Esso Highlands Limited

PNG LNG Project

Caution Bay
Communal Resource Plan

PGLN-EH-SPZZZ-900001

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ACRONYMS

Acronym	Definition
CDC	Community Development Committee
CDS	Community Development Support
CPUE	Catch Per Unit Effort
CRP	Communal Resource Plan
DoT	Department of Transportation
EIS	Environmental Impact Statement
EHL	Esso Highlands Limited
ELC	Environmental Law Centre
FOC	Fiber Optics Cable
ha	Hectare
IFC	International Finance Corporation
ILG	Incorporated Land Group
ISPS	International Ship and Port Facility Security Code
kg	Kilogram
km	Kilometer
KP	kilometer Point
KPI	Key Performance Indicators
L&CA	Land & Community Affairs
LAT	Lowest Astronomical Tide
LNG	Liquefied Natural Gas
LLG	Local Level Government
m	Meter
M&E	Monitoring and Evaluation
O&GA	Oil and Gas Act
PNG	Papua New Guinea
PNG LNG	Papua New Guinea Liquefied Natural Gas Project
PS	Performance Standard
ROW	Right of Way
RPF	Resettlement Policy Framework
SIA	Social Impact Assessment

EXECUTIVE SUMMARY

Introduction

This Communal Resource Plan (CRP) focuses on economic displacement of artisanal fishing activities that may result from construction and operations activities for the Papua New Guinea Liquefied Natural Gas (PNG LNG) Project (Project) facilities in Caution Bay. The Project's facilities are being constructed on lands and in waters leased from the Government of Papua New Guinea. These State Leases include Portion 2457 which is comprised primarily of mangroves and Portion 2458 includes a fringing reef and open sea.

Esso Highland Limited (EHL) is aware that construction activities will cause some short-term inconvenience to foot and boat traffic near offshore pipeline and jetty construction activities. This loss of access may have a minor impact on some villagers' livelihoods with Papa villagers predominately affected. EHL is committed to mitigating impacts to the Caution Bay villages through minimizing the Project footprint; working in close consultation with communities; rehabilitating or restoring disturbed resources; and providing access to training and technical assistance to communities.

EHL has initiated discussions with the relevant PNG authorities regarding jetty operations and has received approval to permit village vessels to transit under the jetty and to fish within the State lease area with limited exclusions. The operations phase marine exclusion zone, as currently approved, will not impede access to the shoreline or fringing reef. Specifically, fishers will be able to access the fringing reef and the fishing areas of Konekaru and the Vaihua River along with the mangrove areas. As the exclusion zone is minimal, no significant impacts to local fisheries have been identified because of normal jetty operations.

Resettlement Goal

The Project's overall resettlement goal is to design and implement resettlement in a manner that gives physically and economically displaced persons the opportunity to restore their livelihoods and standards of living. There is no physical resettlement in Caution Bay. This CRP is consistent with goals, principles, and processes described in the Resettlement Policy Framework (RPF).

Institutional and Legal Framework

This CRP has been prepared to comply with legal requirements and criteria such as the PNG *Oil and Gas Act* (O&GA), key National Government institution guidelines, legislation governing both provincial and local governments, Lender Environmental and Social Requirements, and the International Finance Corporation's Performance Standards on Social and Environmental Sustainability.

The land and waterways in Caution Bay have been reserved to the State, and EHL is not required to pay compensation for deprivation of use and enjoyment of these lands or waterways under the O&GA. Nonetheless, EHL recognizes that villages along Caution Bay are being excluded from parts of their customary fishing grounds. The Project will invest in habitat restoration and capacity building projects to diversify and improve fishing methods used by the impacted fishers in Caution Bay.

Caution Bay Fisheries

Caution Bay is considered a traditional fishing ground, and the artisanal fisheries are an important livelihood and income source for the four villages near the LNG Plant site: Boera, Lealea, Papa and Porebada. Each village regularly fishes and maintains a specific fishing ground on the barrier reefs. Additionally, the onshore fringing reefs, mangrove areas and freshwater swamps around each of the villages have customary boundaries that each village

respects and fishers do not cross. The types of boats and fishing equipment used also influence the types of fishing areas that fisher's access and use.

Consultation and Disclosure

In partnership with Hiri Local Level Government Councilors, the Project's Land & Community Affairs (L&CA) team holds monthly stakeholder engagement meetings with Lealea, Papa, Boera and Porebada villages.

The CRP disclosure meetings were conducted 24 June to 4 July, 2011, in each of the four villages neighboring the PNG LNG Plant site and with the Hiri Local Level Government (LLG) Councilors. Members of L&CA, including the stakeholder engagement team and fisheries team, along with the Environmental Law Center (ELC), conducted disclosure activities. Over 400 people participated in the disclosure meetings.

Disclosure of operations exclusion zones was completed at monthly community engagement with each of the four villages in February 2012. Additional community disclosures and education specific to the operations exclusion zone around the loading berth and movement of tankers will be undertaken in the quarters leading up to 'first gas'.

Livelihoods Restoration and Eligibility

EHL will ensure that those who may have experienced partial loss of livelihoods will be given the opportunity to restore their livelihoods in accordance with International Finance Corporation (IFC) Performance Standard (PS) 5 and the Project's RPF. A small number of full-time fishers were temporarily impacted during the three-month transit closure. Operations impacts will be limited due to the provision for continued community use of the lease area.

Livelihood restoration will focus on short-term economic restoration opportunities and long-term sustainable fisheries projects. Impacts of reduced access to fisheries resources and mangroves will be addressed through in-kind mangrove and fisheries habitat restoration projects and diversification of fishing methods training.

Monitoring and Evaluation

Quarterly fish catch surveys will continue through 2012 to monitor and evaluate construction impacts to Caution Bay artisanal fishing.

EHL implemented a Project Grievance Procedure to receive, respond and address any grievances made to the Project. Potentially affected villagers know the Grievance Procedure which is already being utilised.

Roles and Responsibilities, Implementation and Budget

Overall responsibility for the planning, implementation, and monitoring of economic displacement rests with EHL as specified in the RPF. The L&CA team will undertake these activities. A schedule of CRP tasks has been developed to plan and implement major components.

The estimated cost of this CRP is approximately US$100,000 for livelihood restoration projects during the construction phase of the Project. The Community Development Support budget will fund livelihood restoration projections during operations.

1.0 INTRODUCTION

This CRP focuses on economic displacement of artisanal fishing activities resulting from construction and operations activities for the PNG LNG Project facilities in Caution Bay. Caution Bay is located north of the capital of Port Moresby, Papua New Guinea. Caution Bay, is considered the water between Redscar Head in the north and the barrier reef, including Idia and Bava Islets, approximately 15 kilometers south as shown in Figure 1. As fisheries and coastal resources are common property used by all coastal communities, any economic displacement will be offset by livelihood restoration and assistance projects delivered to communities, not individuals.

EHL's facilities are being constructed on lands and in waters leased from the Government of Papua New Guinea. Portion 2457 is comprised primarily of mangroves, whereas Portion 2458 includes the fringing reef and open sea. Under the O&GA, no compensation is owed when the land is reserved to the State. Currently, the State's award of Portions 2457 and 2458 is contested in the National Court. Upon resolution of the pending case, EHL will address implications to access and compensation.

Primary construction activities in Caution Bay include construction of the offshore pipeline and jetty. During both construction and operations, limited exclusion zones will be in effect. EHL is aware that construction and operations activities will cause some short-term inconvenience to foot and boat traffic along the beach in addition to some localized loss of access to relatively small parts of the fishery resources, notably mangrove areas, small sections of fringing reef and marine area. This loss of access may have a relatively minor impact on some villagers' livelihoods. Based on proximity to the plant site and fishing survey data, Papa village will be most impacted with LeaLea village affected to a lesser extent.

EHL is committed to mitigating any impacts to the Caution Bay villages through:

- design and construction approaches that minimise the Project footprint and curtailment of community activities;
- seeking to avoid and minimise impacts by working in close consultation with communities;
- rehabilitating and restoring disturbed resources such as mangroves, where this is possible; and
- providing access to training and technical assistance to help affected fishers to more effectively manage and utilise their fishery and market their catch (livelihood assistance) and to otherwise help villagers to sustainably diversify their incomes.

Because construction and operations impacts are on common property, livelihood assistance will be delivered through community development assistance rather than individual assistance.

Surveys have been conducted to prepare this CRP, and monitoring and evaluation will continue as per the Project's RFP (Rev. 3, November 2010).

Figure 1: LNG Plant site and Caution Bay

1.1 Timeline

Summarises major activities/milestones cited in this CRP.

Year	Q	Activity
2007		Use/vessel survey of near shore marine resources between Boera and Papa villages.
2008		Studies completed for Social Impact Assessment (SIA) of the Environmental Impact Statement (EIS), included questions on marine resource use: • Caution Bay Resource Use (Coffey) • Questionnaire/resource use data in the EIS's SIA (Goldman)
2010	Q3/4	University of Papua New Guinea conducts fish catch surveys
2011	Q1/2	L&CA fisheries team conducts: • Quarterly fish catch surveys in four villages (50 days) • Vessel traffic survey at LNG Plant site • Two mangrove/fringing reef fish catch surveys at LNG Plant site • Stakeholder engagement team work builds awareness as per upcoming construction activities/articles in monthly newsletter to villages • L&CA conducts CRP public disclosure meetings
2011	Q3	July: Clearing mangroves for offshore pipeline trenching begins. • Villagers walking to site escorted around 400 metre wide construction zone to provide for continued access to mangroves and fringing reef for fishing. • Access provided for all but four days during construction period. Aug/Sept: L&CA fisheries team conducts quarterly fish catch surveys in four village (16 days). Sept: Trenching begins on fringing reef; spoil piles on either side of trench. • Canoes/dinghies dependent upon paddling/poling across fringing reef unable to transit lease area or fish in areas which cannot be accessed due to transit limitations. Sept: Pile driving/jetty construction begins across fringing reef.
	Q4	10 Nov: Offshore pipeline completed through mangroves/fringing reef. Trench filled. 12 Nov: Villages informally notified access open to canoes/dinghies. 18-25 Nov: Villages formally notified during monthly stakeholder engagement meetings. Nov/Dec: L&CA fisheries team conducts quarterly fish catch surveys in four villages (15 days).
2012	Q1	L&CA fisheries team conducting quarterly fish catch surveys in four villages. Mar: CRP submitted to Lenders
	Q2	Apr: CRP submitted to Lenders End of connecting pile driving for the jetty. Exclusion zone around construction vessels continues until 2014 at start of operations. Loitering under jetty superstructure discouraged.
2014 – 2044 +		Operations exclusion zone implemented. 500 metre permanent radius around western end of jetty in open sea. Village use of the mangroves/fringing reef not affected as access provided under jetty and along mangroves. Loitering under jetty superstructure prohibited.

1.2 Construction and Operation Periods Covered by CRP

Construction activities potentially affecting village use of the lease area will occur between July 2011 and March 2013. During this time, the Project's primary impact is temporary restriction of access to fisheries and coastal resources that contribute in part to some families' livelihoods.

Operations will begin in 2014 and will continue for approximately 30 years or longer as business dictates. During operations, the permanent impact will be a minimal restriction of access to fisheries and coastal resources around the jetty. Based on the outcome of

discussions with the neighboring villages, these restrictions are not expected to have any significant impact to families' livelihoods.

1.3 Resettlement Goal

The Project's overall resettlement goal is to design and implement resettlement in a manner that gives physically and economically displaced persons the opportunity to restore their livelihoods and standards of living. This CRP is consistent with the goals, principles and processes set out in the RPF.

This Caution Bay CRP is inclusive of economic impacts associated with construction and operation of the near-shore and offshore LNG plant site facilities. There is no physical resettlement. If unanticipated impacts occur, EHL will amend this CRP commensurate with the scale and complexity of the impacts.

