giraffe camelopardalis*	Least Concern
Mountain reedbuck	*Redunca fulvorufula*	Least Concern
Roan antelope	*Hippotragus equinus*	Least Concern
Sitatunga	*Tragalephus speki*	Least Concern
Tsessebe	*Damaliscus lunatus*	Least Concern

* The conservation status is based on the IUCN Red List of Threatened Species (2012).

Anadarko Moçambique Área 1, Lda

Annex H

Emergency Response Plan

Mozambique Emergency Response Core Plan

Document No: [INTN.ERP.00001]

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Attachment Introduction:
The attachments below present location-specific details, local response plans and procedures, local response structure and resources. The attachments are assembled in a single document whose control is done locally. This way, the document and its control is independent of the ERP Core document (controlled by EHS Houston).

Attachment E Reporting Procedures and Contact Information

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Attachment F Scenario Response Procedures

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Appendix VIII Emergency Response Plan & Oil Spill Contingency Plan – Response Procedures

Abbreviations and Acronyms

ABBREVIATION	DESCRIPTION
APC	Anadarko Petroleum Company
BBL	Barrel
CMT	Crisis Management Team
COML	Communications Unit Leader
cSt	CentiStokes
DIVS	Division / Group Supervisor
DOCL	Documentation Unit Leader
ea.	Each
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
ENVL	Environmental Unit Leader
EOC	Emergency Operations Center
ER	Emergency Response
ERP	Emergency Response Plan
ERT	Emergency Response Team
ESD	Emergency Shut Down
FCPA	Federal Corrupt Practices Act
FSC	Finance Section Chief
ft.	Feet
gal.	Gallons
GPD	Gallons Per Day
H2S	Hydrogen Sulfide
HP	Horsepower
HR	Human Resources
IAP	Incident Action Plan
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
IMS	Incident Management System
IMT	Incident Management Team
ISM	Incident Support Manager
IST	Incident Support Team
ISOS	International SOS
ITOPF	International Tanker Owners Pollution Federation Ltd.
Kts	Knots
Kw	Kilowatts
LSC	Logistics Section Chief
M	Meter
M3	Cubic Meter
Marpol	International Convention for Prevention of Pollution from Ships
MEDEVAC	Medical Evacuation
MERP	Medical Emergency Response Plan
MOC	Management of Change
Mph	Miles per hour
MSDS	Material Safety Data Sheet
nm	Nautical Miles
NOP	Next Operational Period
OIM	Offshore Installation Manager
OPBD	Operations Branch Director
OSC	Operations Section Chief
OSCP	Oil Spill Contingency Plan
OSR	Oil Spill Response
PIC	Person in Charge
PIO	Public Information Officer

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ABBREVIATION	DESCRIPTION
Pkg	Package
PPE	Personal Protective Equipment
PSC	Planning Section Chief
Psi	Pounds per Square Inch
PSV	Platform Supply Vessel
QI	Qualified Individual
RESL	Resource Unit Leader
SITL	Situation Unit Leader
SO2	Sulfur Dioxide
SOFR	Safety Officer
STCR/TFLD	Strike Team / Task Force Leader
TRG	The Response Group
THSP	Technical Specialist
UC	Unified Command
V	Volts
VP	Vice President

1 Introduction

1.1 Purpose

This Emergency Response Plan (ERP) defines Anadarko's organizational structure and protocols that will be implemented to respond to any major incident in a safe, rapid, effective, and efficient manner within the International Region.

For purposes of this Plan (Core Plan), incidents are defined as an event or hazardous circumstance that poses a significant impact to people, the environment, or property.

Anadarko's Emergency Response Principles are used as a basis for the assessment of the level of response in the event of an incident. The following principles are described throughout this Plan and should be integrated into all actions taken by the emergency response organization.

The principles below comprise Anadarko priorities and framework in which response actions should be planned and executed.

1) **Establish Priorities**: All response actions should be geared toward the following priorities in the order below
   - Safety of People (always First)
   - Protection of the Environment
   - Protection of Assets
2) **Use Incident Command System (ICS)**: Anadarko has selected the ICS as the management platform in all locations in its response actions.
3) **Establish a Tiered Response Structure**: Anadarko has established a structure that should be in place for all responses. The tiered response structure should be proportionate to the size and magnitude of the incident.
4) **Over-Respond with Resources**: all available resources should be deployed at the time of the response, even if they are later considered unnecessary.
5) **Address the Issues**: Once the immediate response actions have been planned and executed, the Emergency Response Team (ERT), the Incident Management Team (IMT) and the Incident Support Team (IST) should consider the consequences and implications of the incident and the response actions and plans to address them as soon as possible.
6) **Control Information**: At the time of the incident, all information that needs to be provided beyond the ERT, the IMT or IST should be carefully reviewed and delivered.

1.2 Objective

The Objectives of this Plan include:

1) Define the Emergency Response Organizational Structure;
2) Define Emergency Response terminology;
3) Define criteria for establishing Response Objectives;

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4) Define Resources (personnel & equipment) that can be accessed and/or released in the event of an incident;
5) Define the roles and responsibilities of Command and Support staff;

1.3 Scope

This plan applies to emergency response activities carried out by the IMTs and ISTs, regardless of incident type and size.

This Plan supports, but DOES NOT REPLACE, Local and/or Corporate-Level Procedures, including Local Procedures and Plans that are maintained and utilized by the ERT and IMT.

1.4 Plan Structure

This Plan is comprised of the following components:

Core Plan:

The Core Plan consists of Sections 1 to 7 of this Plan. It outlines Anadarko's Incident Management Philosophy (People First), Response Actions, and Organizational Structure for all Incidents. The Core Plan is static for all locations within the Region.

Country Specific Attachments

Emergency preparedness actions and procedures for each country/project location within the International Ops / E&P Region are documented as Attachments to the Emergency Response Core Plan (ERP). Attachments to this Plan are described below.

Attachment	Title	Description
A	Record of Revisions of Mozambique Attachments	A table recording all revisions for the each Country specific appendix will be kept updated by the Country EHS Representative
B	Facility Information	A description of the facilities that constitute the project site, including supporting facilities. Each EHS Representative is free to group the facilities in the country per project, block, etc.
C	Incident Management Team (IMT)	Contact information of those individuals in country that will fulfill a role during a response.
D	Incident Support Team (IST)	Contact information of selected individuals trained to support incident in the International Region. The individuals based in APC Headquarters (Houston, TX) who have trained to fulfill a supporting role to the IMT in country.
E	Reporting Procedures and Contact Information	Notification and reporting procedures as well as contact information of those individuals within Anadarko, governmental agencies, partners and other institutions that need to be notified in the event of an incident.

Attachment	Title	Description
F	Response Procedures per Scenario	List of contractor's emergency response procedures as well as those prepared by APC in-country.
G	References and	List of tools and references documents

Emergency Response Tool-Kit

ICS Forms, Incident Management & Incident Support Handbooks and other resources are available, to provide in greater detail of the Reactive, Proactive, and Post-Active Incident Command Systems/Structure.

2 Plan Management

2.1 Plan Review

Anadarko's International Environmental, Health & Safety (EHS) Group is responsible for maintenance of the International Emergency Response Plan. At minimum, this Plan should undergo an annual review, with input as appropriate from each operating area.

In addition, the International EHS Group will:

- Ensure supporting tools and systems are appropriately implemented;
- Ensure continuous improvement opportunities are identified and shared with the organization;
- Ensure training and end-user education/awareness materials are available and appropriate.

2.2 Plan Administration

The International EHS Group will maintain the static component of this Plan, and conduct at minimum an annual review.

The EHS Representative for each location should maintain the dynamic components (Attachments) and ensure overall effectiveness of the requirements of this Plan.

The EHS Representative for each Operating Area shall update this Plan in the event of:

- Significant changes to response capabilities and contractors for the operating area.
- Changes to the IMT
- Changes on the facilities covered by this Plan in each operating area
- Relevant changes to this Plan as required by new regulatory requirements.
- Following significant incidents, drills/exercises, as necessary.

2.3 Plan Copies

To facilitate the use of the ERP, hard and soft copies of the last version of the will be available to the organizations that may be involved in a response.

Hard Copies:

- At a minimum, one (1) hard copy of the entire Plan (Core Plan and relevant attachments) should be kept at each APC International location. The Plan should be printed and kept in a three-ring binder, where pages can be easily added / removed.
- Five (5) hard copies of the Core Plan should be kept at each Incident Command Center – where the IMT most likely meet - one for Incident Commander and each Section Chief.
- At a minimum, one (1) hard copy of all Country's Attachments should be kept at Country's Incident Command Center.
- Five (5) hard copies of the Core Plan should be kept at Houston Incident Command Center (one for Incident Support Manager and each Section Chief).

- One (1) copy of each Country Attachments should be kept at the Houston Incident Command/Support Center. Each Country EHS Representative should ensure that the available copy is up to date.

Soft Copies:

- Intl EHS will update the soft copy of the Core Plan available on the Intl EHS Share Point http://sp/ep/EHSR/Intl/default.aspx). The Intl EHS Share Point will be available personnel in all locations.
- Each Country EHS Representative should update all country-specific attachments in the Country's folder in the Intl EHS Share Point.

2.4 Revision History

The Record of Revisions for the Core Plan are found in the table below. A table with the Record of Revisions for the Attachments to this Plan can be found in Attachment A.

REVISION HISTORY					
Rev. No.	**DATE**	**DESCRIPTION**	**PREPARED BY**	**REVIEWED BY**	**APPROVED BY**
Rev2	09/01/2011	Core Updates based on BMC29	Dunagan		
Rev3	09/12/11	Core Updates based on BMC29	Dunagan		
Rev4	11/02/2011	Core Updates based on Intl EHS Team's comments	Pena		

3 Regional Emergency Response Framework

3.1 Response Levels

The Anadarko International ERP operates within a tiered response framework. The Response Level is determined by the complexity of the incident, the risk to personnel and the public, and the impact on the environment, and is further determined by the need for mobilization of resources.

Anadarko classifies Response into three levels:

Response Level	Level 1	Level 2	Level 3
Definition	Incident that is short-term and can be effectively managed locally utilizing on-site/ facility resources.	Incident that is mid-term and has the potential for off-site impact and requires assistance from regional resources.	Incident that is long-term, may have wide spread impact and requires assistance from global resources.
Organization	ERT / IMT	ERT + IMT / IST	ERT + IMT + IST
Resources Required	Locally Available	Mutual Aid / National / Contract	Global

3.2 Principles of ICS

Anadarko has adopted the ICS as the emergency management system for all incidents in the International Region.

ICS provides a systematic and proactive management approach to guide departments at all levels of the corporation to work seamlessly to prevent, protect against, respond to, recover from and mitigate the effects of incidents, regardless of cost, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment.

This ERP satisfies the following ICS core principles:

1) **Common Terminology**: This ERP establishes common terminology that allows incident management and support organizations to work together across a wide variety of incident management functions and hazard scenarios.
2) **Modular (Flexible) Organization**: This ERP has considerable internal flexibility by being modular, and can readily expand or contract to meet the needs of any incident.
3) **Management by Objective**: The Emergency Response Organization is responsible for establishing tactics that are based on specific, measurable and achievable objectives and responsible for ensuring that Anadarko's Response and ICS principles are implemented.

4) **Incident Action Planning (IAP)**: This Emergency Response Organization will implement a "Process" to Define, Measure, Act, & Assess – to ensure incident priorities, objectives and strategies are centralized and coordinated. Action Plans will be documented, utilizing standardized ICS Forms. Anadarko has adopted IAP software facilitate documentation and communication of Action Plans.

5) **Span of Control**: The organizational structure implemented by this ERP ensures effective and efficient management of response personnel. The recommended supervisor to worker ratio is less than 1:7.

6) **Facilities & Locations**: Incident Command and operational support facilities are established in predetermined locations and equipped with adequate resources to manage response efforts.

7) **Resource Management**: An inventory of emergency response resources including personnel and supplies is maintained for all locations.

8) **Integrated Communications**: All locations are equipped with primary and back-up means of communications and up-to-date contact lists are maintained.

9) **Chain of Command**: This ERP establishes a modular organization with a pre-established hierarchy (see Section 3.3). This hierarchy ensures the orderly line of authority within the greater organization.

10) **Unified Command**: All individuals within the emergency response organization are assigned a specific role with a pre-established reporting hierarchy that supersedes conventional line or organizational management. This ERP will allow for the integration of government agencies in the Command structure, where appropriate.

3.3 Emergency Response Organizational Structure

This ERP defines the organizational structure that will be implemented to respond to any major incident in a safe, rapid, effective, and efficient manner within the International Region. The organizational structure is broken down into the following teams:

Emergency Response Team (ERT): First responders, located at the incident scene that execute tactical responses. Please refer to Section 4 for ERT roles and responsibilities.

Incident Management Team (IMT): A pre-defined team based at or near the incident that directs tactical response operations, facilitates planning and addresses the concerns of public and government agencies. Please refer to Section 5 for IMT roles and responsibilities.

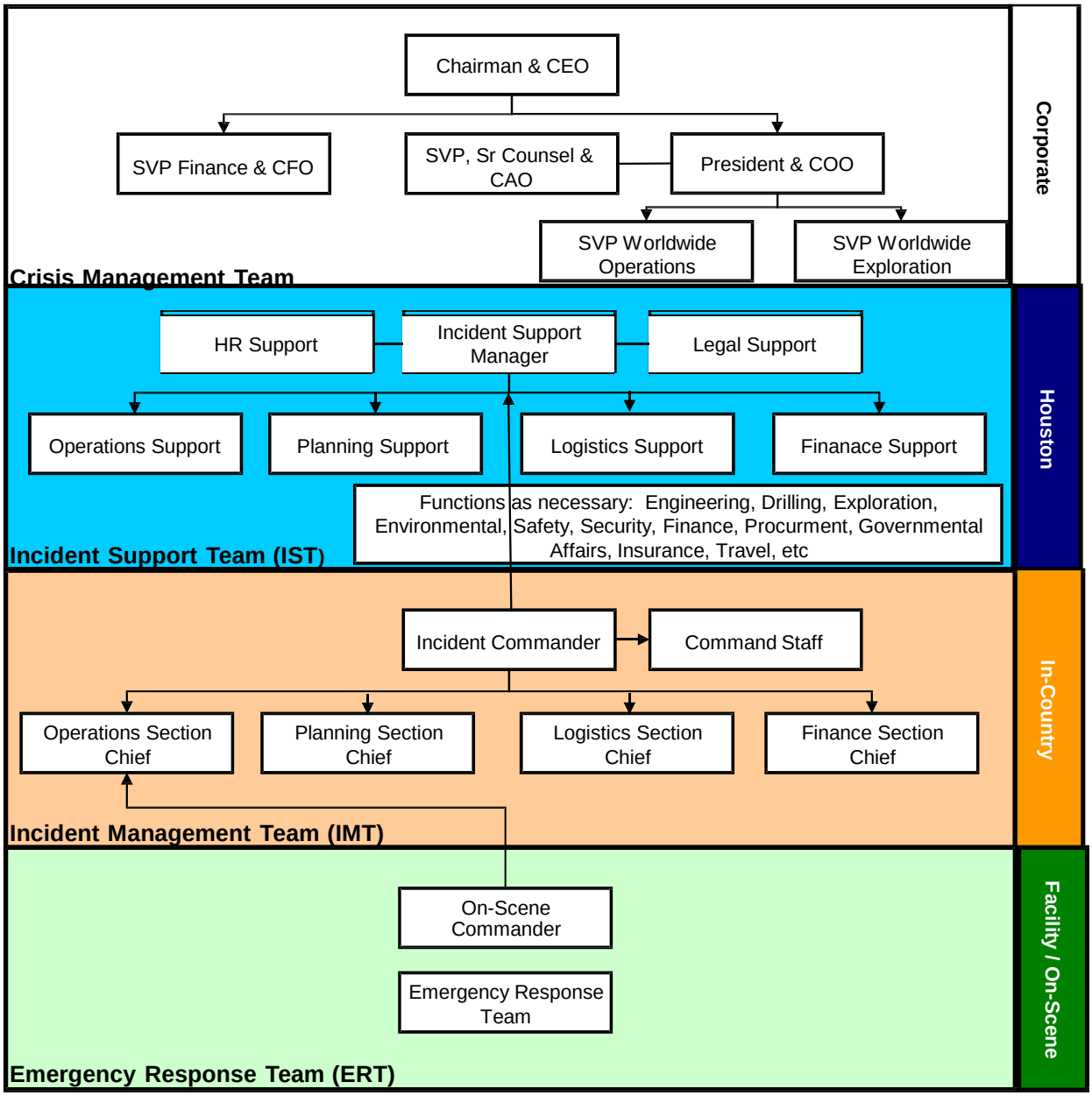
Mobile Incident Management Team (MIMT): A pre-defined team that supplements staffing for the IMT. The MIMT adopts the IMT roles and responsibilities in Section 5.

Incident Support Team (IST): A pre-defined team, based away from the scene that provides support to the Incident Management Team (IMT). Please refer to Section 6 for IST roles and responsibilities.

Crisis Management Team (CMT): Senior management personnel that address the implications of the incident and its potential consequences to the Company's viability, operability and credibility. CMT is outside the scope of this ERP.

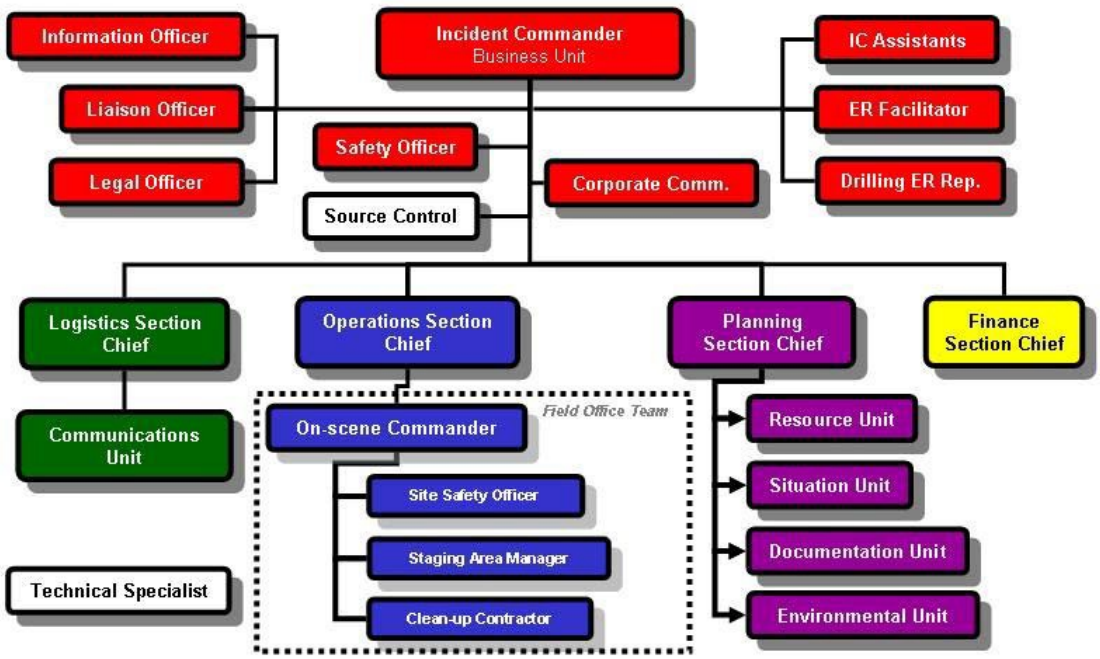
The following figure illustrates the relationship between the in-country and local response teams, the Houston Incident Support Team, and the Anadarko Corporate Crisis Management.

Figure 1. Anadarko's Emergency Response Organization



The figure below is an example of the IMT. This structure will expand, compress and or vary depending on the location and the incident. Refer to Attachment C for country or location specific structure.

Figure 2. Example Structure of the IMT



3.4 Response Implementation

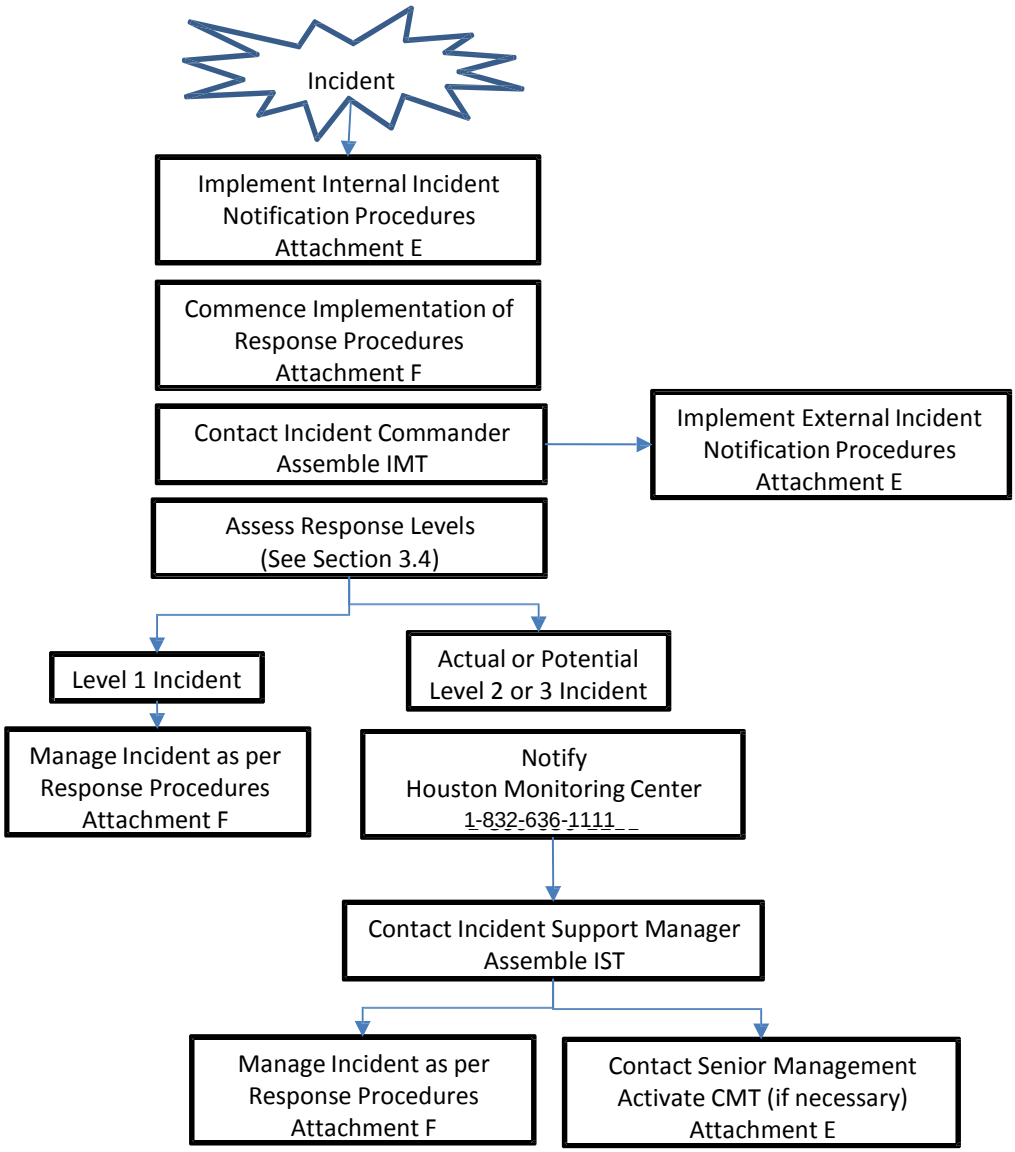
This ERP relies on local, regional, corporate, or contractor plans for the execution of tactical efforts. Depending on the nature of the incident, Anadarko plans may be activated after the initial response has been addressed by the contractor's plans.

The response procedures referenced by this Plan are organized according to incident scenarios. Appropriate procedures (local, regional, corporate or contractor) are provided in Attachment F.

3.5 Activation Procedure

The graphic below describes the general process to activate Anadarko's Emergency Response Organization. Country specific activation procedures for the IMT are provided in Attachment C.

Figure 3. Activation Procedure



Upon Activation, refer to Sections 4 (ERT), 5 (IMT), or 6 (IST) of this Plan for initial actions, roles, and responsibilities.

Immediately upon activation, the filling of the following ICS forms should be considered during the initial (Reactive) phase of the incident (refer to Attachment G for ICS Forms)

- General Incident Report
- Weather Report
- Notification Status Report
- ICS 201-1 (Site Map / Sketch)
- ICS 201-2 (Summary of Current Actions)
- ICS 201-3 (Organization Chart – ERT/IMT/IST)

- ICS 201-4 (Resources Summary)
- ICS 202 (Response Objectives)
- ICS 206 (Medical Plan)
- ICS 208 (Safety Plan)
- ICS 214-A (Individual Log)

3.6 Notification and Reporting Procedures

Country specific notification and reporting procedures (both internal and external) are provided in Attachment E.

4 Response Level - ERT

The Onsite ERT consists of the first responders located at the facility and those emergency contractors (medical, oil spill response, well control, etc.) that arrive very shortly after. This team may be composed of personnel from Anadarko or contractor resources.

A description of the facilities covered by this Plan in each operating area is provided in Attachment B.

The On-site ERT may expand due to the complexity of the incident and/or the arrival of additional resources. When it does, the On-Scene Commander delegates critical functions to subordinate personnel.

For Anadarko operated facilities, the primary responsibilities and tasks of the ERT are as follows (For contracted facilities, refer to facility procedures):

Emergency Response Team Duties and Responsibilities Checklist	
	Response Actions
	Assess the Situation
	Report the Incident
	Secure the Scene
	Account for Personnel
	If safe, shut down the affected operation and isolate the incident/source
	Conduct response per Local Procedure (See Attachment F - Response Procedures & Plans)

Critical responsibilities of the members of the ERT are presented below. A comprehensive list can be found in the Incident Management Handbook.

When applicable, the following positions will also belong to the ERT.

Emergency Response Team Initial Duties and Responsibilities Checklist	
ON-SCENE COMMANDER	
Responsible for executing implementation of the local emergency response procedures.	
	Execute local emergency response procedures. Considering the following priorities: 2) Safety of the people 3) Minimize damage to the environment 4) Protect the integrity of assets (See Attachment F - Response Procedures & Plans)

Emergency Response Team Initial Duties and Responsibilities Checklist	
STAGING AREA MANAGER	
The Staging Area Manager (STAM) is responsible for managing all activities within a Staging Area (the location where incident personnel and equipment are assigned, awaiting tactical assignment) *The Staging Area Manager works closely with the Resource Unit, Operations, and Logistics. Several staging areas may be required depending on the incident.*	
	Proceed to Staging Area
	Establish Staging Area layout
	Determine any support needs for Resources (equipment, feeding, sanitation and security)
	Ensure security of staged resources
	Post areas for identification and traffic control

Emergency Response Team Initial Duties and Responsibilities Checklist	
FIRE SUPPRESSION BRANCH DIRECTOR	
The Fire Suppression Branch Director, when activated, is under the direction of the On-Scene Commander and/or Operations Section Chief (OSC).	
	Direct and coordinate firefighting mission
	Manage dedicated firefighting resources
	Determine resource needs
	Prioritize response action to incident-related fires considering the following priorities: 1) Safety of the people 2) Minimize damage to the environment 3) Protect the integrity of assets

Emergency Response Team Initial Duties and Responsibilities Checklist	
MEDICAL SUPERVISOR	
The Medical Supervisor supervises the Medical Emergencies on-scene. The Medical Supervisor establishes command and controls the activities within a Medical Group/Division, in order to assure the best possible emergency medical care to patients during a multi-casualty incident.	
	Perform Triage on Injured Personnel
	Assess Medical Response
	Direct/Manage medical personnel & supplies
	Activate external (Mutual Aid/ISOS/etc) Resources, if needed

5 Command Level - IMT

A Tier 1 incident beyond the control of the On-site ERT triggers the activation of the in-country IMT who operates from the Command Center. If the incident is expected to reach beyond the in-country capabilities, the IST based in Houston will be called in for support.

If needed, the in-country IMT can be supplemented by personnel available from Anadarko locations (e.g. MIMT) or contractor resources located outside of the affected area.

The primary responsibilities of the in-country IMT include but are not limited to:

Incident Management Team Initial Duties and Responsibilities Checklist	
	Response Actions
	Assess the Incident
	Establish the IMT (Organization Chart)
	Assist in securing and/or mitigating the Incident
	Execute Notification Procedures: Agencies / Community / Houston / Partners
	Activate external resources

Critical responsibilities of the members of the IMT are presented later in this section. A comprehensive list can be found in the Incident Management Handbook.

5.1 IMT Organization

The in-country IMT is organized to carry out the following major functions:

Command: The Command function, headed by the Incident Commander (IC) is strategic in nature. Basically, the command section's function is to:

Generate strategic objectives,

Determine response priorities,

Ensure that emergency response operations are carried out in a safe fashion,

Interact with government agencies and the public, and handle legal matters

Operations: The Operations function establishes strategic and tactical actions, and provides oversight to the ERT.

Planning: The Planning function takes the lead in the preparing short and long term plans (IAPs and General Plans). In addition, the Planning function manages information associated with the response activities.

Logistics: The Logistics function has two key responsibilities:

Supports response actions procuring the personnel, equipment, materials, and supplies needed to carry out the operations for up to 7-days.

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Arranges for the services necessary to sustain response operations, including food, water, housing, clothing, transportation, security, fuel, spare parts, and anything else needed to keep people and equipment working in a safe and productive fashion.

Finance: The Finance function manages all financial transactions associated with emergency response operations. This responsibility includes the compilation of documentation needed to support requests for reimbursement from insurance carriers, and the receipt and processing of third party claims. Finance also should track working hours of response personnel.

Technical Specialist: During an incident, Incident Management may require input from technical specialists, responsible for providing technical and/or functional support. Refer to Section 5.3 for additional information.

The contact information for the members of the IMT is provided in Attachment C of this Plan.

5.2 IMT Main Response Actions

Incident Management Team Initial Duties and Responsibilities Checklist	
INCIDENT COMMANDER/DEPUTY IC	
The IC(s) responsibility is the overall management of the incident. On most incidents, the command activity is carried out by a single IC. The IC is selected by qualifications and experience. Deputies may also be used at section and branch levels of the ICS organization. Deputies should have the same qualifications as the person for whom they work, as they should be ready to take over that position at any time.	
	Determine Incident Objectives & general direction for managing the incident.
	Establish the immediate priorities and incident potential.
	If necessary, notify the Monitoring Center for activation of the IST.
	Establish an Incident Command Post.
	Establish the Incident Management Team (Organization Chart)
	Ensure that adequate safety measures are in place.
	Ensure that adequate Security & Intelligence measures are in place.
	In conjunction with the Public Information Officer, authorize release of information to the news media.
	Attend all Command Staff Meetings

Incident Management Team Initial Duties and Responsibilities Checklist	
SAFETY OFFICER	
The Safety Officer (SOFR) function is to develop and recommend measures for assuring personnel safety, and to assess and/or anticipate hazardous and unsafe situations. Only one primary SOFR will be assigned for each incident. The SOFR may have specialists, as necessary, and the assistants may also represent assisting agencies or jurisdictions. Safety assistants may have specific responsibilities, such as air operations, hazardous materials, etc. ***The SOFR has Stop Work Authority for all activities.***	
	The safety of the people is first, including the safety of first responders. First responders should be appropriately trained and not taking unnecessarily risks.
	Ensure initial Site Assessment has been conducted by the ERT and execute a plan for ongoing monitoring
	Identify hazardous situations associated with the incident.
	Ensure compliance with Personal Protective Equipment (PPE) requirements for all response operations.
	Attend all Command Staff Meetings

Incident Management Team
Initial Duties and Responsibilities Checklist

PUBLIC INFORMATION OFFICER

The Public Information Officer (PIO) is responsible for developing and releasing information about the incident to the news media, to incident personnel, and to other appropriate agencies and organizations. Only one primary PIO will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdiction incidents.

The PIO may have assistants as necessary, and the assistants may also represent assisting agencies or jurisdictions. Agencies have different policies and procedures relative to the handling of public information.

The PIO should be trained and authorized by Anadarko Public Relations to release information outside the Company.

	Determine from the IC if there are any limits on information release.
	Develop material for use in media briefings.
	Obtain IC approval of media releases.
	Inform media and conduct media briefings.
	Arrange for tours and other interviews or briefings that may be required.
	In conjunction with the IC, authorize release of information to the news media.
	Attend all Command Staff Meetings

Incident Management Team Initial Duties and Responsibilities Checklist	
LIAISON OFFICER	
The Liaison Officer is assigned to the incident to be the contact for assisting and/or cooperating Agency Representatives. Incidents that are multi-jurisdictional, or have several agencies involved, may require the establishment of the Liaison Officer position on the Command Staff. Only one primary Liaison Officer will be assigned for each incident, including incidents operating under Unified Command and multi-jurisdiction incidents. The Liaison Officer may have assistants as necessary, and the assistants may also represent assisting agencies or jurisdictions.	
	At the direction of the IC, establish contact with Government (Regulatory Agency) Representatives (See Attachment E for Reporting Procedures and Contact Information).
	Maintain a list of assisting and cooperating agencies and Agency Representatives, including name and contact information Monitor check-in sheets daily to ensure that all Agency Representatives are identified.
	Keep agencies supporting the incident aware of incident status.
	Participate in planning meetings, providing current resource status, including limitations and capability of assisting agency resources.
	Attend all Command Staff Meetings

Incident Management Team Initial Duties and Responsibilities Checklist	
LEGAL OFFICER	
The Legal Officer is responsible for providing advice and direction on all matters of a legal nature including claims, legal requirements relating to the emergency response, investigations, major procurement contracts, insurance coverage, and review of information releases to the media, government agencies and the public.	
	Advise the IC on all legal issues associated with response operations.
	Establish documentation guidelines for and provide advice regarding response activity documentation to the response team.
	Review press releases, documentation, contracts and other matters that may have legal implications for the Company.
	Attend all Command Staff Meetings

Incident Management Team
Initial Duties and Responsibilities Checklist

OPERATIONS SECTION CHIEF

The OSC is responsible for the management of all operations related to the emergency response. The Operations Section Chief may be selected from the Department/Functional Group with the most jurisdictional responsibility for the incident and will work in the Incident Command Post (ICP).

