United Nations Educational, Scientific and Cultural Organization

World Heritage Convention

FORMAT FOR THE SUBMISSION OF STATE OF CONSERVATION REPORTS BY THE STATES PARTIES

East Rennell (Solomon Islands) (N 854)

1. Executive Summary of the report

Although the East Rennell World Heritage site (ERWHS) is inscribed on the List of World Heritage in Danger, its forests seem to be in good condition. The technical workshop organised by HIST in February 2016 concluded that unspoiled forest cover remains at 95% of land area within the ERWHS and at 90% in other parts of Rennell Island and that no logging has occurred within the property.

The process towards declaration of the ERWHS under the Protected Areas Act 2010 remains to be a priority for Environment and Conservation Division; however a thorough and cautious approach is required to ensure community ownership of this decision. Other challenges are that in recent years there have been different views among the various landowning groups with regard to

1) recognition of the involvement of the Government;

2) business interests of logging and mining; and

3) the Lake Tegano World Heritage Site Association and its members (LTWHSA).

Therefore, to progress the formal declaration of the ERWHS as a Protected Area under the Act, a comprehensive and detailed Roadmap to address the variety of governance, management and technical issues must be developed.

Landowner groups have high expectations of government and other Parties (including UNESCO and IUCN). It was generally observed that when there is no obvious benefit under the World Heritage Site program, frustration builds among people. There is also identified issue of non-consultation with all key landowners on the issues pertaining to the World Heritage site. Furthermore, landowner groups with different opinions are dealing directly with international organizations, speaking on behalf of the World Heritage site, causing confusion and "freezing" of heavily needed programs that focus on sustainable socio-economic development for the local communities. This is a result of non-clarity of the different roles Governments, LTWHSA Committee and customary owners play in managing the

World Heritage Site. An example of a letter from the LTWHSA can be found in Annex 3.

Following constructive discussions during the 2015 UNESCO/IUCN mission, the Solomon Islands Government (SIG) adopted a Cabinet Paper in September 2016 to prioritize efforts made for the ERWHS. An inter-ministerial Core Team (Ministry of Environment Climate Change, Disaster Management and Meteorology, Ministry of Culture and Tourism, Ministry of Education, Provincial Government and Prime Minister's Office) for World Heritage was convened to implement the decisions from the Cabinet Paper. A national Round Table is organized for *June 2017***.** The aim of the Round table meeting is to unite all stakeholders, decide on the future implementation strategies for East Rennell World Heritage Site.

The Desired State of Conservation (DSOCR) that was developed during the 2015 UNESCO/IUCN mission, following discussions with ERWHS landowners and Solomon Islands authorities, has considered the importance of the implementation of DSOCR four (4) year plan of activities. The draft DSOCR for the World Heritage Committee's endorsement can be found in Annex 2.

The development of alternative income generating mechanisms is a top priority but will require substantial national and international support, in particular with regard to the development of eco-tourism and small business enterprises.

2. Response to the Decision of the World Heritage Committee

Decision: 40 COM 7A.49 (2016)
The World Heritage Committee,

1. **Having examined Document WHC/16/40.COM/7A.Add.2,**
2. **Recalling Decision 39 COM 7A.16, adopted at its 39th session (Bonn, 2015),**
3. **Regrets that the State Party did not submit a report on the state of conservation of the property, as requested by the Committee;**
4. **Takes note that a joint World Heritage Centre/IUCN Advisory mission visited the property to meet the customary owners and to assist the State Party in the preparation of the Desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR), but also regrets that the State Party did not submit a proposal for the DSOCR and requests the State Party to submit it by 1 February 2017, for adoption by the World Heritage Committee at its 41st session in 2017;**

The draft DSOCR for the World Heritage Committee's endorsement can be found in Annex 2

Following the UNESCO/IUCN mission in November 2015, the Solomon Islands Government developed a strategy to ensure the removal of the ERWHS from the List of World Heritage in Danger:

1) A Cabinet Paper was submitted to the Cabinet on 2nd September 2016 by Minister of Environment, Climate Change, Disaster Management and Meteorology and Minister of Culture and Tourism. The Cabinet noted the In-Danger Status of ERWHS and the underlying factors of its status (copy of Cabinet Paper conclusion can be found in Annex 1).

2) The Cabinet of Solomon Islands sees the importance to ensure that East Rennell World Heritage Site (ERWHS) is protected and tasked various SIG ministries to prioritize the ERWHS:

   - Directed the Ministry of Environment, Climate Change, Conservation, Disaster Management and Meteorology (MECDM) to consult with the landowners including LTWHSA and relevant stakeholders to register the ERWHS as a Protected Area under the 2010 National Protected Areas Act. A proposal for International Assistance from the World Heritage Fund for this effort (community meetings in East Rennell and hiring of legal expert) has been submitted and approved.

   - Directed the Commissioner of Forest and Minister of Forestry and Research to revoke and/or refuse granting any Felling License within all the area at East Rennell of the World Heritage site as per the map kept at MECDM.

   - Directed the Ministry of Culture and Tourism to revive its development assistance to ERWHS through an inclusive sustainable community-integrated tourism development program packaged for ERWHS.

   - Directed the Ministry of Infrastructure Development to provide technical and funding support for road improvement and Tingoa airstrip development.

   - The Terms of Reference based on the approved action points of the Cabinet conclusion will be developed. This is basically to drive work

regarding implementation of programs or activities in Rennell.

3) The decision to restrict issuance of logging license within the Western end of the Lake was noted by Cabinet (and was not requested for endorsement in the Cabinet Paper).

4) An inter-ministerial meeting which include Ministry of Culture and Tourism, Ministry of Environment, Conservation and Meteorology, Ministry of Education (UNESCO National Commission) was held to discuss the cabinet conclusions on ERWHS. It was then decided to form a Solomon Islands Government (SIG) Core Team for Heritage, with the participation of;
    1. Ministry of Culture and Tourism
    2. Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM)
    3. Ministry of Education (UNESCO National Commission)
    4. Ministry of Infrastructure Development
    5. Ministry of Mines and Energy – Water Resource Unit
    6. Rennell and Bellona (RENBEL) Provincial Government
    7. Ministry of Aviation and Communication – Aviation

    The SIG Core Team for Heritage was formalized and submitted to Prime Minister's Office on February 2017.

5) The SIG Core Team for Heritage developed a plan towards hosting a Round Table meeting for all stakeholders and future implementation strategies (including DSOCR) for ERWHS. A proposal for International Assistance from the World Heritage Fund for this Round Table has been submitted and approved.

5. Encourages the State Party to develop an Action Plan which would prioritize local communities and alternative income generating mechanisms that derive benefits from the conservation of the property's Outstanding Universal Value (OUV);

The development of alternative income generating mechanisms remains a top priority. The ERWHS can only be protected for the future if the landowner groups have enough funding, capacity and resources to adequately protect and manage the natural values and resources of the site. They require funding and substantial rural development aid in the form of improved communication and transport facilities, health and medical services, education resources and income-generating small business enterprises based on sustainable uses of the natural resources. The

isolation of the property and the consequent restricted access, requiring long-distance travel on infrequent and unreliable air services and extremely difficult overland travel assist in protection of the property but have also impacted on attempts to develop eco-tourism. Restricted transport links also hinder the ability of the community to obtain food and medical supplies, and to access markets for locally produced products.

The development of alternative income generating mechanisms is ongoing as part of the action points of the different ministries for ERWHS, the planned Round Table meeting and DSOCR. International/ external support is direly needed to complete the minimal government resources and capacity put into the ERWHS, in particular with regard to the development of eco-tourism and small business enterprises.