1.4 Sources of Information and Compliance Protocols

Key sources for compilation of this CRP include:

- PNG *Oil and Gas Act* (1998/2001);
- PNG *National Fisheries Act 1998*;
- International Finance Corporation's Performance Standards on Social and Environmental Sustainability – 30 April, 2006;
    - PS 1 – Social and Environmental Assessment and Management Systems;
    - PS 4 – Community Health, Safety and Security;
    - PS 5 – Land Acquisition and Involuntary Resettlement;
    - PS 7 – Indigenous People;
- Chapter 17, PNG LNG Project, Environmental Impact Statement (Coffey Natural Systems CR_1284_9, January 2009);
- Social Impact Statement, Appendix 26, PNG LNG Environmental Impact Statement (Coffey Natural Systems CR_1284_9, January 2009);
- PNG LNG Project Resettlement Policy Framework (2010, PGGP-EH-SPENV-000018-030);
- Caution Bay Fisheries Quarter 4, 2011 Report (2012, PGHU-EH-SRZZZ-700006); and
- Fiber Optic Cable Environmental and Social Impact Assessment (2011, PGGP-EH-SRENV-000012).

This CRP is compliant with Lender's Environmental and Social Requirements.

2.0 PROJECT DESCRIPTION

2.1 Introduction

The PNG LNG Project involves on and offshore pipeline gas transport from the Southern Highlands to the LNG Plant, sited on the Caution Bay shoreline. The 407 kilometre offshore pipeline between Omati landfall and Kilometre Point (KP) 52 will be buried 1.5 metres below the Omati riverbed and Gulf of Papua seabed. The pipeline is then laid on top of the Gulf of Papua seabed until a point three kilometres from the LNG terminal where it will again be buried one metre below the seabed (2.5 metres below the shipping lane) until exiting at the LNG landfall.

Construction and operations include:

- Construction of the offshore pipeline including landfall installation;
- Installation of a fiber optic cable paralleling the jetty and pipeline right-of-way (ROW);
- Installation of a desalinisation water intake pipe;
- Construction of a jetty to be used for:
    - Piping from onshore LNG product storage tanks to tanker loading berths;
    - LNG tanker moorage and product loading facilities;
    - Materials offloading facilities; and
    - Moorage for tugs and support vessels;
- Installation of mooring dolphins, various navigation aids and channel buoys; and
- Operations of the jetty and exclusion zone.

2.2 Schedule

Construction activities started in March 2011 in Caution Bay. Table 1 outlines the construction activities with their respective schedule.

Table 1: Construction Activities Completed and to be Completed

Construction Activity to Be Completed	Start Date	End Date
Jetty	March 2011	March 2013
Jetty pile driving	March 2011	June 2012
Pipeline pre-commissioning	March 2012	July 2012
Fiber optic cable installation	Oct 2012	Nov 2012
Construction Activities Completed	**Start Date**	**End Date**
Seawater intake pipeline	Dec 2010	March 2011
Landfall preparation (civil works)/onshore trenching	July 2011	October 2011
Near shore and offshore trenching	September 2011	October 2011
Caution Bay pipelay and pipe pull	October 2011	October 2011
Rock dumping and trench backfill (fringing reef)	October 2011	November 2011
Rock dumping and trench backfill (open sea)	Nov 2011	Feb 2012

2.3 Construction Activities

Construction activities are summarised below and illustrated in Figure 2.

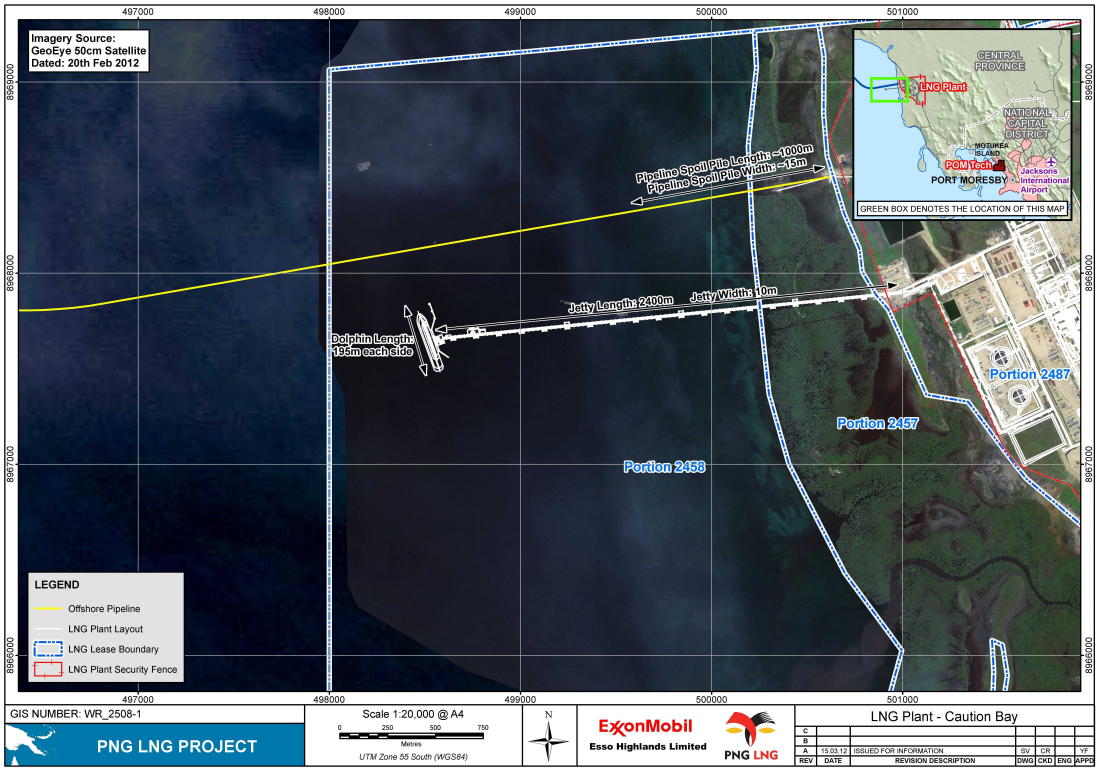


Figure 2: Construction Activities in Caution Bay

2.3.1 Jetty and Associated Infrastructure

A cantilever jetty is being constructed with bents and piles spaced at 24 metres apart. When complete, the jetty will extend 2.4 kilometres long, be approximately ten metres wide, and be capped with a 390 metre long materials offloading facility. Jetty construction commenced in March 2011 and will continue for approximately two years. Construction activity generally occurs between 6:00-18:00 hours.

Construction began with mangrove clearing of the jetty centerline between the LNG Plant site perimeter and the water. In March 2011, pile driving for construction of the jetty superstructure began. As of mid-March 2012, 1.9 kilometres (80%) of the jetty trestle has been completed. The next major piling activity involves installation of the 10 mooring dolphins (mono-piles) which commenced in March 2012 and finishes in August 2012. Installation of the infrastructure, mooring lines and material offloading facilities will complete construction in early 2013.

2.3.2 Seawater Intake

The seawater intake pipe was set in March 2011 immediately south of the jetty. The pipe is above ground (less than 0.3 metres), and villagers are able to step over it when exposed at low tide on the fringing reef. A three-metre wide corridor of mangroves was cleared to lay the 1,300 metre long pipe. Within one month, the young mangroves had begun to regrow. This pipe will be used for pre-commissioning of the pipeline and then be removed prior to operations.

2.3.3 Offshore Pipeline

Landfall site preparation was undertaken between July and September 2011. A 960 metre long by 80 metre wide corridor was cleared between the mangroves and fringing reef in order to excavate the pipeline trench. The width of this area was reduced by over 40% from 142 metres as originally planned, thereby significantly reducing the impact to the mangroves.

Offshore trenching began in September 2011 in the shallower water (~five metres LAT) proceeding into deeper offshore waters for two kilometres. Two shallow water dredgers, operating 24 hours a day and seven days a week, dug the trench.

Pipelay occurred in October 2011. Trench fill and restoration through the mangroves and fringing reef were completed ahead of schedule in November 2011. At that time, villagers were informed (both informally and formally) that they could walk unimpeded across the reef. In early 2012, open sea portions of the trench were backfilled.

Pipeline pre-commissioning is planned for June 2012, and no impact to artisanal fishery activities is expected.

2.3.4 Fiber Optic Cable

An offshore fiber optic cable will be buried in a narrow shallow trench about one metre deep within 100 metres of the subsea pipeline ROW. It will come onshore attaching to the jetty.

Installation is scheduled to commence in October 2012 and is expected to take approximately 60 days. No exclusion zone is anticipated during installation of the fiber optic cable; however, canoes and other boats will need to avoid the cable-laying vessel.

2.4 Operations

During operations, the 2.4 kilometre jetty located in Caution Bay will be primarily used for loading LNG onto vessels. Additional purposes include loading and unloading cargo, refueling of vessels, and mooring tugs and support vessels. A 500 metre exclusion zone will be in affect around the western end of the jetty. See Figure 3 for details. For a detailed discussion on the establishment of the operations exclusion zone, refer to Section 4.3.

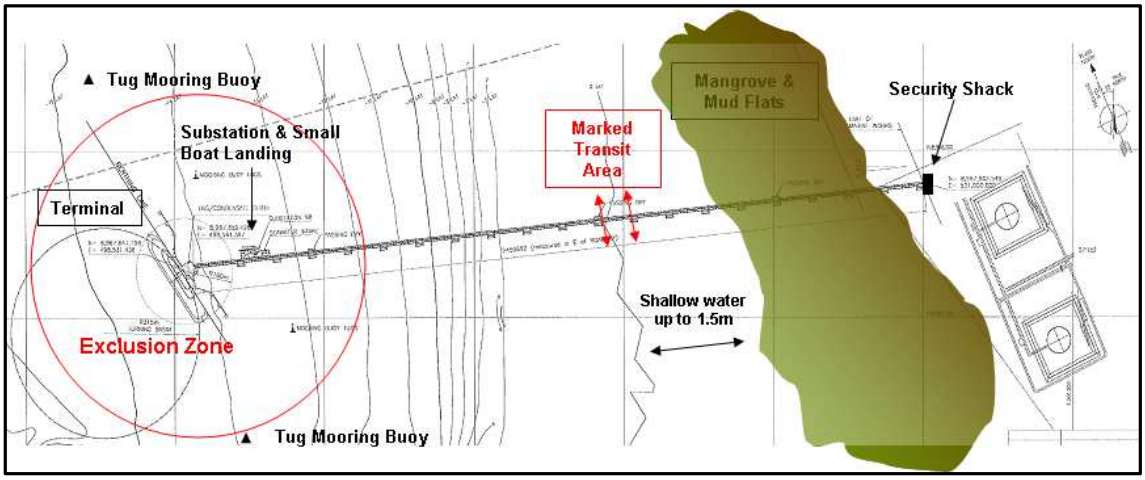


Figure 3: Operations Exclusion Zones

3.0 INSTITUTIONAL AND LEGAL FRAMEWORK

The principal PNG legislations relating to land and compensation are the *Land Act 1996* and the *Oil and Gas Act 1998*.

This CRP has been prepared to comply with legal requirements and criteria, such as those specified in the O&GA, key PNG National Government institution guidelines, legislation governing both provincial and local governments, Lender's Environmental and Social Requirements, and the IFC's PSs on Social and Environmental Sustainability.[1]

3.1 Customary Use and Ownership Rights

The villagers of LeaLea, Papa, Boera and Porebada use a variety of subsistence and artisanal fishing methods within Caution Bay. The Bay is within the three nautical mile coastal zone where all fishing is restricted to customary fisheries as defined in the *Fisheries Management Act 1998*. No commercial vessels are permitted to operate in this area.

Based on customary ownership rights, the Caution Bay artisanal fishery is primarily restricted to villagers living in shoreline villages. Within the customary limits, access is open to any villager. As pertains to specific fishing rights, no village has asserted customary owner's rights over any part of Caution Bay within the three nautical mile limits. To do so, villages would need to form an Incorporated Land Group (ILG) and prepare a fisheries management plan identifying relevant customary fishing rights and practices.

3.2 Compensation as per the *Oil and Gas Act 1998*

Per section 118(2)(a) the O&GA, compensation shall be paid for deprivation of the use and enjoyment of the surface of the land, except where there has been a reservation in favor of the State of the right to such use and enjoyment.