The OSC activates and supervises organization elements in accordance with the Incident Action Plan and directs its execution. The OSC also directs the preparation of tactical plans, manages response resources, and maintains the Incident Action Plan.

	Establish immediate response objectives and strategies.
	Coordinate with ERT the implementation of the tactical response actions
	Identify kind and quantity of resources required to support selected strategies.
	Coordinate planned activities with the Safety Officer to ensure compliance with safety practices
	Provide all information to IC as soon as the Command Post has been established.
	Attend all Command Staff Meetings

Incident Management Team Initial Duties and Responsibilities Checklist	
PLANNING SECTION CHIEF - PSC	
The PSC, a member of the General Staff, is responsible for the collection, evaluation, dissemination and use of incident information and maintaining status of assigned resources. Information is needed to: *1) understand the current situation;* *2) predict the probable course of incident events;* *3) prepare alternative strategies for the incident; and* *4) submit required incident status reports.*	
	Collect, process, and display incident information.
	Assist OSC in the development of response strategies.
	Establish special information collection activities as necessary (e.g., weather, environmental, toxics, etc.).
	Determine the need for any specialized resources in support of the incident.
	Attend all Command Staff Meetings

Incident Management Team Initial Duties and Responsibilities Checklist	
LOGISTICS SECTION CHIEF - LSC	
The LSC, a member of the General Staff, is responsible for providing facilities, services, and resources. The LSC participates in the development and implementation of the IAP and activates and supervises the Branches and Units within the Logistics Section.	
	Determine and supply immediate incident resource and facility needs.
	Solicit needs from all Sections of the IMT, and advise regarding resource approval and procurement processes.
	Review proposed tactics for upcoming operational period to determine resources for logistical support.
	Advise Command and other Section Chiefs on resource availability to support incident needs.
	Identify resource needs for incident contingencies.
	Track resource effectiveness and make necessary adjustments.
	Identify long-term service and support requirements for planned and expected operations.
	Attend all Command Staff Meetings

Incident Management Team Initial Duties and Responsibilities Checklist	
FINANCE SECTION CHIEF - FSC	
The FSC, a member of the General Staff, is responsible for all financial, administrative and cost analysis aspects of the incident and for supervising members of the Finance/Admin Section.	
	Manage all financial aspects of an incident.
	Review operational plans and provide alternatives where financially appropriate.
	Manage Procurement, Insurance, Compensation, and Claims issues.
	Provide financial and cost analysis information as requested.
	Track the Working Hours of all Response Personnel
	Participate in incident planning meetings and briefings as required.
	Attend all Command Staff Meetings

5.3 Technical Specialists

During an incident, Incident Management may require input from technical specialists, responsible for providing technical and/or functional support. This function may be filled by company or contract resources depending upon the particular expertise needed. The Technical Specialist will report through the Planning Section Chief or Support Lead unless otherwise directed. Technical Specialist may include (in alphabetical order):

Aviation Specialist - The Aviation Specialist provides efficient transportation of incident response personnel using owned or chartered aviation resources. They may also be utilized to support and/or ensure the safe operation of contracted aviation resources through safety reviews and the proper selection of equipment and crews.

Business Continuity Specialist - The Business Continuity Specialist provides assistance with issues relating to business continuity. They will determine nature, severity, and duration of business impacts/interruptions. They will also supervise implementation of applicable business continuity plans and ensure that business continuity efforts are coordinated with emergency response operations

Compensation and Claims Specialist - The Compensation and Claims Specialist provides assistance with issues related third party damage claims. More specifically, they support the overall management of the claims process by identifying the resources that will provide guidance on the scope of potential claims, and on whether or not a claims center and hotline should be established. Additionally, the Compensation and Claims Specialist is responsible for claims handling activities. If a Claims Center should be established, and claims adjustors engaged, then they shall identify the resources that will support that entire effort. They will also be prepared to assist in ensuring that documentation for claims is adequate to support any insurance or indemnity requirements.

Drilling/Well Control Specialist - The Drilling Specialist will provide technical expertise, assistance and resources in “well control” incidents.

Finance Specialist - The Finance Specialist provides for necessary incident financial support including accounting support, cost monitoring, invoice processing and payment, funding for claims processing and payment, emergency bank accounts, and cash transfers.

Engineering & Operations Specialist - The Engineering & Operations Specialist will provide expertise in construction, salvage, repair and operations issues that arise during the mitigation of an incident.

Environmental Specialist - The Environmental Specialist provides for assistance in responding to incidents with technical expertise in the areas of air, water, and soil contamination, as well as in the area of waste disposal. They will also be prepared to provide support in the areas of hydrogeology, environmental risk assessment, ecosystems, wildlife rehabilitation, remediation, restoration, and all required environmental permitting.

Government Affairs Specialist - The Government Affairs Specialist supports response teams by providing resources and expertise to communicate and liaison with governments.

Geochemistry Specialist – The Geochemistry Specialist provides the resources for sample tracking, sample preparation, analysis, interpretation and reporting. They can also provide sample modeling, specialized analytical service (isotope studies, GC-MS/MS, etc.), oil fingerprinting and baseline studies.

Incident Management Specialist - The Incident Management Specialist will provide emergency management process and response expertise at the local or geographic emergency management level. This specialist can be called upon to backfill or integrate into the activated Incident Management Team’s ICS structure.

Insurance Specialist - The Insurance Specialist provides assistance with issues related to insurance and various compensation schemes. More specifically, they support the overall management and processing of insurance claims for bodily injury, property damage, and business interruption as applicable. Additionally, they are responsible for the administration of all issues associated with national and international compensation regimes such as the International Oil Pollution Compensation Fund. The Insurance Specialist will assist the Compensation and Claims Specialist with claims and cost containment activities.

Medical Specialist - The Medical Specialist provides the resources for developing overall strategic plans which ensure that all necessary guidance and resources are available / applied to provide medical support for an incident.

Negotiations – Supports the IST by providing advice on existing Production Sharing Agreements/Contracts or Joint Operating Agreements that are in place for the country/activity in question.

Process Engineering Specialist – Supports response teams by providing expertise and guidance on engineering controls, process and design.

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Procurement Specialist - The Procurement Specialist provides for purchasing, procurement, and contracting support for goods and services in an incident as required or necessary. They will assist in the development of facilities necessary to support or manage the incident and in arranging for the transportation of personnel, equipment, and materials to any required location.

Safety, Fire, and Health Specialist - The Safety, Fire and Health Specialist provides for assistance in the areas of accident investigation, safety regulations, safety hazards assessment, responder training, firefighting, and decontamination procedure. They will also provide support in the areas of toxicology, industrial hygiene, and health hazard assessment and monitoring.

Security Specialist - The Security Specialist provides for assistance and support as may be required in the protection of company response personnel, including senior management, and for the security of, and access control at, response facilities, including Command Posts. They will also provide for security support of on-scene operations and response equipment against illegal theft or illegal interference. Security will be prepared to conduct or manage criminal investigations when requested by appropriate management, and will be prepared to establish and maintain liaison as may be appropriate with public safety and/or law enforcement authorities. They will also provide the mechanism to furnish all other advice, as may be requested or necessary on Security matters.

Supply Chain Specialist - Primarily responsible for receiving, storing and distributing all supplies for the incident; maintaining an inventory of supplies; and storing, disbursing and servicing non-expendable supplies and equipment.

Translation Specialist – Provides translation services.

Travel Specialist - The Travel Specialist provides the management of air and ground transportation support for the corporation. It will provide for arrangements to support the transportation or travel of company and external resources to or from affected locations.

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6 Support Level - IST

The IST is in charge of all actions that need to take place away from the scene and not available locally, to support the IMT, facilitate planning and provide additional media and HR coordination, and additional support to address the concerns of the public and government agencies.

The IST's role is secondary and supportive. The IST will not duplicate functions that the on-scene emergency response or incident management teams effectively have in place, but will provide first line assistance if the incident location is unable to effectively manage the incident.

Each incident will be unique in terms of the response roles in the IST that are activated to successfully mitigate the event. The specific composition of the team to be activated will depend on the demands of the location and the type of incident. The involvement of the IST may be different for Anadarko-operated, partner-operated or joint-operated projects.

The IST has also identified experts (Support Specialists) in their respective fields, which can be activated by the Incident Support Manager, based on the incident circumstances, to support response activities.

6.1 Procedure for Activation of IST

When an incident occurs, the in-country IMT will determine if the Houston IST needs to be notified. If so, the in-country IMT will call the 24-hour security number at the Houston office (+1-832-636-1111). In turn, the duty officer will notify the Incident Support Manager (ISM).

The following procedure will be followed to engage Houston resources when Anadarko Houston Security Monitoring Center duty officers receive calls to report a remote incident. Incidents may occur in any location, so this procedure describes a general process to follow for any incident calls received. The role of the Tower Security Monitoring Center duty officer is critical to ensure effective, timely response to remote incidents.

At this point, the Incident Support Manager determines which people on the IST organizational chart need to be notified. Afterwards, security will make the notifications that are determined by the Incident Support Manager, and those notified will report to the Houston Incident Response Center. The Incident Support Manager will place a short call to the in-country IMT manager to confirm receipt of notification of incident and report on timing and assembly of the IST.

Based on the geographic location of the incident and the availability of Anadarko Petroleum Corporation (APC) personnel, the ISM may also activate the MIMT.

The contact information of the members of the IST is provided in Attachment D of this Plan.

6.2 IST Main Response Actions

Critical responsibilities of the members of the IST are presented later in this section. A comprehensive list can be found in the Incident Support Team Handbook.

Incident Support Team Initial Roles and Responsibilities Checklist	
Houston Duty Officer	
The following procedure will be followed to engage Houston resources when the Anadarko Houston Monitoring Center duty officers receive calls to report a remote incident. Incidents may occur in any location, so this procedure describes a general process to follow for any incident calls received. ***The role of the Tower Control Center duty officer is critical to ensure effective, timely response to remote incidents.***	
	Upon receiving the call from the field location where the incident has occurred:
	Locate the notification list for the area/country of the incident & begin notifying Key Incident Support Staff
	Call personnel on the list in the order they are given. Call numbers from left to right. If no one answers, leave a message stating the following: a) Duty officer's name and company position b) Telephone number at which to return a call (+1 832-636-1111) c) "I am calling to inform you that an incident has occurred in (*say the location of the incident*). Since I was unable to reach you, I will call (*say the next name and number on the list*)."
	When a contact is reached: a) state who you are and that you are calling because an incident has been reported, b) communicate the information on the Initial Incident Report starting at the top of the form, c) do not speculate, add to, or take away anything from the information previously provided. d) Obtain from the initial contact how many other people need to be notified at this time, and whether or not they need to immediately go to the Houston Incident Response Center on the 16th floor of the Anadarko Tower.
	When the information has been delivered, a) Complete the Initial Incident Report indicating who was contacted at what time, and record any follow-up instructions given. b) Forward the Initial Incident report via email to the initial contact
	Call out all team members included in the organizational chart, as requested by the initial contact person. Leave a message or tell them that an incident has occurred and whether or not the individual needs to go immediately to the Houston Incident Response Center on the 16th floor of the Anadarko Tower.

Incident Support Team
Initial Roles and Responsibilities Checklist

INCIDENT SUPPORT MANAGER - ISM

The ISM is responsible for providing leadership and direction to the IST, and to ensure that emergency response and crisis management operations are carried out in a manner consistent with Anadarko core values and policies. The ISM also ensures links are maintained with APC senior management in Houston, representatives of the in-country government, joint venture partners and other organizations.

The following responsibilities are supportive only. All actual in-country incident management will be handled at the affected asset's IMT level unless otherwise directed by the ISM.

	Receive the first call from the duty officer and inform the duty officer which members of the IS-team should be mobilized based on incident briefing.
	Mobilize to the Incident Response Center in Houston, if necessary.
	Establish the IST (Organization Chart)
	Call in-country IC to obtain a latest update of the situation and confirm that the Houston IST needs to be, or has been mobilized.
	Serve as a single point of contact for the in-country incident commander.
	Facilitate IST team meetings (in-country Incident Commander will facilitate joint meetings)
	Clarify and agree upon the role of the IST for the particular incident: "What do you need and how can we support you?"
	Ensure the incident has been reported to senior management/Houston Crisis Management Team, and that there is agreement on who will provide any additional updates to the Executive Committee contact
	Request assistance of Planning Support to provide initial and routine communications to senior management, if required.

Incident Support Team
Initial Roles and Responsibilities Checklist

PUBLIC AFFAIRS SUPPORT

Provide advice to the IMT on the media aspects of the incident. The Public Affairs Support Lead will report directly to the ISM.

The Public Affairs Support Lead is the first responder to all external communication. Any and all external communication has to pass through the Public Affairs department for approval prior to release, this includes any external communication from the in-country incident response team.

	Prepare a media statement and make available to IMT, IST and senior management
	Prepare press statements and releases and review those being prepared by IMT
	Ensure that press statements are reviewed by the in-country IMT and the Legal Specialist and approved, as necessary, prior to release to the media.
	Ensure the appropriate “spokesperson” at the right level of management is identified, in the right places and at the right time.
	Provide support to field, regional and/or corporate teams for communications to external organizations - ensure consistency of response communications.

Incident Support Team
Initial Roles and Responsibilities Checklist

HUMAN RESOURCES SUPPORT

Human Resources (HR) provides for advice and assistance on all personnel issues arising from the emergency, including the business interruption aspects of APC personnel dislocation, workman's compensation claims and issues, coordinating the response to concerned relatives and all other personnel problems. HR shall also support all medical and Employee Assistance Program issues that arise, including any Critical Incident Debriefings necessary to restore normalcy in the workplace or in the community. The HR Advisor will report directly to the ISM.

	Prior to an incident maintain a current list of employees with contact numbers and addresses of next kin.
	Prepare list of all expatriate employees currently in-country with contact information on next of kin.
	Identify, and respond to immediate requests for support, information or guidance from the in-country IMT HR function or in-country response team.
	Determine if there are any cultural issues that need to be considered which might affect the type of aid provided as part of Humanitarian Assistance.
	Mobilize Employee Assistance Program as required for the incident.
	Notify and/or mobilize International Humanitarian Response Program as required..

Incident Support Team Initial Roles and Responsibilities Checklist	
LEGAL SUPPORT	
Provide immediate and long term legal implications advice to the IST and in-country IMT as requested. Provide legal advice and assistance including: applicability and interpretation of laws, statutes, regulations, reporting requirements, incident investigation, monitoring, review of media and employee communications, liability evaluation, and litigation.	
	Provide overall legal advice to the IMT
	Compile all existing service and supply contracts that could be impacted by the incident and identify liability and notification language in those contracts..
	Advise on jurisdictional relationships with government.
	Assist the Logistics Support Unit by reviewing contracts for new services.
	Advise on dealing with Federal Corrupt Practices Act (FCPA) issues that may arise from importation of equipment and services.
	Provide legal guidance on the release of all information—including press releases and communications with external stakeholders.
	Establish Attorney-client privilege as required.
	Determine to what extent Anadarko should coordinate response actions, statements, and positions with other responsibilities or partners.

Incident Support Team Initial Roles and Responsibilities Checklist	
OPERATIONS SUPPORT LEAD	
Provide the primary means of contact with the in-country IMT.	
	Provide all operational expertise to the in-country ERT and IMT.
	Work with planning to identify any technical specialists that are or could be needed to support the response.
	Provide assistance in implementing operation specific contingency plans
	Co-ordinate the technical requests from the country.
	Obtain schematics of the affected facility or operation.

Incident Support Team Initial Roles and Responsibilities Checklist	
PLANNING SUPPORT LEAD	
The Planning Support Lead is responsible for the collection, evaluation, dissemination and use of incident information and maintaining status of assigned and future resources. Information is needed to: 1) understand the current situation; 2) predict the probable course of incident events; 3) prepare alternative strategies for the incident; and 4) submit required incident status reports.	
	Compile and display incident status information.
	Keep IST apprised of any significant changes in incident status.
	Ask ISM if they require support in preparing and providing initial and routine communications to senior management, especially during the first hours of any response.
	Work with the in-country Planning Section Chief to establish special information collection activities as necessary (e.g., weather, environmental, toxics, etc.)..
	Work with Legal Specialist and in-country PSC to evaluate potential threat to affected asset's license to operate.
	Assist if requested by the in-country Planning Lead to determine severity and duration of business interruptions; support implementation of applicable Business Continuity Plan(s)
	Work with the in-country PSC to forecast the need for additional in-country resources (both for emergency response as for operational backfill). Provide staffing plan with timing

Incident Support Team Initial Roles and Responsibilities Checklist	
LOGISTICS SUPPORT LEAD	
Provide logistics support to the incident response organization	
	Provide logistics support to the in-country team as requested on: • Procurement of international response products, services and equipment • Shipping and delivery of these services • Assure proper visa are held by service providers. • Preparation of customs documentation. • Aviation support, including use of commercial, company or charter aircraft. • Repatriation of human remains.
	Negotiate service agreements with key international response providers, and have them in place prior to an incident.
	Make necessary arrangements for the transportation (air/ground) of personnel or resources if required

Incident Support Team Initial Roles and Responsibilities Checklist	
FINANCE SUPPORT LEAD	
Provide immediate and long term financial implications advice to the IST and in-country IMT as requested. Provide advice and assistance including: cost reporting requirements, claims handling, contract support, and cost control.	
	Identify and respond to immediate requests for support, as requested activate the Cost Unit, Risk Management, Legal Unit and Negotiations Unit
	Oversee financial control procedures
	Consider the immediate and long-term financial implications of the incident
	Ensure that financial resources are available to meet known or anticipated action, consistent with established financial procedures
	Assess the financial implications of the emergency for Anadarko and prepare action plan to address them.

7 Media

7.1 General

Only Anadarko designated spokespersons may speak with the media on behalf of Anadarko. This

policy is all encompassing and covers both routine press inquiries regarding company operations and activities in addition to negative incidents or issues. Company-approved media training will be provided for selected individuals who may have to act as a spokesperson for a specialized area of the business, or during the early stages of a crisis incident. Only persons who receive this training will be authorized to speak on behalf of the company and provide information to outside representatives, including the media.

Any Anadarko employee who may be contacted by the media should immediately refer the individual to a company-designated spokesperson.

This should be done in a diplomatic and professional manner without offering any information. A listing of authorized spokespersons will be provided to all employees at each operating location as a reference.

No one should release any written information in the form of an official statement or press release, under any circumstances, without prior clearance and approval from (the designated corporate representative) with communications responsibility during an incident.

7.2 Procedure for Release of Information in the event of an incident

Release of information concerning emergency conditions at Company facilities or operations will be provided in accordance with Corporate Procedures.

Employees

	Company employees at the scene of an emergency should:
✓	Contact immediate supervisor or next higher level of management
✓	Maintain site security. Do not allow anyone into ANADARKO facilities except those personnel and equipment required to handle the emergency
✓	Under NO circumstances should the following information be released: • Cause of emergency • Speculation regarding cause • Dollar estimate of physical damage • Names of injured or dead, prior to notification of Next-of-Kin
✓	Refer media inquiries to the Incident Commander until "Designated Spokesperson/PIO" is appointed

Incident Commander

✓	Notifies Line Management
✓	Informs employees not to allow anyone into the facility except those personnel and equipment required to handle the emergency
✓	Directs inquiries from media to Public Information Officer or designated spokesperson
✓	Relays all information gathered at emergency scene to Public Information Officer or designated spokesperson

Designated Spokesperson

✓	Set up room or office outside emergency location for press. If possible, press should have access to telephones for outside calls.
✓	Check credentials of all media before admittance.
✓	Delegate company escorts to accompany media visiting the emergency area.
✓	Issue statements to news media based on suggested outline from Corporate Public Information Officer.

Public Information Officer (PIO)

The PIO will maintain communications with the media in accordance with the requirements of this Section and in close liaison with the Houston Information Officer.

Communication and public affairs are best handled by persons trained in dealing with the media. There will be times when it is not practical to refer all questions from the media and public to our headquarters. Indeed, a factual, short response can help reduce the time and effort ultimately needed to respond to the media and public.

✓	The response should be a short statement of the facts.
✓	Estimates or speculations as to cause or size of the problem should not be made.
✓	If you are going to be questioned in front of a camera, consider your appearance and what will be in the background (behind you) of your interview.
✓	If possible, your interview should be done with a neutral or non-threatening background.

7.3 Example Media Statements

The example statements below have been approved by Corporate Public Information Officer. General statements below may also be given verbally by site manager and communication director in response to media inquiries:

General comments for verbal use only in response to media inquiries to be given by site manager or communications director as appropriate

"An incident occurred at _____ (name of facility) in _____ (location at approximately (time), (date). Anadarko Company has initiated response activities and authorities have been notified. Additional information will be provided as appropriate.

1. "Safety and environmental responsibility are top priorities at Anadarko. While prevention of this type of situation is a core part of our operational strategy, we do prepare for these situations and emphasize internal response training."

2. "(We are responding) or (Necessary teams are responding) and we will share appropriate information with you when it is available."

3. Aswers to general questions about the site/facility.

Attachment E Reporting Procedures and Contact Information

Table of Contents:

E.1 Reporting Procedures

E.2 Agency Notifications

E.3 Other External Local Contact Information

E.1 Reporting Procedures

Anadarko activities in Mozambique involve operational risks. Certain incidents may require the involvement of additional trained Houston personnel to cover certain responsibilities. It is the responsibility of the Incident Commander and/or the Country Manager to activate the Emergency Response Organization during an incident. Once the Organization is in place, they will make all notifications as assigned to their position and as the need is defined by the incident type.

If needed, the Mozambique Incident Management Team (IMT) can be supplemented by personnel available from the Anadarko Houston office or contractor resources located in or outside of Mozambique. The Houston IST supports all activities undertaken by the Mozambique IMT. It provides a structured framework to provide support to Emergency Response Organizations at remote locations such as Mozambique.

The Mozambique IMT organizational structure represents only a limited number of personnel that are trained and ready to assist in any incident. When an incident occurs, the Operations Coordinator will notify the in-country IMT Incident Commander. The Incident Commander will then determine if the Houston IST needs to be notified/activated. If so, the Incident Commander will call the 24-hour security number at the Houston office (1-832-636-1111). In turn, the security person will notify the Houston IST Incident Support Manager (Exploration Manager) or a member of the International EHS group if the Incident Support Manager is unavailable. At this point, the Incident Support Manager determines which people on the Houston IST organizational chart need to be notified and establishes communication with the in-country Incident Commander.

Afterwards, security will make the notifications that are determined by the Incident Support Manager, and if deemed necessary, everyone will gather in the Houston Incident Command Center. In order to minimize any confusion during the response activities, the Houston IST will not take on any emergency response management responsibilities unless requested to do so by the Mozambique IMT. The Houston IST will provide support in the form of additional personnel, finance, legal, HR, public relations, technical specialists, etc., as well as decisions that need to be made on a corporate level. Direct communication between in-country IMT members and their Houston support team shall be established only upon request from the in-country IMT members and they shall decide the preferred way of communication (phone, email, fax, messenger, IAP, etc).

It will be the job of the security officer on duty to complete the following:	
✓	The Security Officer answering the call will ask very basic questions, such as: • What type of incident occurred • When did it occur? • Is anyone injured?

✓	The Security Officer will take the information provided and start calling the following people in Table 5-3.
✓	Call the numbers in order from left to right. If nobody answers, leave a message stating the following: • Security officer's name and company position • Telephone number at which to return a call • "I am calling to inform you that an incident has occurred in Mozambique. Since I was unable to reach you, I will call (say the next name and number on the list)" Do not speculate, add to, or take away anything from the information previously provided.

It is the responsibility of the Mozambique IMT Liaison Officer to ensure incidents are reported to the appropriate governmental agencies. Report all incidents internally and externally to appropriate agencies using the Reporting Forms found Attachment G. Agency contact/phone numbers are located in Section E.2.

The Houston Public Information Officer or Liaison officer should provide notification to the Woodlands building receptionist in the event of a drill or actual incident. This is very important so they know where or to whom to direct incoming calls relative to the drill or incident. In the future, please email instruction to "zz.Team.Houston Receptionist" giving them the names and numbers where to direct calls. Also, include a brief description of the event such as "THIS IS A DRILL, Mozambique has had an explosion and fire in Pemba and we are (1) having a drill, (2) activating the Incident Command Center and/or (3) we have just been notified of an event". The email should be sent as soon as possible at the start of a drill, if the Incident Command Center is activated or as soon as you learn of an incident that may cause calls to Anadarko.

E.2 Agencies Notifications

All offshore and onshore personnel are responsible for assuring that all required notifications/reports are completed in a timely manner for all incidents. All contacts with regulatory agencies must be properly documented.

Typical information to report would be location of incident, type and size of spill, date & time of the incident, and other relevant information.

#	Agency / Entity	Phone	Alt.	Fax
1	**Instituto Nacional da Marinha (INAMAR)** *~ Responsible for oil pollution at sea within the 12 nm territorial limit*	+258 21 301963 +258 82 3075547	+258 82 3011480	--
2	**Pemba Port Authority**	+258 27 220453	+258 82 6016710	+258 27 220 453
3	**INP (National Petroleum Institute)**	+258 21 320935	+258 82 4906200 +258 82 3081870 +258 82 3081570	--
4	**Mozambique Ports and Railway (CFM)**	+258 27 220710	+258 27 220453	+258 27 220 453
5	**MICOA** (Ministério para a Coordenação da Acção Ambiental)	+258 27 220353	+258 82 3130691	--

5	**National Fisheries Administration** (To be contacted when interruptions to commercial fishing operations are necessary)	+258 21 358000	+258 82 3061996	--

E.3 Other External Local Contact Information

Local Contact Listing		
Contact	**Phone**	**Alt.**
Medical Assistance & Medevac		
SOS Netcare (Maputo)	+258 21 31 31 03	Mike Ferguson: +258 84 39 88 256 +258 84 301 6910
International SOS Assistance, Inc	Johannesburg: Tel: +27 11541-1300 +27 11541-1350 Sat: +881 631419 330	Philadelphia: +1 215 942 8226 Fax: +1 215 354 2338
Hospital Maputo (Servico Medicina Legal)	+258 82 3192640 +258 84 305 3097	+258 21 30 60 74
Pemba Provincial Hospital	Dra Bequezela (Director) +258 84 280 0228	Armando Meque (Director Clinico) +258 84 280 0233 or +258 27 220 796
Cabo Delgado Clinic	+258 82 81 35 450	+258 82 70 39 555
Kenyon Europe, Africa and Middle-East	+44 (0) 134 431 6650	Fax: +44 (0) 134 431 6699
Police / Fire Department		
Police Service	+258 27 22 1006	+258 27 22 0484
Fire Department	+258 27 22 0223	+258 27 220 030
Aviation Support		
CHC Global Operations Canada (Helicopter)	Inside Mozambique: CHC Base Manager Mocimboa de Praia Mozambique Tel: +258 82 918 9628	Corporate contact is: Cees Visser Regional Director CHC Global Operations Africa 9 Parellaan 2132 WS Hoofddorp The Netherlands Mobile: +31 (0)6 22993578 Phone: +31 (0)23 5555527 Conference # +31 (0)23 5555650 Fax: +31 (0)23 5555550 E-mail: cvisser@chc.ca
Solenta Aviation (Charter Flight)	+258 82 813 8257	+258 82 813 8250

Local Contact Listing (Continued)

Contact	Phone	Alt.
Aviation Support (Continued)		
Missionary Aviation Fellowship (MAF) Nampula Contacts	MAF Office at MAF Hangar at Nampula Airport: Telephone: +258 26 215512 maf-mozambique@maf.org David Lepoidevin: Tel: +258 26 217630 Fax: +258 26 218368 Mobile: +258 82 386 4890 Email: dlepoidevin@maf.org	Warren Veal Mobile: +258 82 921 0308 Email: wveal@maf.org Gerd LePoidevin Mobile: +258 82 511 4672 Email: glepoidevin@maf.org
Rani Group	+258 82 575 2925	--
Response Contractors		
The Response Group – IAP Software, Trajectories, & Planning Support	+1 281-880-5000	+1 713-906-9866
Seacor Marine	+1 985-876-5400	Fax: +1 985-876-5444
Oil Spill Response (OSR)	+44 23 8033 1551	
Translator – Language Line Services	+1 832-636-1111	security.monitora@anadarko.com
Fatality Notification		
Kenyon - US Headquarters 24/7	+1 281-872-6074	
Embassies & Consulates		
U.S. Embassy 193 Avenida Kenneth Kaunda Maputo	+258 21 49 2797 Emergency after hours: +258 21 49 0723 or +258 82 310 7190	Fax: (258) 21 49 0448
French Embassy Av. Julius Nyerere, 2361 Maputo, Moçambique CP 4781	(258-1) 491 774, 693, 490 444	Fax: (258-21) 491 727
Bristish High Commission Av Vladimir I Lenine 310 (Box 55) Maputo	+258 21 356000	Fax: +258 21 356060
Australian Consulate Avenida Zedequias Manganhela 95-3rd Floor Maputo	+258 21 322780	Fax: +258 21 307369

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Attachment F Scenario Response Procedures

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F.1 Resources at Risk

F.1.1 Environmental

F.1.2 Onshore Response Methods

F.1.3 Coastal Response Methods

F.1.3.1 Waterfowl and Wildlife Protection

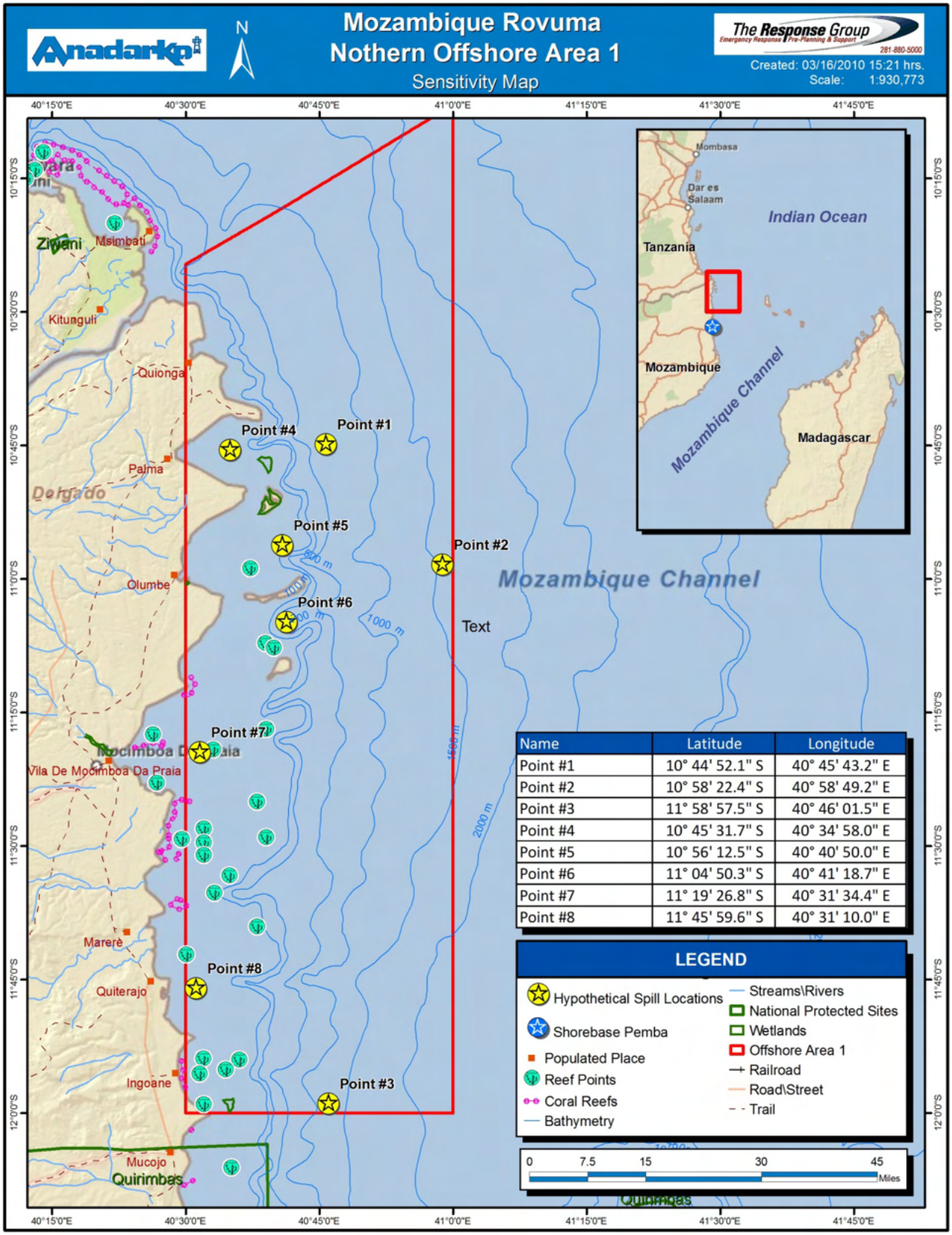
F.2 Scenarios

Appendix VIII Emergency Response Plan & Oil Spill Contingency Plan-Response Procedures

F.1 Resources at Risk

The purpose of this section is to quickly identify the sensitivities that could potentially be affected during an incident.

The resources at risk from are described in detail in The Environmental Impact Assessment (EIA) that has been prepared for seismic & drilling operations. The EIA was used as a planning aid in determining response strategies for spills and is currently located at www.anadarko.com/mozambique.