6. Urges the State Party to expedite the completion and implementation of the revised Management Plan for the property and also requests the State Party to submit an electronic and three printed copies of the draft revised Management Plan to the World Heritage Centre for review by IUCN;

Priority is currently given to the registration of the ERWHS as a protected area under the 2010 National Protected Areas Act. The ERWHS Management Plan can be revised to align it with the Protected Area regulation and guidelines. Developing and Revising the ERWHS Management Plan is a key milestone in the registration process of the ERWHS becoming a PA under the PA Act. As well as any existing Provincial ordinances.

7. Further requests the State Party to provide detailed information on all proposed bauxite mining projects on Rennell Island, including the Environmental Impact Assessments (EIAs) of each project, as well as an assessment of their potential cumulative impacts on the OUV of the property, in conformity with IUCN's World Heritage Advice Note on Environmental Assessment;

8. Reiterates its requests to the State Party to:

a) Defer consideration of bauxite mining license applications until the new management plan for the property has been approved and is being implemented,

Currently in West Rennell, there are two companies that have been issued with Mining licenses to extract bauxite from their respective tenement sites

as designated in the map (See Annex 3. Environment and baseline study report). The operation as stated in the report is targeting only bauxite pocket soils deposit and referred as a discontinuous form of mining method. With this method, it was proposed that it will have a lesser impact to the natural surrounding and ecosystem (s).

b) Put in place interim measures to mitigate the impact of existing logging operations and halt new logging operations until the new management plan has been approved and is being implemented,

As per cabinet directive, the Commissioner of Forest and Minister for Forestry and Research to revoke and refuse granting any felling license within East Rennell area where it was declared the World Heritage Site as per the map kept at the Ministry of Environment, Climate Change, Disaster Management and Meteorology and particularly the northern border described as 160”20’34” E-11”39’52”; and Southern boundary 160” 18’15” E-11”43’6”S.

c) Undertake urgent action to halt the further spread of rats on Rennell Island and prevent them from entering the property, to put in place the biosecurity controls necessary to prevent further introductions of invasive species to the island;

A proposal on the management of invasive species in ERWHS was submitted to CEPF last year to do ‘rat eradication’ at the lake by Steve Turton of Queensland University; however, due to the current uncertainty of governance mechanisms and status, CEPF decided to put “on hold” the proposal whilst waiting for grievances to be resolved by the community with guidance from the State and partners.

9. Requests furthermore the State Party to submit to the World Heritage Centre, by 1 February 2017, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 41st session in 2017;

Report submitted March 17th 2017.

10. Decides to retain East Rennell (Solomon Islands) on the List of World Heritage in Danger.

If the property is inscribed on the List of World Heritage in Danger
Please also provide detailed information on the following:

a) Progress achieved in implementing the corrective measures adopted by the World Heritage Committee

The DSOCR for East Rennell has not yet been endorsed by the World Heritage Committee.

b) Is the timeframe for implementing the corrective measures suitable? If not, please propose an alternative timeframe and an explanation why this alternative timeframe is required.

With the current establishment of the SIG Core Team for Heritage for the World Heritage site, the time frame as proposed in the draft DSOCR (4 years) is fine as the momentum to push some of the key agendas is picking up and seeing that SIG commitment with the cabinet conclusions opens the window to implement the corrective measures in time so as to remove the site from the danger list.

c) Progress achieved towards the desired state of conservation for the removal of the property from the List of World Heritage in Danger (DSOCR)

The DSOCR has not yet been endorsed by the World Heritage Committee. With the recent establishment of the SIG Core Team for Heritage, it is hoped that it will set the way forward and kick start some of the outstanding activities. This will eventually pave the way to implement the corrective measures and aiming to work collectively with other key stakeholders pulling resources together to remove the East Rennell World Heritage site from the danger list.

3. Other current conservation issues identified by the State(s) Party(ies) which may have an impact on the property's Outstanding Universal Value

[Note: this includes conservation issues which are not mentioned in the Decision of the World Heritage Committee or in any information request from the World Heritage Centre]

The impacts of climate change are increasingly being felt by the communities in the ERWHS. Sea level rise has resulted in increasing water levels and salinity in Lake Tegano, reducing the harvest of taro and coconut. Long droughts are also of particular concern. The impact of the current El Nino on the surrounding reefs and species living in ERWHS is unknown. Further technical studies are needed to

ascertain the risks, changing weather and climate, faced by the Property and its dependent communities.

4. In conformity with Paragraph 172 of the *Operational Guidelines*, describe any potential major restorations, alterations and/or new construction(s) intended within the property, the buffer zone(s) and/or corridors or other areas, where such developments may affect the Outstanding Universal Value of the property, including authenticity and integrity.

The road connecting Tingoa Airstrip in West Rennell with the 4 main villages in the ERWHS will be improved by the Ministry of Infrastructure Development. This is the only road that currently exists inside the ERWHS, and this road is in terrible condition. No impact on the outstanding universal value of the ERWHS is expected.

5. Public access to the state of conservation report:

[Note: this report will be uploaded for public access on the World Heritage Centre's State of conservation Information System (http://whc.unesco.org/en/soc). Should your State Party request that the full report should not be uploaded, only the 1-page executive summary provided in point (1.) above will be uploaded for public access].

Ok to upload the full report.

6. Signature of Authority

7.0. ANNEXES

7.1. Annex 1: Cabinet Conclusion on September 2016

DATE: 2/09/16

6. THE EAST RENNEL WORLD HERITAGE
(c) The Cabinet:-

A	NOTED	In Danger Status of ERWHS and the underlying factors of its status
B	APPROVED	The Pipeline of initiatives
C	DIRECTED	MECDM To consult with the landowners including LTWHA and relevant stakeholders to register the ERWHS as a protected Area.
D	DIRECTED	MCT to revive its development assistance to ERWHS through an inclusive sustainable community – integrated tourism development program packaged for ERWHS.
E	ENDORSED	The improvement of road access and upgrading of the Tingoa airstrip in West Renbell for immediate implementation
F	DIRECTED	The Ministry of Infrastructure Development to provide technical and funding support for road improvement and airstrip development.
G	DIRECTED	The Commissioner of Forest and Minister of Forestry and Research to revoke and or refuse granting any Felling license within all the area at East of Rennell of the World as Heritage Site as per the map kept at Ministry of Environment , Climate change, Disaster Management & Meteorology and more particularly the northern border described As 160” 20’ 34” E-11 “39’52”; and southern boundary 160”18’15”E-11 “43’6”S.

7.2. Annex 2: Desired State of Conservation for Removal of the Property from the List of World Heritage in Danger (DSOCR)

Desired State of Conservation for Removal of the Property from the List of World Heritage in Danger (DSOCR)

Proposal based on WHC-IUCN advisory mission to Solomon Islands from 13-26 November 2015.

East Rennell
Date of inscription on World Heritage List: 1998
Date of inscription on World Heritage List in Danger: 2013
World Heritage Inscription criteria (ix)
Overview State of Conservation Reporting: http://whc.unesco.org/en/soc/3196

Proposed timeframe for implementation

A timeframe of 4 years is proposed for achieving the DSOCR, starting upon its adoption by the Committee. This timeframe should enable the State Party to commence an extensive rat monitoring and/or eradication program (with international support), as well as to determine baselines for forest cover, as outlined in the indicators and their rationale below.