In the case of Caution Bay, the land and waterway has been reserved to the State under the *Land Act 1996*. EHL holds a 30-year lease from the State for Portions 2457 and 2458. An additional lease covers the land portion of the LNG Plant site. EHL is not required to pay compensation for deprivation of use and enjoyment of these lands or waterways under the O&GA.

The State's award of Portions 2457 and 2458 is contested in the National Court. Upon court resolution, EHL will reassess our obligations under the O&GA and any additional relevant legislation.

During operations, a portion of the exclusion zone is outside the leased areas; however, no additional compensation is owed under the O&GA as the Act does not address deprivation of the use and enjoyment of waterways.

3.3 Livelihood Assistance for Community Fisheries Projects

EHL will address temporary economic displacement in accordance with IFC PS 5 and the RPF. Livelihood assistance will address subsistence and economic displacement in the Project area. Because impacts are on communal properly, livelihood assistance will be implemented through community projects.

[1] Further details are available in Section 2 of the Esso Highlands Limited PNG LNG Project Komo Airstrip Resettlement Action Plan, November 2009 (revised November 2010).

4.0 PROJECT IMPACTS

4.1 Introduction

Mangroves and a fringing reef extend along the entire four-kilometre length of the PNG LNG lease. Local villagers, primarily from Papa and LeaLea villages, traditionally access the plant site Lease Portions to fish the fringing reef or gather mud crabs, shellfish, and firewood from the mangroves. At higher tides, fishers will fish the fringing reef in the lease area from canoes or dinghies. If villagers have boats with outboard motors, they can transit the lease travelling from the north to reach the Vaihua River on the southern side of the lease. For additional information on fishing in Caution Bay, see Appendix 1.

This section details the impacts because of construction and operations in Caution Bay. Section 4.4 provides a detailed look at the impacts in relations to the Papa community. Papa village, being nearest to the offshore pipeline and jetty construction zone, is the most affected and, therefore, impacts to Papa village are representative of impacts to other Caution Bay villages.

Since the Environmental Impact Statement (EIS) was written in 2008, EHL has made significant changes to both the construction and operations plans to reduce impact to the fishing communities. These mitigations are discussed in Section 5.1.

4.2 Construction Impacts

Construction of the offshore pipeline and jetty in Caution Bay has three areas of potential impact as follows:

- Collecting/gathering in mangrove areas;
- Access restrictions to fringing reef fishing due to blocked canoe/dinghy transit and/or noise; and
- Noise impacts from pile driving during construction.

4.2.1 Mangrove Areas

4.2.1.1 Collecting and Gathering in Mangrove Areas

Mangroves adjacent to the LNG plant site, located in Portion 2457, are accessed by villagers in Caution Bay. Women from the four villages traditionally access the mangroves to collect mud crab, shellfish, and firewood while men frequent the same mangrove areas to cut house-posts. Construction impacts include restricted access and limited mangrove clearing.

Villagers from Papa and LeaLea could not access the mangroves adjacent to Portion 2457 for a four-day period in October 2011 during the pipeline shore pull; however, with the exception of these days, villagers had restricted access to the mangroves and could still collect mud crabs, shellfish, and firewood. Between July and early November, 2011, areas under construction were barricaded off for safety purposes, and villagers were escorted around the construction to reach the southern side of the mangroves. Currently, during jetty construction, there is still restricted access to the mangroves with villagers being escorted around construction areas for safety.

Although villagers cannot fish and collect in the restricted construction areas, they can still access the vast majority of mangroves in the lease area and along the Caution Bay coast. There has been no impact on livelihood because of construction.

4.2.1.2 Clearing of Mangrove Areas

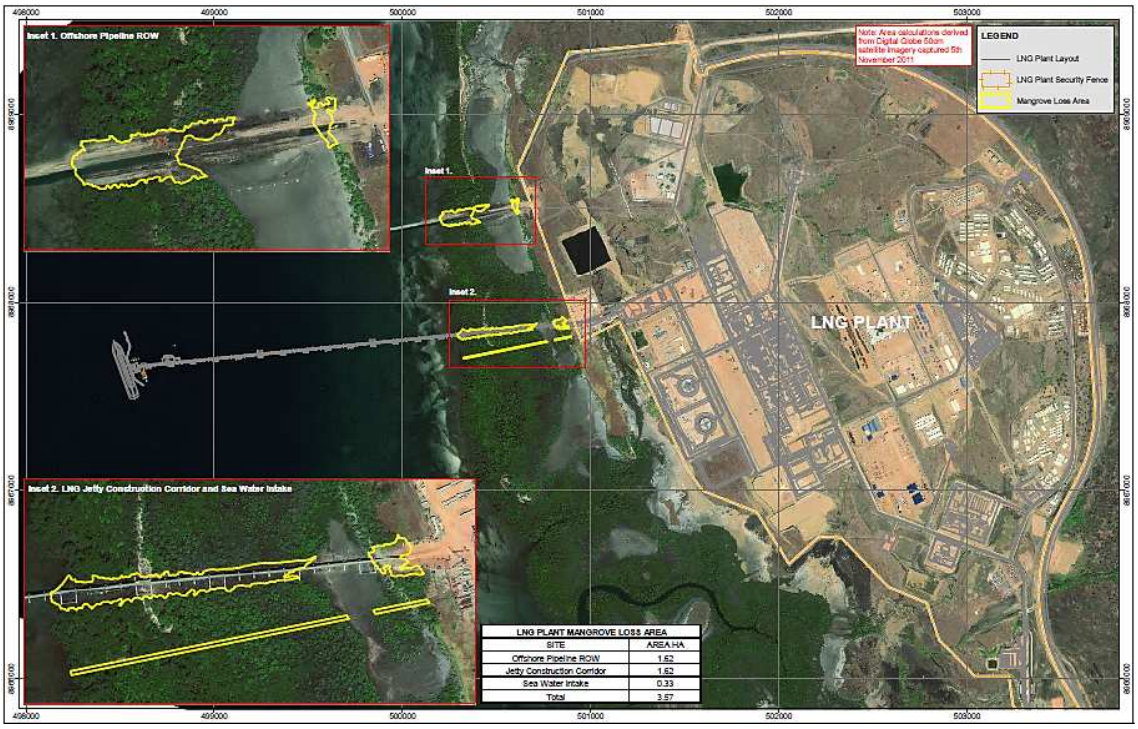


Figure 4: LNG Plant Site Mangrove Loss Area

During construction, small areas of mangroves were cleared for the seawater intake pipe (0.33 hectares), offshore pipeline (1.62 hectares), and jetty construction (1.62 hectares) as shown in Figure 4: LNG Plant Site Mangrove Loss Area. These areas total only 3.57 hectares of the approximately 335 hectares of total mangroves between LeaLea village and Porebada village as shown in Figure 5.

In November 2011, mangrove restoration began with the replanting of approximately 800 mangroves along the offshore pipeline ROW. This restoration effort replaced the 500 mangroves removed by construction in that area and provided employment for impacted locals.

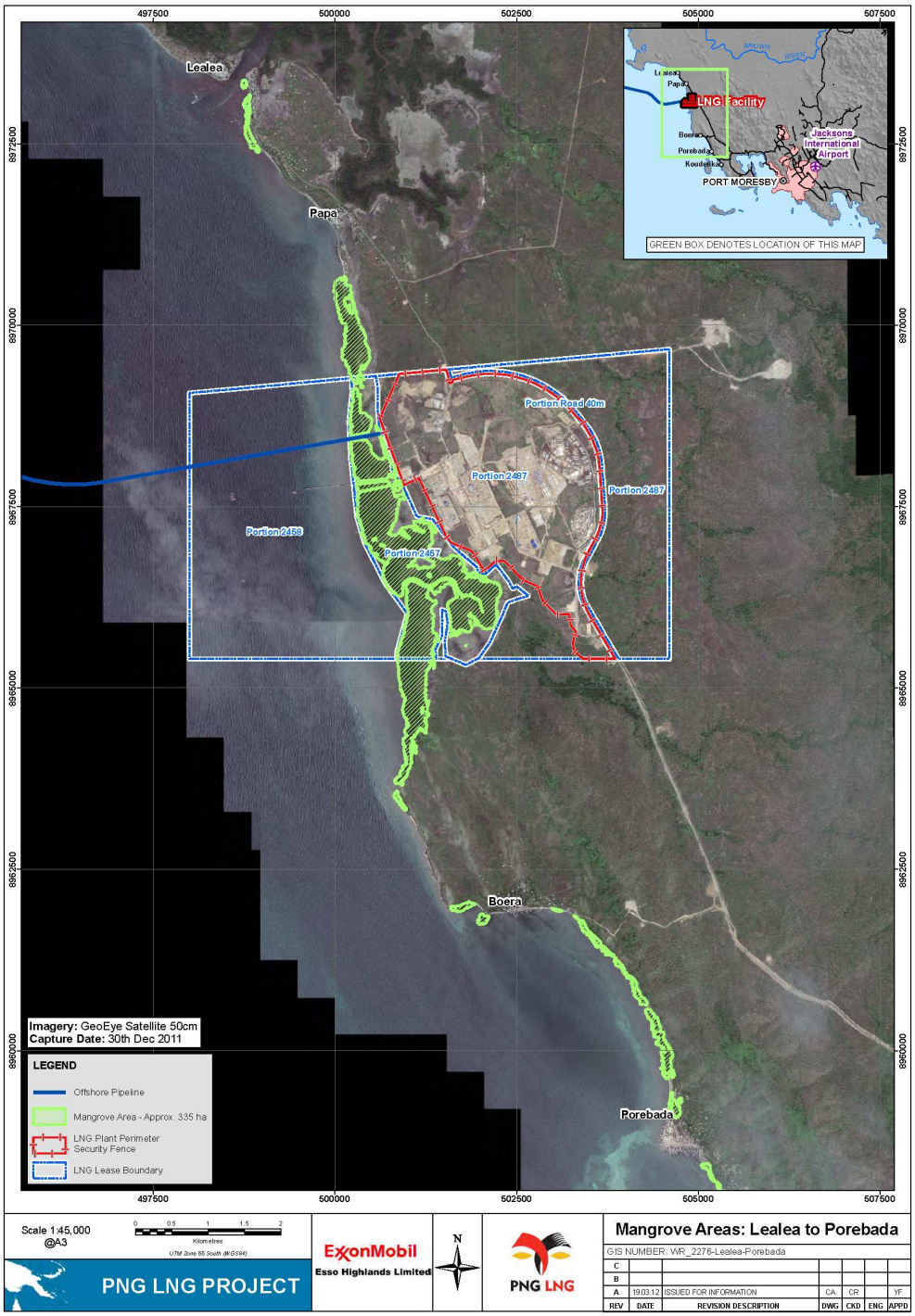


Figure 5: Mangrove Areas: LeaLea to Porebada

4.2.2 Fringing Reef

Construction of both the offshore pipeline and jetty has resulted in enactment of exclusion zones in Caution Bay around heavy construction equipment and dredging vessels working in Portions 2457 and 2458. These exclusion zones are shown in Figure 6. Disclosure of exclusion zones as well as information on near and offshore construction activities began in

February 2011 and continues monthly. See Appendix 2 for details on community engagements and disclosures. During engagements, villagers were provided a No-Go Zone Offshore Access Timetable so villagers would know when they could and could not pass through the construction areas.