Name	Latitude	Longitude
Point #1	10° 44' 52.1" S	40° 45' 43.2" E
Point #2	10° 58' 22.4" S	40° 58' 49.2" E
Point #3	11° 58' 57.5" S	40° 46' 01.5" E
Point #4	10° 45' 31.7" S	40° 34' 58.0" E
Point #5	10° 56' 12.5" S	40° 40' 50.0" E
Point #6	11° 04' 50.3" S	40° 41' 18.7" E
Point #7	11° 19' 26.8" S	40° 31' 34.4" E
Point #8	11° 45' 59.6" S	40° 31' 10.0" E

LEGEND

- Hypothetical Spill Locations
- Shorebase Pemba
- Populated Place
- Reef Points
- Coral Reefs
- Bathymetry
- Streams\Rivers
- National Protected Sites
- Wetlands
- Offshore Area 1
- Railroad
- Road\Street
- Trail

F.1.1 Environmental

The risk of accidental hydrocarbon spillage to the marine environment is one of the main environmental concerns associated with oil-industry developments. The impacts upon marine organisms arising from oil spills are well documented, and a summary of these impacts and their effects is given in the following *Table 1: Potential impacts on components of the marine environment from an oil spill.*

Potential Impacts		**Table 1**
Component	Type of effect	Level of impact
Seabirds	Physical fouling of feathers; potential toxicity by ingestion; damage to eyes etc.	Potential fatalities of sensitive offshore species may arise, especially among diving birds and waders, although this will heavily depend on the quantity of oil spilled, and the probability of oil reaching the coast.
Fish	Direct effects are rare offshore.	Fish may leave the immediate area. Tainting of fish flesh is not proven, but public perception can damage commercial fisheries.
Sea turtles	Effects on turtles include increased egg mortality and developmental defects, direct mortality due to oiling in hatchlings, juveniles, and adults; and negative impacts to the skin, blood, digestive and immune systems, and salt glands.	Potential fatalities due to turtles' inability to avoid contaminated areas.
Fisheries	Loss of fishing access, and potential loss of fishing resources.	Potentially severe impacts on subsistence fishing communities.
Dugong	Found in coastal marine and estuarine habitats as well as fresh water along the coast.	Oil could contaminate the food sources or oil could be ingested as well as adhering to the skin as the animal surfaces for breathing.
Aquaculture	Potential toxicity by ingestion/ filter feeding; physical damage to gills etc.; oxygen reduction in pond area.	Potential mass mortality in cases of extreme contamination partly due to high stocking densities and enclosed area. Taint leading to loss of income. Longer term impact on reproduction.

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Potential Impacts		Table 1
Component	Type of effect	Level of impact
Algae	Oil may be trapped in the algal mat during low tide causing severe biological impacts	The oil will be removed by wave action and natural degradation, but the biological impacts can be immediate and severe. In exposed rocky flats with tidal pools, oil can be trapped in the pools. This habitat is very important as nursery area for fish. Intertidal rocks covered by abundant algal growth, which is exposed at low tide, are encountered in a wide zone along the coast.
Invertebrates	In exposed rocky flats with tidal pools, oil can be trapped in the pools.	The oil will be removed by wave action and natural degradation, but the biological impacts can be immediate and severe. This habitat is very important as nursery area for fish.
Fish and fish eggs and larvae in confined environments	Oil and the oil components tend to adhere to the tidal flats, preventing removal by tides. Oil may persist for years.	The lagoons are important and vulnerable ecosystems, housing a wide variety of fish, shrimps, crabs and mollusk species. Lagoons are almost impossible to clean up due to the soft substrate and limited access. Usually any cleanup effort will mix oil deeper into the sediment prolonging recovery. Natural removal rates are very slow because there is no wave action to remove the oil and the oil components.
Bird eggs and young birds	Reduction in number of eggs, Fertility of eggs, Reduced thickness of shell. Transfer of oil to young birds can cause death.	Feeding, roosting and nesting sites for thousands of migratory and resident birds. The reproduction of the birds can also be affected when adult birds have been in contact with oil.
Mangroves	Important breeding and nursery areas for fish and crustaceans and essential habitats for numerous birds. Exposed root systems are sensitive.	Oil can enter during high tide and coat the aerial roots and sediment surface as the tide goes out. The oil clogs the pores in the aerial roots and collapses the respiratory system and cause the tree to die. Fresh oil can cause death by toxicity of oil components.

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F.1.2 Onshore Response Methods

It is also vital to protect environmentally sensitive areas from the harmful effects of an oil release onshore.

The focus of response efforts will be to protect human life and health, sensitive environmental and ecological areas, and economic entities. Recommended practical steps to take toward achieving these efforts are:

•	Stop further pollution at the source.
•	Consider safety of personnel / call for medical assistance if needed.
•	Shut off ignition sources.
•	Coordinate rescue and medical response actions if necessary.
•	Report all incidents to your immediate supervisor.
•	Contain the pollutant discharge released
•	Remove the product.

Environmentally sensitive areas can consist of waterways, wildlife habitat (as well as the wildlife themselves), water sources used for human consumption, livestock and areas of human habitat. A release may immediately affect these environmentally sensitive areas but in many cases a spill can be contained before it can affect any additional areas. Every effort should be made to safely contain a spill as soon as possible to minimize its effects on these areas. Containment can be accomplished by the use of barriers such as; earth berms, construction of diversion ditches or construction of catchment basins to collect the spilled material.

If any wildlife is affected by an onshore spill, wildlife experts should be notified to assist in capturing and rehabilitating the animals. Initial responders should not attempt to capture affected wildlife as their safety could be jeopardized.

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F.1.3 Coastal Response Methods

It is vital to protect environmentally sensitive areas from the harmful effects of an oil release. Many of the organisms living in the area have a limited ability to cope with changes in their environment. Therefore, it is important to keep spills contained in open water and minimize shoreline exposure to the extent possible.

The focus of response efforts will be to protect human life and health, sensitive environmental and ecological areas, and economic entities. Recommended practical steps to take toward achieving these efforts are:

•	Stop further pollution at the source
•	**Contain the pollutant discharge released**
•	**Remove the product**

F.1.3.1 Waterfowl and Wildlife Protection

Anytime oil is spilled on water, methods to protect waterfowl and wildlife will be considered. Although these methods may be used in open waters, a considerable amount of effort will be spent providing waterfowl and wildlife protection in their living habitats along shorelines and natural nesting areas. Some of the methods that will be considered for waterfowl and wildlife protection are detailed in Table 2.

		Table 2
Method	**Applicability**	**Limitations**
Noise Devices (propane cannons, guns, alarms, horns, etc.)	**Devices used to provide noise to keep birds away from impact areas may be used onboard boats or at shorelines**	**Long term use reduces results. Birds/wildlife may become acclimated to sound; not practical in nesting areas.**
Vehicles and Boats	**Noise from motors and horns may keep birds and wildlife away from impact areas.**	**Limited use in shoreline areas; not practical in nesting areas.**
Over flights	**Noise from airplanes and helicopters may keep birds and wildlife away from impact areas.**	**Limited by weather conditions; not practical in nesting areas.**
Fencing and Netting	**Fencing and netting may be placed around impact areas to keep nestlings from entering.**	**Limited to areas accessible for fencing and netting**
Remove Sea Turtle Nests	**Remove nests from impact areas within 2 days**	**Element of time is essential**
Notify spill response personnel in boats to watch for manatees	**Conduct safety meeting to discuss safety issues concerning wildlife including manatees**	**Poor light & inclement weather conditions**
Helium filled balloons stationary figures	**Place balloons & figures in impact areas**	
Play recorded sounds of alarmed birds	**Play recorded sounds of alarmed birds in impact areas**	

F.2 Scenarios

Category	Scenario	Local/Facility/Contractor	Anadarko Regional/Corporate	Appendix
Spills & Releases	Contained Oil Spill	Belford Dolphin OPEP Transocean Control and Mitigation Measures DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual		VII III IV VI
	Oil Spill on Water	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	ERP & OSCP-Response Procedure	I VIII III IV VI
	Chemical/Produced/ Water/Vapor/Gas/ Radioactive	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual		I III IV

Wells	Kick Management	DWM Emergency Response Manual		IV
	Blowout	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual	 ERP & OSCP-Response Procedure	I III IV VIII

Fire/ Explosion	Fire or Explosion	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	--- ERP & OSCP-Response Procedure	I III IV VI VIII

Personnel	Occupational Injury & Illness	Belford Dolphin Offshore Emergency Procedures Manual Tidewater Marine Emergency Preparedness Manual	ERP & OSCP-Response Procedure	I VI VIII
	Medical or Rescue Emergency (Medevac)	Belford Dolphin Offshore Emergency Procedures Manual DWM Medical Emergency Procedure Tidewater Marine Emergency Preparedness Manual	MedEvac Plan	I V II VI
	Deceased Personnel	Belford Dolphin Offshore Emergency Procedures Manual Tidewater Marine Emergency Preparedness Manual		I VI
	Missing Person	Belford Dolphin Offshore Emergency Procedures Manual DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	---	I IV VI
	Rescue from Height		---	
	Man Overboard	Belford Dolphin Offshore Emergency Procedures Manual	---	I III

		Transocean Control and Mitigation Measures DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual		IV VI
Evacuation	Evacuate/Abandon Vessel/Facility	Belford Dolphin Offshore Emergency Procedures Manual DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	---	I IV VI
	Regional/Country Evacuation			

Transportation	Collision / Hull Failure	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	---	I III IV VI
	Aviation	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual		I III IV
	Flooding / Excessive List	Transocean Control and Mitigation Measures Tidewater Marine Emergency Preparedness Manual		III VI
	Grounding	Belford Dolphin Offshore Emergency Procedures Manual Tidewater Marine Emergency Preparedness Manual	---	I VI
	Emergency Towing	Tidewater Marine Emergency Preparedness Manual	---	VI
	Journey Management		---	

Natural Disaster	Severe Weather	Belford Dolphin Offshore Emergency Procedures Manual DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	ERP & OSCP-Response Procedure	I IV VI VIII

Operations	Facility Shutdown			---
	Loss of Stability	Belford Dolphin Offshore Emergency Procedures Manual Transocean Control and Mitigation Measures DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual		I III IV VI
	Business Continuity			
	DP Failure			

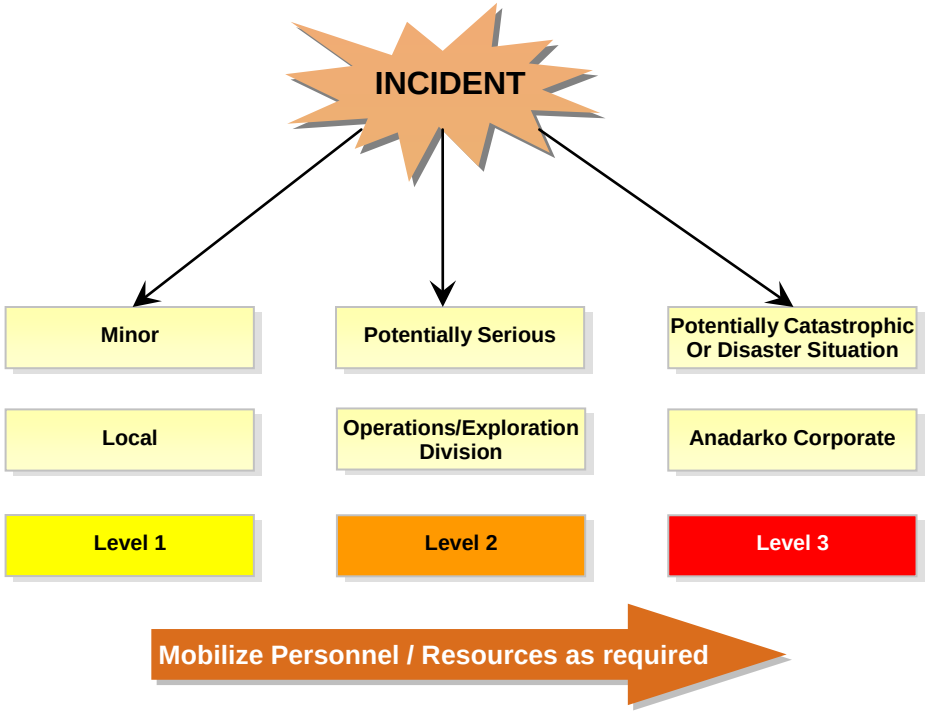
Security	Bomb Threat	Belford Dolphin Offshore Emergency Procedures Manual	ERP & OSCP-Response Procedure	I VIII
	Civil Unrest/Disorder/Acts of Violence	Belford Dolphin Offshore Emergency Procedures Manual DWM Emergency Response Manual Tidewater Marine Emergency Preparedness Manual	ERP & OSCP-Response Procedure	I IV VI VIII
	Kidnap/Missing Persons	Tidewater Marine Emergency Preparedness Manual	---	VI

Appendix VIII
Emergency Response Plan (ERP) &
Oil Spill Contingency Plan (OSCP) - Response Procedures

Section 1 – Response Procedures

1.1 Response Levels & Procedures

In order to properly respond to any emergency, incidents should be classified into one of three levels within Anadarko's Mozambique operating areas. The incident level is determined by the complexity of the incident, the risks to company personnel and the public, and the impact on the environment. These level classifications will be used to communicate to all personnel within the company and do not account for all circumstances.



	Level 1	Level 2	Level 3
Management Level	Superintendent/Foreman	Manager/General Manager/VP	Senior VP
Resources	Local / Facility	External Local/National	External National or International
Government Involvement	Requires Reporting w/ Minimal Follow-up	Immediate Reporting & Likelihood of Involvement	Immediate Reporting & Governmental Involvement
Public Impact	Evacuation in close proximity	Minor Injury/Illnesses Multiple evacuations	Serious Injury, illness or fatality(s), mass evacuations
Area Impact	Limited to Facility	Significant Impact to adjoining facilities	Will Impact External Locations and Pose Additional Risk to Community Locations Beyond Adjoining Locations
Emergency Actions	One Emergency Response Plan (ERP) active	Two ERP's active	Business Continuity Plan or 3 or more ERP's active

1.1 Response Levels & Procedures (Continued)

Below are 12 categories of incidents/risks that have been identified and may occur within Anadarko's operations. Each category has a series of possible incidents listed to better define the categories.

This listing helps in identifying the types of incidents which should be evaluated for each operation, and if likely to occur, to develop an incident-specific plan to properly respond to that incident. The plans should be developed based upon governmental requirements, best industry practices, experience of the ERT/EMT, and Anadarko's internal requirements.

Well Control Problems
- Kick During Drilling
- Blowout of oil
- Blowout of gas
- Radioactive source loss

Evacuations
- From a remote site
- Medical
- Due to civil unrest &/or natural disaster
- Country evacuation

Security
- Civil unrest / revolution
- Strike/ labor unrest
- Kidnap / extortion
- Terrorist threat / attack
- Bomb threat / alert
- Hijacking
- War
- Criminal activity
- Piracy

Spills
- Oil spill
- Other produced product
- Chemical / refined product release
- Produced water release
- Surface or ground water impact

Natural Disasters
- Typhoons / hurricanes / tornadoes
- Floods
- Earthquakes
- Volcanic eruptions
- Forest / grass fires

Anadarko Property Loss
- Could result from any of the listed incidents in many categories

Fire and/or Explosion
- Well
- Pipeline-internal &/or external to facilities
- Facility - equipment process
- Near facility with potential to impact ops

Toxic Releases
- H_2S or SO_2 gas release
- Storage tank - explosive / toxic release
- Gas product release
- Pipeline break / rupture & release off site
- Radioactive incident or source loss

Media / Public Relations
- Could result from any of the listed incidents in many categories

Personnel
- Injury or multiple injuries
- Fatalities
- Missing person(s)
- Medical event
- Evacuation because of injury / illness

Transportation - Personnel & Equipment
- Aircraft - lost or down
- Collisions
- Vessels - work, supply, crew, or standby
- Motor vehicles - buses, autos

Public Impacts
- Public &/or private property
- Community issues
- Environmental impacts
- Injury - Minor or Major
- Fatality
- Third part impacts

Response Procedures/Checklist
Table of Contents

Section	Type of Incident	Page
1.2	Oil Spill	4
1.3	Fire, Explosion, or Well Blowout Flowchart	40
1.4	Injury & Illness Flowchart	42
1.5	Severe Weather Flowchart	43
1.6	Bomb Threat Flowchart	44
1.7	Civil Unrest/Disorder	45

1.2 Oil Spill

Initial Response Checklist	
Upon receiving indication of an oil spill, or other chemical release that may threaten the Waters of Mozambique, the following actions are critical to initiating and sustaining an effective response:	
Detection: Anadarko company employees, contractors, and subcontractors are responsible for maintaining a vigilant watch for oil spill discharges of any magnitude and reporting all discharges to management personnel. In the event the discharge is determined to be from a Anadarko facility or operation, the person in charge (OIM and/or Senior Company Representative) as well as on duty field personnel will take immediate action which may include but is not limited to the following:	
☐	Adopt a "Safety First" attitude throughout the duration of the emergency response, and continually ensure the safety of all personnel.
☐	Person discovering spill will: a) Sound alarm and notify Person in Charge immediately b) Shut off ignition points and restrict access to spill area; c) Isolate discharge source pending approval by Person in Charge.
☐	As quickly as possible, safely shut down the operation responsible for the discharge
☐	Conduct Hazard Assessment to determine the potential for fire, explosion, & hazardous/toxic vapors as well as to define Personal Protection Equipment (PPE) needed by responders.
☐	Identify & evacuate exclusion zone in vicinity of spill site until Hazard Assessment completed.
☐	Initiate notification of management personnel as well as required government agencies as promptly as possible *(Notification contacts located in Section 5).*
☐	The Person in Charge will assume the duties of Incident Commander until the IMT is mobilized and will then resume duties as the On Scene Commander *(Roles & Responsibilities located in Section 6).*
☐	Utilize air monitoring equipment to monitor vapors (I.e. flammable vapors) and required PPE until the response operation is completed.
☐	Notify Anadarko operations personnel (i.e., drilling/platform operators) as well as other company operations that may be impacted by the spill incident *(Notification contacts are located in Section 5).*
☐	The Person in Charge will initiate evacuation procedures in the event unsafe conditions persist to ensure personnel safety.
☐	Sample discharged material as requested by the Incident Commander by using accepted procedures to prevent sample contamination and to protect the legal validity of the sample.
☐	Initiate surveillance over flights of spill area at first light or as soon as possible with fixed wing or rotary wing aircraft (see section 1.2.5 for additional information)
☐	Video and photograph spill area daily during surveillance over flights for documentation and operational purposes, dependent upon weather conditions.
☐	Activate the Anadarko Houston IST dependent upon the severity of the emergency event.
☐	Notify Oil Spill Response Limited (OSR) to respond to the emergency dependent upon spill response requirements (On-Water Recovery & Dispersant Operations). See notification form in Section 10.

1.2 Oil Spill (Continued)

The following oil spill strategies (1.2.1-1.2.13) were developed by Oil Spill Response (OSR):

Oil Spill Response Strategies Contents

	Section
1. Strategy Selection	1.2.1
2. Deep Water Strategies Flowchart	1.2.2
3. Shallow Water Strategies Flowchart	1.2.3
4. Shoreline Cleanup Strategies Flowchart	1.2.4
5. Monitoring and Evaluation (Deep Water / Shallow Water)	1.2.5
6. Containment and Recovery Response (Deep Water / Shallow Water)	1.2.6
7. Dispersant Response (Deep Water)	1.2.7
8. Data Collection, Monitoring and Evaluation (Shoreline)	1.2.8
9. Mudflats / Algal Flats Response Strategies (Shoreline)	1.2.9
10.Mangroves Response Strategies (Shoreline)	1.2.10
11.Sandy Beach Response Strategies (Shoreline)	1.2.11
12.Wildlife Protection Strategies (Shoreline)	1.2.12
13.Waste Management (Deep Water / Shallow Water / Shoreline)	1.2.13
14.OSR Notification and Mobilization Forms	10

1.2.1 Strategy Selection

The following flow chart should be used to select which main oil spill response strategy is applicable depending on the exact situation at the time of the incident.

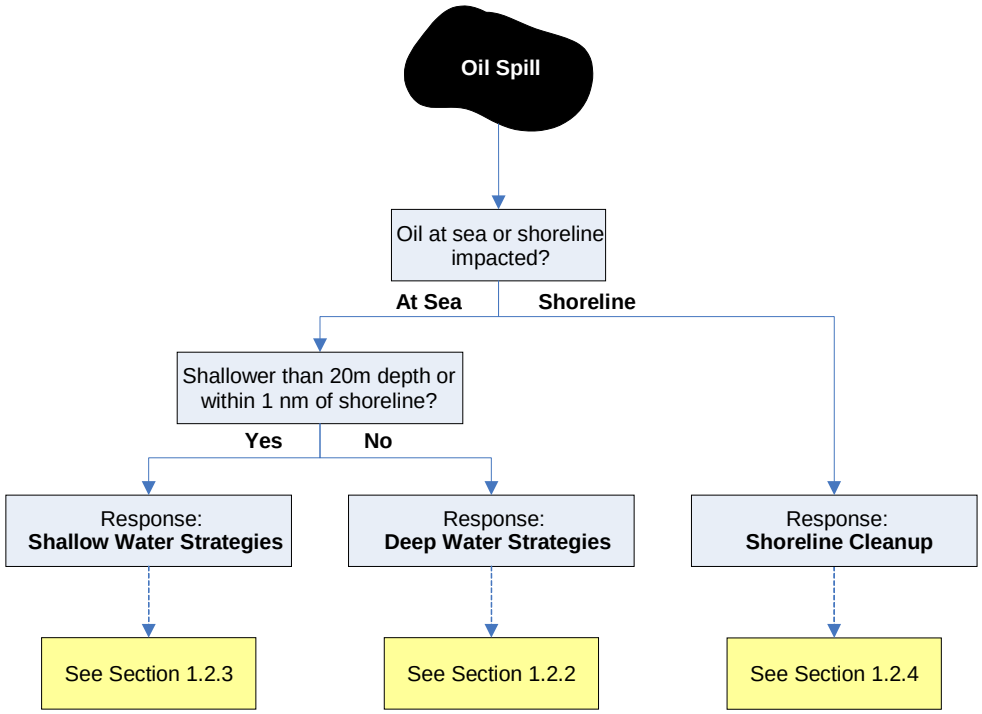


Figure 1-1: Strategy Selection Flow Chart

1.2 Oil Spill (Continued)

1.2.2 Deep Water Strategies Flowchart

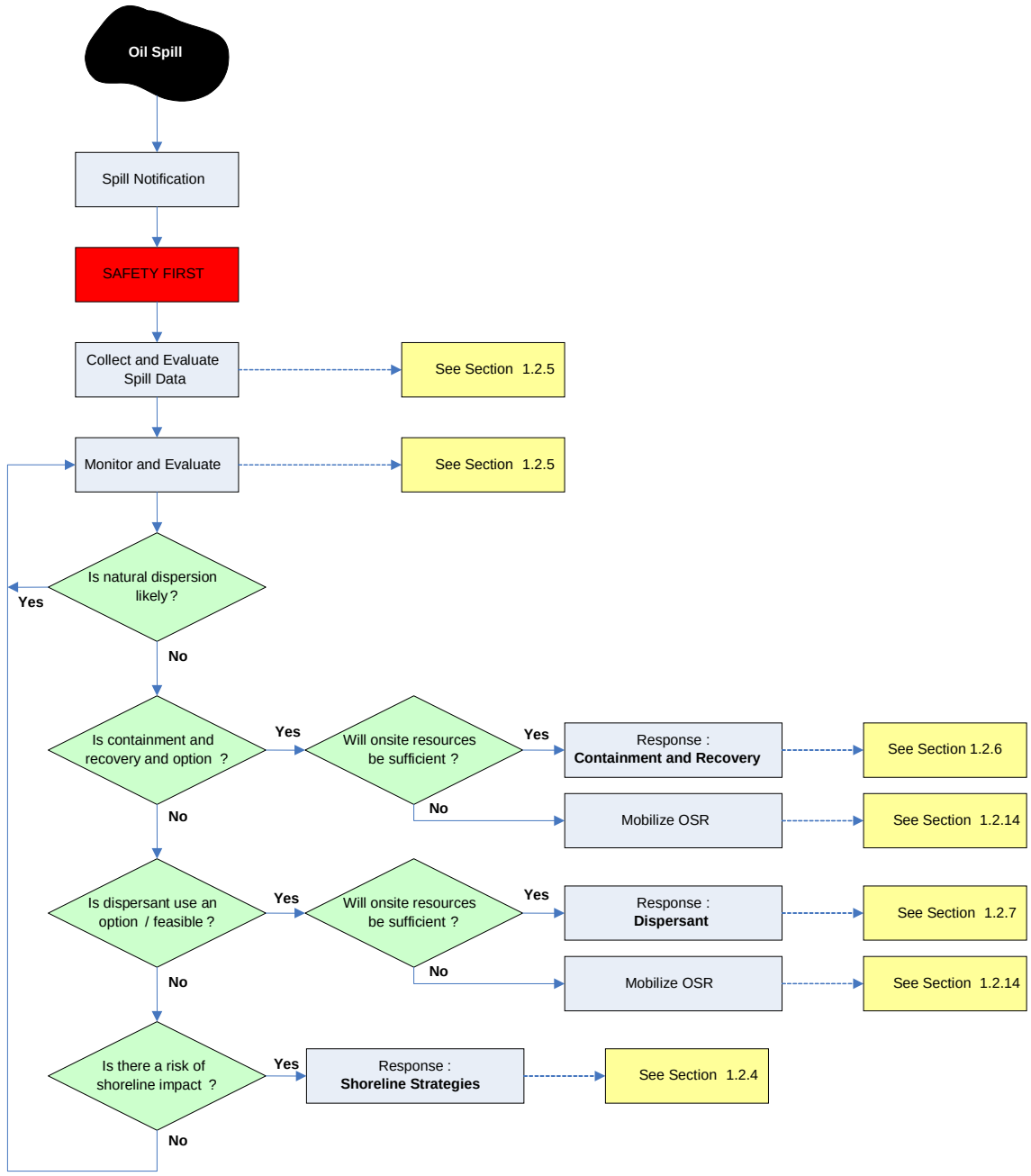


Figure 1-2: Deep Water Strategies Flow Chart

1.2 Oil Spill (Continued)

1.2.3 Shallow Water Strategies Flowchart

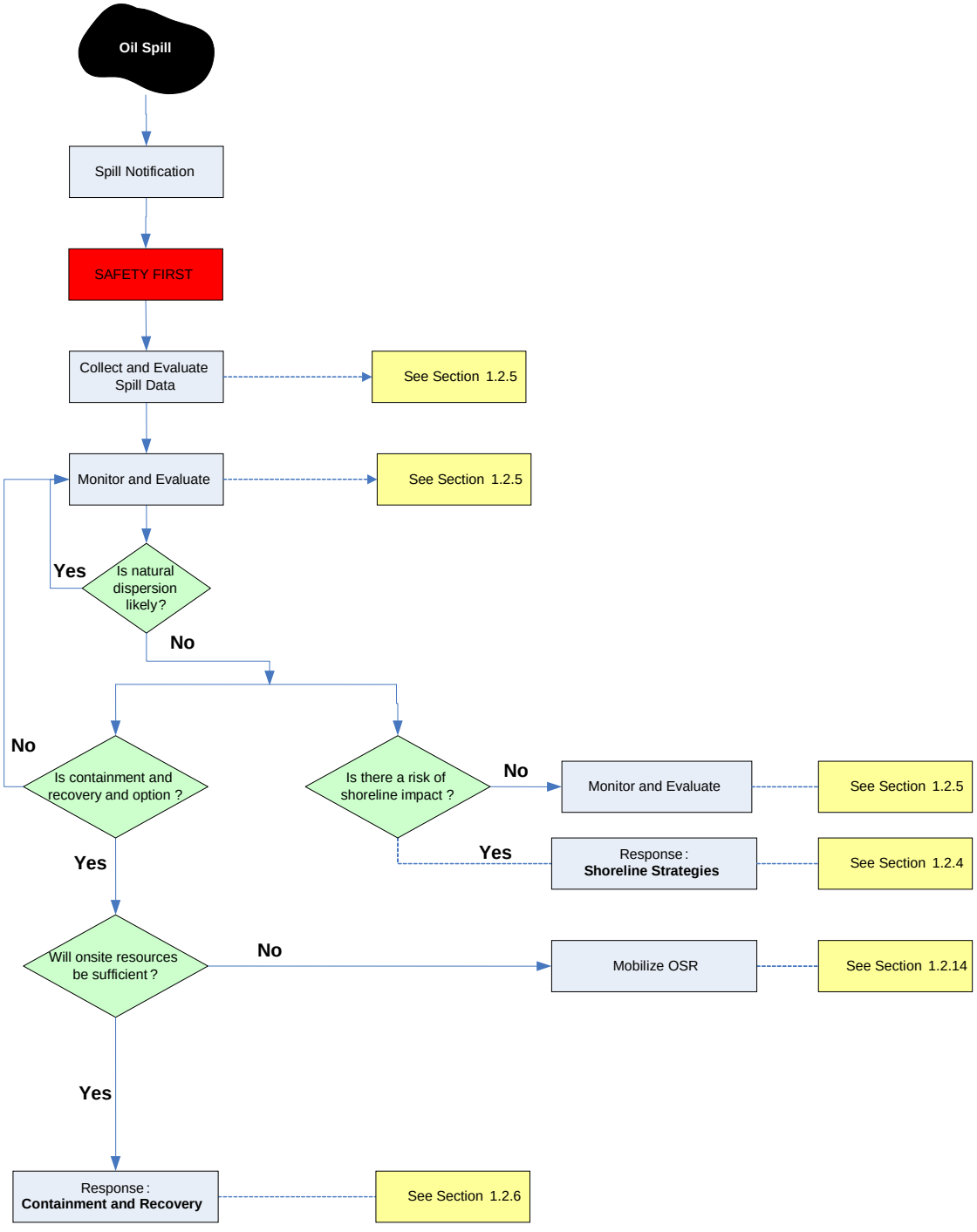


Figure 1-3: Shallow Water Strategies Flow Chart

1.2 Oil Spill (Continued)

1.2.4 Shoreline Cleanup Strategies Flowchart

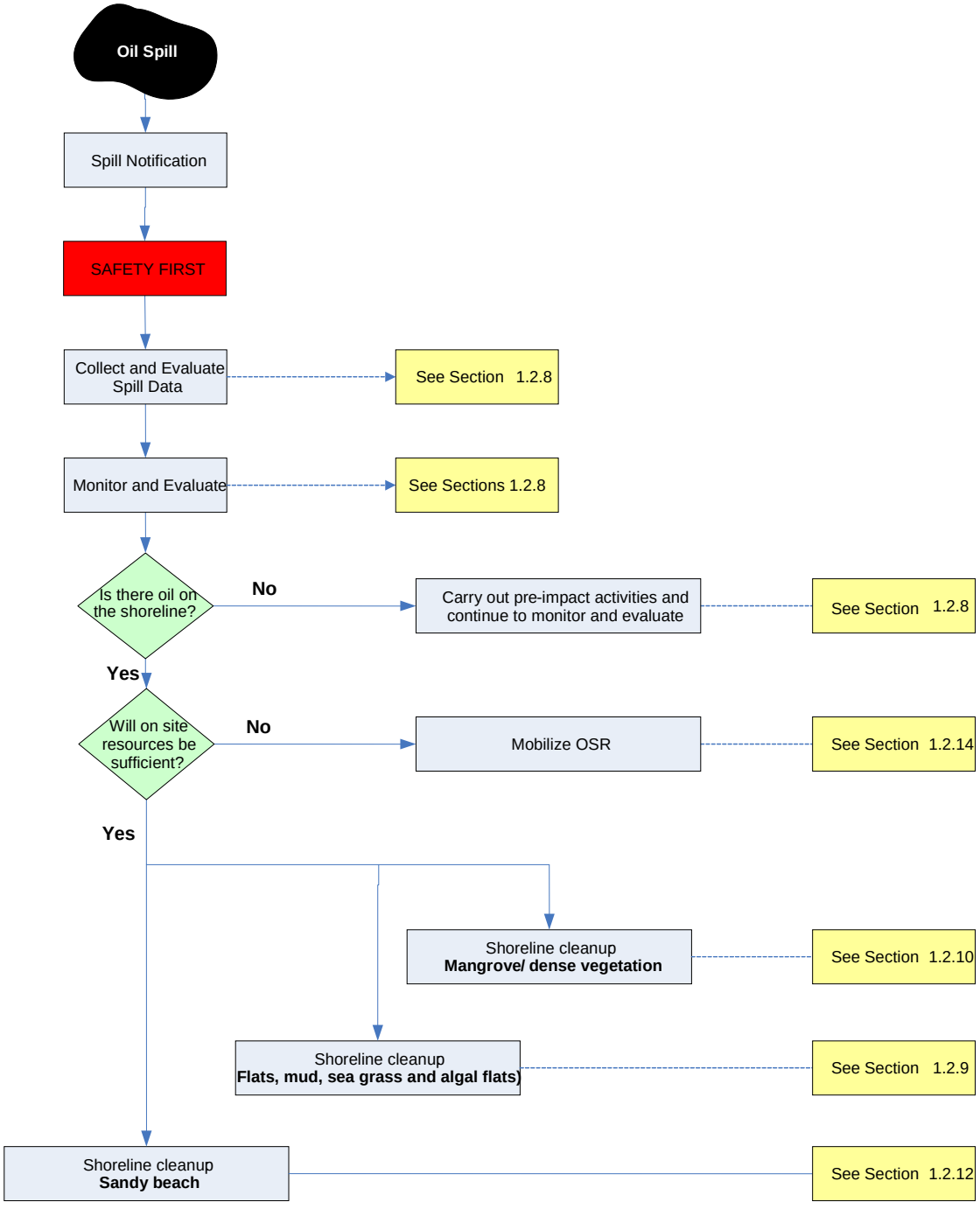


Figure 1-4: Shoreline Cleanup Strategies Flow Chart

1.2 Oil Spill (Continued)

1.2.5 Monitoring and Evaluation (Deep Water / Shallow Water)

1.2.5.1 Safety Considerations

Be aware of the volatile light ends and toxic gases of the oil e.g. gases such as H_2S can be potentially hazardous to life and may even be a danger during aircraft operations. Changes to a flight plan may be required to avoid the remit of the H_2S gas. Gas monitoring near the spill site / operations site will be required to detect the presence of such hazardous gases in accordance with Anadarko procedures and the guidance set out below.