		INDICATOR FOR REMOVAL OF THE PROPERTY FROM THE LIST IN DANGER	RATIONALE	METHOD OF VERIFICATION

ATTRIBUTES	1	Forest cover in the property is maintained measured against the 2013 baseline (time of inscription on the Danger List)	Maintaining forest cover is essential for the conservation of the site's Outstanding Universal Value (OUV), especially with regard to the unmodified forest vegetation and avifauna for which the site was inscribed under criterion (ix) on the World Heritage List. Logging and mining reduce forest cover and threaten important forest habitat that is utilized by avifauna, and represent a material loss of natural values and protection within the property, thus directly impacting the reason for inclusion on the World Heritage List.	Satellite images determining the 1998 (time of inscription) and 2013 (time of inscription on Danger List) baseline for forest cover. Periodical analysis of satellite images indicating the current forest cover measured against the baseline. Adoption of a legal mechanism that would provide for application of the Protected Areas Act 2010 and the Rennell-Bellona Province Lake Tegano Heritage Park Ordinance 2009 to East Rennell, thus banning all logging and mining in the property.
INTEGRITY	2	Any extractive activities in West Rennell (logging, mining) are managed in a way that would prevent any negative impact on the OUV of the property and its integrity	Unsustainable logging and mining operations on Rennell Island have the potential to directly and indirectly impact on the OUV of East Rennell through habitat fragmentation and degradation especially near the boundary of the property. Some scientific research suggests that the forests on East Rennell are not large enough to remain ecologically functional without the forests on West Rennell. More scientific research is urgently required to determine the critical forest areas in West Rennell that support the ecological functioning and the integrity of the property and the conservation of its OUV. The	Development of a 1998 (time of inscription) and 2013 (time of inscription on Danger List) baseline for forest cover. Periodical analysis of satellite images indicating the current forest cover measured against the baseline. Critical forest areas in West Rennell that support the ecological functioning of East Rennell are identified based on sound science, and these areas are excluded

			results of this research will also help policy makers with the development of a sustainable forest management framework in West Rennell in time and space.	from ecologically damaging activities, such as logging and mining. Legal mechanism(s) regulating approval processes for any sustainable forest and mining activities in West Rennell and their management have been established, based on the ecologically critical areas described above. The Code of Practice is applied to existing logging leases in Rennell Island until their completion and no activity that has the potential to impact the OUV of the property is permitted, unless ESIA has indicated that it will not create a negative impact on the property, and the necessary actions specified in the ESIA to prevent such damage are implemented.
	3	Threats to the OUV of the property from already introduced invasive species have been identified and minimized and biosecurity measures have been established	The black rat is among the most widespread invasive vertebrates on islands and continents (Shiels et al., 2013). It survives well in human dominated environments, natural areas, and islands where humans are not present. *Rattus rattus* is typically the most common invasive rodent in insular forests (Shiels et al., 2013). Few vertebrates are	Assessment on the impact and extent of the distribution of invasive rats (*Rattus rattus*) on Rennell Island, and in particular on the OUV of the property. Effective activities to minimize the impact of already introduced

		to prevent new introductions	more problematic to island biota and human livelihoods than *R. rattus*; it is well known to damage crops and stored foods, kill native species, and serve as a vector for human diseases (Shiels et al., 2013). The black rat is an omnivore, yet fruit and seed generally dominate their diet, and prey items (including eggs and hatchlings) from the ground to the canopy are commonly at risk and exploited as a result of the prominent arboreal activity of black rats. It is likely that there have been multiple introductions of black rats (and potentially other species) into West Rennell via the ocean-going barges that originally came from China and now process logs through Honiara Port, where black rats are common. Rats have been observed by local communities inside the World Heritage property. The accidental introduction of the Giant African Land Snail (*Achatina spp*.) into Rennell Island is considered to be a serious potential threat to the OUV of the East Rennell World Heritage site and also to food security on the island. Considered one of the 100 world´s worst invasive alien species, intense concern is raised due to its adverse impact on agriculture, human health and native fauna (Vogler et al., 2013); moreover, once established this snail is impossible to eradicate. More research is urgently required to understand the	invasive species, especially via the eradication of rats, are underway, adequately funded and showing positive results (eg., rat eradication program with international support and working closely with local people and relevant state and provincial government personnel, …). Effective biosecurity measures are fully operational at places of disembarkation on Rennell Island (airport, seaport, log ponds) to prevent the accidental introduction of invasive species (eg., rats, snails, ants, plants) on Rennell island.

			population dynamics of invasive rats (presence, population density, current distribution, rate of spread) and its impact on the OUV of the property. A full eradication of black rats on Rennell Island will be very difficult because of its large size (Shiels et al., 2013), therefore research will help to identify next steps and potential international support.	
	4	Coconut crab and other marine resources are harvested in a sustainable manner based on traditional resource use regimes	The people of East Rennell harvest crayfish, giant clam, trochus (sea snail) and reef fish for consumption and for sale. Beche-de-mer (sea cucumber) was a key resource for income generation until a national ban on its export was imposed in 2005, which shifted the pressure to trochus. Coconut crabs, which are important for subsistence use and as a source of cash income, are harvested year-round. Crabs have disappeared from the western part of Rennell Island, and within the property the harvesting success rate is dropping, raising concerns that increased harvesting pressure may lead to localised extinction of the species. Harvesting of marine resources is essentially unregulated and traditional conservation measures have been supplanted by a more commercial approach. For coconut crab there are no community-based controls on target animals or on harvesting levels, times or durations (IUCN mission report, 2012). Controls on harvesting of marine resources and coconut	Adoption and enforcement of restrictions on harvesting levels for coconut crab (number and size of animals allowed to be harvested), establishment of no-take zones and imposition of seasonal restrictions, through the revised Management Plan for the property or another mechanism. Population data for coconut crab and other key indicator species (to define) compared to baseline data (to be collected, relative to a date as close as possible to the date of inscription on the World Heritage List).

			crabs are urgently required, including restrictions on the number and size of animals harvested, prohibition of taking pregnant females or eggs, and imposition of seasonal limits and no-take zones. A return to traditional conservation measures should be encouraged. This should be accompanied by research, survey and monitoring along with training and awareness-raising in the local community (IUCN mission report, 2012).	
MANAGEMENT	5	The management plan for the sustainable management of the property has been officially adopted and is being implemented	A management plan would integrate the development needs of the local communities with the priorities of protecting the OUV of the property. Completing and adopting the management plan, with consent of the customary owners, will strengthen the actions and rules of the management plan, especially those that relate directly to the Protected Area Regulations and as such would be enforced through the Protected Areas Act. Without continuous financial and technical support, the decisions made by the Lake Tegano World Heritage Site Association and the objectives of the management plan cannot be implemented on the ground. Once continuous support is available for basic activities, extra sources of funding for specific projects could be more easily attracted from a wide variety of sources. Without a viable income-generating alternative for	The new management plan has been endorsed by the Lake Tegano World Heritage Site Association. The Solomon Islands Government has allocated funding for the implementation of the management plan. The Solomon Islands Government has adopted an Action Plan to prioritize East Rennell and its local communities, and to develop alternative income generating mechanisms that derive benefits from the conservation of the property's OUV.

			mining and logging, it could be difficult for local communities to continue to support the sustainable conservation of the World Heritage property. Climate change has already resulted in decreased food security and increased dependency on imported food for which cash money is necessary thus increasing the need for cash income even more in the short term.	