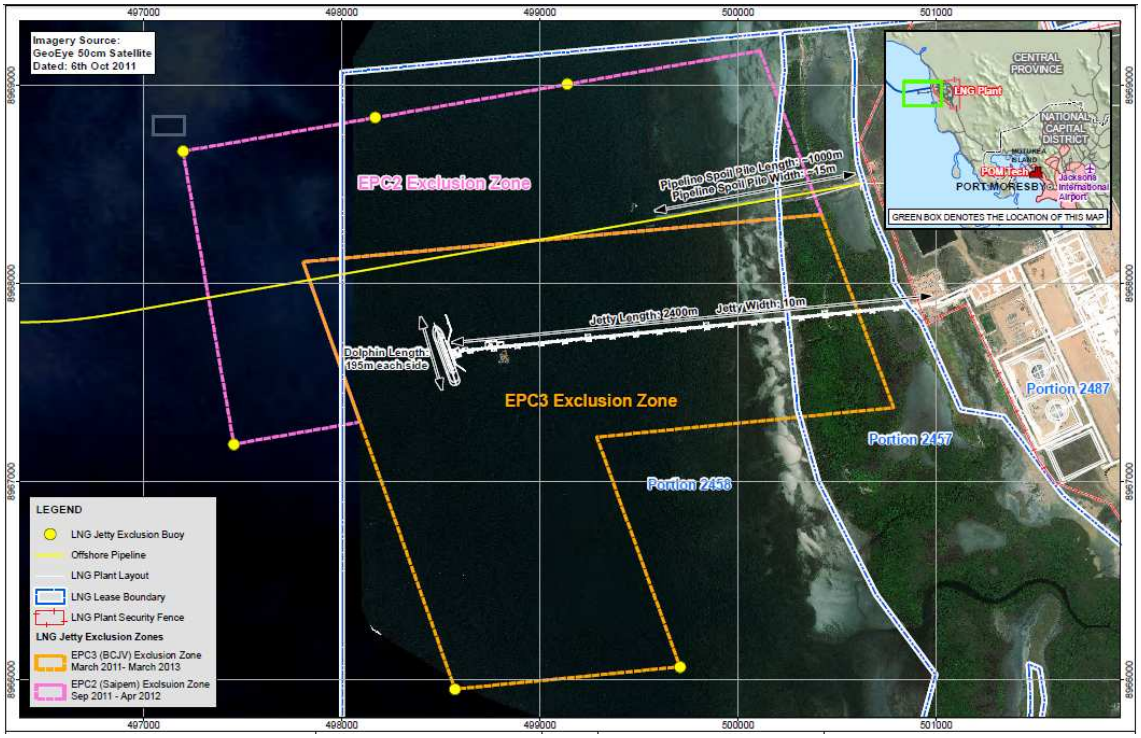


Figure 6: Construction Exclusion Zones

The offshore pipeline construction exclusion zone (labeled EPC2 Exclusion Zone) was in effect between September and November 2011 with primary construction activities occurring in October/November. The jetty exclusion zone (labeled EPC3 Exclusion Zone) has been in effect since March 2011 and will remain through the completion of jetty construction in mid to late 2012.

Fishers who traditionally fish the fringing reefs in the lease areas are affected by construction exclusion zones depending on proximity to the actual construction site, fishing methods, and fishing vessels. Papa village, being nearest to the offshore pipeline and jetty construction zone, is the most affected. Other fishers from Boera and Porebada are affected to a lesser extent as their villages are located south of jetty construction and the fishers primarily fish the barrier reefs. The traditional fishing ground known as Konekaru could not be fished when exclusion zones were in effect. Additionally, Papa and LeaLea fishers could not transit through the construction area to reach the Vaihua River. Fishers were limited to areas outside of the enforced construction exclusion zone for fishing and transit.

When assessing the actual impact and inconvenience to the fishing communities due to construction exclusion zones, enforcement of the zones is a factor. Although construction exclusion zones have been in effect since March 2011, the actual enforcement of the exclusion zones has varied. The only time the exclusion zones were ‘strongly’ enforced was during the offshore trench excavation and shore pull in October and November 2011 where it was not safe for boats to transit. Currently, the jetty construction contractor works with the community to allow safe passage during construction, and boats have continued to pass through the construction exclusion zones as long as safe to do so. The safe crossing points,

currently at the reef sloop, are communicated to the fishing community through the fishers groups.

In addition, to assess impacts to the fishing communities, the fisheries team has conducted quarterly fishing studies for each quarter of 2011. These studies show that, although fishers did change the areas that they fished based on construction, the overall catch rates (kilograms/trip, kilograms/fisher, kilograms/hour) did not decline. Fishers from all four villages continue to maintain catch rates in line with catch rates from pre-construction quarters. See Caution Bay Fisheries Fourth Quarter 2011 Report (PGHU-EH-SRZZZ-700006) for a complete assessment of fishery surveys. Villagers are inconvenienced by the restricted access to the fringing reef; however, no evidence supports economic displacement because of construction. Fish catch volumes and incomes from fishing have not declined.

Fisheries monitoring will continue through 2012 to identify and address any unforeseen impacts. Additionally, any community grievances will be evaluated through the EHL Grievance Procedure and legitimate impacts addressed.

4.2.3 Noise Impacts

Jetty construction is planned to be completed by December 2012 with piling completing in June 2012. As noise and vibration of piling can impact fisheries habitats, the initialization of piling work was done as a soft start to allow the fish to move out of the area. No dead fish have been reported as a result of piling. Additionally, when piling ends, it is expected that fish will return to the area.

The main community issue raised by Papa fishers over the jetty construction is that noise of the construction is driving the fish away. When discussing these complaints with the Papa fishers, they articulate that they still catch all the fish they used to but have to go elsewhere. Additionally, the fishing surveys do not show reduced fish catches. The fisheries team continues to engage with the community to address perceptions and to explain programs and benefits being provided by EHL.

As piling is scheduled to be completed within the next months, no additional impacts from piling are foreseeable; however, EHL will continue to assess impacts and work with the community if any issues arise.

4.3 Operations Impact

4.3.1 Exclusion Zone

EHL has initiated discussions with the relevant PNG authorities regarding the operations exclusion zone and has received approval to permit village vessels to transit under the jetty and to fish within the State lease area with limited exclusions as described in the next section. Fishers will be able to access the fringing reef and the fishing areas of Konekaru, north of the jetty, and the Vaihua River, south of the jetty. In addition to transiting under the jetty and fishing within the State lease area, villagers will continue to have access to the mangrove area for gathering of mud crabs and firewood.

As the exclusion areas are minimal, no significant impacts to local fisheries were identified because of normal jetty operations. Community engagements were held with LeaLea, Papa, Boera, and Porebada villagers in February 2012 to disclose the revised operations exclusion zones around docked vessels and designated pass-through under the jetty for boats. The information was well received with no objections from the villagers. Additional community disclosures and education specific to the operations exclusion zone around the loading berth and movement of tankers will be undertaken in the quarters leading up to ‘first gas’. Furthermore, EHL will continue to engage the community and monitor unforeseen impacts during operations.

4.3.2 Establishment of Operations Exclusion Zone

Regulatory compliance requirements during operations are established by PNG Department of Transportation (DoT) – Maritime Security Branch and the International Ship and Port Facility Security Code (ISPS). PNG has recently adopted the latter. In addition, under recent legislative enactment, the Caution Bay area has now been incorporated into the port boundaries of the Port of Port Moresby. The various security activities being utilised at EHL's LNG terminal will require synchronization and compatibility with PNG Ports Corporation Ltd's security procedures for the entire Port of Port Moresby area.

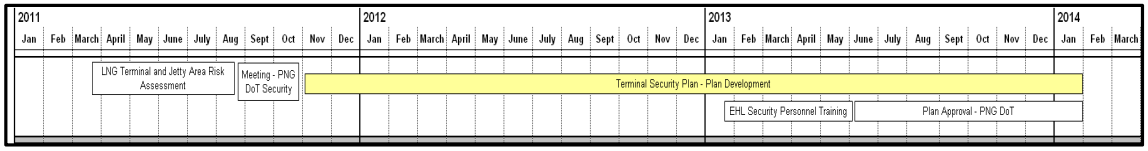
On 16 August, 2011, EHL personnel met with the senior staff of PNG DoT – Maritime Security Branch to discuss long term operating concepts and options to satisfy PNG's regulatory port and ship security requirements. The Security Branch has provided EHL with a pro-forma protocol frame work under which aspects of the port area security program shall be developed.

These require:

- Conducting a Security Risk Assessment, which was completed in August 2011;
- Development of a Security Plan that mitigates exposures identified in the Risk Assessment;
- Submittal of the Risk Assessment and Security Plan to PNG Dot – Maritime Security Branch for approval; and
- Implementation of the Security Plan (personnel, training, facilities and hardware, drills and exercises).

The schedule is illustrated below.

Table 2: Operations Security Plan Timeline



As part of the discussion with PNG DoT – Maritime Security Branch, the use of exclusion zones and the needs of the community to transit the area were discussed. The discussions involved a range of exclusion zone dimensions, layout and enforcement considerations. A final exclusion zone concept was established, which will ultimately be reflected in the Terminal's Security Plan, and submitted to the PNG DoT – Maritime Security Branch for final approval in mid-2013.

The exclusion zone is represented in Figure 3: Operations Exclusion Zones. Key aspects are:

- A 500 metre radius around the end of the jetty that encompasses the Ship Loading Platform and critical equipment area. The 500 metre area is in force at all times;
- Designated and marked area under the jetty trestle to allow small vessel to pass under the jetty while transiting the area;
- Installation of signs to advise shoreline pedestrians to avoid loitering under the jetty trestle;
- Small security vessel that will advise small vessels to avoid loitering under the jetty area; and

- A community education effort to advise pedestrian walking along the shoreline to avoid loitering under the jetty.

4.4 Papa Village Fishers and Impacts

Papa village is the closest village to the LNG plant site situated north of jetty construction. Based on survey data, Papa fishers use two primary fishing methods: gillnetting (53% of total catch) and hand-lining (30% of total catch). A vessel survey (Second Quarter 2011) documented 14 canoes and two aluminum dinghies in Papa. There were eight outboard engines but four needed repair. Papa fishers primarily fish the fringing reef and beaches in close proximity to the village as their fishing methods and vessels do not support fishing the barrier reefs.

In relation to the LNG jetty area, the fringing reefs along the shore between Konekaru and Vaihua are the most important fishing grounds for Papa village. In the Second Quarter 2011, 97% of the surveyed catch was from those reefs. When the construction exclusion zones went into effect in the Third Quarter 2011, Papa fishers who traditionally fish the jetty area reefs could not access the full coastal extent of the available reef. They were limited to fish only in areas outside of the enforced construction exclusion zone, which included the Papa beachfront, freshwater lakes, and swamps. Additionally, Papa fishers could fish the fringing reefs and mangroves closer to the village.

Papa village fishers have experienced reduced access to fishing areas due to construction exclusion zones; however, the catch rates at Papa have not declined. Based on the quarterly fishing survey data, fishers maintain similar catch rates, including kilograms per trip, kilograms per fisher, and kilograms per hour. See Table 3 for details.

Table 3: Fisheries Survey Data for Papa Village by Quarter

Quarter	Number of Fishers Surveyed	Kilogram/trip	Kilogram/fisher	Kilogram/hour
1st Quarter 2011	85	7.9	4.3	1.5
2nd Quarter 2011	17	7.6	5.4	1.5
3rd Quarter 2011	22	12.4	9.6	1.8
4th Quarter 2011	34	10.5	5.5	2.2

As pertains to the mangroves adjacent to Portion 2457, Papa villagers could not access the mangroves for a four day period in October 2011, during the pipeline shore pull; however, with the exception of these days, villagers had restricted access to the mangroves and could still collect mud crabs, shellfish, and firewood. The mangroves cleared for construction were approximately 1% of the total mangroves accessible by Papa villagers.

During operations, there is no foreseeable impact to Papa fishers. Local boats and canoes will be able to access most of the fringing reef through the Jetty underpass. Additionally, mangroves are accessible from the Papa side of the LNG Plant using footpaths provided by the Project.

Table 4: Impacts against Total Resources in Caution Bay

Habitat/ Resource type	Uses	Total area available in Caution Bay	Area excluded by construction	% of total area	Area excluded during Ops	% of total area
Mangroves	Timber, shellfish gathering, crabbing	335 ha	Approximately 3.6 ha (based on area cleared during construction)	1 %	<0.2 ha	<1%
Fringing reef	Spearfishing, line fishing, gill netting	1873 ha	Approximately 78 ha	4.2%	1.6 ha (under jetty)	<1%
Marine	Boat transit, limited fishing	15,874 ha	Approximately 685 ha	4.3%	79 ha	<1%

The main community issue being raised over jetty construction by Papa fishers was that "noise of the construction" is driving the fish away; however, there has been no decline in catch rates.