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person. ✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date. ✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels. ✓ Only to be use by personnel trained in the correct operation. ✓ Always use a gas monitor when you are approaching site for the first time. ✓ Approach site from up wind. ✓ Work up wind from any contaminated area and continually gas monitor. ✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

1.2.5.2 Data Collection

After initial notification, data collection should be the first response to any incident following a hydrocarbon release onto water. This will enable the most suitable response strategy to be formulated. The information that needs to be collated should include, but not be limited to the following:

Oil Type and Volume	The assay sheet (contains the properties the oil) and MSDS (Material Safety Data Sheet) will primarily give safety advice and information required for both predicting the oil weathering / behavior and formulating a response plan.
Weather Conditions	These will affect the response options, safety considerations, the weathering of the oil and its trajectory.
Spill Trajectory	✓ Request a spill trajectory model from The Response Group (trajectory form found in Section 10.8) and/or OSR/EARL. This can be done at any time, day or night. ✓ A model will give an indication of where the oil is migrating and what resources may be impacted, e.g. another rig or the shoreline. ✓ A basic trajectory can be plotted manually; on a chart, plot one point per hour using 100% of the current and 3% of the predicted wind for that time. The resultant vector represents the predicted oil trajectory:

1.2 Oil Spill (Continued)

1.2.5 Monitoring and Evaluation (Deep Water / Shallow Water) (Continued)

1.2.5.2 Data Collection (Continued)

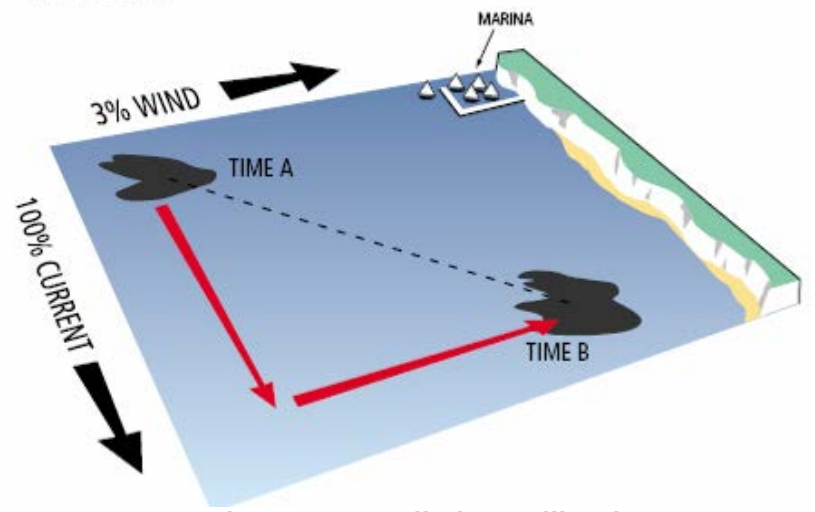


Figure 1-5 Predicting spill trajectory

1.2.5.3 Monitor and Evaluate

Oil is a naturally occurring product and, over time, will dissipate or evaporate. Especially with lighter oils that have a greater risk of explosion or release of toxic gases, if the oil is not going to impact any sensitive resources, it must be recognized that sometimes, the safest and most efficient response will be to let the product naturally dissipate. This will require regular monitoring to track the spill and ensure that other actions are taken in a timely manner if it looks likely to impact other resources, such as the coast line. Monitoring of oil spills is best carried out from a helicopter or small plane with a trained observer.

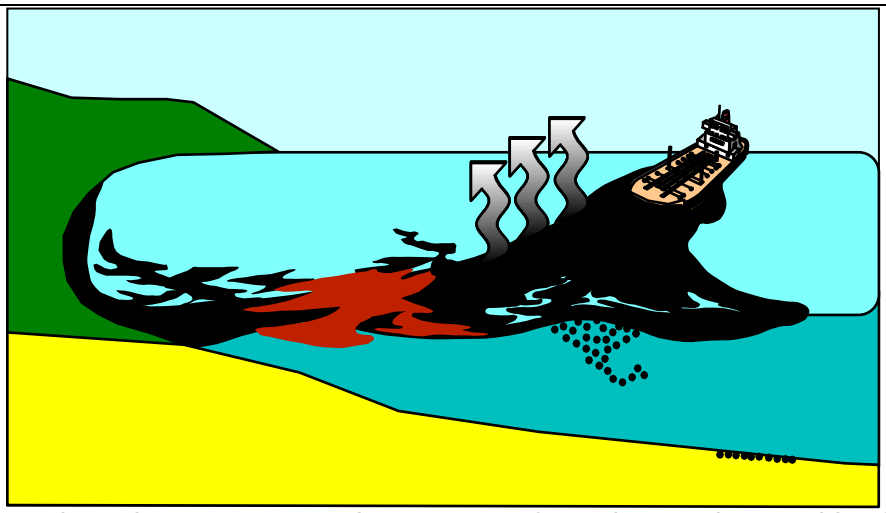
Technique	▪ Factors that should be considered when assessing oil spill movement and weathering include: ✓ Currents and tide ✓ Weather (including wind direction and speed), water temperature ✓ Spill size / volume. This can be estimated either from oil lost or from an aerial surveillance flight (see below) ✓ Type of oil spilled and its properties (viscosity, pour point, specific gravity, dispersion and evaporation. These can be found on the oil's assay sheet).

1.2 Oil Spill (Continued)

1.2.5 Monitoring and Evaluation (Deep Water / Shallow Water) (Continued)

1.2.5.3 Monitor and Evaluate (Continued)

Technique (Continued)



- ✓ Hydrocarbons move on the water surface due to the combined influence of 100% current and 3% wind. See Figure 1-5.
- ✓ The primary aim of a surveillance flight is to estimate the location of the spill. The secondary aim is to quantify the spill. This information will help to predict where impact may occur and formulate an appropriate response strategy.
- ✓ Over flights should carried out at dawn and dusk of each day after an incident until there is not more oil at sea to be seen.
- ✓ Flight paths should be conducted in a 'ladder search pattern'.

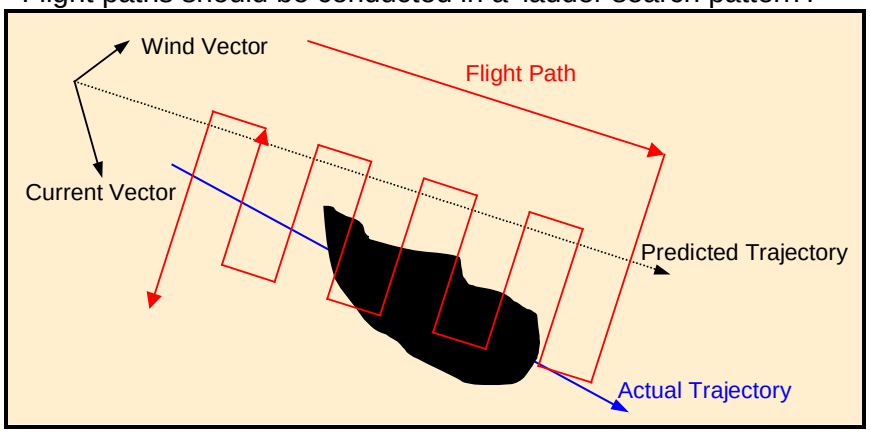


Figure 1-6 Over flight path

- ✓ All observations should be recorded, e.g. photographs, logs, GPS coordinates, etc.

1.2 Oil Spill (Continued)

1.2.5 Monitoring and Evaluation (Deep Water / Shallow Water) (Continued)

1.2.5.3 Monitor and Evaluate (Continued)

Technique cont.

Depending on the exact incident, the spill volume may be obtainable from the source, for example by knowing the volume of the lost / damaged inventory, flow rate, etc. If the volume cannot be determined this way, it can be calculated by observing the total area covered by the spill and estimating the different thicknesses of oil from its color combined with its proportion of the overall spill area. The relationship between slick color and thickness is provided in Table 1-1.

Code	Description - Appearance	Layer Thickness Interval (µm)	Litres per km^2
1	Sheen (silvery/grey)	0.04 to 0.30	40 – 300
2	Rainbow	0.30 to 5.0	300 – 5000
3	Metallic	5.0 to 50	5000 – 50,000
4	Discontinuous True Oil Color	50 to 200	50,000 – 200,000
5	Continuous True Oil Color	> 200	> 200,000

Table 1-1 The Bonn Agreement Oil Appearance Color Code – The relationship between slick color and thickness

- ✓ Surveillance can also be undertaken from a vessel / rig, however this is not as compressive as aerial options.

Avoid

- × Avoid confusing oil with other false image observations, e.g. algal blooms, seaweed / sea grass, cloud shadow, etc.

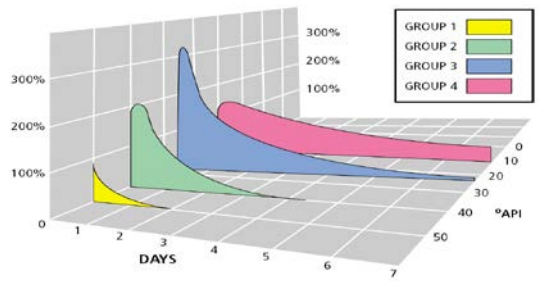
Equipment

Helicopter / fixed wing airplane, binoculars, chart / map, digital camera, GPS, sketchpad and pen.

Additional Guidance

The table below gives a useful guide to the behavior of different oil types. It is emphasized however, that this is only a guide and further oil spill computer modeling for individual product types should be carried out in the event of an incident.

Table 1-2 - Persistence guide for example products

Product	Persistence Guide
Kerosene / Jet A-1	
Gas Oil / Light Crude Oils	
Crude Oils	
Heavy Crudes / HFO	

(Source: ITOPF)

ITOPF: International Tanker Owners Pollution Federation Ltd

1.2.5.4 Waste Disposal

No waste will be generated from these activities.

1.2 Oil Spill (Continued)

1.2.6 Containment and Recovery Response (Deep Water / Shallow Water)

1.2.6.1 Safety Considerations

Safety considerations in this type of response include those posed by the oil e.g. toxic gas emission, risk of explosion (see product MSDS sheet), and those associated with operating at sea, using machinery and by natural hazards e.g. weather, sea, etc. If there is a risk of toxic gases or explosive gasses being present then gas monitoring should be conducted in accordance with Anadarko procedures and guidance set out below.

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person. ✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date. ✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels. ✓ Only to be use by personnel trained in the correct operation. ✓ Always use a gas monitor when you are approaching site for the first time. ✓ Approach site from up wind. ✓ Work up wind from any contaminated area and continually gas monitor. ✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

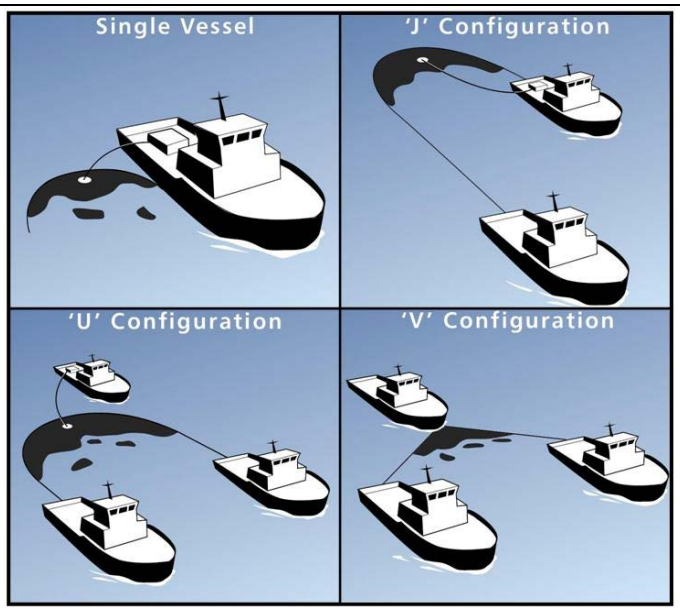
1.2.6.2 Containment and Recovery Options

Technique	
	✓ Boom (a floating barrier) should only be deployed by personnel who have been trained in the safe operation and deployment of containment and recovery strategies. ✓ Booms should be ideally towed with the current to limit failure. ✓ Skimmer (a mechanical oil recovery device) choice will be based on the viscosity of the oil. A weir skimmer is best suited to low viscosity oils, whereas a mechanical skimmer would be better suited to high viscosity oil. Oleophilic skimmers work best with light to medium viscosity oils and have a high oil to water recovery ratio. ✓ A variety of configurations can be used for containment and recovery. The choice will depend on how many vessels and what systems are available.

1.2 Oil Spill (Continued)

1.2.6 Containment and Recovery Response (Deep Water/Shallow Water) (Continued)

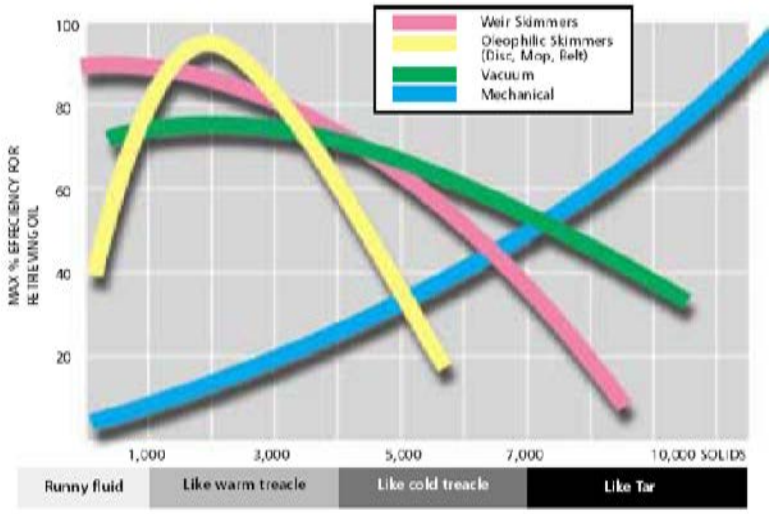
1.2.6.2 Containment and Recovery Options (Continued)

Technique (Continued)	 ***Figure 1-7 Possible containment and recovery options*** ✓ For offshore containment and recovery, there must be storage options available, e.g. slop tanks on the supply vessels, barges, inflatable storage barges, etc. ✓ Sorbents (material that can be used to absorb oil) could be use for absorption of very minor spills in calm conditions.
Avoid	× A boom may fail (loose oil at the apex) due to a number of possible reasons: • If the current speed is at right angles to the face of the boom and it exceeds 0.75 knots (0.36m/s). • If the boom is not flexible enough and can not flex with the swell. • If too much oil is collected in the apex of the boom it will seep underneath the boom. × Oleophilic skimmers should not be used after dispersant has been applied to the oil.
Additional Guidance	✓ Ensure there is a method for removing the oil from the boom. ✓ Ensure there is sufficient temporary storage for the oil and oily water once it has been removed from the boom by the skimmer. The figure below provides guidance on the suitability of different skimmers for different oil types

1.2 Oil Spill (Continued)

1.2.6 Containment and Recovery Response (Deep Water/Shallow Water) (Continued)

1.2.6.2 Containment and Recovery Options (Continued)

Additional Guidance (Continued)	 ***Figure 1-8 Performance of different skimmer types*** ✓ Following a spill incident, ensure all equipment is cleaned, serviced and consumables replaced.

1.2.6.3 Waste Disposal

Waste generated from this type of response will generate the following types of waste:

- Oil / water mix
- Oiled PPE
- Oiled debris
- Oiled sorbents

See Waste Management, Section 1.2.13, for further details.

1.2 Oil Spill (Continued)

1.2.7 Dispersant Response (Deep Water)

1.2.7.1 Safety Considerations

Safety considerations in this type of response include those posed by the oil e.g. toxic gas emission, risk of explosion (see product MSDS sheet), and those associated with operating at sea, using machinery and by natural hazards e.g. weather, sea, etc. There will also be hazards posed by the dispersants themselves e.g. exposure of skin to the dispersants and inhalation of dispersant droplets. The dispersant MSDS sheet should be read before handling to help determine the minimum level of PPE. If there is a risk of toxic gases or explosive gasses being present then gas monitoring should be conducted in accordance with Anadarko procedures and guidance set out below.

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person. ✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date. ✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels. ✓ Only to be use by personnel trained in the correct operation. ✓ Always use a gas monitor when you are approaching site for the first time. ✓ Approach site from up wind. ✓ Work up wind from any contaminated area and continually gas monitor. ✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

1.2.7.2 Dispersant Application Techniques

Dispersion of oil into the water column will occur naturally under the right conditions. Dispersant is a surfactant-based chemical than can be applied onto the oil slick to enhance natural dispersion of the oil into the water column. The subsequent formation of tiny oil droplets improves the opportunity for biodegradation. Dispersant spraying requires trained and experienced personnel to assist in calculating dosages and application rates, advice on safety, and to analyze the effectiveness of the spray operation.

Technique	✓ Dispersant can be sprayed from: • A vessel with hose adaptors. Do not spray directly from fire monitors as the droplet size will be too large and penetrate through the oil, rather than settle onto the surface. • A vessel with spray arms. Ensure that the spray arms are mounted towards the bow to ensure maximum efficiency. • A helicopter carrying a dispersant spray bucket. • An aircraft (large or small) with bespoke spray arms. Accurate targeting of aerial dispersant application should be monitored by another aerial asset.

1.2 Oil Spill (Continued)

1.2.7 Dispersant Response (Deep Water) (Continued)

1.2.7.2 Dispersant Application Techniques (Continued)

Technique (Continued)	✓ For modern concentrate dispersants, use an application rate of about 1: 20 – 1:50. Read manufacturers data for guidance on the correct rate. ✓ The effectiveness of the dispersant on the oil slick must be monitored, and this is best done by observing the sprayed area from the air or a vessel. The observations should be made about 30 minutes after spraying. Where there is a coffee-coloured plume in the water, this generally indicates effective dispersion of the oil. Where the oil has resurfaced there will be black patches. White clouds of dispersant in the water indicate the dispersant is not acting effectively on the oil.
Avoid	× Do not use in water depths less than 20m or within 1 nautical mile of the shoreline. × Do not use on light oils such as diesel, light products such as condensates or on sheen. Dispersants may become less efficient with oils of a higher viscosity (above 3000 – 5000 cSt) or that are emulsified. Field-testing prior to application is required on these oils, and increased and more vigilant monitoring. × Dispersant is unlikely to be effective on very heavy oils or heavily emulsified oils. × Do not spray in high winds (~35mph) or in conditions which is dangerous to do so.
Additional Guidance	✓ Ensure dispersant is approved for use by relevant authority. Appropriate authorisation must be obtained before applying any dispersant. ✓ Dispersants must be labelled, with correct health and safety supporting documentation. ✓ Ensure correct PPE is available for use by response teams. ✓ Field test effectiveness of the dispersant on the oil if there is doubt of the efficiency prior to application. ✓ Adjust the speed of vessel / aircraft and pump rate to change the dosage rate. ✓ Dispersants to be applied by spray only. Spray sets to be purpose designed to ensure correct droplet size. ✓ Following a spill incident, ensure dispersant stocks are replenished.



Figure 1-9 Vessel delivery system



Figure 1-10 Airborne delivery system

1.2 Oil Spill (Continued)

1.2.7 Dispersant Response (Deep Water) (Continued)

1.2.7.3 Waste Disposal

A small amount of waste may be generated from this response option:

- Soiled PPE
- Empty dispersant containers

See Waste Management, Section 1.2.13, for further details.

1.2.8 Data Collection, Monitoring and Evaluation (Shoreline)

1.2.8.1 Data Collection

After initial notification, data collection should be the first response to any incident following a hydrocarbon release on to water. This will enable the most suitable response strategy to be formulated. The information that needs to be collated should include, but not be limited to the following:

Oil type and volume	The assay sheet and MSDS will primarily give safety advice and formulating a response plan.
Weather conditions	These will affect the response options, safety considerations, the weathering of the oil
Spill trajectory (if oil still at sea)	Request a spill trajectory model from The Response Group (trajectory form found in Section 10.8). OSR can also provide this service. This can be done at any time of the day or night. This will give an indication of where the oil is going and what areas, e.g. another platform or the shoreline, could become oiled / impacted. A trajectory can be plotted manually; on a chart, plot one point per hour using a vector of 100% of the current and 3% of the predicted wind for that time, or oils spill computer modeling can be requested.

1.2.8.2 Shoreline surveying

Pre-cleaning and shoreline surveying should take place, if possible, before the oil comes ashore. Basic pre-cleaning involves moving beach debris to above the high water mark and should only be done on firm substrates i.e. sandy beaches, not mud flats or mangroves. This will reduce the amount of oiled waste that needs to be disposed of. Shoreline surveying before the oil comes ashore will help the clean up return it to its original state.

1.2 Oil Spill (Continued)

1.2.8 Data Collection, Monitoring and Evaluation (Shoreline) (Continued)

1.2.8.3 Monitor and Evaluate

Oil is a naturally occurring product and, over time, will dissipate or evaporate. Especially with lighter oils that have a greater risk of explosion or release of toxic gases, it must be recognized that sometimes, the safest and most efficient response will be to let the product naturally dissipate. For low energy habitats, such as mangroves, mud flats and algal flats, more harm than good can come from invasive cleaning techniques as entry to the areas will cause the oil to become entrained into the substrate. This will require regular monitoring and liaison with the local communities to help understand the response methods.

This obviously depends on the type of product, which has spilled and what resources it has impacted. Monitoring of oil spills on shorelines can be carried out by foot, boat or aircraft. Surveying by foot should only carried out over firm or solid substrates e.g. sandy or rocky beaches. Mud flats and mangroves should avoid being walked through as this will mix in the oil and damage the substrate. Be aware of the volatile light ends and toxic gases e.g. H_2S. An aircraft is a quick and efficient way to view a large amount of shoreline in a short space of time but may miss light oiling that can be seen on foot. Strategy discussions should include the advice of local stakeholders and relevant government officials.

1.2.8.4 Waste Disposal

Oiled waste is generally not generated from these activities. If there is any oiled PPE that requires disposing of from beach surveying, see Waste Management, Section 1.2.13, for further details.

1.2.9 Mudflats / Algal Flats Response Strategies (Shoreline)

1.2.9.1 Safety

Safety considerations in this type of response include those posed by the oil e.g. toxic gas emission, risk of explosion (see product MSDS sheet), by natural hazards e.g. weather, tides and machinery operation. Also be aware of personnel and equipment of becoming stuck in the mud. If there is a risk of toxic gases or explosive gasses being present then gas monitoring should be conducted in accordance with Anadarko procedures and guidance set out below.

1.2 Oil Spill (Continued)

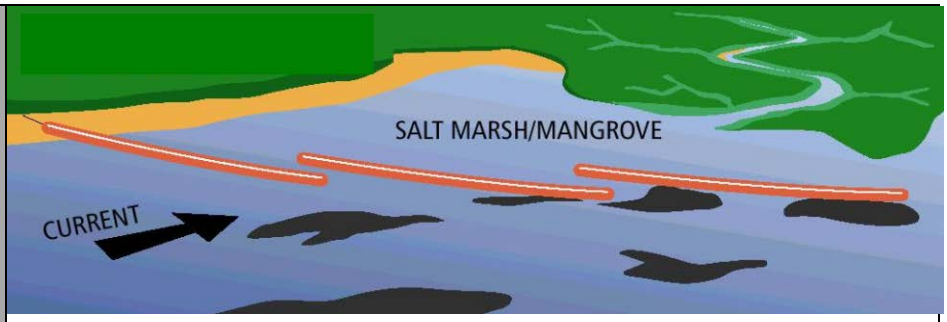
1.2.9 Mudflats / Algal Flats Response Strategies (Shoreline) (Continued)

1.2.9.1 Safety (Continued)

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person. ✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date. ✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels. ✓ Only to be use by personnel trained in the correct operation. ✓ Always use a gas monitor when you are approaching site for the first time. ✓ Approach site from up wind. ✓ Work up wind from any contaminated area and continually gas monitor. ✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

1.2.9.2 Shoreline Protection

Booms can be used to protect installations or sensitive areas from oiling and a cascade system can be used where near shore sensitive areas are at risk. Long boom lengths are required for this strategy.

Diagram	
Technique	✓ Booms can be used to redirect oil away from a sensitive site or area towards a selected location where shoreline cleanup may be easier and more effective. ✓ This may be achieved by using the cascade booming method, as in inland waterway containment. ✓ Booms can also exclude oil by providing a barrier around a resource or embayment (e.g. river mouth, lagoon entrance etc.).
Avoid	× Do not use heavy machinery to get to the shoreline, as this will cause long-term damage the structure of the flats.

1.2 Oil Spill (Continued)

1.2.9 Mudflats / Algal Flats Response Strategies (Shoreline) (Continued)

1.2.9.2 Shoreline Protection (Continued)

Equipment	***Sorbent boom*** A sorbent boom may be deployed in areas where the current speed flows at <0.7 knots. Consider, where possible, storing sorbent booms close to areas at risk from oil spills, such as pipeline crossings. This would allow more rapid deployment in the event of a spill. Sorbent recovery is more labor intensive than other skimming methods. ***Skor Boom*** Skor Boom combines the characteristics of sorbent boom and the conventional containment boom. It is highly absorbent and can be deployed 3 times longer than conventional sorbent boom. It has a high absorbency for a wide range of crude and refined oils. ***Shore Sealing Boom*** Special booms have been designed for use in intertidal areas, which are able to move up and down with the tide and maintain a good seal between the boom and the shoreline to stop oil escaping underneath. They have an air chamber for buoyancy on top of two water ballast chambers at the base, which follow the contour of the shore / the tidal patterns when aground and form a sub-surface barrier to oil when afloat. ***Nearshore Boom*** These booms are best used in areas which are reasonably sheltered such as estuaries, rivers, shoreline, and harbors. Inflatable versions can be stored in a relatively small volume but they are prone to damage from abrasion.

1.2.9.3 Clean-up

Shoreline clean-up is usually labor intensive. Once oil is stranded onshore, a response to an oil spill normally changes from an emergency to a project and will need to be managed as such.

It is important to note that the use of inappropriate techniques and inadequate organization can aggravate rather than mitigate the extent of the damage caused by the pollution. There are three stages in the cleanup of shoreline contamination:

Stage 1 Removal of floating oil at the water's edge and thick concentrations on the shore.

Stage 2 Clean-up of moderate contamination, stranded oil and oiled beach materials.

Stage 3 Clean-up of lightly contaminated shorelines and final polishing (i.e. removal of oil stains).

1.2 Oil Spill (Continued)

1.2.9 Mudflats / Algal Flats Response Strategies (Shoreline) (Continued)

1.2.9.3 Clean-up (Continued)

Oil is a naturally occurring product and, over time, will dissipate or evaporate. Especially with lighter oils that have a greater risk of explosion or release of toxic gases, it must be recognized that sometimes, the safest and most efficient response will be to let the product naturally dissipate. Mudflats are a low energy environment and more harm than good can come from invasive cleaning techniques as entry to the areas will cause the oil to become entrained into the substrate. This will require regular monitoring and liaison with the local communities to help understand the response methods. Before attempting any shoreline clean-up operation it is most important to take guidance from recognized environmental organizations as to the most sensitive approach to adopt.

<table>
<tr><td>Technique</td><td>✓ Consult with experts familiar with the areas ecology.
✓ Use booms to protect areas not impacted.
✓ A combination of safety considerations and the possible entrainment of oil into the substrate by cleanup crews may conclude that the most effective strategy would be to allow the oil to naturally dissipate. Continue to monitor the area.
✓ Oil can be sometimes be remobilized from the shoreline by using low-pressure flushing with sea water. This is when sea water is pumped to the top of the shore and allowed to flow down to the waterline and where it can then be collected with a skimmer.
✓ Recovery operations can be carried out from a flat bottom boat.
✓ Sorbents can be used on small patches of accessible oil. Consider the use of natural sorbents to reduce the necessity of recovery and disposal the artificial sorbent materials.
✓ If approved use light equipment for manual cleanup.</td></tr>
<tr><td>Avoid</td><td>× Do not use heavy machinery or vehicles on these areas.
× Do not force oil into the substrate.
× Be aware of tidal ranges and ensure personnel are not caught out by the tide.
× People walking in these areas unless the substrate will support them and the damage is limited.</td></tr>
<tr><td>Additional Guidance</td><td>
<table>
<tr><th>Method</th><th>Light</th><th>Medium</th><th>Heavy</th></tr>
<tr><td>Natural</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Low Pressure Flush</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Manual</td><td></td><td></td><td>✓</td></tr>
<tr><td>Sorbents</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
✓ Preferred Method ✓ Suitable for relatively small amounts of oil
</td></tr>
</table>

1.2 Oil Spill (Continued)

1.2.9 Mudflats / Algal Flats Response Strategies (Shoreline) (Continued)

1.2.9.4 Waste Disposal

Waste generated from this type of response will generate the following types of waste:

- Oil / Water mix
- Oiled PPE
- Oiled debris
- Oiled sorbents
- Oiled dead wildlife

See Waste Management, Section 1.2.13 for further details

1.2.10 Mangroves Response Strategies (Shoreline)

1.2.10.1 Safety

Safety considerations in this type of response include those posed by the oil e.g. toxic gas emission, risk of explosion (see product MSDS sheet), by natural hazards e.g. weather, tides and machinery operation. If there is a risk of toxic gases or explosive gasses being present then gas monitoring should be conducted in accordance with Anadarko procedures and guidance set out below.

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person.
✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date.
✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels.
✓ Only to be use by personnel trained in the correct operation.
✓ Always use a gas monitor when you are approaching site for the first time.
✓ Approach site from up wind.
✓ Work up wind from any contaminated area and continually gas monitor.
✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

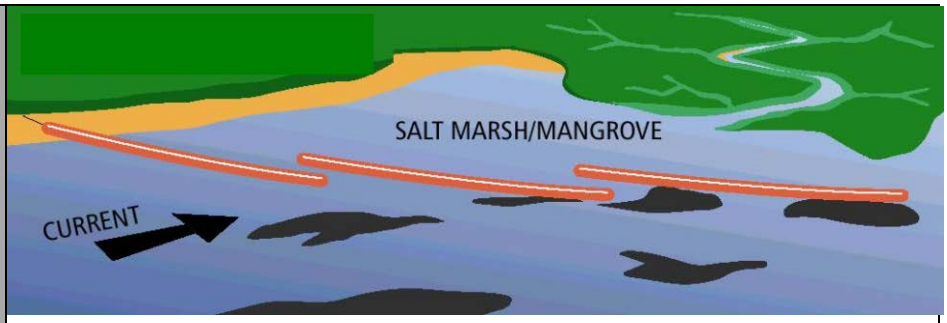
1.2.10.2 Shoreline Protection

Booms can be used to protect installations or sensitive areas from oiling and a cascade system can be used where near shore sensitive areas are at risk. Long boom lengths are required for this strategy.

1.2 Oil Spill (Continued)

1.2.10 Mangroves Response Strategies (Shoreline) (Continued)

1.2.10.2 Shoreline Protection (Continued)

Diagram	
Technique	✓ Booms can be used to redirect oil away from a sensitive site or area towards a selected location where shoreline cleanup may be easier and more effective. ✓ For example, oil could be directed away from a sensitive mangrove area towards a beach, which is easier to clean. ✓ This may be achieved by using the cascade booming method, as in inland waterway containment. ✓ Booms can also exclude oil by providing a barrier around a resource or embayment (e.g. river mouth, lagoon entrance etc.).
Avoid	× Do not use heavy machinery to get to the shoreline, as this will cause long-term damage the structure of the flats.
Equipment	***Sorbent boom*** A sorbent boom may be deployed in areas where the current speed flows at <0.7 knots. Consider, where possible, storing sorbent booms close to areas at risk from oil spills, such as pipeline crossings. This would allow more rapid deployment in the event of a spill. Sorbent recovery is more labor intensive than other skimming methods. ***Skor Boom*** Skor Boom combines the characteristics of sorbent boom and the conventional containment boom. It is highly absorbent and can be deployed 3 times longer than conventional sorbent boom. It has a high absorbency for a wide range of crude and refined oils. ***Shore Sealing Boom*** Special booms have been designed for use in intertidal areas, which are able to move up and down with the tide and maintain a good seal between the boom and the shoreline to stop oil escaping underneath. They have an air chamber for buoyancy on top of two water ballast chambers at the base, which follow the contour of the shore / tidal range when aground and form a sub-surface barrier to oil when afloat. ***Nearshore Boom*** These booms are best used in areas which are reasonably sheltered such as estuaries, rivers, shoreline, and harbors. Inflatable versions can be stored in a relatively small volume but they are prone to damage from abrasion.

1.2 Oil Spill (Continued)

1.2.10 Mangroves Response Strategies (Shoreline) (Continued)

1.2.10.3 Clean up

Shoreline clean-up is usually labor intensive. Once oil is stranded onshore, a response to an oil spill normally changes from an emergency to a project and will need to be managed as such.

It is important to note that the use of inappropriate techniques and inadequate organization can aggravate rather than mitigate the extent of the damage caused by the pollution. There are three stages in the cleanup of shoreline contamination:

Stage 1 Removal of floating oil at the water's edge and thick concentrations on the shore.