7.3. Annex 3: Asia Pacific Investment Development Limited Report

ASIA PACIFIC INVESTMENT DEVELOPMENT LTD

Rennell Island Bauxite Deposit, Renbel Province
Prospecting License: PL 04/08

ENVIRONMENT TECHNICAL REPORT

APPLICATION FOR MINING LEASE

APRIL 2014

CONTENTS

EXECUTIVE SUMMARRY

Relevant national legislation require that prior to such mining development taking place on the ground, an environment assessment is to be carried out to assess the status and condition of the environment so that potential impacts of the mining development are identified and mitigation measures can be ascertained. This has been done for this development activity and this is the summary of that assessment.

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Rennell island is an uplifted coral atoll and is one of the world's largest of such uplifted coral atoll. Bellona and the indispensable reef are part of the same uplifted coral reef system. The present landform shows the former coral reefs that form the island. The island is a bi-lobed basin joined together at the centre at the Kangava Bay area. The highest points of the island are at the rim of the island on the islands perimeter. Its central interior comprises the lowland areas. More than 70% of the island surfaces are covered by dolomitic coral or limestone rocks that make it difficult to access the interior of the island. The climate is tropical with a daily temperature of 22.7°C and 32.2°C but usually cooler and wetter than the larger islands of the country due to its location which is further south of the Solomon group. There are no rivers or streams on Rennell but rock pools, caves, sink holes and the mighty, slightly brackish and saline Tengano lake at East Rennell.

Rennell Island's tropical climate is characterized by high and uniform temperatures and humidity. The daily diurnal temperature is normally between 22.7°C and 32.2°C. The island, as with Bellona, is usually wetter and some degrees cooler than most of the larger islands of the country. Its annual rainfall is about 3000-4000mm

The forest or vegetation of the island are biogeographically unique and are markedly different from the forests of the main Solomon group. They also show lower diversity than the larger islands in the group. The three main forest types are karst forest of the ridge crest and steeply sloping terraces, lowland tall forest of the central interior and the beach forest of the Lake. The fauna, especially the avifauna show high endemism. Existing information show that the island is a classic example of on-going ecological and biological processes and is an important site for the science of island biogeography. It is hence considered as an important stepping stone in the migration and evolution of species in the western Pacific and for speciation processes, especially with respect to avifauna. Combined with the strong climatic effects of frequent cyclones, the island is regarded as a true natural laboratory for scientific study.

The above outstanding ecological features were the main reason in the designation of East Rennell as a World Heritage site in 1998 with the support of the local communities. In 2013, the site has been placed on the List of World Heritage site in Danger due to logging of West Rennell. The local communities have now expressed their wishes to explore other developments as the World Heritage site has not brought them the benefits (from tourism especially) as they were promised. After 16 years after the site was designated a world heritage site, there is hardly any tourism in Rennell, an activity promoted with the designation of the site, and benefits have been lacking for the local people. Many have turned to logging.

Even though the island is of rural status and does not usually have well developed activities, some development activities have taken place on the island and already have their own adverse impacts. These include the Tingoa township, airstrip, the main Rennell Island road network, and the many coconut plots, subsistence gardens and village settlements. The most recent development which is of concern is logging.

In the 2009 census, Rennell and Bellona has a population of 3041 and an annual growth rate of 2.5%. This is about 1% of the total population of Solomon Islands. Rennell island itself has a

population of 2176. The west Rennell area where this project is located, (wards 3, 4, 5 and 6) has a population of 1431. Most of the islands population have moved to Honiara and Russell Islands in search of better services.

The Mining method proposed for this Bauxite operation is very simple and does not involve the use of high technology equipment, chemicals or other hazardous materials. It simply involves the digging of the ore from their pockets using excavators, transport them in large transport trucks to a drying area and then load them into ocean going vessels using barges for shipment to an overseas destination (China). The bauxite pockets are scattered within the central interior of west Rennell and will be mined in phases and progressively rehabilitated to return them to a vegetated condition as soon as mining in the pocket is completed. Otherwise future use of the mined out pockets will be determined by the landowner themselves.

The main potential adverse impacts identified from the assessment are : Loss of cultivable subsistence land; loss of coconut plots, houses and playing fields; potential for hydrocarbons to enter subsurface flow and surface water flow on the Lake, short term decrease in biodiversity due to reduction in forest cover from mining, road and infrastructure areas, loss of outstanding universal value in the East Rennell World Heritage site, public access on main roads affected (limited due to volume of traffic), increase in lifestyle diseases due to increase income, low entrepreneurial participation by locals on related services, increase alcohol and substance abuse with antisocial behaviour, declining social/cultural norms and behaviour, and impacts of climate change on various components of the development

The following are the main mitigating measures suggested for the operation: mining will commence from the most western end of Rennell to limit potential direct influences and adverse impacts to the East Rennell World Heritage Site, all mining pockets will be progressively rehabilitated and re-vegetated, a relocation programme will be designed for affected villages and amenities, an Environmental Management Plan will be detailed to take care of all issues of concern in detail, a Waste Management Plan will be formulated for waste management issues, a Water Management strategy will take care of issues relating to water and its use, and APID will assist in implementation of East Rennell World Heritage Site Management Plan e.g. assist in eradication of invasive species such as the new introduction, pacific rats, and helping to address declining Taro production in the lake due to pathogenic issues and rising water levels.

This assessment has found that this mining operation will be a clean and sustainable operation in mining industry standards as it involves simple mining techniques and does not produce undesirable hazardous products, and no waste ore due to no significant processing of ore on site. It does not involve any chemical processing on site and thereby no such issues as tailings and waste water. All ore is taken and processed overseas. Apart from the loss of forest cover and its consequential impacts, most environmental issues are insignificant. It is recommended that APID be given a license to mine the resource but to adhere to environmental management plans and other guidelines to be detailed further to assist the operation so that the human and natural environment is taken care of and sustainably managed.

1. INTRODUCTION

This Environment Impacts assessment Report has been prepared to meet the requirements of the Mines and Minerals Act. It has been specifically prepared to assist the Minerals Board in its deliberation for a Mining License application for the commercial mining of Bauxite resources in west Rennell by the Asia Pacific Investment and Development Limited (APID). The format of the report adheres to the format as required under the Environment Act 1998 and the Environment Regulations 2008 as the format as required under the Environment Act and the Environment Regulations covers all environment issues as catered for under the Mines and Minerals Act. The developer is committed to the production of a further detailed and refined report to submit to the Environment and Conservation Division for its application for a 'Development Consent' as required under the Environment Act as soon as possible.

In the Mines and Minerals Act, an application for a Mining License/lease must also be accompanied with an Environment Impact Statement. APID believes that this report meets that requirement. The substantive environmental approval will be made when a more detailed environment report as required under the Environment Act, is submitted to the Environment and Conservation division of the Ministry of Environment, Climate Change, Disaster Management and Meteorology for a 'Development Consent'. This will have to be done, as 'Mining' is a 'prescribed development' under the Environment Act 1998 and 'prescribed' developments are required to be subjected to some form of environment impact assessment (EIA) depending on the type, level and location of the development.

This assessment report identifies the potential impacts from the various aspects of the development of the bauxite resource in Rennell and proposes measures to mitigate, eliminate, reduce and manage those impacts at levels that will still allow the socio-economic and natural systems to sustain or improve itself in the long term.

It is also important to note that the formulation and production of environment assessments reports, is not only for the sole purpose of meeting statutory or regulatory requirements but is also part and parcel of the commitment of industry and the consumers to institute environmental best practice in their business and ensure development activities safeguards the environment and promotes sustainable development principles. As such, this report is a tangible manifestation of the Asia Pacific Investment and Development Limited's (APID) commitment to observe and apply best practice in environmental management in its development activities.