Papa villagers are being inconvenienced by the lack of unrestricted access to Konekaru and Vaihua; however, the inconvenience to the community is for a limited time. No specific economic displacement has been identified for Papa village or the other Caution Bay villages.

5.0 MITIGATIONS AND ENTITLEMENTS

5.1 Mitigations

Impact to the communities along Caution Bay has been significantly lessened by the reduction of exclusion zones and increased access points provided by the Project. When evaluated as part of the EIS (2008), the economic impacts were anticipated to be significant during construction and operations due to life-of-the Project exclusion zones. If implemented they would have resulted in the loss of about 50% of the mangroves and fringing reef used by Papa villages for collecting and fishing.

In an effort to minimise impacts, risk assessments were conducted by construction and operations to look at safety and security requirements in order to determine actual required exclusion zones and potential access points.

As a result of these risk assessments, the following mitigations resulted.

- Design of jetty modified to reduce shading on water (thinner structure built) and impact to environment (cantilever and pile-based versus causeway design).
- Reduced mangrove cut from offshore pipeline from 142 metres wide to 80 metres. Endemic mangrove species repopulated in the area post backfill.
- Pedestrian access to mangroves. Pass through monitored continuously to allow access and to maintain safety.
- Coordinated access points (along fence line for offshore pipeline construction) and in designated under-jetty pass through for jetty construction.
- Defined offshore access point during 'go' times for boats to pass. Construction vessels engaged bridge watch to ensure safety.
- Permanent exclusion zone for operations minimised to a 500 metre radius around vessel loading point and with the balance of the mudflats, mangroves, and fringing reef used by villagers, especially Papa, accessible as shown in Figure 3.

5.2 Eligibility and Entitlements

Table 2 lists eligibility and entitlements as described in this Section for temporary livelihoods impacts in Caution Bay. Although construction has inconvenienced the fishing communities' routines, the fisheries surveys have not identified economic losses because of construction. Additionally, no specific fisheries based losses are foreseeable during operations.

Table 5: Eligibility and Entitlements

Type of Loss	Mitigation	Who is entitled
Loss of mangrove trees	• Right to salvage felled mangrove timber • Re-planting/rehabilitation of mangrove area equivalent to that cleared upon construction completion	People identified as users of the mangrove areas inside the lease (predominately villagers of Papa and LeaLea)
Temporary loss of access to mangroves for crabbing/shell fish gathering	• Controlled access to mangroves monitored continuously and villagers directed around construction to maintain community safety • Improved infrastructure security measures to allow passage under jetty to access mangroves	People identified by baseline surveys as users of the LNG jetty affected mangrove areas (predominantly women of Papa and LeaLea)
Temporary loss of access to fishing grounds near jetty and southern fishing grounds	• Construction contractor working with community to allow passage through construction exclusion zone when safety allows • Controlled access point under jetty established at 700 metres during operations	People identified during fishing surveys that reside north of the jetty construction and access the Vaihua River and fishing areas south of the jetty

6.0 LIVELIHOOD RESTORATION PROGRAM

6.1 Introduction

Livelihood restoration and assistance projects will focus on short-term economic assistance opportunities and long-term sustainable fisheries projects. This strategy aligns with the level of impact to villagers because of construction and operations. In construction, livelihoods of a small number of fishers will be temporarily impacted because of exclusion zones. Throughout operations, impacts will be minimal due to the provision for continued community use of the lease area.

A summary of areas addressed in ensuring the Project restores impacted livelihoods in accordance with IFC PS 5 and the RPF follow. Some initiatives are in progress, whereas others are in development. Additionally, some are linked to EHL's broader Community Development Support (CDS) plan and have broader development objectives in addition to providing direct livelihood assistance.

6.2 Fishery Awareness and Skills Enhancement

Through quarterly fisheries surveys in Caution Bay villages, Porebada fishers have the largest catch rates followed by Boera, LeaLea and Papa having the lowest. The local fisheries and the National Fisheries College collectively identified a need to improve fishing skills. A training plan is currently under development with the National Fisheries College based in Kavieng, New Ireland Province. This training will entail two main components. First, it will provide skills training to local fishers. Secondly, based on competency and ability, local fisher attendees will be trained as trainers. These "local trainers" will then have the skills, knowledge and ability to train others in their villages. This training of trainers component provides long-term skills enhancements of additional fishers implemented at the village level.

Table 6: Fisheries Skills Enhancement Strategy

Fisheries Enhancement Strategy	Target Beneficiary	Outcome	Implementation	Implementing Groups	Duration	Key Performance Indicators
Deep sea fishing training	40 fishers (distributed between village fishers based on Project induced impact/ inconvenience)	• Will be able to fish safely in deep sea • Will be able to generate greater income from fish catch • Will be certified small fishing operations trainer from the National Fisheries College – PNG • Will train other fishers in their village on new fishing techniques and methods	• Organise training with National Fisheries College - PNG • Identify candidates • Conduct training • Follow up with trained participants on training others in the community	L&CA Plant site Fisheries team & CDS Attendees - "local trainers"	1st through 3rd Quarter 2012 Ongoing - training other fishers by "local trainers"	*Measures* • Number of fishers trained • Number completed • Usage of skills from training • Change in income generated • Number of fishers trained by "local trainers" *Monitoring* -- Fisheries team during quarterly fishing surveys will interview past participants and report on key measures

Improving fishery awareness is currently underway. During fisheries surveys, basic fisheries issues and observations, such as over-harvesting, biology and sustainability of marine life, are discussed with fishers and women. The fisheries team also engages local assistants in carrying out surveys. As the assistants share their increased skills and knowledge with their community members, community awareness of the importance of fisheries also grows.

6.3 Fisheries Habitat Restoration Programs

Historically, the fringing reef and fishing areas around the LNG plant site have been overfished and, therefore, are currently benefiting from the reduction in fishing resulting from plant site employment. To improve fisheries habitats further, EHL will explore initiatives to restore fishery habitats along with developing skills and generate short-term employment opportunities. Current efforts are exploratory and will be investigated in partnership with the village fisheries committees. Additionally, further dialogue will be held with the PNG National Fisheries Authority, the PNG Department of Environment and Conservation, and other Non-Government Organisations (NGO) partners working on marine habitat restoration. Initiatives explored will include:

- *Artificial reef development:* This is an initiative that EHL has supported in other countries, such as Qatar, and can be developed for all four villages.
- *Fringing reef preservation:* Fringing reefs near all four villages are in poor condition. Methods to restore the reefs will be explored.

Table 7: Fisheries Habitat Restoration Strategy

Fisheries Enhancement Strategy	Target Beneficiary	Outcome	Implementation	Implementing groups	Duration	Key Indicators
Mangrove replanting	Papa villagers	• Short term employment • Improved awareness and education on mangrove planting • Improved fisheries habitat • Minimize erosion	• Partnership with University of PNG to conduct training • Identified areas and types to replant • Purchase initial mangroves • Identify villagers for training and short term employment • Plan mangroves • Assist with community driven mangrove projects	University of PNG L&CA team Fisheries team Papa Community Development Committee (including fisheries committee)	Two weeks (purchase, training, planting) Three to six months (ongoing monitoring and tendering)	*Measures* • Number of people trained • Number of mangroves planted • 6 months post planting • Additional community driven mangrove restoration projects *Monitoring* -- Fisheries team and Village Liaison Officers will monitor during quarterly fisheries survey and report on key measures
Artificial reef development and fringing reef preservation	Fishers in Caution Bay	• Increased fish available in Caution Bay • Improved habitats	• Identify collaborative organisation • Review past fisheries restoration projects in other Company projects • Engage with communities to get community support • Assess feasibility of Project options • Develop implementation plan • Implement with involvement of community	L&CA team Partner to be identified Community Development Committees (including fisheries committees)	One to two years	*Measures* • Number and type of participating organizations (government, educational institutions, Community Development Committees) • Number of feasible projects implemented • Fisheries data – improved catch rates, earnings *Monitoring* -- Fisheries team and Village Liaison Officers will monitor during quarterly fisheries survey and report on key measures

6.4 Community Development Support Projects

Currently, EHL has a comprehensive CDS program that will continue into operations. Existing programs benefiting villagers in Caution Bay are described below. These projects are outside of the livelihood assistance and restoration projects specific to this CRP.

6.4.1 Capacity Building of Fishing Committees

Strong local institutions within the villages are vital to sustaining improved fishing and income generation. Current initiatives identified include building organisational and leadership capacity of each fisheries committee. In addition to the mentoring and dialogue current undertaken by CDS field officers and the fisheries team, formal business training will be offered for the fisheries committees. This training is in line with existing development of the committees especially in Papa, LeaLea and Porebada. In those villages, committees are already undertaking discussions on the formation of legal entities; engaging financial membership and programs; and activities to implement through their committees. Boera is still struggling to get itself organised. Members of established fisheries committees will attend a one week training course through the IBBM Enterprise Centre. Attendance is CDS funded with completion of the training targeted for first half of 2012.

As organisations are made of individuals, capacity building of individuals is important to effective and efficient operation of committees. Personal Viability training will be provided to committee members and other entrepreneurs within the villages. Twenty people from each village will attend this one week training course. This training is CDS funded with completion targeted for mid-2012.

6.4.2 Alternative Economic Development

Alternative livelihood strategies include access to jobs created during construction period and participation in local economic and agriculture development projects facilitated by CDS.

Plant site jobs are available to individuals from the local communities who meet the literacy, health and fitness criteria. Data from fishing surveys already shows a decline in active fishers due to increased employment at the LNG Plant site.

Additionally, CDS has implemented two major economic development projects that enable local villagers to participate in income generation.

- The cashew out-growers program began at the start of 2011. To date a total of 16,000 trees have been delivered to the four villages. A total of 1,174 individuals are now engaged in this alternative income generating activity; 55% are women.
- The poultry egg production program is being developed. It will aim to have small holders within the community who will supply to a central buyer. The buyer will sell to the plant site facilities as well as the general Port Moresby market.

6.4.3 Utilisation of Existing Small Grant Support Process

EHL also has a CDS short-term small grants program. Funding through this program is available to groups, including fisheries committees, to implement small-scale community projects related to Local Economic Development, Social Resilience and Community Capacity Building.

Examples of initiatives already considered include:

- Expansion of the LeaLea Fish Market to include other services they would like to provide; and
- Construction of a fish shed that Papa Fisheries Committee has started to build to store their catch.

These small grant opportunities allow communities and EHL to implement quickly short-term initiatives that compliment/support some of the longer-term initiatives.

6.5 CDS Projects during Operations

Operational impacts will be addressed under the main CDS Strategy. This strategy entails the capacity building of local Community Development Committees (CDCs) and other community based institutions such as women's groups, youth groups, and church and local level government committees. The main activities started during construction and carried into operations will include:

- Community mobilisation, education and awareness;
- Revival and development of community development institutions – including CDCs;
- The development of community plans that are owned and driven by the community; and
- Implementation of plans with support from multiple stakeholders (government at local, district and provincial levels; non-government and non-profit organisations; national development partners; private sector donors) including the PNG LNG Project.

Programs during construction are in place to develop CDCs in each of the four villages in Caution Bay. Through this process, the fisheries committees in each village should be able to develop their institutional, programming and networking capacity to implement sustainable community fisheries programs and activities. EHL will ensure funding to direct projects in Caution Bay commensurate with operations impacts; however, additional funds also will be available for community driven projects meeting required CDS criteria for funding.

6.6 Summary

The fisheries skills enhancement and fisheries restoration initiatives described above are specifically tailored to target fishers and women affected by the construction period. They will benefit the entire community and are initial inputs for longer-term livelihood development. They complement efforts undertaken through the CDS Program and are not stand-alone initiatives. Furthermore, they require the participation, engagement and capacity building of key community based institutions to be implemented and sustained into the long term.