Stage 2 Clean-up of moderate contamination, stranded oil and oiled beach materials.

Stage 3 Clean-up of lightly contaminated shorelines and final polishing (i.e. removal of oil stains).

Oil is a naturally occurring product and, over time, will dissipate or evaporate. Especially with lighter oils that have a greater risk of explosion or release of toxic gases, it must be recognized that sometimes, the safest and most efficient response will be to let the product naturally dissipate. Mangroves are a low energy environment and more harm than good can come from invasive cleaning techniques as entry to the areas will cause the oil to become entrained into the substrate. This will require regular monitoring and liaison with the local communities to help understand the response methods. Before attempting any shoreline clean-up operation it is most important to take guidance from recognized environmental organizations as to the most sensitive approach to adopt.

Technique	✓ Give priority to protection of mangroves. ✓ Consult with the experts to what (or if) a cleanup should be carried out. ✓ A combination of safety considerations and the possible entrainment of oil into the substrate by cleanup crews may conclude that the most effective strategy would be to allow the oil to naturally dissipate. Continue to monitor the area. ✓ Low pressure, salt water flushing maybe used remobilize the oil and to herd it into collection points where it can then be collected with a skimmer. ✓ If using sorbents, use natural materials, as it may be impractical to recover them. ✓ Set up devices to scare birds from the area.
Avoid	× Avoid any cosmetic cleanup. × Do not enter the area with heavy equipment. × Avoid walking/driving in the mangroves to carry out flushing. × Avoid removing any substrate, except in extreme circumstances.

1.2 Oil Spill (Continued)

1.2.10 Mangroves Response Strategies (Shoreline) (Continued)

1.2.10.3 Clean up (Continued)

Additional Guidance	Method	Light 	Medium 	Heavy 
	Natural	✓	✓	✓
	Low Pressure Flush	✓	✓	✓
	Manual			✓
	Sorbents	✓	✓	✓
	✓ Preferred Method ✓ Suitable for relatively small amounts of oil			

1.2.10.4 Waste Disposal

Waste generated from this type of response will generate the following types of waste:

- Oil / Water mix
- Oiled PPE
- Oiled debris
- Oiled sorbents

See Waste Management, Section1.2.13 for further details

1.2.11 Sandy Beach Response Strategies (Shoreline)

1.2.11.1 Safety

Safety considerations in this type of response include those posed by the oil e.g. toxic gas emission, risk of explosion (see product MSDS sheet), by natural hazards e.g. weather, tides and machinery operation. If there is a risk of toxic gases or explosive gasses being present then gas monitoring should be conducted in accordance with Anadarko procedures and guidance set out below.

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person.
✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date.
✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels.
✓ Only to be use by personnel trained in the correct operation.
✓ Always use a gas monitor when you are approaching site for the first time.
✓ Approach site from up wind.
✓ Work up wind from any contaminated area and continually gas monitor.
✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

1.2 Oil Spill (Continued)

1.2.11 Sandy Beach Response Strategies (Shoreline)

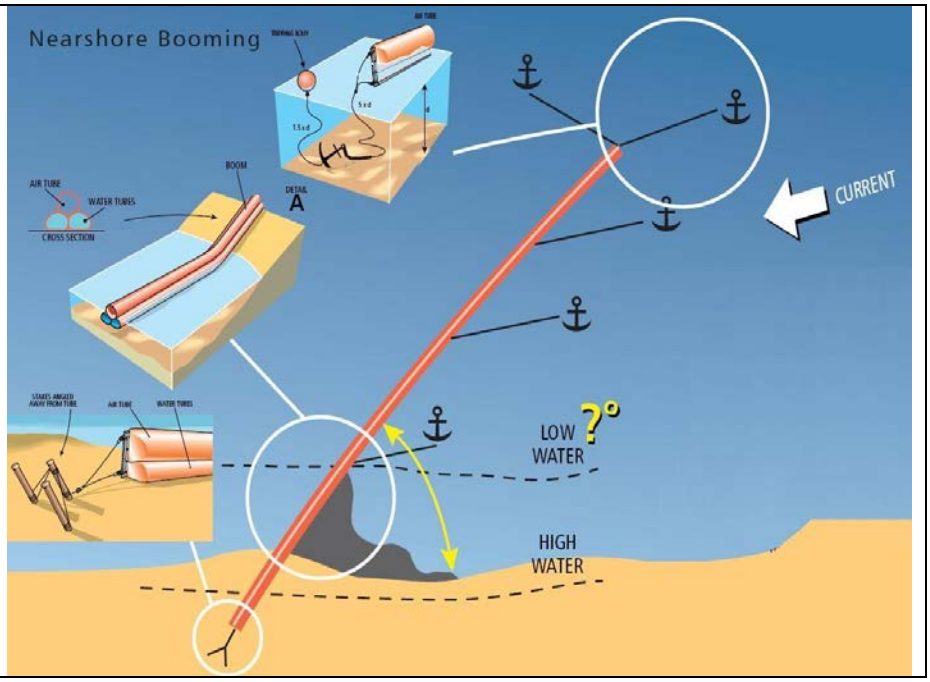
1.2.11.1 Safety

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person.
✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date.
✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels.
✓ Only to be use by personnel trained in the correct operation.
✓ Always use a gas monitor when you are approaching site for the first time.
✓ Approach site from up wind.
✓ Work up wind from any contaminated area and continually gas monitor.
✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

1.2.11.2 Shoreline Protection

Booms can be used to protect installations or sensitive areas from oiling and a cascade system can be used where nearshore sensitive areas are at risk. Long boom lengths are required for this strategy.

Diagram	



1.2 Oil Spill (Continued)

1.2.11 Sandy Beach Response Strategies (Shoreline) (Continued)

1.2.11.2 Shoreline Protection (Continued)

Technique	✓ Booms can be used to redirect oil away from a sensitive site or area towards a selected location where shoreline cleanup may be easier and more effective. ✓ For example, oil could be directed away from a sensitive mangrove area towards a firm, sandy beach, which is easier to clean. ✓ This may be achieved by using the cascade booming method, as in inland waterway containment. ✓ Booms can also exclude oil by providing a barrier around a resource or embayment (e.g. river mouth, lagoon entrance etc.).
Avoid	× Do not use heavy machinery to get to the shoreline, as this will cause long-term damage the structure of the flats.
Equipment	***Sorbent boom*** A sorbent boom may be deployed in areas where the current speed flows at <0.7 knots. Consider, where possible, storing sorbent booms close to areas at risk from oil spills, such as pipeline crossings. This would allow more rapid deployment in the event of a spill. Sorbent recovery is more labor intensive than other skimming methods. ***Skor Boom*** Skor Boom combines the characteristics of sorbent boom and the conventional containment boom. It is highly absorbent and can be deployed 3 times longer than conventional sorbent boom. It has a high absorbency for a wide range of crude and refined oils. ***Shore Sealing Boom*** Special booms have been designed for use in intertidal areas, which are able to move up and down with the tide and maintain a good seal between the boom and the shoreline to stop oil escaping underneath. They have an air chamber for buoyancy on top of two water ballast chambers at the base, which follow the contour of the shore when aground and form a sub-surface barrier to oil when afloat. ***Nearshore Boom*** These booms are best used in areas which are reasonably sheltered such as estuaries, rivers, shoreline, and harbors. Inflatable versions can be stored in a relatively small volume but they are prone to damage from abrasion.

1.2.11.3 Clean up

Shoreline clean-up is usually labor intensive. Once oil is stranded onshore, a response to an oil spill normally changes from an emergency to a project and will need to be managed as such.

1.2 Oil Spill (Continued)

1.2.11 Sandy Beach Response Strategies (Shoreline) (Continued)

1.2.11.3 Clean up (Continued)

It is important to note that the use of inappropriate techniques and inadequate organization can aggravate rather than mitigate the extent of the damage caused by the pollution. There are three stages in the cleanup of shoreline contamination:

Stage 1 Removal of floating oil at the water's edge and thick concentrations on the shore.

Stage 2 Clean up of moderate contamination, stranded oil and oiled beach materials.

Stage 3 Clean up of lightly contaminated shorelines and final polishing (i.e. removal of oil stains).

Oil is a naturally occurring product and, over time, will dissipate or evaporate. Especially with lighter oils that have a greater risk of explosion or release of toxic gases, it must be recognized that sometimes, the safest and most efficient response will be to let the product naturally dissipate. In a low energy environment and more harm than good can come from invasive cleaning techniques as entry to the areas will cause the oil to become entrained into the substrate. This will require regular monitoring and liaison with the local communities to help understand the response methods. Before attempting any shoreline clean-up operation it is most important to take guidance from recognized environmental organizations as to the most sensitive approach to adopt.

Technique	✓ Consider seasonal effect on amenity/ecological impact to determine level of cleanup required. ✓ For severe oiling, boards maybe fitted to mechanical equipment to herd the oil into storage areas. Ensure temporary storage pits are lined. ✓ With heavy oils, it is often the preferred option to manually remove the oil and oily sand. Earthmoving equipment may be used if the beach will support it. With lighter oils, such as light crudes, the surface oil can be mobilized by flushing the beach with high volumes of salt water. Lightly contaminated sand can also be moved into surf, if available. This will use natural energy within the surf to remove the oil from the sand.
Avoid	× Over cleaning or removing any more sand that is necessary. Removal may increase beach erosion and will increase disposal issues. × Machinery or personnel running over contaminated beach and pushing oil into the substrate. × Digging storage pit below the high waterline. × Avoid burying the oil in the sand. × High-pressure washing. × Re-oiling of adjacent beaches. Use booms to keep oil on site. × Avoid cross contamination of oil into clean areas. Set up clean down areas. × Disturbing wildlife especially in breeding seasons

1.2 Oil Spill (Continued)

1.2.11 Sandy Beach Response Strategies (Shoreline) (Continued)

1.2.11.3 Clean up (Continued)

Additional Guidance	Method	Light 	Medium 	Heavy 
	Natural	✓	✓	✓
	Low Pressure Flush	✓	✓	
	Manual	✓	✓	✓
	Mechanical		✓	✓
	Surf wash	✓	✓	✓
	Sorbents		✓	✓
	✓ Preferred Method ✓ Suitable for relatively small amounts of oil			

1.2.11.4 Waste Disposal

Waste generated from this type of response will generate the following types of waste:

- Oil / Water mix
- Oil / sand mix
- Oiled PPE
- Oiled debris
- Oiled sorbents

See Waste Management, Section 1.2.13, for further details.

1.2.12 Wildlife Protection Strategies (Shoreline)

1.2.12.1 Safety

Safety considerations in this type of response include those posed by the oil e.g. toxic gas emission, risk of explosion (see product MSDS sheet), by natural hazards e.g. weather, tides and machinery operation and by the handling of wildlife. The handling of wildlife is best left to experienced personnel as this will also reduce the stress that the animals can be put under whilst being handled. If there is a risk of toxic gases or explosive gasses being present then gas monitoring should be conducted in accordance with Anadarko procedures and guidance set out below.

1.2 Oil Spill (Continued)

1.2.12 Wildlife Protection Strategies (Shoreline) (Continued)

1.2.12.1 Safety (Continued)

Gas monitoring guidance
✓ Set up of monitors should be undertaken in accordance to manufacturer's specifications by a competent person. ✓ Ensure gas monitors are maintained by a competent person. Do not use if the monitor is not within its calibration date. ✓ Turn on gas monitors in 'clean air' before reaching site to ensure that they are reading correct background levels. ✓ Only to be use by personnel trained in the correct operation. ✓ Always use a gas monitor when you are approaching site for the first time. ✓ Approach site from up wind. ✓ Work up wind from any contaminated area and continually gas monitor. ✓ If any gas monitor alarms start ringing, remove all personnel from site until further monitoring confirms that it is safe to resume work.

1.2.12.2 Wildlife at Risk

See Section 8.2 for details on environmental and wildlife at risk.

Technique	✓ Hazing – by scaring birds away it prevents them from becoming oiled. These can be done with noise devices (e.g. propane cannons, guns, horns) or with visual devices (e.g. helium balloons, strings of bunting, stationary figures). Hazing should be performed pre-impact as well as after impacted. ✓ Fencing and netting can be placed around small areas of contamination to prevent wildlife from wandering in and becoming oiled.
Avoid	× Avoid handling wildlife as this can cause extreme stress to the animals. × Do not use hazing around nesting areas as this will only serve to keep the adults away from feeding their young. × Vary the methods of hazing to avoid the birds getting too acclimatized to one type. × Spill response boat handlers should take care to avoid manatees when they are operating in manatee habitats.
Additional Guidance	Experienced oiled wildlife responders should be used to handle all wildlife related issues, including capture, cleaning and rehabilitation.

1.2 Oil Spill (Continued)

1.2.12 Wildlife Protection Strategies (Shoreline) (Continued)

1.2.12.3 Waste Disposal

Hazing should not generate any waste but a full wildlife response will generate the following types of waste:

- Oil / water / detergent mix
- Oiled PPE
- Oiled / dead wildlife
- Oiled debris
- Other biological wastes such as food scraps.

See Waste Management, Section 1.2.13, for further details

1.2.13 Waste Management (Deep Water / Shallow Water / Shoreline)

Most oil spill operations, particularly those onshore, result in the collection of oil and oily debris, which must eventually be dealt with and disposed of in such a way to cause as minimal impact as possible for the future.

Waste management is a major logistics issue during a large oil spill and can impact the entire response operation by causing delays and increasing costs unless suitable arrangements can be made. If there is no temporary storage to deposit recovered oil, the recovery process will have to come to a halt. Similarly, if there is no transport to take oily waste away, the temporary storage facilities will become full and the response operations will have to come to an end. Oily waste is classified as a hazardous substance under Marpol 73/78 and also by Anadarko

1.2.13.1 Waste Streams

Waste collected as part of an oil spill response usually falls into one of the following five waste streams and stored accordingly:

- Oily Liquids
  - Emulsified
  - Non Emulsified
- Oil Solids
  - Biodegradable
  - Non-biodegradable
  - Sand/Pebbles

All oily waste needs to be kept in rain proof and leak proof containers for no more than 180 days. Each container must be labeled in accordance to Anadarko's procedures with contents, hazardous waste warnings, generator information and storage start date. All documents generated regarding the waste, including logs, manifest and movement forms must be kept at the facility of nearest office for no less than three years.

1.2 Oil Spill (Continued)

1.2.13 Waste Management (Deep Water / Shallow Water / Shoreline) (Continued)

1.2.13.2 The Waste Hierarchy Model

A useful model for dealing with a waste stream originating from any source is the 'waste hierarchy' concept (See Figure 1.11 below). It provides a tool for structuring a waste management strategy and can be used as a model for all operations.

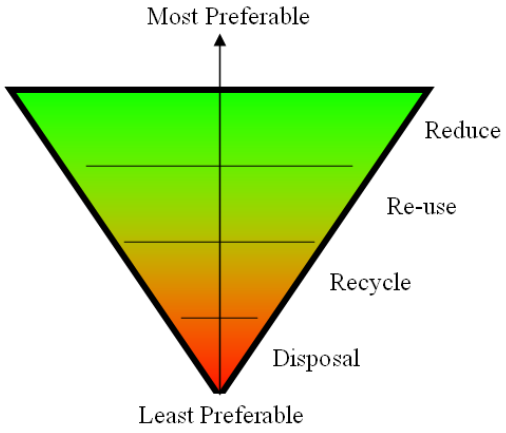


Figure 1.11 - The Waste Management Hierarchy Model

1.2.13.3 Reduce

The volume of oil spill waste can be reduced by following some basic principles:

- If oil is likely to impact an area, move all items that could become oily waste to an area that will not become impacted e.g. above the high water mark. This reduces the amount of oily waste, which requires recovery.
- Recognize the types of waste streams and plan your waste response to cope with these streams. Have a separate waste container for each type of waste stream.
- Set up temporary storage areas in anticipation of a final waste strategy. Guidance on temporary storage solutions is shown below.
- Plan the transport strategy.

1.2.13.4 Re-use

There are current no facilities in Mozambique with the ability to reuse recovered oils.

1.2.13.5 Recycle

No facilities are known to exist within Mozambique for the recycling for oil and oily wastes.

1.2 Oil Spill (Continued)

1.2.13 Waste Management (Deep Water / Shallow Water / Shoreline) (Continued)

1.2.13.6 Direct Disposal

At the time of writing, the sole method for disposal of oily waste from operations in Mozambique is via direct disposal in landfill. This will be done through a contractor. As soon as it is suspected that significant quantities of oily waste are to be generated, it will be necessary to liaise with the waste contractor to ensure that this does not hold up the response chain. Waste generated at sea will be transferred to the waste contractor at Pemba Port. Transportation for waste generated on the shoreline from an oil spill should be discussed with the waste contractor on a case by case basis.

1.2.13.7 Transport and Temporary Storage

Transport of material to a disposal site can become a major cost item. It is therefore beneficial to reduce the amount of material to be transported by separating oil from water and sand during temporary storage. Water-in-oil emulsions can be broken up to liberate water, oil seeping from heaped beach material and debris can be collected in a ditch surrounding the storage area and sieving techniques can be used to separate clean sand.

Methods of transport to final disposal site include vacuum tankers, polythene-lined skips, refuse trucks, open topped tipper trucks etc. Methods of transport along a shoreline include dumpster trucks, front-end loaders, rough terrain vehicles etc. (N.B. Beware of risk of secondary contamination of roads by restricting these vehicles to the beach until they have been cleaned.). Oily waste must only be transported by an authorized and certified carrier in accordance with Anadarko's procedures.

Item	Guidance
Flexible open topped tank	Suitable for initial storage to allow operation to start. Not movable when full. Therefore, an additional transfer required. Primary use with low capacity skimmers up to 10 t/hr.
Flexible pillow tanks	With pallet support - Suitable for initial storage to start operation. Can be moved provided suitable lifting equipment available. May be difficult to remove heavy mousse from tank. Suitable for low capacity skimmers up to 10 t/hr. No pallet support - Suitable for initial storage to allow start of operation. Not movable when full. Therefore, additional transfer required - danger of being unable to remove heavy mousse once inside tank.
Polythene sheets	Continuous polythene tubing cut into lengths and sealed at end. Suitable for initial or emergency storage. Unsuitable for transportation unless very well supported - intended for single use and then disposal. Used for lining containers, skips and pits to prevent escape of oil and gross secondary contamination.

1.2 Oil Spill (Continued)

1.2.13 Waste Management (Deep Water / Shallow Water / Shoreline) (Continued)

1.2.13.7 Transport and Temporary Storage (Continued)

Item	Guidance
Buoyant rubber storage tanks	Suitable for initial storage for operations at sea. May be problems in removing mousse from them. Suitable for low to medium capacity skimming operations up to 50 t/hr, depending on size of tank.
Mobile road tanks	Well suited for operations close to the shore, especially when quays are available. They allow efficient transportation of recovered oil to disposal points. They are also used to recover oil from primary storage vessels, rubber tanks, barges, pillow tanks, etc.
Barges	Normally suitable for both small and large capacity skimmers not only because of their capacity, but also because they can provide a stable working platform from which skimmers can be operated safely.
Oil tankers	Suitable for very large spills - normally best used to collect oil already recovered in barges etc. If recovery systems with very large capacity (500 t/hr) are used, small coastal tankers will need to be used as primary storage.
Ships tanks	It is rare that masters will permit the use of their spare tankage for the reception of recovered oil. However, in a number of areas where boats have been previously identified as oil recovery vessels, some tankage is set aside for handling recovered oil.
Movable open top tanks	Suitable as first storage in separating heavily oiled solids from the bulk of the waste oil by use of coarse sieves of wire mesh. These should be covered if expecting rain as an influx of rainwater will increase amount of waste.
Plastic bags (heavy duty)	Ideally suited when clearing beaches etc. by hand. They can be manhandled when full and moved well away from the high water line for collection.
Open topped barrels	Providing some lifting facilities are available, they can be suitable for collecting debris from beaches and transporting full plastic bags to central storage/disposal areas.
Skips	Very robust containers ideally suited for the transportation of oil contaminated solid debris to disposal sites. Can be transported on boats/landing craft to get to isolated sites. If possible, line with plastic sheet. Cover if expecting rain.
Temporary storage pits	Need to be lined with plastic sheets to prevent contamination of the substrate and seepage into ground waters. Where sharp rocks/protrusions may cause damage to sheet, pre-line with sand to provide a smooth surface. Should be close to major clean-up sites to act as temporary reception for contaminated solid debris. It is recommended that pits are constructed in areas with impermeable substrate or subsoil. The excavated pit should have a flat bottom and a layer of water forming the base.

1.2 Oil Spill (Continued)

1.2.14 Dispersant Use Plan

A. Overview

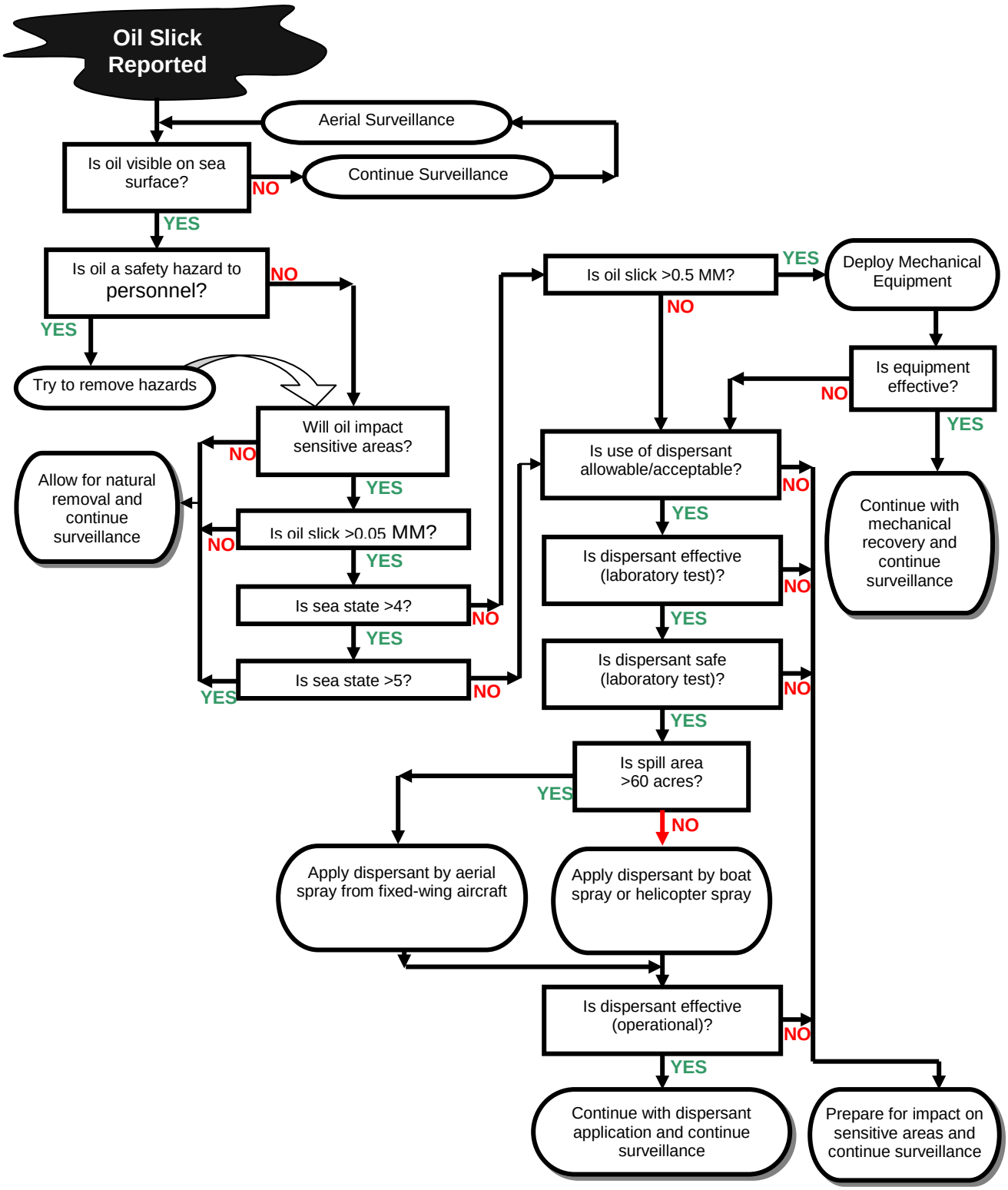
Dispersants are chemicals used to remove floating oil from the water surface and disperse it into the water column in order to reduce impact to sensitive shoreline habitats and animals that are present on the water surface. Specially formulated products containing surface-active agents are sprayed onto the slicks by aircraft or boat and are applied undiluted or mixed with water. The dispersants reduce the oil/water surface tension and decrease the energy needed for the slick to break into small particles and mix into the water column. Some turbulence is needed to mix the dispersant into the oil and the treated oil into the water. The Dispersant Use Decision Tree (**Figure 1-2-8**) may be used to determine if dispersant operations are the optimum countermeasure during cleanup operations.

B. Dispersants Inventory & Application Equipment

Sufficient inventories of dispersants available to Anadarko thru Oil Spill Response (OSR) are detailed in **Appendix B.** Acquisition of dispersant and application vehicles is guaranteed through contracts/agreements with OSR and other supply companies.

Dispersant Use Decision Tree

Figure 1-2-14



Dispersant Use Activity System — **Figure 1-2-15**

DISPERSANT USE ACTIVATION SYSTEM

OPERATIONS SECTION

1. ADVISE PLANNING TO PROCEED WITH DISPERSANT CHECKLIST
   - STATUS 1 "ALERT"
2. ISSUE A DISPERSANT USE "ALERT" THROUGH APPROPREATE OSRO
3. PUT LOGISTICS ON "ALERT" TO ARRANGE TRANSPORTATION, LABOR TO LOAD, AND CONTROL AIRCRAFT
   - STATUS 2 "SPRAY"
4. ESTABLISH A DISPERSANT TEAM
5. WORK WITH THE DISPERSANT TEAM TO IMPLEMENT THE DISPERSANT PLAN WITHIN 6 HOURS OF THE SPILL
6. NOTIFY LOGISTICS TO FINALIZE THE LOADING AND ARRANGEMENTS FOR CONTROL AIRCRAFT
7. ADVISE TO LOAD
8. COORDINATE
9. SPRAY

PLANNING SECTION

1. COMPLETE DISPERSANT PREAPPROVED CHECKLIST (LAT./LONG., TIME, VOLUME, WEATHER)
2. TRANSMIT TO REGULATORY AGENCY FOR DECISION

DECISION

- ***NO*** → ***STOP***
- ***YES*** → NOTIFY OPERATION

3. CONTACT ***THE RESPONSE GROUP*** TO DEVELOP THE SPILL TRAJECTORY SHOWING THE PROJECTED SPILL LOCATION IN 6 HOURS

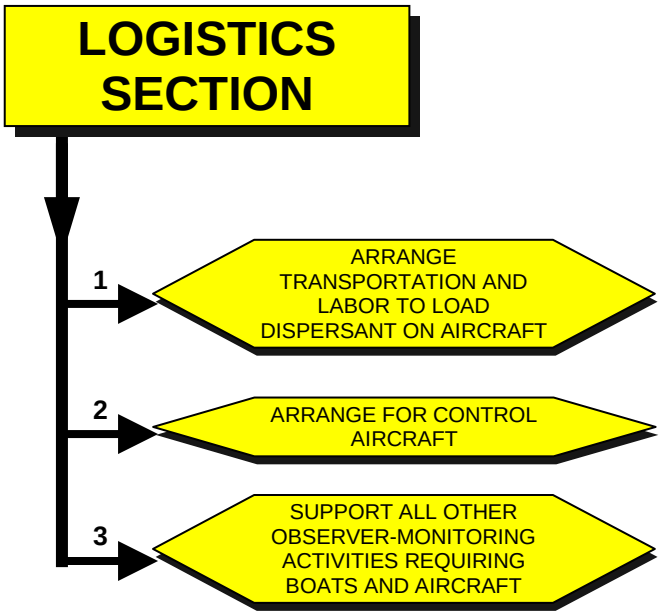
THE RESPONSE GROUP
(281) 880-5000 OFFICE
(281) 880-5005 FAX ***OR***
TRAJECTORY@RESPONSEGROUPINC.COM

4. OBTAIN THE 6-HOUR TRAJECTORY INFORMATION FROM ***THE RESPONSE GROUP***

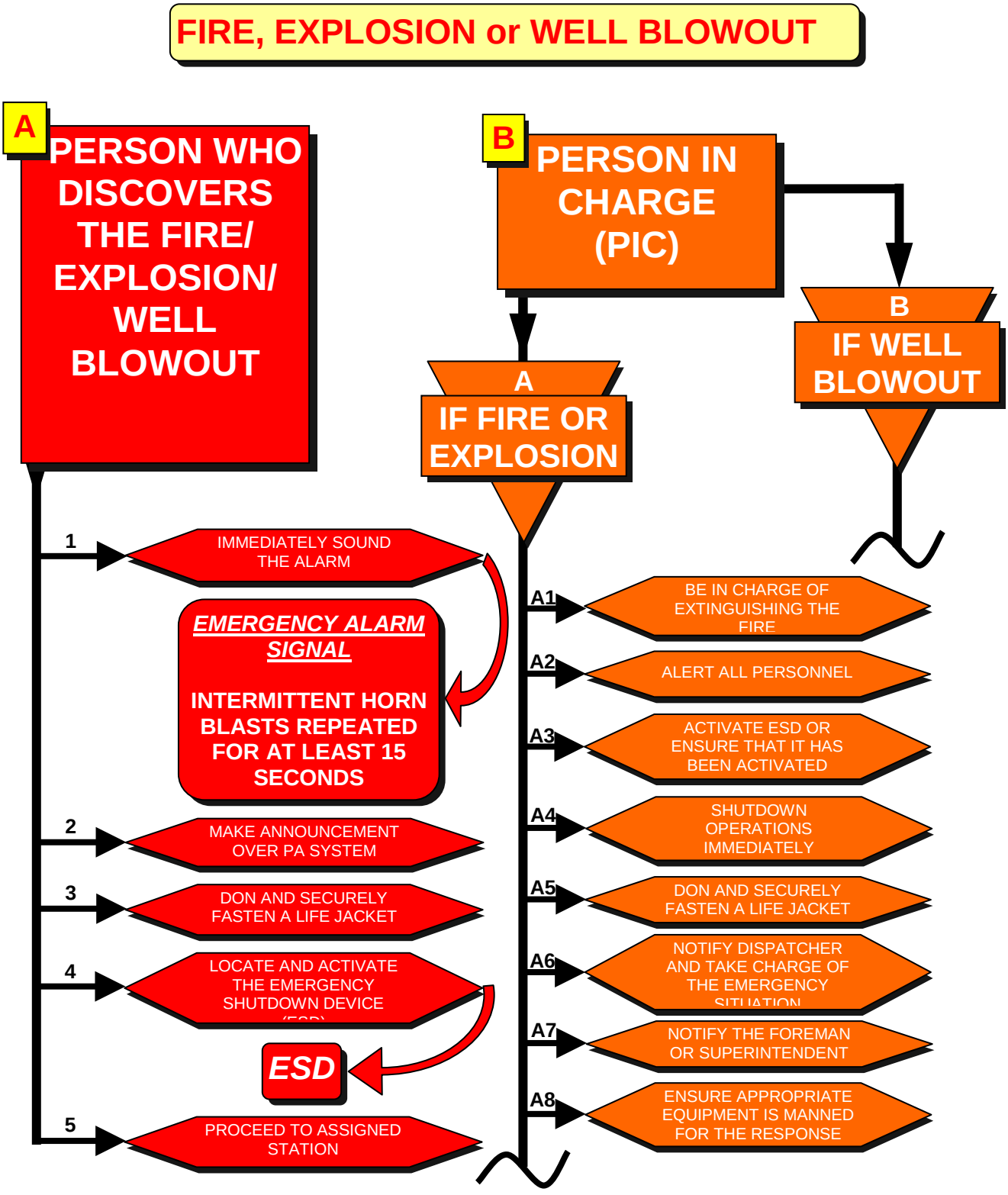
RESTRICTIONS

1. THE PRE-APPROVED AREA FOR DISPERSANT USE IS DETERMINED BY THE APPROPRIATE REGLATORY AGENCY.
2. ACTUAL APPLICATION MAY OCCUR ONLY DURING DAYLIGHT.