The developers are aware that national policies and strategies do exist and do require and demand the integration of environmental considerations into all forms of economic and social development activities. The Asia Pacific Investment and Development Limited endeavors through this report to meet those requirement as well. The exercise that APID went through to compile this report seeks to fulfill and adhere to those national polices. The Asia Pacific Investment and Development Limited is also aware that Solomon Islands does have regional and global commitments to care for and manage the environment in a sustainable manner. This effort will show that Solomon Islands and its national partners are cooperating towards the fulfillment of those commitments. This report will therefore not only fulfill our desire to be granted the license or approval for the Bauxite mining activity we seek, but also shows the company's support for the promotion of sound environmental management practice in all walks of life as a way to achieve sustainable development in Solomon Islands.

As required under the Mines and Minerals Act, this report is the environmental impact assessment report submitted by the developer, the Asia Pacific Investment and Development Limited. Following the assessment exercise and the formulation of the report, the general view is

that, the proposed west Rennell mining of bauxite deposits and the mining method proposed pauses no significant adverse impacts on the Rennell environment. Rennell Island has been subjected to natural disaster events regularly and has recovered to its current natural state. The last major one being Cyclone Nina in 1994 which caused considerable damage to the forests of the island and therefore its biological diversity. Yet what has come about to the forest today with its pristine condition and good cover exemplifies the rigor of the forest of Rennell that it can recover very quickly from the adverse impacts of such disturbances. The proposed mining method proposed for this project and all its related infrastructure will create impacts less than the physical and ecological impacts of the major cyclones that the island has experienced in the past. The mining method is simple, not high technology intensive, there is no chemical processing of ore, no ore wastes or hazardous, and no tailings. In fact the operation is a sustainable and green operation that provides huge benefits than adverse impacts or losses in mining industry standards. It is recommended that APID be granted a Mining lease pending completion of other necessary statutory requirements and the submission of a more detailed EIA for a development consent.

2. POLICY. LEGAL AND ADMINISTRATIVE FRAMEWORK

A comprehensive Minerals policy has not been instituted in Solomon Islands for some time even though there have been talk about its need for many years. There has even been a draft policy formulated some years ago but no effort was committed to continue work on the draft to its completion.

At the national political level, the current National Coalition for Rural Advancement (NCRA) government policy statement provides the basis for action and policy implementation for national programs and activities. The NCRA policy statement focuses on a new Solomon Islands with special emphasis on rural development which could assist rural Solomon Islanders to be more self sufficient.

Under the major sectors policy program, the NCRA government states that it recognizes the importance of the private sector and shall vigorously pursue the development of the productive sector, especially in tourism, fishery, agriculture and mining. Under its specific focus on the mining industry, the NCRA government states that it recognizes the potential for increased mineral development in the country and would immediately pursue tendering the selection of potential investors for the development of mining projects with landowning groups. It further stated that it will pursue such major objectives by:

- updating all information and data on mineral deposits in Solomon islands;
- pursuing an urgent aerial survey to determine the mineral potentials in Solomon islands;
- corporatizing the secretariat of the industry and build their capacity so that compliance to the mining act is enforced;
- adopting the requirements of the Extractive Industry Transparency Initiative (EITI) as part of the reform program; and
- ensuring that only formally registered companies are licensed to export alluvial gold.

The above NCRA statements are relevant to this project development and do support the purposes of these development project. In the long term at the operational level of the government, however, the current Solomon Islands National Development Strategy (SINDS) 2011 – 2020 provides for the more concrete policy actions and strategies that guide many agencies and groups in their long term programmes.

The vision of the strategy states, 'A United and Vibrant Solomon Islands', and its mission is to:

- create a modern, united and vibrant Solomon Islands founded on mutual respect, trust and peaceful co-existence in a diverse yet secure and prosperous community where tolerance and gender equality are encouraged and natural resources are sustainably managed ; and,
- to enable all Solomon islanders to achieve better quality of life and standard of living for themselves and their families through constructive partnership for social, economic, political and spiritual development'.

The strategy has the following focal areas:

- To build better lives for all Solomon islanders (overarching Focus Area)
- Taking better care of all the people of Solomon Islands (central focus area)
- Improving the livelihoods of all the People of the Solomon Islands (central focus area)
- Creating and Maintaining the enabling environment (underlining focus area)

While all of the major focus areas of the strategy are relevant to this project, the most relevant is the third focus area, 'Improving the livelihoods of all the People of the Solomon Islands'. This focal area is aimed at improving the economic benefits to the people through higher growth,

increased employment and the distribution of the benefits of development. The focal area has two major objectives:

- To increase the rate of economic growth and equitably distribute the benefits of employment and higher incomes amongst all the provinces and people of the Solomon islands; and,
- To build an upgrade physical infrastructure and utilities to ensure that all Solomon Islanders have access to essential services and to markets *(SIG, 2011).*

Much of the implementation of such policies is the responsibility of government agencies through their own sectoral and annual plans. It is also important to note that at the provincial level provincial development plans also exist that support such development projects as this.

Apart from the politically based policies, the national development plans, and sectoral plans, the legal framework in the relevant sector already exists to provide the basis and direction for policy development in the country. In the mining sector the principal legislation is the Mines and Minerals act and its regulations. Other legislation in the sector includes the Petroleum Act and Continental shelf Act. The Mines and Minerals act is principal act that governs all aspects of mining. It establishes a system for mining applications and licensing, and a Minerals Board regulates and controls mining activities and includes prospecting. The act requires that all mining projects submit an EIA report which shall include an EMP.

In 2013, the NCRA government committed to an effort to draw up an independent body to be known as the Mineral Resources Authority to look after the affairs of the Mining sector but this effort was not accepted by the resource owners and the provincial governments. The government is now focusing its effort in cementing its membership of the EITI. This will add more reform to the sector.

In the environment sector, the principal legislation is the environment act 1998 and its related environment regulations. The Act makes provision for the conservation and protection of the environment and establishes the environment and conservation Division (ECD).

The Act provides for an integrated system of development control, environmental impact assessment (EIA) and pollution control including

- Prevention, control and monitoring of pollution including regulating discharge of pollutants to air, water or land and reducing risks to human health and prevention of degradation of the environment;
- Regulating the transport, collection, treatment, storage and disposal of waste and promoting recycling, reuse and recovery of materials in an economically viable manner; and
- Complying with, and giving effect to, regional and international conventions and obligations relating to the environment.

The environment act has considerable power by virtue of article 4 (1) which states that in the event of conflict between the Act and other Acts, the provisions of the environment Act shall prevail.

The Regulation under the Environment Act cover detailed requirements for EIA and has a schedule which lists all ‘prescribed developments that will need to undergo some form of EIA. All prescribed developments require a simple scoping assessment through a ‘screening’ or ‘scoping’ process, to determine what additional assessment is required. Most development projects require a public environment report (PER), while many major projects will also need a second stage of appraisal which include technical, economic, environmental and social investigations presented in an EIA or environmental impact statement (EIS) report.

The principal agency, in terms of the administration requirements in the mining sector, is the Ministry of Mines, Energy and Rural Electrification. Under the Mines and Minerals Act, the principal administrator is the Director of Mines who is the principal advisor to the Minister on all matters relating to geology. The director is assisted by inspectors of mines and other officers who are appointed under normal Public Service procedures. The Act also establishes a Minerals Board who is vested with considerable powers including an advisory role to the Minister, and the approval of prospecting and mining lease applications.

It seems that currently, the statutory agencies above continue to have systemic institutional capacity issues which continue to affect their performances in enforcing the relevant Acts. There exist many other relevant legislations when it comes to mining and development of infrastructures. These include the Lands and Titles Act, Customs and Excise Act, and Foreign Investment Act which are implemented by other agencies or ministries. These agencies however would have similar problems in enforcing or implementing their relevant acts.