7.0 MONITORING AND EVALUATION

The Management and Evaluation system (M&E) provides Project management, and directly affected persons, households and communities, with timely, concise, indicative information on whether compensation and related development investments are on track and achieving Project goals.

7.1 Fisheries Resource Monitoring

Monitoring is conducted quarterly during the construction period by the fisheries team. Quarterly monitoring surveys assess usage of fisheries resources within each village. Specifically the surveys record village fish catches including mud crab and shellfish. Surveys are also conducted to evaluate mangrove usage along with vessel and fishing gear usage. Fisheries surveys will be reported quarterly in fishing survey reports.

7.2 Livelihood Program Monitoring

Fisheries skill enhancement and habitat restoration projects as discussed in Sections 6.2 and 6.3 will be monitored by the fisheries teams on a quarterly basis. Progress against the Key Perfromance Indicators (KPIs) will be reported as an addendum to the quarterly fisheries reports.

The CDS programs, which complement the fisheries livelihood programs, each have a logical framework that highlights key indicators that are monitored on weekly, monthly and quarterly basis to determine progress of outcomes and activities. Monitoring information will be utilised to assess implications of programs including changes occurring in the communities.

A mid-term and an end of construction period evaluation will be carried out on all CDS programs. The fisheries livelihood programs will also be incorporated into these evaluations to assess what elements will be carried forward into operations as part of the CDS program.

7.3 Grievance Monitoring and Stakeholder Engagement

Caution Bay villager grievances will be managed through the Project's Grievance Procedure, which is available to people affected by displacement, other local populations residing in the Project impact area, and other stakeholders directly affected by the Project. The Grievance Procedure adopted for the Caution Bay area is defined in the RPF.

The Grievance Procedure is well known to potentially affected villages, interested persons and organisations and is already being utilised by the people. LeaLea, Papa, Boera and Porebada surround the LNG Plant site and have been working with the L&CA team as well as utilising the Grievance Procedure for over two years.

The Project's Grievance Procedure is reiterated within all formal and informal community meetings. The transparency and fairness of the process has been and will continue to be explained through both verbal (via regular stakeholder meetings) and written updates (such as newsletters and posters).

The grievance reporting and monitoring process utilised by L&CA is currently used to track concerns and issues raised by the community. The fisheries team is provided grievances related to fisheries and tasked to close these out. Where possible, the fisheries team is utilising fisheries committees to facilitate grievances. For example in Papa village, the fisheries committee has been instrumental in addressing village concerns relating to jetty construction and their access to the mangrove and reef areas for inshore fishing.

8.0 ROLES AND RESPONSIBILITIES, IMPLEMENTATION AND BUDGET

8.1 Roles and Responsibilities

EHL is responsible for overall planning, implementation, and monitoring as per the RPF. EHL's L&CA team has primary responsibility for all areas under the RPF. The Social Impacts team coordinator will coordinate M&E internal and external implementation.

8.2 Implementation

The following table provides a summary of tasks to implement the CRP.

Table 8: Implementation Schedule

Activity/Task	Actions	2011							2012
		J	J	A	S	O	N	D	J+
Disclosure	CRP disclosure	✓							
Construction assessment	Finalise plans for community use/access mangroves, fringing reef, and transit through site	✓	✓						
Approvals	CRP submitted to IESC			✓			✓		✓
	Comments received/CRP revised					✓	✓		✓
Livelihood restoration	Planning implementation of Livelihood Restoration Projects							✓	✓
Verification and monitoring	Quarterly through construction period	✓				✓		✓	✓
	Internal monitoring through 2013			✓	✓	✓	✓	✓	✓
	External evaluation (including completion audit)								✓

8.3 Budget

Although fisheries survey data suggests no impact on livelihoods of fishers in Caution Bay, construction has inconvenienced the fishers. To address this inconvenience and disruption in addition to encouraging fisheries restoration and promotion of sustainable fishing in Caution Bay, the Project will invest US$100,000 to village fisheries projects during construction.

Livelihood restoration projects will continue during operations and be funded through the CDS budget for the Project with EHL ensuring funding to direct fisheries projects in Caution Bay commensurate with operations impacts. These projects along with all CDS projects during operations will be community driven with funds allocated based on the community proposals. CDCs established in each village along with fisheries committees, women's groups or other organised committees will be able to request funding for community projects.

APPENDIX 1: Caution Bay Fisheries

Fishing in Caution Bay

People from the villages of Boera, LeaLea, Papa and Porebada use a variety of subsistence and artisanal fishing methods in Caution Bay. Caution Bay is the water between Redscar Head to the northeast and the Papuan Barrier Reefs including Bava and Hidihi Cays, approximately 15 kilometres to the south of the LNG Plant. The landward side of Caution Bay consists of the four Plant site villages of LeaLea and Papa to the north-west, Boera, and Porebada to the south east of the LNG Plant.

Caution Bay is considered a traditional fishing ground of the four villages in the bay. Fishing is for income generation and subsistence. The inshore fringing reefs and shallow shoals fished by people from the four villages lie within the three nautical mile zone of the land on the coast. Within three nautical miles, resource access is reserved for local use. The barrier reefs off Daugo, Bava and Hidihi Islands are in open seas beyond three nautical miles from shore. Each village regularly fishes and maintains a specific fishing ground on the barrier reefs. The onshore fringing reefs, mangrove areas and freshwater swamps around each of the villages have customary boundaries that each village respects and fisher folk do not cross.

Fishing occurs by:

- Walking to the mangrove and freshwater swamps to collect mud crabs, shellfish and firewood;
- Setting gill nets at the freshwater swamps for freshwater fish;
- Walking along the beach, then swimming out onto the fringing reefs to spear fish and return on foot back to the village;
- Walking to the river and fishing from the riverbank;
- Paddling or sailing dug-out canoes or fiberglass dinghies to selected fishing spots; and
- Using fiber glass dinghies 7.2 to 9.3 metres long powered by 30 to 40HP outboard engines to fish the open seas and the barrier reefs around Bava and Hidihi Cays.

Fishing happens at any time of the day or night. Fishing times are influenced by tides, moon phase, and prevailing wind and weather conditions. The small fishing vessels used also restrict the village fishing range particularly during the prolonged periods of strong south-easterly winds, the Laurabada, from June to September and during the short sharp squalls experienced during the northwest season, from November to May.

Of the four villages, Papa is the Koitabu ethnic group and the other three are from the Motu ethnic group. A minority of Koitabu people do live amongst and with the Motuan people. Both have different language and customs.

The Koitabu moved to the coast relatively recently and some have become good fisher folk. The Koitabu are traditionally land based people, who hunt more than fish; however, Papa villagers have become good fisher folk for reef fish and introduced fish such as tilapia, gourami, and the common carp *(Carpio carpio)* and milkfish. Mud crab and shellfish are regularly collected.

Today both ethnic groups fish in Caution Bay.

Fishing Grounds

There are a variety of fishing habitats in Caution Bay. These include:

- Freshwater swamps and rivers mainly for milkfish and for introduced fish;
- Mangroves for black bass, mud crab and shellfish;

- Beaches and onshore fringing reefs;
- Inner reefs which are shoals that are 10 to 15 metre deep that occur between the fringing and the barrier reefs;
- The barrier reefs off Daugo, Bava and Hidihi islands;
- Open seas for pelagic fish (e.g. Fish Families: *Carangidae*; *Belonidae*, *Scomberomoridae*); and
- Sunken reefs to the west of Hidihi locally called LebuLebu for deep-bottom fishing.

Beyond the Barrier Reefs, the shelf drops off rapidly to over 1,000 metres.

Catch Species Composition

Caution Bay is nine degrees south of the equator and lies within the PNG Coral Triangle. The broad range of habitats associated with tropical coral reefs supports fish biodiversity with each type of habitat supporting characteristic fish assemblages. Typical of coral reefs, many of the fish species occur in multiple habitats. The same fish families and species were landed throughout the inshore reefs, shoals, barrier reefs and open water.

Usually men fish the fringing, shallow shoals, open seas and the barrier reefs while women tend to collect mud crab, shellfish and firewood in the mangroves.

Fish Landing and Marketing

There is no formal regulation of where, when or how fish may be landed and sold. Additionally, there are no known established fishing cooperatives to support marketing of fish in the Caution Bay area. Primarily women have the responsibility for selling the fish in the village or in town markets in Port Moresby.

APPENDIX 2: Stakeholder Engagements And Disclosure Meetings

Ongoing Stakeholder Engagement

The L&CA team at the LNG Plant site holds monthly stakeholder engagement meetings with the four primary villages in Caution Bay: LeaLea, Papa, Boera and Porebada villages. They also attempt to meet with other nearby villages on an as needed basis. All meetings address project-specific matters, community issues and grievances. Any community concerns raised are captured, referred to relevant persons, addressed and followed up. The Project's Grievance Procedure is also reiterated within all formal and informal community meetings.

In addition to general engagements with the communities, the L&CA team has regular meetings with women's groups and the fisher committees. These targeted engagements ensure that specific issues and concerns of women and fishers are identified and addressed.

Exclusion Zone Awareness

The most significant impact to local fishers is the need for marine and near-shore exclusion zones. The operations exclusion zone was first discussed during the EIS public meetings. At that time, the actual exclusion zone was unknown.

Disclosure of construction exclusion zones, as well as information on near and offshore construction activities near the LNG Plant, was initiated in February 2011. The first meeting with the Local Level Government Councillors of the local villages was designed to raise awareness of the Project's offshore construction activity and proposed exclusion zone. EHL then held village meetings with the four Caution Bay villages. These open meetings provided details of the intended exclusion zone to be applied around the jetty construction area and consulted with communities on potential social impacts of such a zone.

Disclosure of operations exclusion zones was completed at monthly community engagement with each of the four villages in February 2012. This disclosure included information that PNG Ports Corporation may instigate rules around the shipping lane enforceable when ships enter or leave the port. Additionally, the no-go (exclusion) around a docked ship and the fisher's ability to pass under the jetty at the designated pass-through were reiterated. The community raised no objections.

Additional community disclosures and education specific to the operations exclusion zone around the loading berth and movement of tankers will be undertaken in the quarters leading up to 'first gas'.

CRP Disclosure Meetings

The Caution Bay CRP was disclosed from 24 June to 4 July , 2011. The aim was to provide awareness to the local communities affected by the Project construction activities in the Caution Bay area on the content of the Caution Bay CRP and to gage their feedback.

Disclosure sessions were held in four villages (Papa, Boera, LeaLea, and Porebada) and with the Hiri LLG Councillors. A total of 438 community members (329 men and 109 women) attended these sessions. Of the 438 attendees, almost half identified themselves as fishers. Members of the L&CA team, Stakeholder Engagement team, Fisheries team, and Environmental Law Centre conducted disclosure activities.

Table 1: Summary of Caution Bay Consultation and Awareness

CRP Awareness					
		Number of Attendees			
Village	Date	Male	Female	Fishers	Total
Hiri LLG Councillors	24/6/2011	4	-	-	4
Papa	28/6/2011	42	11	30	53
Boera	30/6/2011	69	47	50	116
LeaLea	27/6/2011	80	27	20	107
Porebada	01/7/2011	134	24	100	158

Summary of Disclosure Meetings, Key Themes Raised

Issues raised by the community can be categorised into the following main themes:

- Social and Environment Impact – this captured concerns the communities had around impact to their livelihood and to the environment as a result of the construction activities.
- Entitlements – this included questions and concerns raised around legislative, payment arrangements, land ownership, and recognition.
- Operations – this captures items that were raised in relation to processes, activities and approaches that the Project was using in carrying out its business.
- Employment – this captured issues around lanco activity and business development opportunities

All five engagements raised issues in relation to social and environmental impact. The main concerns were livelihood restoration in the event that offshore access is cut off to fishers and environmental damage including impact of desalinization, noise and vibrations. Additionally, both Papa and LeaLea villages requested community infrastructure with the Company either building and maintaining roads or providing grants for the communities to do the work.

Issues around entitlements were raised in four engagements. The primary issue was over potential distribution of mangrove wood to the communities. Additionally, the Hiri LLG Counsellors and Boera raised issues around land title and the State's right to lease the land to the Company.