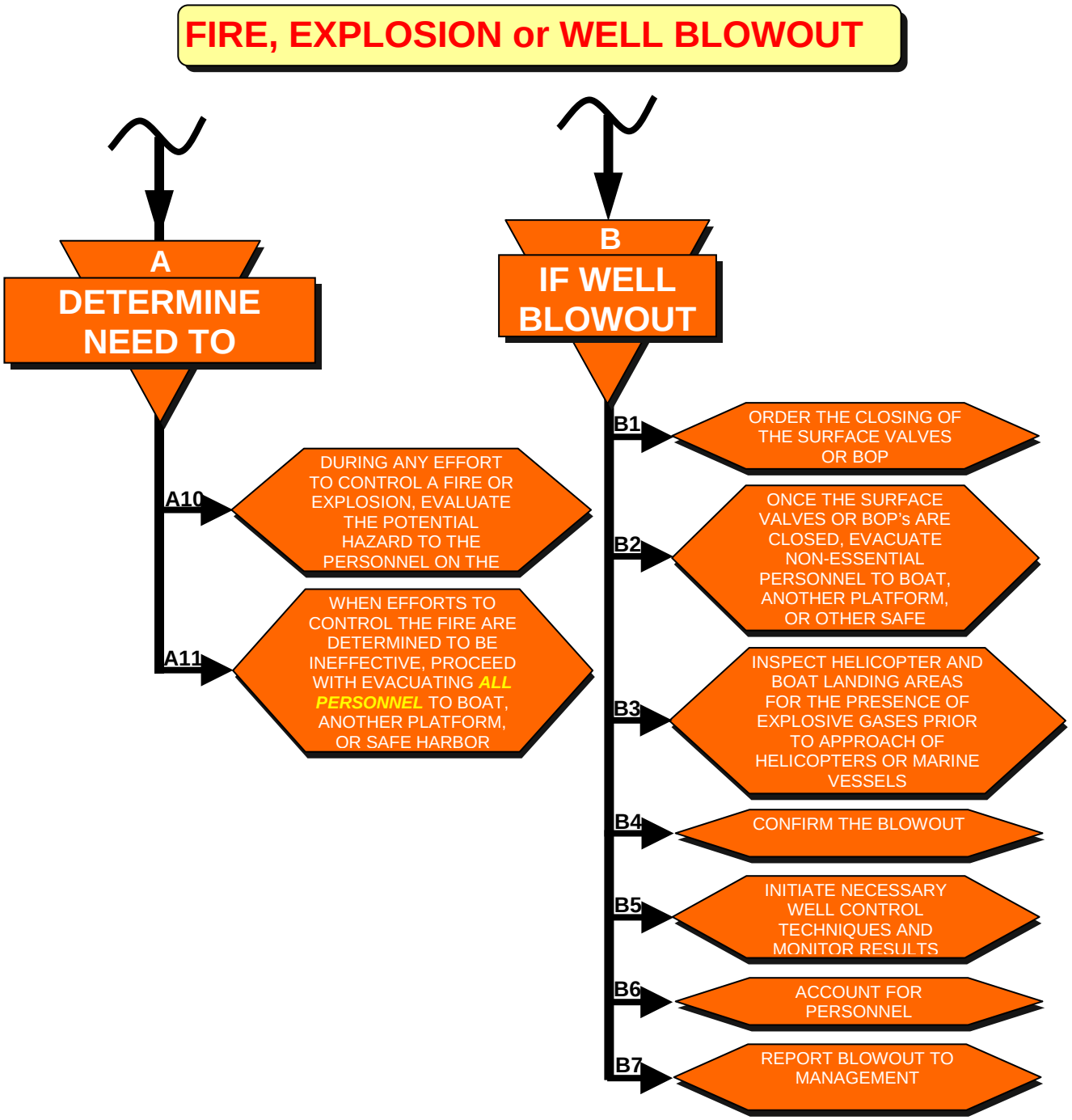
DISPERSANT USE ACTIVATION SYSTEM (CONTINUED)



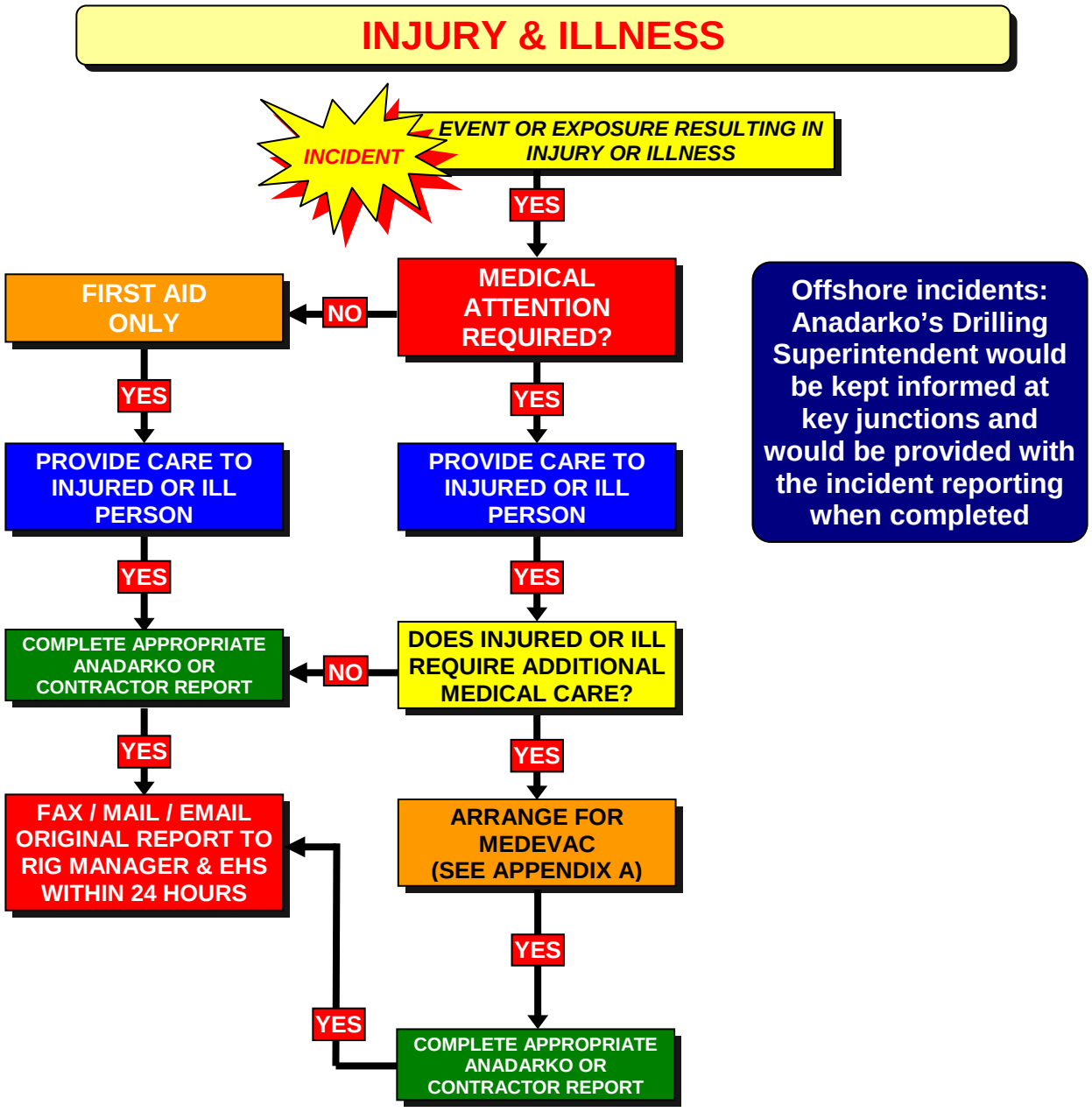
1.3 Fire, Explosion, or Well Blowout



1.3 Fire, Explosion, or Well Blowout (Continued)



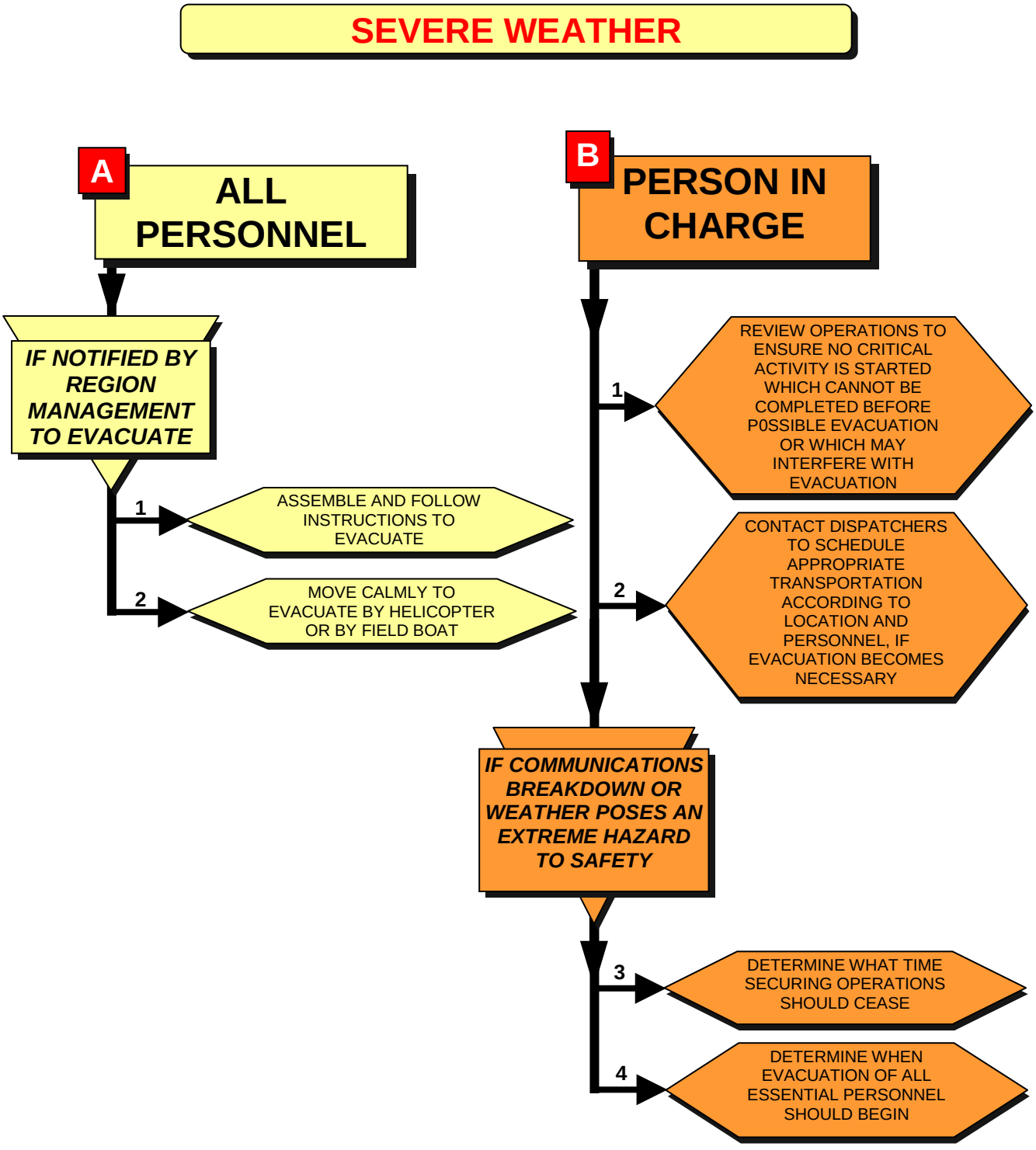
1.4 Injury and Illness



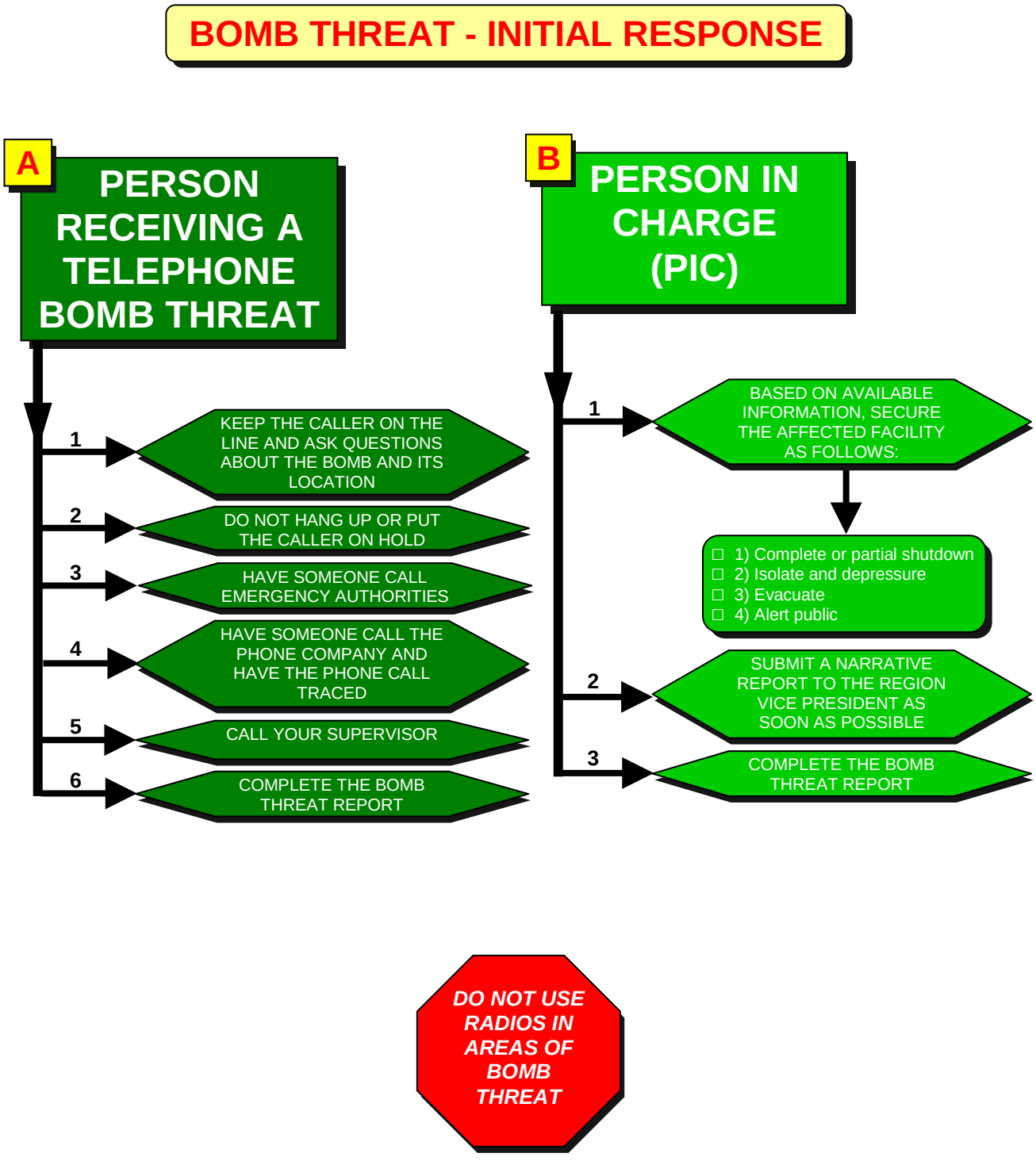
***For additional information, reference the following:**

- **Medical Emergency Response Plan (MERP) – Appendix A**
- **Office Emergency Procedures – in office**

1.5 Severe Weather



1.6 Bomb Threat



1.7 Civil Unrest/Disorder

Unlike with operational incidents and accidents there will be no formal notification of the civil situation going astray, whether it is political or environmental. It is however unlikely for any civil situation to change overnight. Generally there will be build up before the situation either returns to normal or gets out of control. Regardless of the situation, it will have media attention.

It is advised and also everyone's responsibility to stay informed about the status of these types on incidents. Any reports (even rumors) of changes in the situation that might affect the wellbeing of the company's employees should be reported.

IN COUNTRY MANAGER CHECKLIST	
✓	Ensure all in-country personnel are registered with their appropriate embassy and are in the embassy warden program.
✓	Provides an in-country security briefing to all employees.
✓	Develop in-country sources of information and assistance.
✓	Monitors political stability through contacts with embassy officials, host government employees, business contacts and local staff
✓	Has the authority to determine what stage of evacuation is required in a particular situation
✓	Maintains liaison with Corporate Security Department, re: security needs and concerns
✓	Monitor local media to gather as much information as possible.
✓	Ensure the appropriate communications are in place.
✓	Evaluate overall country situation.
✓	Make sure Evacuation Plan is in place.
✓	Establish safe mustering places.
✓	Provide Public Information Officer with updated information.

Annex I

Initial Resettlement Plan

Mozambique Gas Development Project
Initial Resettlement Plan

MOZAMBIQUE GAS DEVELOPMENT

0	15 Nov 13	Issued for Use	Marisa du Toit	Robert Barclay	Herman Roos	Cory Weinbel
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Page No.	Section	Change Description

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Preamble

AMA1 and eni are joint proponents for the Mozambique Gas Development Project. AMA1 has been leading the resettlement process to date and will continue to lead the process on behalf of the proponents with the close cooperation and involvement of eni'

Stakeholders are advised to refer to the English version of this document as it is the official document reviewed and approved by the Project Proponents.

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- MacAlister Elliott & Partners;
- Projectos e Estudos de Impacto Ambiental, Lda.;
- Womiwu Rural Development; and
- WorleyParsons RSA (Pty) Ltd.

Abbreviations and Acronyms

AMA1	Anadarko Mozambique Área 1 Lda
APC	Anadarko Petroleum Corporation
APE	Agentes Polivalentes Elementares
APs	Affected Parties
CCC	Community Consultative Committee
DINOPOT	Nacional de Ordenamento e Planeamento Territorial (National Department for Urban and Regional Planning)
DPCAA	Direcção Provincial de Coordenação da Acção Ambiental (Provincial Directorate for the Coordination of Environmental Action)
DUAT	Right of Use and Exploitation of Land
EIA	Environmental Impact Assessment
ENH	Empresa Nacional de Hidrocarbonetos
eni	Eni East Africa S.p.A.
FRV	Full Replacement Value
GIS	Geographic Information System
IFC	International Finance Corporation
IRP	Initial Resettlement Plan
LNG	Liquefied Natural Gas
LRP	Livelihood Restoration Plan
MICOA	Ministry of Coordination of Environmental Affairs
PS	Performance Standard
RAP	Resettlement Action Plan
RSC	Resettlement Steering Committee
UXO	Unexploded Ordinance

MICOA IRP Compliance Check List

Initial Resettlement Plan Component	Section(s) in IRP
1. A brief description of the project and components involving land acquisition, thus justifying the resettlement.	Section 3.1
2. Alternatives considered to avoid or minimize resettlement.	Section 3.3
3. The project's environmental and social category.	Section 3.2
4. The legal framework related to resettlement, land ownership, land expropriation and use, to analyze the link between national laws and regulations and, if financed by external funds, any policies of the financing institution and necessary permits and licenses to perform the operation, including the establishment of new settlements; the results of a study on the relevant legislation covering:	Section 4
a. the nature of the rights of people in terms of land use and the nature of their compensation, both in terms of the evaluation method and in terms of the method of compensation prescribed by law;	Section 4.4
b. the applicable legal and administrative procedures, including a description of resources available and within reach of displaced people in case of a judicial process, as well as the deadline for such procedures and any mechanisms for resolving conflicts that may be relevant to resettlement within the project;	Section 4.7
c. the applicable law (including customary law and traditional law) governing the rights of land ownership, assigning values to assets and losses, compensation and rights;	Section 4.1, 4.3 & 4.4
d. laws and regulations relating to the institutions, agencies, NGOs, contractors, etc. responsible for implementing the resettlement activities; and	Section 4.6
e. gaps, if any, between local laws governing property rights and the resettlement policy of the donor / investor, if any, and the mechanisms to overcome such gaps.	Section 4.8
5. Principles and objectives governing the preparation and implementation of resettlement.	Section 2
6. Any legal steps necessary to ensure the effective implementation of resettlement activities within the project, including, as applicable, a process for recognizing claims to legal rights to land-including claims that derive from customary law and traditional use.	Section 4.1, 4.3, 4.4 & 6.8
7. Systems of ownership and transfer of land, including an inventory of communal natural resources on which people base their subsistence and livelihood systems, communal use systems, without any related deeds (including fishing, grazing, or use of forest areas), driven by locally recognized mechanisms of land allocation.	Section 3.3
8. A description of the process of preparation and approval of the Resettlement Action Plans.	Section 5 and 6
9. A description of the affected areas, such as the living conditions of	Section 3.3 Affected

Initial Resettlement Plan Component	Section(s) in IRP
the people in these areas, and if possible, an estimate of the population, affected assets, and probable categories of affected persons.	assets section 6.3.4
10. Eligibility criteria for various categories of affected people and the corresponding benefits.	Categories of affected people section 6.3.3
11. Methods of valuing affected assets.	Section 6.3.2
12. Institutional arrangements to comply with obligations and necessary human resources.	Section 6.8
13. Institutional Framework. Analysis of the institutional framework covering:	Section 6.8
a. identification of the entities (firms, contractors, NGOs, government agencies, etc.) responsible for providing resettlement services, which may have a role in project implementation;	Section 6.8
b. assessment of the institutional capacity of such agencies and NGOs;	Section 6.8
c. legal instruments (contracts, MOUs, agreements, etc.) that define the obligations and deliverables of each entity involved in the resettlement process;	Section 6.8
d. the value of services provided and the source of funds;	Section 6.8
e. evaluation of the technical capabilities of the entities to perform the functions assigned to them;	Section 6.8
f. any measures (including technical assistance) needed to strengthen the capacity of executing agencies and NGOs in the area of design and implementation of resettlement activities; and	Section 6.8
g. Provisions for the transfer to local authorities or to the resettled people themselves of the responsibility for managing facilities and services provided under the project and the transfer of responsibilities from other executing agencies, where appropriate.	Section 5.2.3
14. Draft of the Resettlement Action Plan to be prepared.	Section 6
15. Description of the implementation process, establishing the link between resettlement implementation and the works.	Section 5.2
16. Description of the mechanisms for compensation for losses.	Section 6.3.4
17. Estimated budget of resettlement to be included in the overall project cost.	Section 6.10
18. Mechanisms for public consultation and participation of affected people in the planning, implementation and monitoring of the resettlement process.	Sections 6.5, 6.7 (provision to include the CCC as far as possible) and 6.8 (description of extent of involvement)
19. Grievance mechanisms for affected people.	Section 6.6

Initial Resettlement Plan Component	Section(s) in IRP
20. Indicators for a baseline study that will feed a monitoring and evaluation system, to be monitored by the implementing agency or by independent auditors.	Section 6.7

1. The Purpose of the Initial Resettlement Plan (IRP)

Anadarko Moçambique Área 1 Lda. (AMA1) is a Mozambican registered company and a subsidiary of Anadarko Petroleum Corporation (APC)[1]. Following the discovery of important deposits of natural gas in the Rovuma basin by AMA1 (Area 1) and eni (Area 4), the Project Proponents, as operators of the Mozambique Gas Development Project (the Project), plans to construct onshore facilities on the Afungi Peninsula located in the Cabo Delgado Province of Mozambique. This will require resettlement of about 750 households.

The Project Proponents will be responsible for the management of a resettlement program for these affected households and for coordinating with the Government of Mozambique to ensure that they are granted rights of use over suitable replacement land. The onshore development of the Project will cover a 7,000 ha area and will involve physical and economic displacement of households.

The Project has prepared this Initial Resettlement Plan (IRP) to describe the approach, principles and procedures that will be followed to manage all unavoidable displacement. This IRP is the precursor to the preparation of a full Resettlement Action Plan (RAP). The RAP will be prepared in accordance with Mozambican legislation and the International Finance Corporation's Performance Standard 5: Land Acquisition and Involuntary Resettlement (IFC PS 5). The purpose of the IRP is to provide preliminary information about Project resettlement to relevant government departments and stakeholders in support of the Environmental Impact Assessment (EIA). The IRP forms an annex of the EIA.

The IRP outlines the goals, principles, organization and procedures that will be used to manage all physical and economic displacement for the Mozambique Gas Development Project. The IRP includes the following elements:

- Resettlement goal;
- Legislative framework and international standards applicable to the resettlement;
- Principles for compensation, resettlement and other forms of resettlement assistance;
- Planning and implementation procedures;
- Framework for the participation of people affected by displacement (directly affected people, host communities, relevant levels of government) in planning, implementation, and monitoring;
- Eligibility criteria for compensation and other resettlement assistance;
- Organization, roles and responsibilities;
- Grievance mechanism;
- Internal and external monitoring;

[1] APC is among the largest independent oil and natural gas, exploration and production companies in the world, holding its major onshore operations in the U.S. and also operating as a producer in the deep waters of the Gulf of Mexico and Ghana. APC also has licenses for research in deep waters in Brazil, China, Indonesia, Mozambique, New Zealand, East and West Africa.

- Indicative schedule; and
- Indicative budget.

This IRP provides the framework for the future development of a RAP. The RAP will be developed in close consultation with the affected communities. The RAP will be consistent with the goals, objectives, principles and processes described in this IRP and will be designed to address the specific conditions, characteristics and needs of the people and enterprises affected by physical and economic displacement.

2. Resettlement Goals and Principles

2.1. Resettlement Goal

The Project's overall resettlement goal is to develop and execute resettlement in a manner that gives physically and economically displaced persons the opportunity to improve or at least restore their livelihoods and standards of living.

Physical displacement refers to relocation and the loss of shelter as a result of project-related land acquisition and/or restrictions on land use (IFC PS 5) or the resettlement of affected population from one location to another, and the restructuring or creation of comparable or superior living conditions (Decree 31/2012, of 8 August, Article 1(j)).

Economic displacement refers to loss of assets or access to assets that leads to loss of income sources or other means of livelihood as a result of project-related land acquisition and/or restrictions on land use. 'Livelihood' refers to the full range of means that individuals, families, and communities utilize to make a living, such as wage-based income, agriculture, fishing, foraging, other natural resource-based livelihoods, petty trade and bartering (IFC PS 5).

This IRP addresses both 'tangible assets' (individual or communal quantifiable assets such as crops, immovable property and improvements made to land) and 'intangible assets' (individual or communal unquantifiable assets such as communication routes, sacred forests, historical sites, burial places and access to transportation and basic services) (Decree 31/2012, Article 1(b) and (c)).

2.2. Resettlement Principles[2]

The following principles will support and guide the achievement of the resettlement goal:

- Avoid and minimize the need for physical and/or economic displacement through alternatives analysis, siting, alignment, and other design modifications;

[2] The Mozambique Gas Development Project Resettlement Principles were designed in accordance with Article 4 of Decree 31/2012. The social cohesion and social equality principles are covered by principles 5 and 6, the direct benefit principle is covered by 9, social equity principle by 4, non variation of income by 6, public participation principle by 2, environmental accountability by 4, and social responsibility by 5.

- Conduct consultation processes that achieve free, prior, and informed participation of affected people and communities (including hosts) in decision making related to resettlement and that continue participation during implementation and monitoring;
- The resettlement process will involve representatives from Provincial, District, Administrative Post, Locality and Community;
- Compensate affected parties (APs) at full replacement value (FRV) for lost assets in cash or in kind in accordance with Mozambican legislation and IFC PS 5;
- Provide opportunities for displaced people to improve their living standards including through the provision of improved housing, social infrastructure and utilities and through social integration with their hosts;
- Design and implement in a timely manner culturally appropriate and economically sustainable livelihood restoration measures;
- Provide measures to support physical relocation and re-establishment;
- Identify any people or households that may be especially vulnerable to displacement impacts and provide special assistance where warranted to help them participate and benefit from resettlement programs;
- Establish programs and initiatives through which displaced households can directly benefit from the Project; and
- Carefully monitor and evaluate resettlement program implementation to ensure that Project measures are meeting the needs of affected people and to identify any corrective measures, if required.

3. Project Context

3.1. Project Components Involving Land Acquisition

On 12 December 2012 a DUAT was awarded to Rovuma Basin LNG Land, Lda. (RBLL), a company jointly owned by Anadarko Moçambique Área 1, Lda. (AMA1) and Empresa Nacional de Hidrocarbonetos, E.P. (ENH). The DUAT was awarded for an area of 7,000 ha in the Palma area in Cabo Delgado Province. On 19 December 2012, the Minister of Agriculture approved an agreement for assigning rights to use the land between RBLL and AMA1. This gives AMA1 the right to develop the DUAT area on the Afungi Peninsula and transfers the responsibilities for resettlement to AMA1 and eni as Project Proponents. For the purposes of the IRP, the DUAT area will be referred to as the 'Afungi Project Site'.

The Project is designed to collect, transport, process, and export (in liquefied form) natural gas in northern Mozambique. This process begins offshore where natural gas will be extracted from gas reservoirs below the seafloor via subsea wells. The gas will be collected and transported to the onshore LNG Facility by pipelines. Once onshore, the gas will be processed, converted to liquid (through cooling the gas), and stored in storage tanks. The liquefied gas will then be transported through insulated pipelines to an export jetty where it

will be loaded into LNG vessels to be transported to international markets. These specially designed ships maintain the LNG in a liquid state for sea voyages of several thousand kilometers.

The main components of the Project are grouped together and discussed as offshore, onshore, and near shore components of the overall Project. These are defined below:

- The Offshore Project components will consist of the Area 1 and Area 4 offshore production wells and the infrastructure necessary to develop the gas reserves. This also includes the offshore pipeline system, which will convey natural gas from the offshore production fields to the onshore facilities. This Project component does not require any physical resettlement and is unlikely to cause any economic displacement.
- The Onshore Project (terrestrial) components will include the LNG facilities and supporting infrastructure (e.g. worker accommodation facilities, construction areas, access roads, and airstrip). This Project component will involve physical resettlement of areas within the Afungi Project Site. It will also cause some economic displacement of households that cultivate land and use resources within the Afungi Project Site but whose dwellings are situated outside of the Project area.
- The Near Shore Project components will consist of the marine infrastructure within Palma Bay necessary for construction, operation, and maintenance of the Project. This includes logistics, support, and export facilities (e.g. shipping channels, materials offloading facility, and LNG Export Jetty). This Project component will not require any physical resettlement but might lead to some economic displacement (partial loss of access to coastal resources). Economic displacement might result from the imposition of safety exclusion zones around Near Shore Project components during Project construction and operations.

This IRP addresses individuals, households, and enterprises physically and/or economically displaced by terrestrial and near-shore components of the Project. Terrestrial components will be sited within the Afungi Project Site on the Afungi Peninsula (see EIA Figure 4.11).

The village of Quitupo is the only administrative village within the Afungi Project Site; the villages of Senga and Maganja are located in close proximity to the Afungi Project Site (at 0.88 and 1.88km distance, respectively). Senga and Maganja have some production zones within the Afungi Project Site. EIA surveys indicate that the potential physically displaced population (2012) is about 2,733 individuals that make up 743 households. The actual number of displaced households will be verified by a census that will be undertaken as part of RAP preparation.

Some communities will be affected by the near shore marine facilities (see EIA Figure 4.16) and associated operations. These have not yet been identified but will be determined by fisheries specialists in close consultation with affected communities and the government as part of RAP preparation.

For a detailed description of the Project please refer to Chapter 4 of the EIA. The following sections provide an overview of the Project's categorization and a description of its socio-economic context.

3.2. Project Environmental and Social Category

The Mozambique Gas Development Project is a Hydrocarbon Sector project that has been categorized by the Ministry of Coordination of Environmental Affairs (MICOA) as a 'type A' project for EIA purposes (Letter ref. 325/DPCAA/CD/011, dated August 22, 2011 issued by the Provincial Directorate for the Coordination of Environmental Action (DPCAA) see Annex A of the EIA). A full EIA has been prepared in accordance with the requirements of Mozambican environmental law.

3.3. Consideration of Alternatives

IFC PS 5 has the objective of avoiding, and when avoidance is not possible, minimizing physical and economic displacement by exploring alternative project designs. Site planning and detailed layout for the Project is ongoing. As part of this process, the Project team will progressively refine the facilities' footprint to avoid un-necessary resettlement and loss of productive land. The RAP will summarize Project consideration of alternatives and measures to avoid or minimize resettlement.

3.4. Socioeconomic Description

People to be displaced come from the Cimakwé, Kimwani, Shimakonde, Kiswaili and Emakhua ethnic groups. Households on the Afungi peninsula typically practice a subsistence lifestyle that integrates fishing and agriculture. Villages near the coast fish more than those inland. Fish is an important source of protein.

Agricultural production is predominantly for household consumption. Households utilize both dry, sandy *machambas* for growing cassava and maize as well as wetland areas for cultivation of rice, vegetables, sweet potatoes, and bananas. Each household typically also owns several fruit trees. Mangoes, cashew nuts, and coco palms are the most popular. Foraging for firewood, construction materials, and medicinal plants is also important. While there are some small enterprises, poor roads and transport services are a constraint.

The main settlement in the Project area is Quitupo, with a population of about 819 inhabitants. Some smaller settlements are found along the coastline. The settlement pattern of the area is typically rural. Villages normally have a relatively dense core (an inheritance from the '*aldeamentos estratégicos*', i.e. the strategic villages imposed by the Portuguese army during the liberation war to control the rural population) from which the settlement disperses, as people seek to establish themselves closer to their agricultural land or sea-based resources. Within the Project area there is approximately 480 hectares of land used for various agricultural activities. Coastlines are extensively used for fishing and gathering.

The following sections briefly characterize socio-economic conditions within the Afungi Project Site. Information is derived from EIA baseline studies and preliminary data gathered

by the Project resettlement team. A detailed description of the Project area's socio-economic context is available in Chapter 9 of the EIA.

3.4.1. Land Ownership

On the Afungi Project Site, households' rights to land are generally derived from their occupation and use of the land for a period of more than 10 years. Mozambican Law recognizes this type of tenure (see Section 4.4).

3.4.2. Natural Resources and Communal Use

The affected communities use forests and grazing areas for their livelihood strategies. Forests provide medicinal plants, firewood, wild fruits, and timber for construction. No communal agricultural land exists.

The sea and the intertidal area are important resources widely used by local communities. They provide important dietary supplements such as fish and molluscs, and enable fish drying and selling, and other income-generating activities. There are also communal assets such as sacred sites and graveyards, which play an important role in the community life.

3.4.3. Living Conditions in Affected Areas

The Afungi Project Site includes the village of Quitupo and its production zones (Quitunda, Barabarane, Milamba and Ngodji) as well as some production zones from the villages of Maganja and Senga. The villages of Maganja and Senga fall outside the Afungi Project Site.

Residential Structures and Patterns
Residential patterns within the Afungi Project Site can be characterized as permanent or temporary. Most households in the Afungi Project Site are permanent residents. A smaller number of people live in the Afungi Project Site on a seasonal basis for either fishing or agriculture.

Local houses are typically constructed from mud-brick with thatched or corrugated iron roofs. The style of the homes allows for easy expansion and enlargement of dwellings. Cooking and ablution activities are conducted outside of the main dwelling. Infrastructure supporting households is rudimentary i.e. water from shared, shallow wells; basic or no sanitation; poorly formed roads and access tracks; and no electrification.