3. GENERAL INFORMATION /BACKGROUND

3.1 The Proposed Development

The Asia Pacific Investment and Development Limited Bauxite Mining project currently comprises the following major components on location at West Rennell:

- Numerous Bauxite Pocket Deposits,
- Major Road Net Work and Hauling Roads Connecting Pocket Deposits
- Road Transport Fleets
- Mining Equipments On Pocket Deposits
- Stockpile Areas or storage bases
- Ore Drying Areas
- Workshop facilities
- Fuel storage area/depot
- Wharf or Marine Loading Area
- Marine Vessel Fleets
- Workers Camp
- Power System facilities
- Health Centre

The proposed development will involve the extraction of bauxite deposits which are made up of bauxite soil contents using specially designed vehicles and equipments, load them into large transport trucks and get them to a stockpile area on the south of the island where they will then be taken to the marine loading area where they will then be dried to less than 20% moisture content before loaded into barges which will transfer the load to ocean going vessels that will take the load direct to overseas markets.

This report is part of the company's application for a mining lease over its current tenement which the company hopes will be granted as soon possible to allow it to proceed with actual construction as soon possible within the next few months.

3.6 Name and postal address of designated proponent

The principal development proponent of the Rennell Bauxite Mining project is the Asia Pacific Investment and Development Limited, of the following address:

Mr. Ray Chu
Asia Pacific Investment and Development Limited
P.O.Box 1927
Honiara
Solomon Islands

Tel. (677) 39147 Fax. (677) 39148
Email: Website: www.

3.7 Outline of the object of the development

The main objective of the Rennell Bauxite Mining project is to extract the Bauxite resources from the numerous Bauxite pockets that occur as physical depressions on the surface of the uplifted coral island of Rennell. These deposits were assessed by the companies' geologists and confirmed what was previously discovered and proved by the multinational corporation, Mitsui

Corporation of Japan. Mitsui was in fact granted a Mining lease over the deposit when it worked at Rennell in the past.

The development will involve the extraction of the Bauxite resources which comprises of soil contents from the pockets which differ in areas, and size but with an average area of about 0.5 - 1 hectare per pocket. These pockets also have an average depth of about 5m each. Current proven reserves amount to about 26 million metric tonnes. More reserves do exist but will still be subjected to further geological analysis. This has the potential of putting the total known proven reserves to around 35 million metric tonnes for the current application.

There will be a major road network that will be established from the west end of the island to the Lughughi bay. This will actually involve the improvement of the current road system which was established by Mitsui in the past. The road will basically be widened to allow ease of movement for the large transport vehicles that will transport the ore to the designated stock pile areas. This major road network will then connect to the pocket areas where the Bauxite resources are, via improved hauling roads. These also do exist from the Mitsui operation in the past and will simply be reopened and improved to connect the pockets for ease of access. As the Bauxite pockets are numerous and spread throughout the central region of the island from the west to the middle end of the island around the Lughughi bay, the road network will be comprehensive and will be a significant system.

To the south of the island around the Lughuhi bay area will be established a stockpile area where the ore will be stockpiled for transport down to the coast at the bay area where the ore will be stock piled for drying prior to loading for export. From the stockpile area to the coast, the ore will be transported by large transport trucks to the marine loading area. At the marine loading, there will be established a large enough area of around 16 hectares for the ore to be sun dried to less than 20% moisture content before they will be loaded into barges and taken to the ocean going vessels direct to the company's buyer overseas where the ore can be taken to smelters for processing.

The marine terminal area will be an improved site from what is currently seen at Lughughi bay. There will be an improved port and an improved terminal area for loading the ore to the barges and on to ocean going vessels. During the mining operation, there will be ocean going vessels loading bauxite ore from the marine terminal on a daily basis.

There will be many specially designed excavators, dozers, dumps trucks etc as part of the large transport fleet that will be key to the transport needs of the operation. A power supply system will also be installed to power to the operation's camp that will also be established to accommodate the workers and laborers. It is expected that the mine will employ around 600 people when in full operation. More people will hopefully be involved in many other related services which should increase the number of employed many times fold. As there will be a large transport fleet, a workshop will also be established to take care of and manage such a large fleet and take care of other essential operational equipment and instruments.

The operation will also involve a large marine vessel fleet involving barges and ocean going vessels. These vessels will be conforming to national and international maritime safety standards and will abide by all requirements of the International Maritime Organization. As such there will also be a fuel storage area that will be used by all the land vehicles and some of the marine vessels that will serve key components of the mining operation at the coastal port loading area.

The bauxite pockets occurs over a wide area of the central area of the island and inter mixed with local village locations and other establishments such as playing fields, coconut palm plots

and even graveyards. An environmental management plan will be detailed for further approval to take care of such issues during the operation of the development.

The mining development will provide significant benefit packages to the local people and their communities of Rennell through royalties, employment, rentals and so forth which will be negotiated between the developer and the communities and which will be finalized in specific agreements.

3.4 Location of proposed development

The mining development is located on the west part of Rennell in the central interior region from the Kagua area to the west of Kangava bay area. The area is covered under wards 3,4,5 and 6 of the provincial ward boundaries. Rennell is about 1 hour flight south from the capital, Honiara. The location of the development is shown in the figure below.

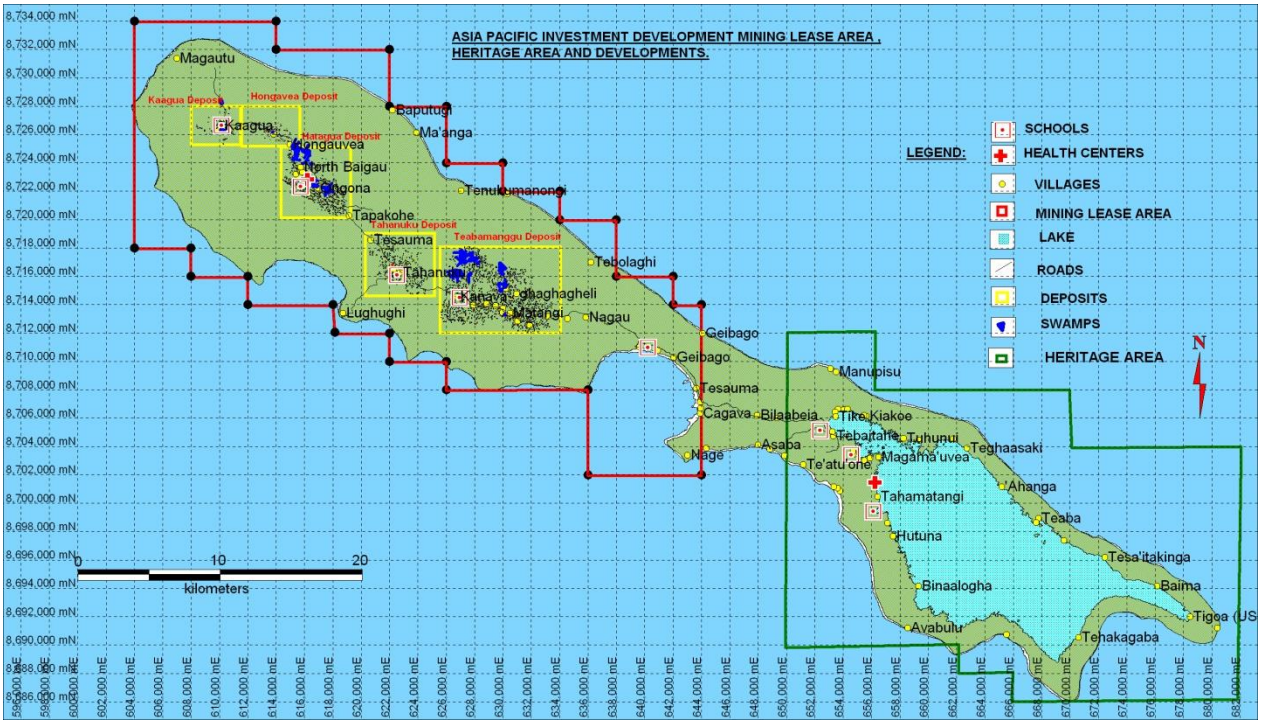

Fig. 1 Project location - Rennell Island showing proposed Mining Lease area, actual mining area (deposits), roads, East Rennell World Heritage site, villages, schools etc.