Concerns around operations were raised in all engagements. The concerns focused on construction timelines and construction methods. The communities are concerned over the desalinisation process and impact to the environment. The exclusion zones required during construction were discussed at all engagements with positive responses from the communities. There is an understanding that the Company need to maintain a safe working environment. Communities were appreciative that limits to access would be continually reviewed and allowances to the exclusion zones made where practicable.

As pertains to employment, all communities continue to want employment opportunities and training. Additionally, Papa village wants business development training and assistance to start an industrial fishing business.

Detailed summaries of the questions/issues raised at each disclosure meeting follow.

Table 2: Summary of Questions/Issues by Communities

Question/Issue	Subject - Category
Hiri LLG CRP Disclosure Meeting	**Date: 24 June, 2011**
Can you show the village the maps and the photos of the construction equipment at next week's meeting?	SL - Engagement
Where will the labour come from to clear the mangroves?	EC - Employment
I am concerned about the size of the mangroves that you are cutting down.	PJ - Construction Activities
The mangroves are part of our environment. Will there be compensation for the removal of these mangroves?	LD - Compensation
Will the noise from all of these big vessels be heard underwater? I am concerned that divers will damage there eardrums when they go underwater.	EN - Noise and Vibration
When will you be distributing the spare timber from the Plant Site to the local villages? How will this be done?	OT - Other
Portion 2457 is our customary land and Portion 2458 is our customary land. We should be given compensation for the loss of access to the land and sea.	LD - Compensation
Lealea CRP Disclosure Meeting	**Date: 27 JUNE, 2011**
You said our catch rate was really low. What do you suggest we do about it?	EN - Ecology
What is the effect of the desalination plant on our marine life?	EN - Water
Caution Bay belongs to the people of LeaLea. Please think of our people first for your employment needs.	EC - Employment
Laba has failed to train our children. They should have been trained to operate the specialised equipment at the Plant Site. Six weeks is not enough at Port Moresby Construction Training Facility (POMCTF). We want them to have long-term employment opportunities. When the Project is over, they will just come back to the village and do nothing. We want them to have international opportunities.	EC - Employment
We [local construction workers] need specialised training. We need more on the job experience.	EC - Local Workforce Development
Apart from the POMCTF training, we want driver training here as they have up in Hides.	EC - Employment
LeaLea people own Caution Bay. Portion 152 is LeaLea's too. It is not Papa's. Portion 152A is going to Papa. We are the most impacted community. I am asking the contractors to consider this and give work fairly to the LeaLea people.	EC - Employment
Have you employed workers to clear the mangroves yet?	EC - Employment
Is there any compensation for cutting down our mangroves?	LD - Compensation
The kids wake up early for work and arrive home late. They are exhausted. What are you going to do to improve the transport to and from work?	SL - Community Health, Safety & Security
Why do we have to wait to be employed by POMCTF?	EC - Employment
The two kilometer road leading to LeaLea has not improved for the last three years. It does not reflect well on Exxon Mobil. Can you patch up the road for us?	EC – Community Development/Strategic Community Investment
Can you give us the contacts of people in government that we can speak to?	EC - Community Development/Strategic Community Investment
Can you give us an update about what is happening with the LeaLea Bridge? When will you be building the new one?	EC - Community Development/Strategic Community Investment
Papa CRP Disclosure Meeting	**Date: 28 June, 2011**
Thank you for coming to Papa today. 10,000 hectares of land is owned by Papa people. We believe your presentation today will provide great education to our people. After today, we will know what is happening on our land. It is great to see Anne Kajir at this meeting. With Anne Kajir here today we cannot go wrong.	SL - Engagement
What are the statistics for the number of women from Papa that are currently employed?	SL - Engagement
I have heard that people not employed through Laba are earning a lot more money.	SL - Engagement

Question/Issue	Subject - Category
Can you give us funds to repair the (Papa-LeaLea) road?	CA - Grievance Management
I raised many environmental questions at the last community meeting. I wrote a letter to Peter Graham and to the Department of Environment and Conservation (DEC). I have not received a response from DEC. I would like more information from them.	EN - Ecology
What can we expect to hear from the EPC2 construction activities when we are out fishing?	PJ - Construction Activities
I want to develop a corporate fisheries group. Can the project help me with this?	EC - Community Development/Strategic Community Investment
We use the mangroves to access wood to build our houses. How can we continue to do this?	PJ - Construction Activities
I have an idea for a Rapid Implementation Project (RIP) To whom do I speak?	EC - Community Development/Strategic Community Investment
Who is looking after the police? My Public Motor Vehicle (PMV) was caught speeding the other day and they took my money. Is this OK?	OT - Other
We need to do grievance awareness through L&CA so people know how to raise an issue.	CA - Grievance Management
We have a lack of buses because the PMVs are now taking people to the Plant Site.	OT - Other
Borea CRP Disclosure Meeting	**Date: 30 June, 2011**
Your information on the Fisheries Catch Landing Survey might not be accurate as some of the best fishers are at the Plant site working. The other factor you should consider during your survey is the weather.	EN - Ecology
When the jetty is constructed, will the fishers be allowed to fish within the no-go zone?	SL - Community Health and Safety
Is the jetty already completed?	PJ - Construction Activities
Can you give us an idea on the amount of sea floor that will be trenched in Caution Bay area?	PJ - Construction Activities
What is the amount of mud and silt produced by this activity and what is the extent of the impact it will have on the fishing ground?	EN - Erosion and Sediment Control
Can you give us a rough estimation of the timeline of the activities and the period of rehabilitation, before people can go out and fish?	PJ - Construction Activities
Can we be compensated for the period that we suffer, if we cannot use the area for fishing?	LD - Compensation
Boera has not been paid compensation for the customary land that is being used by the Project. We understand that you paid compensation to a company called Kenmore for State land. Why did you not pay compensation to Boera for its customary land?	LD - Compensation
It is not fair that the Project is not paying anything for the lease of land to Boera community as compensation. The lease was also done without our notice.	LD - Compensation
The State of Papua New Guinea has leased Portion 152. However, the other areas such as Portion 2457 and Portion 2458 are customary land. What about the strip of land between the sea and the Plant Site area? That is customary land.	LD - Access and Agreements
You are telling us to go to the court for our own customary land. You paid millions of kina to the Project's contractors, why can you not just compensate us.	LD - Compensation
You have talked a lot about safety in your presentation, but what happens if a worker gets hurt?	SL - Community Health and Safety
What if a local fisher gets hurt? Even after all the safety messages and the warnings, a fisher still gets hurt.	SL - Community Health and Safety
Whether it is your fault or not, if a local fisher gets hurt, the community will still try to disrupt the construction activities because they will still blame the Project.	SL - Community Health and Safety
During trenching, mangroves will be cut down. Our resources will be destroyed. Two years is a very long time. Are you going to compensate us?	LD - Compensation
Who are the contractors that will be working on the pipelay construction?	PJ - Construction Activities

Question/Issue	Subject - Category
I appreciate what you are doing today. You have talked to us about what will happen during the construction. The other thing that you did not tell us is what will happen when there are incidents. Do you have any contingency plans? What are your emergency response plans? Can you execute it in times of disaster?	SL - Community Health and Safety
Can anyone information share fisheries information with you?	SL - Engagement
Porebada CRP Disclosure Meeting	**Date: 1 July, 2011**
What months were your officers (Fisheries team) here to carry out the survey? From the record you read out, the catch rates are very low.	SL - Engagement
If the fisheries studies were done some years ago, they would collect adequate fisheries information.	EN - Ecology
The Catch Per Unit Effort (CPUE) that you have calculated is quite low and does not reflect the catch rate for fishers here in Porebada. We are at a stage where we want to develop a fishing industry that is why the catch rates are low.	EN - Ecology
Porebada men are better fishers than those fishers from LeaLea, Papa and Boera are. Our catch rates are low because there are not enough dinghies and outboard motors to go fishing.	EN - Ecology
Are your fisheries survey studies based on assessing the commercial viability of fishing or to assess the environmental impact from the project?	EN - Ecology
Are you saying that some of the fishing areas that are within the project owned boundary will be restricted to fishers?	SL - Engagement
The fisheries survey results collected in February should not be accepted. The survey should be carried out for a year, as there may be some variations in the number of fish catch as a result of changes in seasons and weather patterns.	EN - Ecology
You are saying that you do not want to damage the environment but you are already destroying it.	EN - Spill Prevention and Response
What happens if one of the pipes is damaged?	PJ - Construction Activities
Why was the pipe not laid on the land?	PJ - Construction Activities
How much salt will be coming out to the sea from the desalination plant?	PJ - Construction Activities
How far is the outlet from the desalination plant?	PJ - Construction Activities
During construction, how many people will the desalination plant cater for?	EN - Water
Is this the only method to manage waste from the desalination plant?	EN - Waste
You are here to educate us and tell us about the construction activities that will be happening. We cannot argue with you because the government has already leased you the land. The least we can do is listen to what you have to say	LD - Compensation
If the construction work is going to happen where will the fishers fish? How are you going to compensate them?	PJ - Construction Activities
Due to the Project, many ships will be coming in. The ballast water from the foreign ships may affect the marine life in our waters.	EN - Ecology
Laba recruits the workers from our village and then terminates them based on absenteeism. Are there any programs for counselling the workers about this?	EC - Employment
How can you educate the workers from the villages that are near the construction site (Plant Site)?	OT - Other
Can educational programs be conducted for the local workers on topics such as health?	SL - Community Health and Safety
Is the fiber optic cable a separate project managed by another company?	PJ - Construction Activities
Can you tell us when the fishers will be allowed to go fishing in the no go zone?	PJ - Construction Activities

APPENDIX 3: Social And Cultural Background

The Project's LNG Plant site is located within the Central Province of PNG, west of the Owen Stanley Range. The Central Province occupies 29,900 km^2 along the south coast of the PNG mainland. Average rainfall is less than 2000 millimetres per year with a long dry season. The central coastal area from Pari to LeaLea has a mean annual rainfall of 995 millmetres. The site falls within the Kairuku-Hiri district and is accessible by road from the capital Port Moresby.

Population density of the area in Hiri Rural LLG is approximately 10 people per square kilometre. Outboard motor-boat and canoe travel are common along this coastline. Most people can access Port Moresby within one to two hours. The following provides some demographic data for village census units within the region.

Table: Central Province Demographics

Central Province 2000							
Total	**Male**	**Female**	**HHs**	**LLGs**	**CU**	**Wards**	**Districts**
183,983	96,062	87,921	29,823	13	961	209	4
Kairuku-Hiri District							
78,784	41,552	37,232	12,464	4	373	76	
Hiri Rural LLG							
28,352	15,112	13,240	3589		77	18	
Ward Units							
1310	683	627	155	Boera			
885	479	406	96	Papa			
929	528	401	81	Roku			
1685	888	797	190	LeaLea			
4055	2173	1882	428	Porebada			
Census Unit							
393	228	165	40	Kouderika (Porebada Ward)			

Languages

The area is populated by speakers of Motu and Koita. Motuan is the dominant language but Koita is spoken regularly in Papa Village.

Motu is part of the Austronesian family of languages (e.g., Mekeo, Motu Roro, Gabadi—all having common descent) and which have affiliations outside the PNG area.

Koita on the other hand is a non-Austronesian or Papuan language, which has no affiliations outside the island of PNG. Most of the Austronesian languages of PNG are spoken on the coastal and south islands areas. It is generally held that Austronesian languages are immigrant to New Guinea, with ancestral ties to Malayo-Polynesian language stocks (Dutton 1976, 1977).

Research History

This south coast area has been a focus of academic interest for scholars from a range of disciplines[2] – linguistics (e.g., Dutton 1969b), archaeology and cultural heritage (e.g., Bulmer 1971; Swadling 1977, 1981), and social anthropology (Seligman 1910, Belshaw 1957, Groves 1963, and more recently Goddard [e.g., 2001]), and history (e.g., Oram 1977). It is one of the most intensely researched regions of PNG, with many early anthropological figures of note in Melanesian ethnography such as Seligman, Haddon, Chalmers and others having provided some of the first fine-grained ethnographic data.