Education and Literacy
Literacy levels in the Project area are generally very low. Women, in particular, have very low levels of education and 92 percent are illiterate. Adult Literacy and Education (ALE) programs are aimed at people who are not of school age and these are available throughout the country. In the Afungi Project Site, however, only one village, Senga had an ALE program. In Quitupo and Maganja the programs have been discontinued due to a lack of available teachers. Some of those who have attended the ALE classes have dropped-out due to the demands of subsistence activities which take priority during preparation of land or harvesting.

Health

Access to health services in the Project area is poor. Health care facilities are only available in Palma Town and Maganja village (Type II and Type I Health Care Centers, respectively). This means that for the majority of the population who live in the Afungi Project Site, the available health care units are far from their area of residence. A significant problem for the population is lack of transportation to travel to the health post/center. Despite this, the surveyed population expressed a great deal of confidence in the health care system as the first treatment option in the event of illness.

Agriculture

The most commonly grown crops are maize, cassava, peanut and beans. These are cultivated on higher ground with sandy soils of low nutrient status. Rice, sweet potatoes, and horticultural products are cultivated in the lowland areas, generally located along drainage lines and the alluvial plains of rivers and streams where soils are typically rich in nutrients.

Land is cultivated in a rain-fed regime over two seasons. The first season begins around October to November when plots are prepared for food crops as maize, rice and beans, and the second from March to April to prepare for sweet potato and vegetables. Manual watering is practiced in lowland areas.

Each household is responsible for their own production with all production activities undertaken by members of the household. Women are most active in crop farming and generally tend to their crops on a daily basis. Production for each household takes place in three general areas:

- *Machambas* – land granted by the chief of production and recognized by the village where a form of slash and burn agriculture under rain-fed conditions is practiced. Cropped areas are rotated so a household does not cultivate all its area at any one time;
- Wetland plots – many villages have access to a wetland area. This has higher potential area productivity and crops such as rice, sweet potatoes, and bananas are grown. The size of each wetland plot is much smaller than the *machamba*, but more intensively cultivated, especially during the wet season; and
- Near-house gardens – many households cultivate an area near or around the homestead. Although this too is under rain-fed conditions, the proximity to the house ensures that cultivation is more intensive. Crops planted include cassava, maize, pineapples, beans, sweet potatoes, bananas, and fruit trees.

Within the Afungi Project Site, available agricultural extension services are limited. For households from the Afungi Project Site to access agricultural extension services they generally need to travel to Palma Town. Households make good use of the fruit harvested from household-owned fruit trees. Apart from storing dried cassava and some peanuts and bambara beans, little other processing of food takes place.

Livestock keeping is not widely practiced in the area. Cattle are not kept due to the high prevalence of the tsetse fly. Most commonly kept livestock include goats, chickens, and ducks. These are kept for subsistence use and culled for special occasions.

Fisheries

Small-scale fishing is practiced by the communities along the coast and along inland waterways, where catches are used for consumption as well as for sale. This constitutes the second most important activity in terms of household food security and cash income. In general, the majority of households are involved in subsistence fishing oriented towards home consumption. Commercial fishing is largely undeveloped.

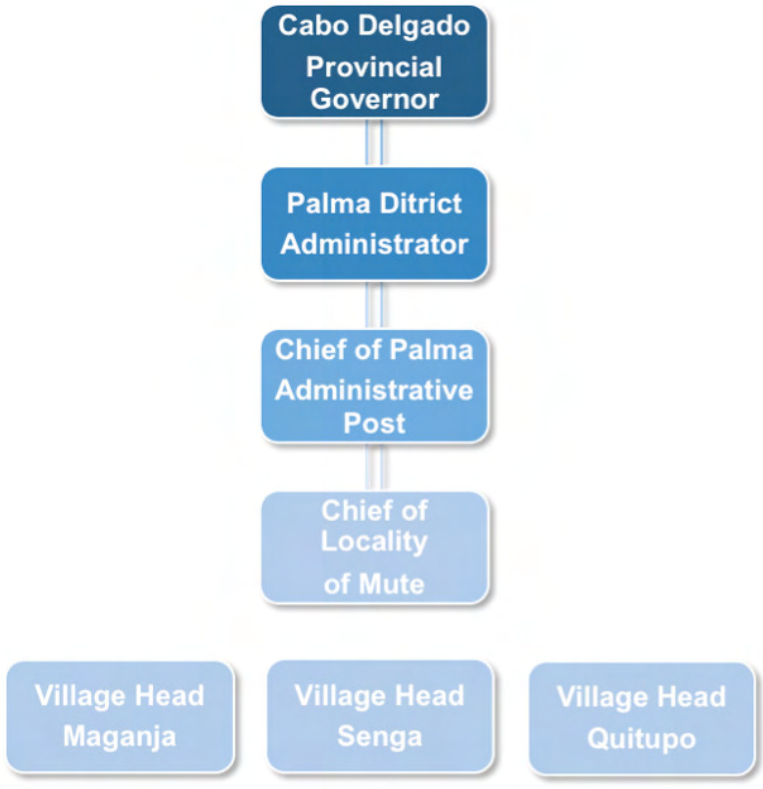
Commercial Activity

A weak commercial network, both formal and informal, characterizes the Afungi Project Site. In the villages of Maganja and in Nsemo, there is a market area with some informal commercial establishments. This market is reliant on sea transportation routes that link it to the north and south of Cabo Delgado Province. In Senga and Quitupo there are only a very few isolated local stalls.

3.4.4. Local Governance Framework

In accordance with the general administrative framework, a Provincial Governor appointed by the President of the Republic heads the Cabo Delgado Province. The Province comprises several districts, each led by District Administrators who are directly accountable to the Governor. Each District Administrator, in turn, supervises the Chiefs of the Administrative Posts of the respective district, as appointed by the Ministry of State Administration. The Administrative Posts are divided into Localities, headed by Heads (Chiefs) of Locality. Each Locality, finally, comprises several villages (see Figure 3-1 below).

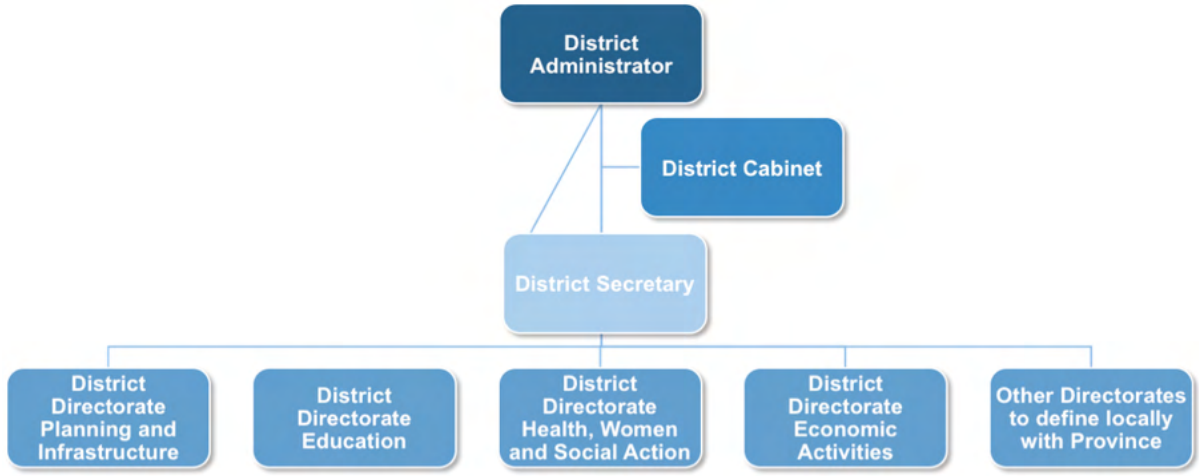
FIGURE 3-1: GOVERNMENT ADMINISTRATIVE STRUCTURE AT PROVINCIAL LEVEL



The Project site falls within the Administrative Post of Palma and the Locality of Mute. The District of Palma is divided into four Administrative Posts and six Localities. The District Administrator, aided by a Permanent Secretary, and Directors of District Services, directs the District.

Figure 3-2 illustrates typical structure of District Government, according to Decree 6/2006, of April12.

FIGURE 3-2: TYPICAL STRUCTURE OF DISTRICT GOVERNMENT

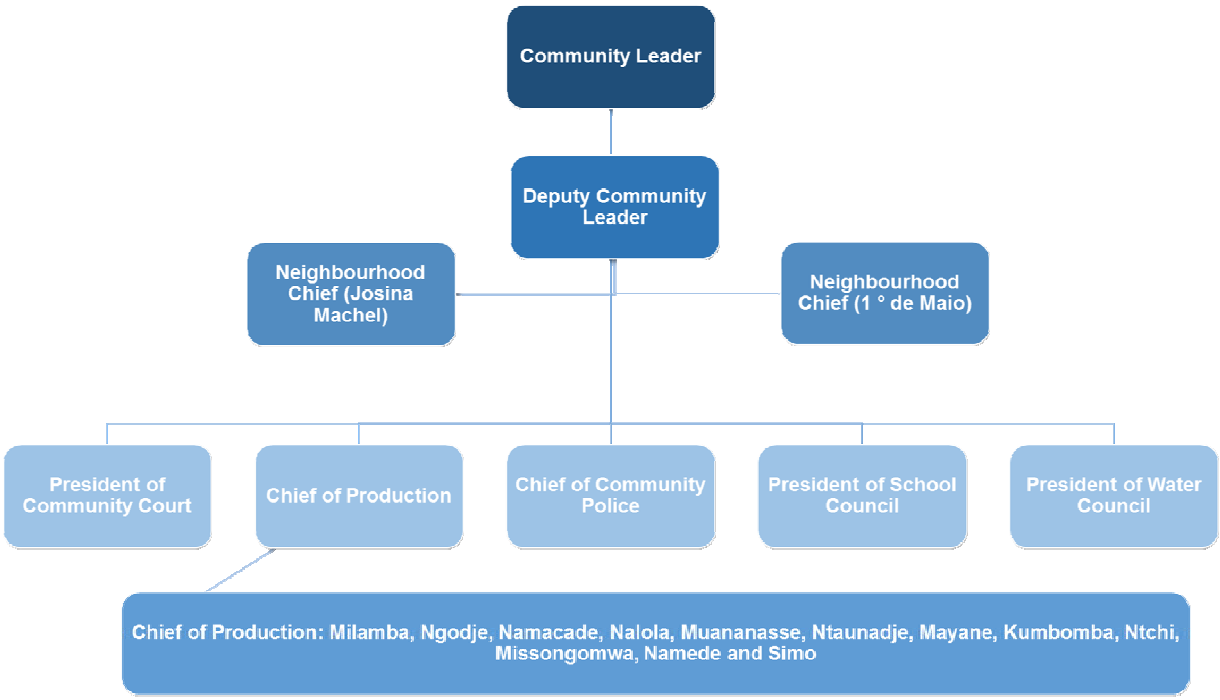


The administrative structure at local level includes both formal and traditional authorities. There are no formal government structures below village level. Below village level, leadership is provided by community authorities (including traditional leaders selected according to custom), or elected community leaders. The authority of traditional and community leaders is recognized and maintained by the Government under Decree 35/2012, of 5 October.

Community leaders can make decisions about various community issues, including allocation of land. In essence, however, their duties are focused on conflict resolution within the community and the preservation of customs and traditional ceremonies, thus helping to maintain the cultural and social cohesion of the group.

The only large village existing inside the Afungi Project Site is Quitupo. The village controls administratively a number of Zonas de Produção (Production Zones), small settlements scattered through the area. Figure 3-3 indicates the community leadership structure of Quitupo village.

FIGURE 3-3: ADMINISTRATIVE STRUCTURE OF QUITUPO VILLAGE



4. Regulatory Framework

The Resettlement Action Plan will be prepared in accordance with the requirements of the following:

- Mozambican Law;
- Customary Law (norms and practices) of the affected communities; and
- IFC Performance Standards on Environmental and Social Sustainability.

4.1. Mozambican Legislation

The main Mozambican legislation relevant to the resettlement process is:

- Environmental Regulations for Petroleum Operations (Decree No. 56/2010, of 22 November)
- The Regulation on The Process of Resettlement Resulting from Economic Activities (Decree No. 31/2012, of 8 August);
- The Land Law (Law No. 19/97 of 1 October) and The Land Law Regulations (Decree No. 66/98, of 8 December) as amended by Decree No. 1/2003, of 18 February;

- The Law on the Protection of Cultural Heritage (Law No. 10/88, of 22 December) and The Regulation for the Protection of Archaeological Heritage (Decree No. 27/94, of 20 July);
- The Territorial Planning Law and Regulations (Law No. 19/2007, of 18 July and Decree 23/2008, of 1 July);
- Directive on the Process of Expropriation for the Purposes of Land Planning (Ministerial Diploma No. 181/2010, of 1 July); and
- The Petroleum Law (Law No. 3/2001, of 21 February) and the Petroleum Operations Regulations (Decree 24/2004, of 20 August).

Table 4-1 provides a brief summary of the pertinent legislation and how it is applicable to Project resettlement.

TABLE 4-1: MOZAMBICAN LEGISLATION APPLICABLE TO THE RESETTLEMENT PROCESS

Legislation Name	Description
Environmental Regulations for Petroleum Operations	The Regulation stipulates the procedure for obtaining an Environmental License as a prerequisite for a project such as the Mozambique Gas Development Project. The regulation also stipulates the requirement for public participation as part of the environmental impact assessment process. Article 19 requires public participation to take place for projects that classify as Category A and Category B activities. Public participation is part of the EIS process but disclosure and consultation specifically with resettlement-affected households will take place as part of RAP planning and implementation.
The Regulation on the Process of Resettlement Resulting from Economic Activities	The Regulation prescribes basic rules and principles to be applied to the resettlement process (Arts. 2-5) and the requirement to establish a 'Technical Commission'. The composition and responsibilities of the Commission are defined (Arts. 6-8). It defines the rights of the affected population (Art. 10); roles and responsibilities of the proponent (Art. 11) and those of central and local government (Art. 12). Requirements for public participation (Art. 13) and information disclosure (Art. 14) are also described. The Regulation prescribes requirements for drafting and approval of a resettlement plan (Arts. 9, 15 and 19-21) as well as the required characteristics of replacement housing, facilities, and utilities (Arts. 16-18). Sanctions for breaches of the Regulation are outlined (Arts. 24-28).
The Land Law	The Land Law prescribes that all land is State property and cannot be sold, transferred, mortgaged or pledged (Article 3). Access to land by individuals or legal persons is obtained

Legislation Name	Description
	through the acquisition of rights to use and benefit from land (DUATs). The Law also recognizes customary means of acquiring rights to use, exploit or occupy land by Mozambican citizens (regardless of gender) and local communities (Articles 10 and 12). When occupation is according to either customary norms or possession in good faith, extending for more than 10 years (Article 12(b)) its legitimacy is recognized by the law. Thus, the absence of formal title (DUAT) issued by the cadastral services does not imply any loss of rights over communal lands. The law also provides for land use rights to be revoked with fair compensation for reasons of public interest (Article 18b). While referring to the need to pay compensation for expropriated land, the law does not provide any details on applicable principles, eligibility, basis for compensation, procedures to be followed or roles and responsibilities.
The Territorial Planning Policy	The Policy aims to create a favorable environment to ensure that new investments result in direct benefits for both the developer and local communities, with the integration of new opportunities for economic development in rural areas as essential.
Territorial Planning Law and Regulations	The state has the authority to requisition land and expropriate property when it is in the public interest, such as investment in public infrastructure and for economic development with significant positive social impacts. Expropriation for the public interest gives rise to the payment of fair compensation for the loss of tangible and intangible goods and productive assets as well as the disruption of social cohesion. Compensation should be paid before the transfer or expropriation of property and assets, which should not only cover the real value of expropriated assets, but also damage and loss of profit. Fair compensation should be paid prior to the transfer of ownership or possession of the property to be expropriated. Compensation may be in cash or, in the case of buildings, in kind.
Directive on the Process of Expropriation for the Purpose of Land Planning	Authorizes expropriation for the purpose of land-use planning. No specific procedural mechanisms, other than authorizing in principle expropriation for the purpose of land-use Planning.
The Petroleum Law and the Petroleum Operations Regulations	The Petroleum Law (Article 17.f and 20) and the Petroleum Operations Regulations (Article 23) allow for the withdrawal of the right to use and benefit from land in the national interest following the payment of fair compensation. Damages or

Legislation Name	Description
	losses, servitudes and expropriation of rights to holders of land rights, regardless of whether or not such are in possession of title documents or not must be compensated, including damage to crops, soils, building and improvements and/or relocation. The Petroleum Law (Article 17, clause f)) obliges the holder of a reconnaissance, exploration and production, or oil or gas pipeline contract to compensate parties who suffer damages or loss to their crops, soils, building and improvements; or who require relocation of the legal user or occupants of land within the contract area. Such holder and operator have the obligation to compensate the holders of title to the assets and the person relocated.
The Law on the Protection of Cultural Heritage	Assets of archaeological, anthropological or geological value, as well as non-physical assets are considered items of cultural heritage and worthy of protection. Depending on the nature of such finds of heritage, discoveries must be communicated to the relevant authority which will inspect and determine the further management and classification of the find, including further construction or excavation near the site.

4.2. IFC Performance Standards

It has become accepted practice in Mozambique that the standards on involuntary resettlement provided by institutions such as the World Bank, Equator Principles banks and, in particular, the International Finance Corporation, are followed because of the safeguards these provide to affected parties.

The Project Proponents will likely seek financing for the Mozambique Gas Development Project and will therefore align its environmental and social management with the IFC Performance Standards on Environmental and Social Sustainability (2012). The following IFC standards are relevant to resettlement planning and implementation:

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts;
- PS 4: Community Health, Safety and Security;
- PS 5: Land Acquisition and Involuntary Resettlement; and,
- PS 8: Cultural Heritage.

PS 5 Land Acquisition and Involuntary Resettlement is the core IFC Performance Standard that will be applied to Project displacement.

4.3. Customary Law

The Constitution of the Republic of Mozambique 2004 recognizes Customary Law as a legitimate source of rights. In the case of land rights, these informal land tenure rights are incorporated into the land laws (Land Law, Art.12). This implies that, especially in the case of rural resettlement, the resettlement process needs to take into account the norms espoused by the affected communities in terms of land tenure and land allocation mechanisms.

The absence of registration does not prejudice the holders of rights according to custom (local communities) or good faith occupants for at least ten years. Hence, in addition to compliance with the Land Law, the Project will follow a participatory approach prescribed in the Land Law Regulations and Technical Annex to ensure that local communities and good faith occupants take an active part in the identification and demarcation of boundaries and the reallocation of land rights. The Project Proponents will comply with these regulatory procedures of information dissemination and phased consultation with affected communities, including focus group meetings with community leaders.

4.4. Nature of Rights and Eligibility for Compensation

As all land vests in the State and cannot be owned or alienated, the only types of rights that can be obtained and thus expropriated and compensated are various forms of use and benefit rights.

There are three main tenure types (right to use and benefit (DUAT)):

i) Customary tenure;
ii) Occupation in good faith for at least ten years; and
iii) Formal title through application and registration.

National individuals and corporate persons, men and women (equally), as well as local communities may hold DUATs. National individuals and corporate persons may obtain the rights individually or jointly with other individuals and corporate persons by way of joint title holding. The rights exercised by local communities adhere to the principles of joint title holding for the purpose of the law. Individual members of a community may request and acquire individual titles after partitioning from the relevant community land, in a process called individuation.

Although a DUAT holder cannot own the land, he or she can own any fixed assets on that land including houses, buildings, infrastructure, trees, crops, and other improvements. Regardless of how it was acquired, DUATs are recognized by Mozambican law as real rights to a plot of land and are transmissible as part of transactions involving the fixed assets upon the land. The transfer of infrastructure, buildings or improvements over a rural tenement, however does not imply the automatic transfer of the DUAT. In order for that DUAT to be transferred along with the buildings, the transfer must be approved by the entity, which approved the DUAT. The transfer of infrastructure, buildings or improvements erected in an urban tenement entails the automatic transfer of the DUAT.

At the simplest level, these rights include:

- The right to occupy a dwelling;

- To rent or lease the infrastructure as a residential dwelling or business;
- To carry on business (subject to authorization and exploitation plan[3]); and
- The right to work the land individually or jointly and to enjoy the yield from the land.

A person or community claiming to be the lawful occupant of a piece of land may use any of the following methods to prove an existing right:

i) Present a registered title;
ii) Offer testimony of members (both men and women) of local communities; or
iii) Obtain expert or other technical evidence.

The project will record and process all the information gathered during the census, as informal mechanisms of transfer are anticipated to be prevalent. The project will further consider actual loss and tenure security as determinant to design eligibility criteria that strike a balance between informal practices and the law, such as to recognize the equal status of men and women.

4.5. Licensing and Permitting for Replacement Village(s)

The following permits and licenses will be required for the replacement village(s):

- Environmental license according to the Environment Law, 20/97, Article 15;
- Land Use Rights (DUAT) according to the Land Law, for communities or households (as per agreement with the Government of Mozambique) to be resettled to the replacement village(s);
- Construction License for the replacement village(s) according to Decree 2/2004, of 31 March;
- A vegetation clearance license to clear land for construction activities according to Article 103 of the Regulation to the Forests and Wildlife Act (Decree 12/2002, 6 June); and
- Depending on the selected resettlement site(s), water use licenses might be required in terms of Article 18 of the Water Law, 16/91, of 3 August in the following instances: installation of reservoirs, planting of crops or felling of trees on the beds of shores of a water source, and where sand or clay is removed on the banks or shores of water sources.

4.6. Laws and regulations binding to third parties (Contractors, implementation institutions)

In order to ensure consistent application of the Mozambican Law and of the relevant IFC standards, the Project Proponents will contractually instruct all subcontractors and entities operating under their umbrella to comply with the referred legal and regulatory principles.

[3] In terms of the Commercial Code, the proprietor of a commercial establishment may dispose of it through lease, usufruct or transfer, according to the calculation methods included in the Code (Article 71 and 72)

The IFC Performance Standards also provide for supply chain compliance and transparency, which will be monitored.

4.7. Dispute Resolution

There will be various opportunities and means for interested and affected persons with objections to the expropriation, compensation, and resettlement process to raise their objection and obtain legal redress. The most practical and appropriate dispute resolution mechanism will depend on the exact nature of the dispute, the phase of the resettlement process during which the dispute arises and the parties involved.

In law and in practice, disputes involving rural communities are primarily resolved through a participatory approach, which includes consultation, mediation, and arbitration. The 2004 Constitution recognized legal pluralism, and both statutory law and custom incorporate these methods.

As a first step towards conciliation, the Land laws and the Resettlement Decree prescribe several consultations between a project and land rights holders. These laws create mechanisms for participation in natural resource management, conflict resolution, boundary determinations, mapping (requiring consensus; Technical Annex), proving legitimacy of claims as well as verification and consultation by and with neighbors (Land Law, Article 13 and 24, Regulations, Article 27). As a matter of law, customary norms and practices may be used to this end.

The project grievance procedures will be accessible to any affected community member or aggrieved party. These procedures will be adapted to incorporate input from affected communities where applicable and in keeping with the law.

There are various avenues aggrieved parties can follow to access the legal system:

- The Law on Extra-Judicial Conflict Management (Arbitration Law, Law no. 11/99, of 8 July) recognizes conciliation, mediation, and arbitration as tools for conflict resolution. This is in keeping with the practice of a participatory approach, which affords relative flexibility, and ease of access to justice. This is generally considered the more desirable way to resolve disputes between investors and communities. Although arbitration does not usually afford appeal opportunities, both parties may have input in the choice of the adjudicating chair(s), and it is possible to refer an arbitration award to a judicial court in connection with an application for setting aside or enforcing the arbitral award;
- The judicial courts system applies formal law and has an adversarial nature (winners and losers). In terms of the Law of the Judicial Organizition, Law no. 24/2007, of 10 August (*Lei da Organização Judiciária*) the District Judicial Courts would be the courts of first instance, followed by the Provincial Judicial Courts that can adjudicate appeals from the District Judicial Courts, the Superior Courts of Appeal and finally the Supreme Court that can adjudicate appeals from the lower courts;

- If the matter in dispute relates purely to an administrative decision taken by the Government in respect of the project, the Administrative Court could be approached to seek judicial review of the decision; and
- The Community Courts established by Law 4/92, of 6 May creates a system of unofficial justice. In Cabo Delgado, these courts are especially active and apply customary law though in compliance with the Constitution. These courts are, however not linked to the formal Judicial Courts system, and do not have appeal jurisdiction.

The 2004 Constitution, Article 81 introduced the right to class action, allowing citizens to seek indemnity for and protection of environmental and cultural heritage. Complementary legislation has yet to be passed to facilitate class actions.

4.8. Gap Analysis

Decree 31/2012, of August 8, is an important first step to regulate resettlement induced by economic activities. A further Government Directive is expected to clarify the application of Decree 31/2012, to further align Mozambican Law with IFC PS 5.

Some of the gaps that have been identified in this Decree include the following:

- Consideration of alternatives to avoid or minimize involuntary resettlement;
- Inconsistency in the consultation processes prescribed by the Resettlement Decree and that of the Land Law Regulations in terms of participation and representation, including for the participation of affected communities and marginalized or vulnerable groups (women, children, the elderly, people with disabilities);
- Adequate grievance mechanism that ensures consultation, responsiveness, timely feedback, and where appropriate access to justice;
- The prescriptions for replacement housing don't consider alternative models for communities that might prefer design around communal use and occupation;
- Lack of clarity about access right to natural resources (forest resources, hunting, fishing);
- Proximity and rights of access to cultural assets; and
- Status of rights pending transfer.

Other pertinent legal gaps include a lack of details regarding the form of compensation in case of expropriation, means of calculating compensation (other than for crops), eligibility criteria, clear planning, implementation and execution criteria and standards.

To overcome these issues, the Project Proponents will incorporate a comprehensive gap analysis together with proposed measures to address the gaps in the design of its RAP, thus ensuring full compliance with IFC PS 5.

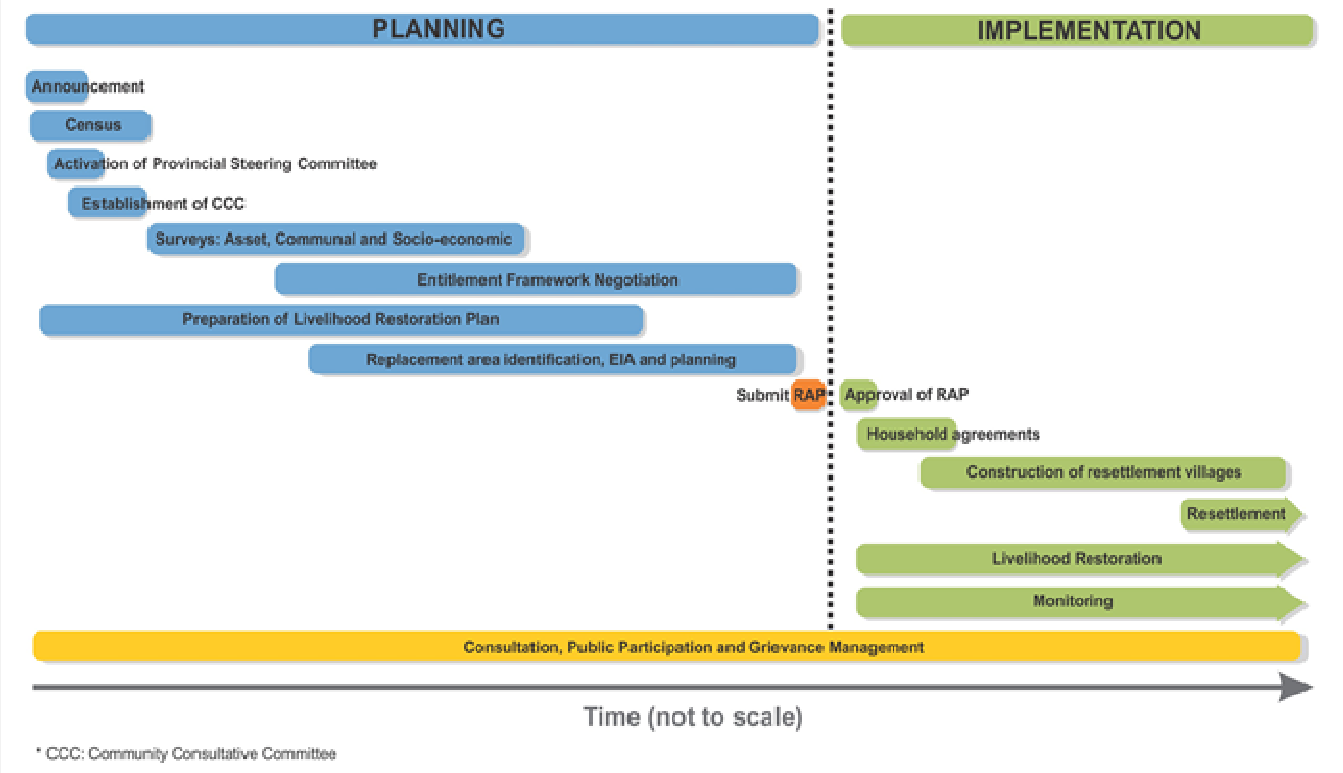
5. Resettlement Process

The resettlement process consists of two phases namely:

- **Planning Phase** during which data is collected, communities are engaged and replacement sites are selected and studied. The final output of this phase is a RAP that will be submitted to the Government of Mozambique and Project Lenders. It will be approved by the affected communities;
- **Implementation Phase** will commence after RAP approval and will commence with signing of household resettlement agreements, construction of replacement village(s), completion of physical relocation, and commencement of livelihood restoration programs.

Figure 5-1 indicates the principle activities during resettlement planning and implementation.

FIGURE 5-1: RESETTLEMENT PROCESS



The following sections briefly describe the tasks that will be undertaken in the abovementioned resettlement phases.

5.1. Resettlement Planning

Following submission of the IRP, and assuming the Project continues to be developed, the Project Proponents will prepare a RAP in accordance with Decree 31/2012, of August 8 and IFC PS 5. The RAP will be developed in close consultation with affected communities and in

cooperation with the Provincial and District Governments to ensure its alignment with Provincial and District development plans and strategies.

Principal tasks to be undertaken during resettlement planning and RAP preparation are summarized in Table 5-1.

TABLE 5-1: RESETTLEMENT PLANNING PROCESS AND TASKS

Tasks	Description
Census	Undertake a census to identify and record all people, households, and enterprises residing on the Afungi Project Site. Each surveyed household will receive a registration card. The census will be carried out by a team of enumerators under the supervision of a Resettlement Specialist and will have the participation of community leaders as witnesses.
Election of community representatives and set-up of resettlement bodies	The following activities will be undertaken: • Provide information on resettlement to affected people. • Announce the 'cut-off date' and explain its significance. • Assist communities to select representatives to participate in the resettlement planning process. • Establish the resettlement committees (statutory and other) that will supervise and participate in resettlement planning, and implement, monitor and evaluate the resettlement process. • Establish a grievance mechanism.
Assets Survey	Undertake a survey and inventory of all household assets (land, trees, crops, structures, wells, and the like) that will be lost to the Project. See Section 6.1 for further detail.
Communal Asset Survey	Undertake a survey and inventory of all communal and public assets (schools, health facilities, mosques, churches, sacred sites, graveyards, and the like). The communal asset survey will also identify the 'owners' or government authorities responsible for each asset. The communal asset survey will be carried out by a team of enumerators under the supervision of a Resettlement Specialist. A registered valuer will be utilized if required.
Socio-economic Survey	Conduct a socio-economic survey on a representative sample of affected households to define pre-project standards of living and livelihoods and to gain an understanding of households' systems of production and income sources. Both quantitative and qualitative survey techniques will be utilized. The socio-economic surveys will contribute to the Resettlement team's understanding of local livelihood systems and appropriate mitigation measures. The socio-economic surveys will also be tailored to provide baseline information against which the effectiveness of post-resettlement livelihood restoration programs can be monitored.
Design the Compensation Framework – valuation, eligibility and entitlements	Based on the census, socio-economic surveys and asset inventories, the following activities will be undertaken: • Develop criteria to define eligibility for compensation and other forms of assistance; • Valuate land, crops, structures and other assets to be affected by land acquisition, including any communal property, social and physical infrastructure, and cultural heritage items; • Develop compensation approaches – cash, in-kind, resettlement assistance;

Tasks	Description
	• Develop an entitlement matrix; • Prepare household compensation and resettlement agreements; and • Prepare agreements to cover design standards, handover arrangements, equipment and staffing, and maintenance of communal and public facilities and infrastructure.
Livelihood Restoration Plan	Develop livelihood restoration frameworks and plans covering agriculture, fisheries and non-land based livelihoods to ensure the improvement of productive strategies of physically and economically displaced communities.
Replacement Area selection and Replacement Area EIA	Consult with affected communities and coordinate with the District and Provincial Governments to identify, evaluate, and select a preferred replacement village site or sites. Activities will include: • Consult with affected communities to identify their preferences and requirements; • Develop a brief of requirements for the replacement site; • Identify and evaluate potential replacement village site options; • Conduct detailed site investigations (e.g. geotechnical, water supply, agricultural suitability and the like) to confirm the suitability of the preferred site; • Consult with any host or receiving communities; • Survey host communities with the same instruments as were used with the resettlement-affected households; • Develop housing designs in consultation with affected communities; • Develop a replacement site master plan that defines the village layout and supporting land uses; • Develop architectural and engineering designs for tender of replacement village construction; and • Develop replacement village construction budgets and schedule.
Vulnerable peoples program	Identify vulnerable groups and, where needed, develop measures to support them during resettlement planning, agreement negotiation, compensation disbursement, physical relocation, and subsequent livelihood restoration.
Resettlement Action Plan	Prepare a RAP document in accordance with Mozambican legislation and IFC PS 5. Reach agreement on the plan with affected communities. See Section 6 for an indicative RAP Table of Contents.