Whilst the pocket desposits occur within the central interior as shown, the port loading area will be at the Lughughi Bay. The stockpile base will also be at a location closer to the Lughughi Bay.

3.5 Other development projects in the area

As with many rural areas of Solomon Islands that are mostly undeveloped, there are no well developed projects in the West Rennell area except for logging operations which have been recently allowed (since 2008) and have started in the province. This proposed mining development will not occur on natural forest areas but on areas that are already disturbed by other development activities even though many are small as they may be. The areas targeted by this mining are also on already degraded forest areas that have been modified to that status by anthropogenic and natural disturbances. Some of the development activities observed and known in the area are briefly described below.

3.5.1 East Rennell world heritage site

The largest and the best known development activity on the island is the East Rennell World Heritage Site. It was listed as a world heritage site in 1998 and is the first world heritage site in the insular Pacific and is also internationally well known. The site covers the east half of the island and was established due to the outstanding and unique universal conservation value of the site. (see figure.2.) There have been challenges in managing the site and sustaining it due to what the local people say is the lack of benefits from the designation of the site as a world heritage site. The local people have now expressed the view to explore other means of development on the site which are not so compatible with world heritage principles.

*fig.2 . location of East Rennell World Heritage Site (*from Turton, 2014)

3.5.2 Pacific Crest logging operation

A logging operation is currently going on in the northern coast of Kagua, at the Northwestern end of the island. This operation is owned by Pacific Crest. The operation is currently inside the tenement areas of APID and targeted for this mining application. The disturbance already caused by this operation is a concern to the mining company. It is important to note therefore that some of the areas targeted by the mining operation are already disturbed by this operation which was unfortunately allowed into the island.

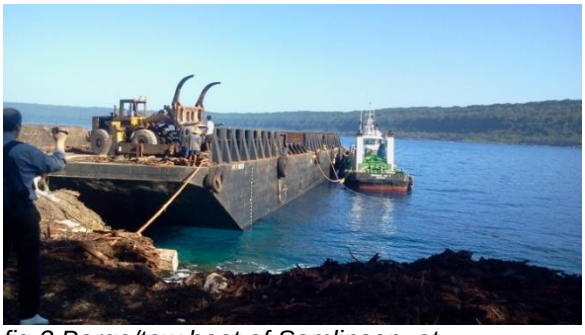

fig.3 Barge/tow boat of Samlinsan at Lughughi bay

3.5.3 Samlimsan Logging operation

Another major logging operation occurs about to the north of the island. This is also the Samlimsan logging operation that has been subjected to public debate between members of the public and the company. The operation has a log pond area and port at Lavena Bay where extensive disturbance has been done to the coastal and marine environment. The operation has ceased and has moved to Lughughi Bay

fig.4. Former log pond at Lavena bay

3.5.4 Tingoa airstrip

The Tingoa airstrip is one of the most important services on the island as it caters for the only means of reliable transport travel to the province which is by air. The airstrip is about which is about 800m long was first established by the Americans during the war and later improved by Mitsui during their prospecting work there. This airstrip provides for the most significant service to the province and provides a critical service to the communities of Rennell. The flight between Rennell and Honiara is one hour. There is currently two weekly flights to Rennell from Honiara.

fig.5. Tigoa airstrip

3.5.5 Tingoa township)

The Tingoa township which is the provincial headquarters is the most significant development in the province in terms of infrastructure, services, and population are concerned. It is where the provincial services are located and is the largest human settlement unit in the province. The township also has other services such as a school, airstrip, telekom, churches and other government agencies.

fig.6. Tigoa township

3.5.6 Tingoa Health Centre

The Tingoa health centre is the main institution that provides hospital services to the people of the province. It has resident doctor. As it is a small health centre, it lacks many essential services as required in provincial hospitals. All major medical cases get referred to the referral hospital in Honiara.

fig.7 Tigoa Health centre

3.5.7 Tingoa Telekom Centre

One of the most significant service seen on Rennell is also the telecommunication service provided by Our Telekom at Tingoa township. At present there are no direct line services but mobile telephone services enjoyed by all throughout the most part of the island.

fig.8. Tigoa Telekom

3.5.8 Fisheries Centre

In the coastal area of Kangava Bay, a Fisheries centre exists to provide marine and fisheries services to fishermen of Rennell. The centre is located at Lavaqu village within the bay area, but has been run down and has not function as it should.

fig.9. location of fisheries centre

3.5.9 Schools

Rennell records a very high enrolment of students in schools from the last population census. This is 97.3% for 6-12 year olds, 96.3% for 6-15 year olds and 83.1 % for 15-19 year olds. Literacy rate for 15 + years is 99.1 %, and 98.3% for 15-24%. There are a total of 9 primary schools in the province. There are currently two community high school one of which is the New Place Community High School located at Tingoa township and is also a boarding school. There is one known vocational centres and tertiary level education is provided through the extension services of the University of the South Pacific.


fig.10. Tigoa CHS

3.5.10 Coconut plantations

The Rennell coconut variety is the most well known and popular variety of coconut in Solomon Islands and had been given to farmers throughout the country to farm. Coconut plantations in Rennell at present are not that large and are mostly small plots that are mostly used for subsistence purposes. Most of these are found associated with the village settlements in the interior and also on some locations along the coasts.


fig.11. Coconut plantation, Tigoa

3.8.11 Rice farms

Some villagers have converted the village garden areas and have used them for rice farming areas. There is not enough information to determine if these rice farms still exist though. There is no enough land area to into more extensive rice farming activities on the island, even for other major agricultural crops.


fig.12. Rice farm on bauxite pocket

3.5.12 Human/Village settlements

Major villages and human settlements in the area are shown in the map on fig1 . The main villages are Segena, Kagua, Tepoogima, Hongauvea,Tingoa Township, Gogona, Tapakohe, Tesauma, Tahanuku, Kanava and Teabamagu. The population of these villages is about 800. The main Tingoa township comprises people from the immediate local area, other parts of Rennell and workers from other parts of the province and the country.

fig.13. Typical village house, Tigoa

2.5.13 Subsistence gardens

Many communities in the rural areas depend on their subsistence garden for their daily survival and this is no different with the communities covered by this project. Subsistence gardens are similar as one may find in the other parts of the larger islands and provinces. All the gardens in Rennell are located in the Bauxite pockets as this areas are the only areas where there are soils in Rennell. Otherwise all other land surfaces in Rennell are covered by coral rock or dolotomized coral and are untenable for subsistence agriculture. Common garden crops are potato, cassava, taro, slippery cabbage, melon, and pawpaw

fig.14. Typical subsistence garden

3.6 Current status of the prescribed/proposed development

The Asia Pacific Investment and Development Limited has acquired the prospecting license to prospect for bauxite and other minerals in the West Rennell area (PL 04/08) This license is still valid but has been renewed once in 2012 due to the global financial crisis. These same resource was previously under the prospecting work of Mitsui Corporation of Japan who had already proven the reserves and had acquired a Mining License for it in the past. APID prospecting work however had proven once again the existence of the reserve and has now found it viable for its commercial extraction.