This large corpus of work has primarily focused on the following topics:

- The derivation of Motu and Koita language groups and divergences of these from proto-languages both inside and outside the PNG mainland—using lexico-statistics and glottochronology.
- The migration of social groups and where they chose to settle in the context of known environmental conditions.
- Concordance between archaeological interpretations of ceramic remains and phases, linguistic analysis and oral tradition.
- Urbanisation patterns in PNG and effects of urban growth in the national capital region.

In respect to issues of land, genealogy, migration and history, the work of anthropologist Nigel Oram must be mentioned. Copies of his work have been deposited both in PNG and in the National Library of Australia (www.nla.gov.au/ms/findaids).

Migration Patterns

Swadling writes that “traditional accounts indicate that the Koita have moved to the coastal lowlands in relatively recent times” (Swadling 1981:248).

The Koita believe that their ancestors moved towards the coast because they feared death at the hands of the Koiari, either by sorcery or by water poisoning. . . . Such acts by the Koiari were undoubtedly enhanced by the simultaneous appearance and spread of European introduced diseases (Swadling 1981:248).

Swadling concludes, “The Koita as a group moved towards the coast within the last 200–300 years” (Swadling 1981:248). The Koita moved to “established Motu villages” during this southward migration (Dutton 1969a:373). “This suggests that the presence of the Motu may have been an important factor in the final movement of the Koita to the coast proper” (Dutton 1969a:373). In other words, while the Koita inhabited the hinterland of the Port Moresby coast before the ancestors of the present-day Motu arrived, by the time they moved towards the coast, Motu were already established in coastal villages there.

The Motu-Koita can thus be said to constitute a “portmanteau” social group, two distinct languages and cultures, two distinct subsistence ways of life and orientations towards land and territory that have converged on the same village space and have formed over the last 200–300 years a single social construct.

Once they had established themselves, Koitabu people migrated from inland areas and began cohabiting with Motu in the same villages. What this means is that there are two competing narratives of who are the ‘aboriginal’ people of this area—the Koitabu maintain that it has always been ancestral Koitabu land; the Motu claim that it was empty land when they arrived and settled; furthermore, Motuans claim Koitabu people followed them to these areas after the Motuans arrived.

[2] See Weiner 2008 for a more complete bibliography on the Motu-Koita area.

Social Structure

The social structure of most of these villages appears to have been predominantly based on agnatic descent groups (*iduhu*) with both ascribed and achieved leadership. That is, descent-group headmen co-existed with 'big-men' who achieved renown through their economic and political exploits. Residentially, *iduhu* constituted separate parts of any village area. Groves observed that 'there is no traditional government of any formal kind at the village level' (1963:17) and that mobilisation for collective action always occurred at the instigation of particular local patrilineal corporate groups or *iduhu* (Groves 1963:17).

The *iduhu* is the unit of social recruitment in Motu-Koita society. Belshaw (1957:12-13) saw it in spatial terms: "It consists of one or more lines of houses built on piles over the sea at an angle to the coastline by people who give themselves an *iduhu* name". He goes on: "The *iduhu* . . . is primarily a residence unity based upon one or more separate lineages of patrilineal emphasis, and hence may be differentiated from a clan which, in a technical sense, must consist of people claiming common descent" (Belshaw 1957:13).

As a result of movement, migration and warfare, *iduhu* have fissioned (and sometimes fused) and *iduhu* of the same name can be found in different villages, often with an additional name to differentiate them from other local *iduhu* of the same original name (Groves 1963:16; Goddard 2001:315).

Some of the project area villages have multiple dual divisions, which intersect to create separate clans of the same name. In Boera, for example, the terms iduata and koke refer to the west and east sides of the village (as one stands with one's back to the sea). One finds (in the Motuan language) Gubarei Idibana clan and Gubarei Laurina ('right' and 'left'). In Boera, this same division was made with reference to actual places on either side of the village—Iduata on the northwest, and Koke on the southeast. The division Hanuamoto (or Idibana) and Hanuabada refers to the same division into west and east respectively.

Furthermore, clans are sometimes divided into numbered divisions: #1, #2 and so forth—these reflect the manner in which smaller divisions of each clan were apportioned to each local deacon for church congregation purposes. The deacons were allotted only 15 families necessitating this division. As the clans grew in size, additional sections were added to keep the number of families allotted to a single deacon at the same number.

Although people are at pains to point out that these divisions are an artifact of population growth and their local congregational organisation, the impression was that the numbered segments of each clan had acquired a social existence of their own, though these numbered segments did not hold any separate land rights in the clan lands. The divisions, however, do reflect genealogical divisions that separate out lines of more closely, proximately related families.

Subsistence Practices and Cash Income

People on this coastal strip are engaged in minor sales of betel nut, coconut, fish and other fresh food, and further derive income from wage employment and local small businesses. In this region, sweet potato, banana and cassava are the important staple crops. Land potential is relatively poor due to a combination of poor soils, low rainfall, seasonal inundation and land degradation. The agricultural system in general is characterised by high intensity agriculture in a low potential area.

Hunting and gathering were important components of the traditional subsistence economy (Oram 1977:83).

Because of regular cash sales of meat and fish to Port Moresby, the earnings of persons employed locally, and a robust remittance-based economy, there is a large amount of money in Motu-Koita villages in general. Much of it is tied up in the traditional economy, mainly for

bride price. Bride price amounts today range from a low of K40,000 to as much as K140,000 in the urban villages of the National Capital District. Adult men may face a minimum contribution of K500 if a relative is engaged in gathering a bride price.

Other major recurrent expenses are church "bou bou," reported to be about K120 per person annually in one village. In addition, other voluntary contributions are solicited on a regular basis—on a single Sunday at Porebada, over K3,800 was pledged by individuals, businesses and clans as contributions to the upkeep of the church and the pastor and his family.

Use of Mangrove Areas

Acquiring mud crabs in the mangroves that surround the villages is one of the most important subsistence activities that women engage in. It is the most commonly exported item for sale in Port Moresby, fetching about K2 per kilogram. As appears to be the case with all major resource areas, mangroves are not owned, either by individuals or by clans, but are communally utilised by all villagers.

While the villagers say there are no restrictions on ocean fishing, they do recognize that there is a migration and breeding cycle for mud crabs and do not take crabs during the breeding season; they are ready to be taken in the period between March and May. A species of fish they call milkfish are also taken in mangrove areas and their breeding cycle is protected as well. These resources are therefore managed at the village level—the taking of these species is carried out at the same times of year by everyone.

Although the women travel together to the mangroves and work in groups, these groups are not organised in any way, such as along clan or kinship lines, as reported by the men. Mangrove is also the source of the hardwood posts used in house and fence construction in the village.

Rights to Land

As a result of the urban growth of Port Moresby, "land held by each village situated within the boundaries of Port Moresby, with the exception of Kila Kila, now extends only a short way beyond the village itself" (Oram 1970:16). This contraction of village land has led to the demise of communal garden making and that overall, "increasingly small groups of close kinsmen appear to hold exclusive right to a particular area" (Oram 1970:17).

Weiner (2005) noted after inspecting garden sites and land holdings in the LNG Plant Project area that Oram's observation was accurate for coastal villages especially Boera and Porebada.

Koitabu Customary Leadership

Goddard, surveying the early literature on Motu-Koitabu leadership states, 'elements of social control were embedded in kinship and exchange relations, sorcery and the sanction of tutelary spirits, rather than centralised in individual political leaders' (Goddard 2001:318).

Goddard observes that the Motu-Koitabuans have a 'robust genealogical memory' and that middle-aged villagers of Pari can recall seven or eight generations of their ascendants predecessors (Goddard 2001:317). He also importantly observes that 'lineage and *iduhu* leaders are important points of reference in local discourses of *iduhu*' (Goddard 2001:317). By this, he means that leadership is linked to patrilineal inheritance so that knowledge of genealogy is important for reckoning entitlement to and inheritance of such *iduhu* positions of leadership.

Biaguna is a term that Goddard translates as 'boss,' a term of authority also used by Motu-Koita people (Goddard 2001:319). He wrote further that an *iduhu* leader can be called in

terms of his land controlling functions a tanobiaguna (ibid.). The term kwarana meaning 'head' was also used (ibid.), and the terms *iduhu* kwarana and *iduhu* biaguna were more or less synonymous (ibid.). Goddard also says that '. . . an *iduhu* kwarana is usually the *iduhu* tanobiaguna (land controller), unless he chooses to hand this duty to another senior male in the *iduhu*' (Goddard 2001:320). Goddard also notes that there is still a difference made between inherited and achieved positions of authority within the *iduhu* (ibid.). Goddard further explains:

Goddard's opinion is that the *iduhu* kwarana derives his authority from the institution of primogeniture and agnatic descent, even if this is not the only mechanism by which men can become affiliated with an *iduhu* (Goddard 2001:321). He becomes 'a personification of the idiom through which the *iduhu*, as a political corporation, expresses its identity . . . he represents the ancestors to the living *iduhu*' (Goddard 2001:321).

Customary leadership among the Koitabu was and still is attained by virtue of both personal skills and powers and inherited status.

Men were accorded status as koita, so that the term meiu koita means 'renown hunter', biru koita, 'renown gardener', goro koita, 'sorcerer', fei koita or 'healer', or ga'a rofi 'warrior' (see Atabe 2009:10).3. Except for the last status, these statuses are still acquired by the Koitabu.

Cultural Heritage and Trade

The Caution Bay environs contain abundant remains of previous areas of habitation and settlement. Pottery shards are common at previous village and house sites. Trade types, which have been documented ethnographically for the study region, include:

- Direct or indirect hiri trade by Motu traders from the Port Moresby and nearby areas, exchanging ceramics and shell artifacts for sago and canoe logs;
- Axe trade from the highlands to the north and to the east; and
- Trade between neighboring Koita, Motu and Koiari groups.

Boera, or to be more accurate, the former site of Davage village to the northwest of Boera, has been the site of archaeological excavation in the past. Pottery was the central cultural artifact that defined the Motu area for a large region of southeastern PNG. Groves wrote in 1960:

"The Motu pottery industry has always overshadowed the others… the Motu exported many thousands of pots over very long distances. Motu pottery traditionally found its way and still finds its way into almost every village along the shores of the Papua Gulf and in the immediate hinterland" (Groves 1960:3).

Hiri Trade

The hiri is an ethnographically reported trade system involving Motu ceramic pot manufacturers and traders sailing annually in fleets of multi-hulled canoes called lakatoi to villages in the Gulf of Papua largely to obtain food that they could not provide for themselves in their poor environment by way of trade in pots and shell ornaments. The hiri trade journeys have been well documented in the late nineteenth century and early twentieth century ethnohistoric literature (e.g., Barton 1910; Chalmers 1895; Chester 1878).

Oram (1977:87) wrote that Western Motu accounts of the hiri stress its role in alleviating food shortages: 'Accounts of the founding of the hiri specifically say that the institution of abirakwa, the exchange relationship between the Western Motu and Koita, arose because of

[3] Bruce S.R. Atabe gives some examples of traditional war chants (*Iviga*) employed by Koitabu people in his 2009 submission (2009: 22-23).

food shortages among the latter' (Oram 1977:87). Abirakwa (or abilakwa) involved the Koita providing the Motu with food on credit, to be repaid with sago when the hiri traders returned (Oram 1989:63).

Trade voyagers typically set-off in fleets of lakatoi from the Port Moresby area of Bootless Bay (including the island of Motupore) when the south east Trade winds blew, typically in October or November, and returned with the Monsoons around January. These trading expeditions brought ceramic pots and shell artifacts (often obtained through trade during the course of their westward journeys) to the western Gulf villages, which they exchanged for sago and canoe logs. So large were these expeditions that G. Seymour Fort (1886:15) wrote in his government report on British New Guinea in 1886 that, 'It was estimated that in one of these expeditions, which started from Port Moresby . . . 20,000 pots were taken, for which they would bring back in exchange about 150 tons of sago."