5.2. Resettlement Implementation

Resettlement implementation will commence upon approval of the RAP by stakeholders (after a period of public disclosure) and by the Government of Mozambique. The following activities are included in the implementation phase:

- Signing of resettlement agreements;
- Payment of compensation payments;
- Replacement site preparation and construction of the replacement village/s;
- Physical relocation of households and businesses;
- Provision of resettlement assistance and transitional support;
- Handover of communal and public facilities;
- On-going information sharing with affected people with continuing opportunities for their participation and consultation throughout implementation of resettlement;
- Implementation of livelihood restoration programs;
- Regular internal and external monitoring and reporting;
- Complaints and grievance management; and
- Completion audit following a reasonable period for RAP measures, particularly livelihood restoration, to have been completed.

The following sections provide a brief overview of some key steps that the Project Proponents would like to highlight for the purposes of the IRP.

5.2.1. Resettlement Agreements

A resettlement agreement will be signed with each displaced household and enterprise. This will describe matters such as assets to be lost, the amount of compensation payable to the household and the forms of resettlement assistance to which the household is entitled. It will also specify the rights and obligations of the household related to the resettlement process.

5.2.2. Replacement site(s) preparation

Following approval of the replacement site(s) by the Government of Mozambique, the completion of the EIA for the replacement village(s) and permitting of all relevant activities, replacement village construction will be commenced. Activities will include:

- Construction of replacement houses;
- Construction of communal and public facilities;
- Installation of roads, drainage, water supply and electrical trunk supply;
- Clearance of agricultural land;
- Establishment of demonstration plots; and
- Preparation of subdivision plans for issue of DUATs.

5.2.3. Handover Agreements for Communal and Public Facilities

The Project Proponents will prepare a plan for the handover of communal and public facilities and utilities to the relevant community body or responsible government authority.

Prior to the start of construction, agreements will be signed between the Project Proponents and the relevant community body or responsible government authority to clearly define the following:

- Applicable design standards to be complied with;
- Conditions to be achieved for handover;
- Responsibilities for rectifying construction defects; and
- Responsibilities for ongoing staffing, equipment, operations and maintenance.

5.2.4. Moving to the Resettlement Site

The Project Proponents will assist households and enterprises to help them transport their people, possessions and livestock to the resettlement site/s. Affected households will not be required to move until their replacement dwellings and essential communal facilities such as the school and health center are completed.

6. Resettlement Action Plan Framework

The RAP will expand the framework established for the IRP and incorporate specific information about the affected people based on the census, completed inventory of affected assets and the results of the socio-economic survey. It will also specifically address the needs of the vulnerable groups identified by these activities.

Consistent with the forthcoming MICOA guidelines on RAP preparation, the Mozambique Gas Development Project RAP will include the following components:

- Results of the census and the socio-economic studies with a classification of affected people including consideration of gender, youth, and vulnerable groups; and, addressing the following:
  - characteristics of displaced households, including a description of:
    - production, work and family organization systems;
    - basic information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities); and
    - standards of living (including health status) of the displaced population;
  - description of social organization, including relevant aspects of local society, the leaders, the ethnic differences, the social groupings (families, households, lineages, clans, religious groups, etc.), and the existence of any antagonisms and conflicts;
  - identification of areas of cultural importance such as cemeteries, churches or areas of worship, sacred tombs;
- An inventory of project affected assets and their appraised value;
- Specific rates and patterns of compensation;

- Evidence of public consultations with the affected population (according to Decree 31/2012) and the host population, and of addressing the issues raised by both;
- Actions of communication with the affected and host communities, including the communication of the cut-off date;
- Eligibility Matrix – including a definition of categories of affected persons and criteria for determining their eligibility for compensation and other resettlement assistance, including relevant dates of termination of benefits;
- Description of the size and minimum qualifications of the team implementing the RAP;
- Measures to assist vulnerable people, taking advantage of existing social networks and mutual support systems whenever possible;
- Description of resettlement sites and programs for improvement or at least restoration of affected peoples' livelihoods and living conditions;
- Description of housing, infrastructure, and social services to be provided at the resettlement site, including details of:
    - plans for replacement housing, infrastructure (e.g. water supply, feeder roads), and social services (such as schools, health posts);
    - plans to offer benefits to host populations;
    - proposed site improvements and architectural plans for facilities;
- Institutional matrix defining roles and responsibilities of each entity involved in implementing the plan, the legal instrument used, the funding source, and the budgeted amount;
- Procedures for the transfer to the new location and transition costs;
- Specific measures to restore livelihoods;
- Grievance mechanisms for affected people;
- Implementation schedule for resettlement activities synchronized with the works;
- Coordination with the Government regarding land tenure arrangements, and to ensure the transfer of DUATs to the resettled population is in compliance with applicable legislation;
- RAP budget and schedule;
- Develop and implement a monitoring and evaluation strategy;
- Prepare local language summaries of the RAP; and
- Publically disclose the RAP in national, provincial, and local locations accessible to affected people.

The following sections provide further detail on key components of the RAP.

6.1. Identification of Project Affected Population and Impacts

A census of affected households, socio-economic survey, and assets inventory (recording farmland, grazing land, residential and support structures, fruit trees, etc.) will be undertaken to identify all people and property that will be affected by the Project. The asset inventory of homestead plots and farmland will be done with the aid of geo-referencing tools and will result in a database containing a list of all affected property. This database will provide the basis for defining which households and enterprises are eligible for compensation, the extent of their losses and what their entitlements will be for compensation and other forms of resettlement assistance.

Potential resettlement impacts will involve some or all of the following:

- Permanent loss of homes and ancillary structures (houses, barns, corrals, chicken coops, stalls, etc.);
- Permanent loss of business structures (stalls);
- Loss of agricultural land and possible loss of crops;
- Loss of perennial crops (and any in-ground annual crops at time of possession);
- Loss of grazing areas;
- Loss of fruit trees;
- Loss of access to common resources such as forest, woodland, and wetlands;
- Loss of graves and sacred sites;
- Loss of social infrastructure (schools, first aid stations and water pumps);
- Temporary loss of access to some marine and coastal resources due to restrictions on access during construction for safety reasons; and
- Permanent loss of access to some marine and coastal resources as a result of exclusion zones around certain Project marine facilities (e.g. LNG loading berth).

Host communities may also experience impacts from receiving resettled communities. These impacts will depend on the nature of the selected replacement sites but may include:

- Increased demands on existing social facilities (e.g. schools, health posts, law and order);
- Increased demands on existing roads and services (e.g. water, waste management, sanitation, drainage);
- Increased demands on common resources (e.g. fisheries, coastal gathering, foraging, firewood and non-timber forest products, wildlife and the like).

Impacts on hosts will be assessed both as part of the RAP and the EIA for the replacement village/s. Mitigation measures and offsetting benefits will be designed to address any impacts, in close consultation with the host communities.

6.2. Legislative and Regulatory Framework and Standards

The regulatory framework applicable to the resettlement program is outlined in Section 4. During RAP preparation, this framework will be developed through a more detailed legislative analysis taking into account all laws, decrees, policies and regulations applicable to Project resettlement. Differences between Mozambican statutory requirements and IFC PS 5 will be identified. Where necessary measures will be developed to ensure that Project resettlement arrangements are in accordance with both Mozambican law and IFC requirements.

6.3. Compensation Framework, Entitlements and Eligibility Criteria

6.3.1. Compensation Framework

The RAP will define the compensation framework for the Project. This will be developed in close consultation with the Community Representative Committee and will define the following:

- Valuation basis – the types of assets, land improvements and losses that will be considered for compensation, the basis for their measurement and valuation, and rates for compensation;
- Eligibility criteria – to define which categories of displaced land users, occupiers and enterprises will be eligible to receive compensation and resettlement assistance; and
- Entitlements – to define the entitlements (compensation, livelihood restoration assistance, and other kinds of resettlement assistance) for each category of eligible user, occupier, or enterprise.

In consultation with affected communities, the Project will develop packages of monetary compensation, in-kind compensation, and other forms of assistance to help eligible households and individuals restore or improve their living standards and livelihoods in the event the Project is approved and developed.

6.3.2. Methods for Evaluation of Compensation

A detailed asset inventory will be undertaken (as detailed in Section 5.1 and 6.1) to refine detailed compensation packages. The value of lost assets will be calculated at Full Replacement Value (FRV) (as defined by IFC PS 5) with the assistance of a registered valuer. Loss of dwellings and loss of agricultural land will be compensated in-kind, with replacement houses and agricultural plots being allocated to affected families. Loss of crops and fruit trees will be compensated on a monetary basis, based on the tables issued by the Ministry of Agriculture, adjusted where necessary to ensure compensation at FRV as defined by IFC PS 5. Losses resulting from interruption of activity will also be compensated. Multiple methods will used to determine replacement valuations.

6.3.3. Eligibility Criteria

Entitlement for compensation and other forms of resettlement assistance will be determined according to the nature of impact and the type of proprietary interest that each community, household, or individual has in the affected asset – e.g. tenants and sharecroppers, or boat owners and crewmembers, may have differing entitlements to compensation.

Eligibility categories will only be defined once the census, socio-economic surveys, and asset surveys have been completed, and the detailed nature of losses and impacts can be understood. In the case of communities that have access to the coast severed by the LNG site, although their land may be unaffected, they may still need to be resettled. Some preliminary categories of affected people will include but are not be limited to the following:

- Households physically and economically displaced by the Project i.e. losing dwellings and productive assets;
- Households economically displaced by the Project i.e. those losing most of their productive assets, but whose dwellings are outside of the project area;
- Households economically displaced by the Project, but who experience loss of only a small part of their total land plots;
- Communities experiencing loss or restrictions of access to some or all of their common resources (various categories);
- Public, communal, or private entities owning structures, for public use or not, affected by the Project (e.g. private owners of mosques used by communities);
- Entities who utilize project-affected areas for economic activity;
- Individuals with third party proprietary interests in land (e.g. tenants with formal agreements; tenants with informal or verbal agreements; sharecroppers); and
- Communities experiencing severance of access to coastal resources, markets or the like caused by the Project.

As provided for in IFC PS 5, where appropriate, benefits and compensation associated with natural resource usage may be collective in nature rather than directly oriented towards individuals or households.

6.3.4. Conceptual Entitlement Framework

Table 6-1 below represents an indicative entitlement framework. An actual entitlement framework will be developed as part of the RAP.

TABLE 6-1: INDICATIVE ENTITLEMENT FRAMEWORK (NOT FOR IMPLEMENTATION)

Type of Loss	Action/Compensation
Loss of permanent structures (residential or business)	• Replacement structures will be built in a replacement village in accordance with Decree 31/2012. • The Project will provide transport for the affected households and

Type of Loss	Action/Compensation
	their belongings to the new residential area. • The construction of replacement structures will be completed before the date fixed for the abandonment of old dwellings.
Loss of agricultural land (farms/ *machambas* or parts of *machambas*):	• Agricultural land forfeited to the Project shall be compensated in kind (land for land) – subject to Government approval of suitable replacement land. • The Project will cover the cost of clearing and preparation of new fields/ *machambas* at the replacement site. • The Project will support agricultural extension services to assist farmers to improve the productivity of their new plots.
Loss of crops	• Wherever possible, farmers will be given sufficient notice to enable them to harvest in-ground annual crops prior to relocation. • Any loss of crops will be compensated on a monetary basis based on tables provided for this purpose by the Provincial Agriculture Services, adjusted where necessary to achieve Full Replacement Value as defined by IFC PS 5.
Loss of fruit trees	Monetary compensation based on the tables provided for this purpose by the Provincial Agriculture Services.
Loss of graves and sacred sites	• The Project proponents will provide the resources necessary to perform the appropriate ceremonies, and to effect the relocation (actual or symbolic) of the cemeteries, graves, and sacred sites that will be displaced. • This process will be conducted in close liaison with community leaders and customary site custodians who will be closely involved in defining the ceremonies and activities to be undertaken.
Loss of social infrastructure	Social facilities shall be replaced in-kind at the replacement village site/s.
Loss of access to forage and bush-land	Selection of a site and sufficient site area to provide for access to forage and bush-land.
Loss of access to marine and coastal resources	• Selection of a replacement site with equivalent access to fisheries resources – subject to Government approval of a suitable replacement location. • Provision of fisheries technical assistance to enable fishermen to restore or enhance their livelihoods.

6.4. Resettlement and Livelihood Restoration

6.4.1. Replacement Area Selection and Distribution of Land

The Project Proponents will coordinate and provide technical assistance to the Government to support its allocation of one or more resettlement sites by conducting studies for identifying suitable host areas based on a set of preliminary criteria including but not limited to the following:

- Distance from original residence[4];
- Proximity to Palma or other hub;
- Availability of equivalent areas of uncultivated land free from settlement or competing users, similar or larger in size to the current area;
- Access to markets and social services;
- Reasonable access to existing road system;
- Availability of water for potable and agricultural uses;
- Suitability of the area for agriculture and cultivation;
- Proximity to rivers and wetlands is desirable for agricultural purposes;
- Access to and proximity of coastal and fishery resources;
- Existence of available natural resources (bush-land for firewood, medicinal plants, etc.);
- Area outside of established Protected Areas as per current legislation, or areas likely to become a Protected Area in the future;
- Suitable topography and geotechnical conditions for establishment of housing; and
- Acceptance by host or receiving communities, including ethnic and religious compatibility, and acceptance by traditional or customary landholders.[5]

The result of these studies will be presented to the relevant authorities in order to inform Government's decision-making. The Project Proponents will also facilitate the participation of resettlement-affected households in the site selection. Once the final choice of the replacement area or areas has been made, the Project Proponents will facilitate procedures as defined in the Land Law for the official assignment of new land to the beneficiaries. The Project Proponents will provide assistance with the following:

- The demarcation and numbering of plots to be allocated;
- Allocation of each plot to a community or eligible household;
- Preparation of the plots for delivery (e.g. Unexploded ordinance (UXO) clearance, clearing of trees, tillage, as the case may be); and
- A rights award ceremony (DUATs) attended by representatives such as the district authorities, the Project Proponents, Community Consultative Committee (CCC), and community leaders.

6.4.2. Replacement Structures

[4] It is suggested that the replacement area be not too far from the Afungi Project Site as the Project Proponents based this recommendation on lessons learnt from the Human Rights Watch Report (2013) "*What is a House without Food?" Mozambique's Coal Mining Boom and Resettlements.* This report show that when households are resettled to an area too far and too different from their original home it decreases the likelihood of success of the resettlement.

[5] It is important to note that no community or government consultation has taken place to review these criteria.

The construction of all replacement structures (such as houses, school, health clinic and the like) will be the responsibility of the Project Proponents and its appointed contractor who will maximize local content so far as possible without sacrificing the quality, cost, and duration of construction. The designs of houses and communal facilities will be discussed and developed with input from the CCC.

In the case of auxiliary household structures (traditional granaries, barns, corrals, etc.) the Project Proponents may provide replacement materials (subject to availability) for self-construction by the respective households, or equivalent monetary compensation.

Facilities requirements will be negotiated with the Resettlement Steering Committee (RSC) (see Section 6.5.1) and responsible government agencies. Agreements will be reached between the Project and each responsible government agency to cover each facility's design requirements as well as responsibility for ongoing provision of equipment, staffing, operations, and maintenance. Such agreements will be reached prior to any construction commencement.

6.4.3. Support for Livelihood Restoration

A detailed Livelihood Restoration Plan (LRP) will be presented as part of the RAP. The LRP will be developed in consultation with affected communities and relevant District and Provincial departments. The goal of the LRP is to provide displaced households with the opportunity to improve or at least restore their livelihoods. Livelihood programs will be developed by livelihood specialists taking into account the needs, aptitudes and skills of displaced people.

The focus of livelihood programs will initially be on restoring food security and subsistence production through providing access to suitable replacement land and coastal resources. Subsequent programs will focus on diversifying household incomes and cash earning opportunities. Programs that will be investigated further for feasibility by livelihood specialists may include the following:

- Agricultural awareness and training programs (i.e. exposure to new and improved farming techniques and inputs through demonstration and trial plots and the establishment of farmer support groups);
- Agricultural support and mentoring programs from identified partners;
- Fisheries development;
- Small enterprise training and development;
- Local procurement opportunities;
- Vocational training and skills development; and
- Scholarship and educational assistance.

Affected communities will be closely involved in the selection and design of livelihood programs. Where appropriate, the Project will utilize the services of specialist partners (e.g. experienced in-country development NGOs, consultants, national institutes, and universities) to design and deliver livelihood programs. Where feasible, the Project will align its livelihood programs with government national and regional programs for rural development, fisheries development, and enterprise promotion.

The following next steps have been identified in order to fully develop the LRPs:

- Data collection through census, asset survey, socioeconomic survey, and other data collection methods (focus groups, case studies);
- Once the replacement site(s) has been identified, a comparative assessment will be made with the Afungi Peninsula by expanding data collection to potential host communities;
- Development of LRPs; and
- Development of monitoring and evaluation criteria.

6.4.4. Assistance to Vulnerable Persons and Groups

Vulnerable individuals and households will be identified during the preparation of the RAP and will be supported with additional assistance, where needed, to enable them to share in development benefits and resettlement opportunities. These measures will be defined in the RAP taking into account each individual or household's specific needs. The CCC will be involved in the screening and monitoring of vulnerable assistance programs.

The following criteria for the classification of people/groups as vulnerable will be considered:

- Physical disability;
- Mental disability;
- Social handicaps (i.e. albinos);
- Single mothers;
- Widows;
- Female headed households;
- Orphans;
- Child headed households;
- Elderly (above the age of 60);
- Persons with chronic/incapacitating disease; and
- Any other marginalized group(s) that are identified by census and surveys.

6.5. Institutional Framework

The following section provides an overview of the groups that will be involved in the resettlement planning process:

- Government representation through the RSC;
- Government and community representation through the CCC;
- Mozambique Gas Development Project Resettlement Team; and

- Potential Non-Governmental Organization Implementation Partners.

6.5.1. Resettlement Steering Committee

The Provincial Government has, established a RSC in 2012 that was chaired by the Cabo Delgado Permanent Secretary. The committee consists of the following representatives:

- Permanent Secretary – Provincial Government (Chair);
- Provincial Department of Health;
- Provincial Secretariat;
- Department of Agriculture;
- Head of Land Department – "*Cadastro*";
- National Institute of Disaster Management;
- Provincial Directorate of Education;
- Provincial Directorate of Environmental Affairs;
- Provincial Directorate of Mineral Resources;
- Provincial Directorate of Public Works and Housing; and
- Provincial Directorate of Tourism.

In a letter to AMA1 dated 05/06/2013 (Reference Number 87GG/CD/2013) the Governor of Cabo Delgado confirmed that the RSC would continue to provide support as needed. In this letter the Governor indicated that the RSC would be responsible, in cooperation with the District Authorities and AMA1, for the identification of potential replacement sites within the framework of the Agro-Ecological Zoning and ongoing preliminary work for compiling the Land Use Plan for Palma District.

The membership of the RSC will be adapted to comply with the requirements of Article 6 of Decree 31/2012.

The Project Proponents will also provide technical assistance, should the RSC request such assistance, and will work with the RSC to document all agreements reached with the RSC through Memoranda of Agreement. It is envisaged that the RSCs involvement in the Mozambique Gas Development Project's resettlement process will continue through the planning and implementation phases.

6.5.2. Community Consultative Committee

The CCC will be established shortly after the announcement of the commencement of the resettlement planning process and will address the following topics during the first meeting:

- Explanation of the resettlement process;
- The role of the CCC during RAP planning, implementation and monitoring; and

- Need for the CCC to have representation from all segments of the community, e.g. farmers, fishermen, women, youths, community leaders and elders, vulnerable groups.

It is proposed that the CCC will consist of representatives drawn from the following:

- Community representatives from the affected communities (host communities will be included once a replacement site(s) have been identified);
- District Government representatives;
- Administrative and locality post representatives;
- Private sector representatives;
- Civil society representatives; and
- Project representatives.

The purpose of the CCC will be to:

- Undertake discussions and negotiations to reach consensus on the resettlement process, compensation and mitigation measures and other resettlement related development initiatives. This will include, for example, valuation of assets, eligibility and entitlement criteria, replacement site selection, replacement site master planning, replacement housing designs, and grievance resolution;
- Ensure effective information dissemination and broad-based understanding of resettlement matters and decisions within affected communities; and
- Represent the interests and preferences of all community members and interest groups.

As most members of the CCC have probably never taken part in a resettlement process before, The Project Proponents will support training and capacity building for CCC members. Capacity building will include workshops / training sessions on:

- What is resettlement?
- Approaches to selection of CCC representatives;
- Roles and responsibilities of CCC members;
- Meeting management and recording;
- Negotiation skills;
- Conflict management and dispute resolution;
- Resettlement implementation phase steps; and
- Resettlement planning schedule.

It is envisaged that the CCC will form working groups to address resettlement aspects such as measurement and valuation, compensation eligibility and entitlements, replacement site

selection, replacement village master planning, replacement housing and facilities design, agricultural livelihoods, fisheries livelihoods, non-land based livelihoods and new village administration. The Mozambique Gas Development Project's resettlement team will provide specialists to support the working groups and help them reach decisions needed to advance the resettlement planning process.

Rules and procedures for the operation of the CCC will be developed during the early meetings and formalized in a constitution to be ratified by the members of the CCC. A quorum should be agreed might consist of two-thirds members. Agreements and decisions will be recorded and the minutes / records of agreements will be ratified at each meeting. The minutes will be distributed within the affected communities and displayed at village information points or *nkutano's*[6].

The CCC's involvement in the Mozambique Gas Development Project's resettlement process will extend through the planning and implementation phases of the process.

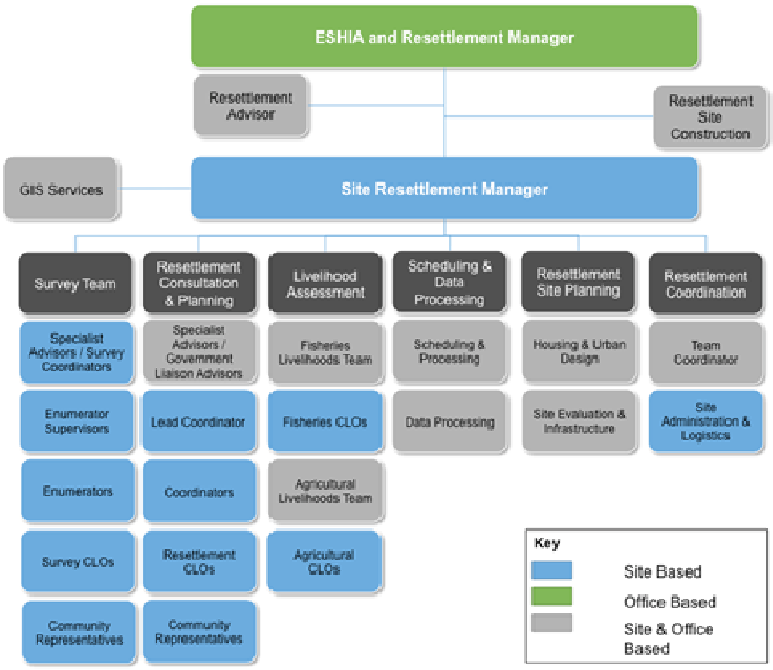
6.5.3. Resettlement Team

Responsibility for preparation of the RAP lies with the Project proponents. The Project Proponents commit to provide the staff, budget, other resources and logistical support necessary for resettlement planning, implementation and monitoring. A Project Resettlement team has been mobilized. The Resettlement team's role will extend until the resettlement completion audit has been satisfactorily completed.

The Resettlement Team will be responsible for the preparation of the RAP and will coordinate with the Government of Mozambique, affected communities and other relevant stakeholders to prepare and execute the RAP. An organizational chart of the Resettlement Team is provided in Figure 6-1.

[6] Nkutano's are meeting places that the communities have set up with the Mozambique Gas Development Project Community Relations Team for exclusive use for the sharing of Mozambique Gas Development Project related information

FIGURE 6-1: RESETTLEMENT TEAM COMPOSITION



The Resettlement team's responsibilities are to undertake all activities as defined in Section 5 above.

The Resettlement team includes a mix of highly experienced Mozambican and international specialists with expertise in resettlement, stakeholder engagement, socio-economics, land use planning, data management (GIS), agricultural development and fisheries livelihoods. The Resettlement team is supported by a Resettlement Advisor who has wide experience in planning, executing, monitoring, and auditing of resettlement for large oil and gas projects undertaken to comply with the IFC Performance Standards and Equator Principles.

6.5.4. Potential Non-Governmental Organization Implementation Partners

Where appropriate, livelihood programs will be delivered through partnerships with suitably experienced development NGOs, governmental agencies, educational institutes or the like. The Resettlement team will assess the experience and capacity of prospective partners to deliver the types and quality of services that it requires. Suitably experienced entities will be invited to bid for the opportunity to deliver various components of the livelihood restoration program.

6.6. Disclosure, Consultation, and Public Participation

International and local resettlement experience points to the importance of actively involving affected communities and their hosts in decisions about matters that directly affect them. Such matters include selection of replacement agricultural land, housing designs, and livelihood options.

The methods for involving communities in decision-making and disclosing important information to them will be established during the resettlement planning phase and will be further developed during implementation. During the planning phase the focus of participation, disclosure, and engagement activities will focus on two distinct groups of stakeholders:

- *Affected stakeholders* that include the affected communities (affected Afungi households and any households residing or using the potential replacement sites), as well as the government of the Palma District. Once the replacement site has been identified the host communities will be included in the CCC (see Section 6.5.2), and other activities; and
- *Interested stakeholders* such as NGOs, civil society organizations, academic institutions, Provincial and National Government.

The following engagement activities are proposed with affected stakeholders:

- Regular village level meetings to provide and receive feedback on the resettlement process;
- Regular meetings with the CCC in order to make specific decisions in the resettlement process;
- Meetings at the village level to make decisions when necessary;
- Qualitative data collection that includes focus groups and interviews – focus group meetings designed to elicit the views and preferences of particular interest groups within the community during all phases of the resettlement process; and
- Public consultation meetings with the affected communities and other external stakeholders – at least 4 meetings to comply with the requirements of the Regulation on The Process of Resettlement Resulting from Economic Activities (Decree 31/2012, of 1 August).

Consultation and the active participation of affected people in the resettlement process will underpin all resettlement planning activities. Experience from Mozambique and internationally has demonstrated that effective consultation and participation has the following benefits:

- It empowers Project affected people and gives them a level of ownership over the decisions affecting their future;
- Consultation provides a means of exchanging information and contributes to better decisions that are informed by affected people's detailed knowledge of their own environment, livelihoods, and social circumstances;
- It can pre-empt serious disputes or conflicts and enable them to be resolved through dialogue and discussion; and
- It builds trust and better working relationships between the Project, communities and local leaders and the Government.

The following sections provide a brief overview of proposed organizational arrangements for engagement activities and the involvement of specific stakeholder groups.

6.6.1. Community Consultative Committee Meetings

The CCC will be formed, as required by the Regulations for Resettlement Decree. The rules for the engagement process and meetings will be agreed on after the formation of the CCC.

6.6.2. Qualitative Data Collection

Qualitative data collection entails the collection of information from stakeholders, or specific interest groups, to obtain an understanding of perceptions, opinions, beliefs, and attitudes to a specific topic or issue. Qualitative data collection will be undertaken through focus group discussions of 7 to 12 people and individual interviews. Focus group discussions will be held, for example, with women's groups, farmers groups, fishing groups, youth groups, political groups, the aged, business groups, and others.

6.6.3. Public Meetings

According to the Resettlement Regulations (Decree 31/2012, of August 8), public participation must be guaranteed throughout the preparation and implementation of the RAP (Art. 13.1). Recommendations issued from public meetings are to be recorded in minutes (Art. 13.5). Minutes are to be approved by the Technical Commission for Resettlement (Art.13.6) and acceptance or rejection of recommendations must be duly justified (Art. 13.7). The resettlement process must be subject to at least 4 public consultation meetings, duly publicized (Art. 23.1). Minutes must be produced within 5 days and posted in appropriate sites for public perusal (Art. 23.3).

Open public meetings will be held at national (Maputo), Provincial (Pemba) and District (Palma) levels. Affected communities will be consistently engaged through a combination of activities that includes village meetings. These meetings will not be open to the general public, but will include District Government representatives and an NGO observer. Advertisements / announcements for all public meetings will be placed 15 days prior to the meeting in the following outlets:

- *Notícias de Moçambique*;
- Local radio (Pemba); and
- Announcement posted at Village, District, Provincial and National Government headquarters.

6.6.4. Government Participation

Involvement of Government officials at all phases of resettlement is essential for the success of the RAP. Government participation (namely District Government) inputs local socio-political knowledge into the resettlement process and is essential to achieve the following objectives:

- An environment of good relationships, trust and mutual understanding between the Project team, communities, local authorities and other interested parties;

- The transmission of accurate and appropriate information to the affected local communities and the authorities, in order to prevent the dissemination of misleading or false information; and
- The alignment of the resettlement principles with the policies, plans and programs of the Government;

Resettlement committees will be established in such a way to ensure that the Provincial and District Government are involved at all the key milestones. The Project Proponents have also undertaken to report to the National Government through the National Department for Urban and Regional Planning (DINOPOT - *Nacional de Ordenamento e Planeamento Territorial*) on a regular basis.

6.7. Grievance Redress

During the early stages of resettlement planning, a complaints and grievance mechanism will be established. This will have the following aims:

- To provide affected people with straightforward and accessible avenues for making a complaint or seeking resolution of any dispute that may arise during the course of resettlement;
- To ensure that each complaint is investigated and that where warranted, appropriate and timely corrective action is taken; and
- To provide a vehicle for mediation and settlement of disputes or conflicts when they arise.

The avenues for making a complaint will be widely publicized in communities within and around the Project area. The Mozambique Gas Development Project Community Relations Team is currently using a grievance redress procedure with communities in the Afungi Project Site that will (in collaboration with the CCC) be adapted for use in the resettlement process.

In order to ensure the effectiveness of the grievance redress procedure it is essential to have the input and buy-in of the affected communities.

6.8. Monitoring and Evaluation

The Project will establish a resettlement monitoring and evaluation system. This is consistent with the requirements of IFC PS 5. Monitoring will assess the Project's performance against the activities, schedule, and budget defined in the RAP. It will also identify the need for any changes in resettlement systems or processes necessary to improve resettlement delivery. Monitoring will periodically assess the progress and effectiveness of RAP programs in restoring the living standards and livelihoods of affected people. There will be two tiers of monitoring:

- Internal monitoring by the Project's resettlement team with the active participation of the CCC as far as is practicable;

- External monitoring by third party specialists.

Typically, internal monitoring might cover the following:

- Report progress against the RAP schedule – input and output indicators;
- Verify that land acquisition and compensation entitlements are being delivered in full;
- Monitor vulnerable households to ensure that they receive any special assistance to which they are entitled and to identify any problems, issues, or cases of hardship resulting from the resettlement process;
- Collate records of grievances and undertake simple analysis; and
- Prepare status reports for the Project management team.

External monitoring might cover the following:

- Assess resettlement program compliance with national statutory requirements and IFC PS 5;
- Review progress against the RAP schedule;
- Interview a representative cross-section of affected households and businesses:
  - to assess the extent to which standards of living and livelihoods have been restored;
  - to verify that project affected people have been sufficiently informed and consulted;
  - to hear affected peoples' opinions on entitlements delivery, resettlement housing and grievance management;
  - learn about their overall satisfaction with the resettlement process;
- Review effectiveness of any vulnerable peoples initiatives;
- Assess resettlement team management systems, record keeping and resources – Identify any additional resource needs, training or capacity building requirements;
- Review grievance records and outcomes;
- Review progress with implementation and effectiveness of livelihood restoration programs - make any recommendations on measures to improve effectiveness; and
- Prepare a summary report on resettlement progress, issues arising and any required corrective actions.

A detailed monitoring and evaluation program with key performance indicators will be developed and described in the RAP.

6.9. Planning Schedule

Table 6-2 presents an indicative schedule for resettlement planning and preparation of the RAP, assuming the Project is approved and moves forward with development.

TABLE 6-2: INDICATIVE SCHEDULE FOR THE COMPLETION OF THE RAP (RESETTLEMENT PLANNING)

TASKS	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13
Announcement of the start of resettlement planning activities													
Resettlement Census													
Activate Steering Committee													
Setting up Community Consultative Committee													
Asset Survey													
Communal Asset Survey													
Socioeconomic Survey													
Entitlement Framework negotiation													
Preparation of Livelihood Restoration Plan													
Replacement Area selection													
Replacement Area Assessment Study													
Planning of Resettlement Village													
Submission of Draft RAP													
Public disclosure of Draft RAP													
Consultation & Public Participation													
Grievance management													
Submission of Final RAP Report													

6.10. Indicative Budget

The Project Proponents will be responsible for all funding of the resettlement program. This will include budgeting, disbursing, monitoring, and reporting on use of funds. Detailed cost estimates will be provided in the full RAP that will be determined by the following:

- Final resettlement numbers of households to be relocated and land area required, following measures to minimize resettlement and final Project design;
- Location of resettlement site(s) identified and agreed with Government and communities;
- Physical attributes and resources of resettlement sites(s);
- Final village layouts, house sizes and designs agreed with Government and communities;
- Community and social infrastructure agreed with Government and communities; and
- Livelihood and development opportunities at resettlement sites, both land and sea based.

Considering information currently available on communities within the Project area and taking account of other resettlement projects in Mozambique and elsewhere, the preliminary budget to implement the resettlement program if the Project is approved and development continures, is estimated at **US$ 73 million**. This estimate is broadly indicative and will be subject to refinement during the resettlement planning process.

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