All in all, APID has already proven a commercial reserve of about 26 million tonnes of bauxite and is now ready to go into mining. All of APIDs overseas analysis of the bauxite ore by various overseas smelters has proven a very high content of bauxite in the samples which now give it the urge to proceed on to a commercial mining operation, given the economic circumstances of the Solomon Islands right now.

The APIDs prospecting programme has now identified and located enough ore reserve bodies or pockets and is satisfied that this is now viable for an immediate commercial operation. APID group has been in constant contact with its key landowning individuals and group and is satisfied

with the support rendered to it by the key landowning families and individuals. In fact APID has already advance negotiations with the landowners who have already signed on to the development of the resource. They have also urged APID to speed up work on the development of the mine.

It is probably appropriate to remind all as well that, the Rennell Island tenement had already been acquired for mining in the past by the government for the Mitsui Mining operation. There have even been trial Mining of some of the Bauxite pocket (at Tingoa) and all landowners or tribes and clans have already been identified during the Mitsui operation as far as the land is concerned. Since the mining technique and methods is so simple, APID is ready to proceed with mining immediately following finalization of relevant agreements.

3.7 Consequences of not proceeding with the development

The whole general purpose of this bauxite mining development, in Rennell is to

- develop a commercially viable bauxite mining operation on Rennell Island in an environmentally friendly manner and in accordance with the business objectives of the investors and wishes of the local people and their communities,
- extract and produce bauxite ore for the international market for use in the relevant industry
- work together with the national, provincial government and local tribes and communities in mining development activities.
- develop and maximize the economic and social benefits of the resource to the governments, people of Solomon Islands and Asia Pacific Investment and Development limited.

None of such objectives will be achieved if the development project does not go ahead. One of the most obvious need of the independent sovereign nation of Solomon Islands is to diversify its economy and to move away from the narrow focus on agriculture and industrial logging. It has become so obvious that the Solomon Islands is too dependent on the logging industry which is now fast declining due to the depletion of the resource which will certainly run out soon. This now necessitates the development of new resources and it is hoped that the development of our mineral resources will hopefully take the place of the declining logging revenue due to the disappearance of our commercial forest. This is very important for the future security and sustainability of Solomon Islands as a sovereign independent nation. Without any replacement to the obvious lost revenue from the logging industry, Solomon Islands will face dire socio-economic consequences.

A number of significant development activities in Rennell has also been associated with what the local people say was the slow pace of developing the bauxite resource. The local people have already gone through the experience of the Mitsui prospecting activities and do know and believe that the resource is worth developing but has not been developed due to reasons not known to them. The consequences of these is that the local people have now turned to logging, which is more destructive than what is being proposed for this mining operation. The mining development will enable the resource owners to leave their natural forests intact but allow their pockets of bauxite to be mined for their benefit. This is already happening and the assessment work done for this report actually was told of this fact that many resource owners are now turning to logging because there has been no development in Rennell especially the development of the well known bauxite resource. It seems that the forest of Rennell will be decimated without the development of the bauxite resources or any other development alternatives.

The development of the world heritage site in east Rennell was done with much emphasis on benefits from tourism from the heritage site. The local people have said that they have not

benefited anything from the world heritage site and there has been very little tourism in Rennell. This means that tourism cannot be any answer to the non-development of the bauxite as there has been nothing much developed in terms of tourism to develop the island. The local people and the province have witnessed this fact and have not seen any benefit from what they were promised about tourism in relation to the world heritage site.

The non development of the resource will also mean a precious mineral which is important for the industry will not be made available to industry for its use and benefit. Solomon Islands should take part and does have some commitment to take part in international commerce and contribute to the development of humankind by allowing its resource to be used which at the same time can provide significant benefits to itself and its people.

In the longer term, this development not proceeding will mean leaving the precious bauxite reserve which is already a proven reserve for the future generation of Solomon Islands. In such situation, the great opportunities for the country, the province and the landowners to generate significant revenue and promote the development of mineral resources for economic development for the present generation will not be realized and the country will need to develop other resources to take the place of such resource developments if it cannot go ahead. The benefits that this development could potentially bring about to the whole nation, the province and people of Rennell will have been lost or passed on to probably another company or to the next of future generation. As for the landowners and the local communities, there exist very little income generating activities in their villages which their livelihood depends on and not realizing this rare opportunity will deprive them of the new and increased benefits from their natural resources to increase their income and improve their livelihood and standard of living. Being a least developed country and a poor country, Solomon Islands cannot afford to lose this precious opportunity.

There are other development activities that are attached to this development as a package of benefits to the local resource owners. These include development grants and small micro-projects grants for families, individuals and communities. The project not proceeding will deprive the families, individuals and communities of these increased opportunities for income and other development activities for their livelihood.

One of the other major loss if the development does not proceed is that many of the infrastructures that will be part of the development such as improved roads, increased length of roads, improved wharf, and many other facilities which can go to the local people and the province after the end of the mining would not be there. These type of facilities do not come freely and quickly as you could have on such major developments and would have provided good opportunities for the province and the local people to have better and improved infrastructure and facilities for their continuous use well beyond the life of the mine.

In situations where there are major new developments such as in mining, there are a number of spin off benefits that are stimulated by such developments. These include direct spin off benefits such as the provision of various required services to the operation by the local people. Many other indirect spin off benefits do come about and do stimulate a significant increase in commercial or business activities not only on site in the mining areas but in other parts of the province and country as well. Not proceeding with the development will consequently suppress any new opportunities for new related economic and social development activities that are usually associated with the mining operation. In such situations the landowners, the communities, the provincial and national government will not realize those other potential benefits that could be generated as a result of the mining development.

4. DESCRIPTION (OF THE PRESCRIBED DEVELOPMENT)

The proposed Rennell Bauxite Mining Development project will establish a bauxite mining operation on the western half of Rennell Island. This excludes the eastern part of the island which is the lake region and is a world heritage site. The actual mining area targeted for this mininhg application is about 12 kilometres from the boundary of the world heritage site. The world heritage site is well protected from a natural geographical barrier located in the middle in the Kanggava bay area, between the west and east Rennell. These are the narrow geographical constriction caused by the bay, and the ridges that exist in the interior, physically separating west and east Rennell into two gigantic basins.

The mine comprises numerous bauxite pocket deposits within the central interior of the western half of the island. Each of these bauxite pocket which are about 0.5 -1 hectare will be mined using simple excavators to dig up the bauxite ore which comprises of soil. These bauxite soil ores will be loaded onto larger dump transport trucks and taken to a flat area near the coast where they will then be stockpiled and prepared for sun drying. The ore will then be sun dried to remove moisture content to at least 15% before being loaded onto barges which will take the ore to ocean going vessels that will take them to the overseas buyers. There is no chemical processing of the ore at any stages of the mining operation on Rennell. Any chemical processing will be done outside of the country and will be basically be done by the smelting companies. There is therefore no issue of any waste ore or tailings or even waste water as in other mining operations.

A main road that was established by Mitsui Mining and Smelting company of Japan will be widened and have its surface improved for use in the operation. Connecting the main road to the bauxite pockets are hauling roads which were also established in the past by Mitsui. These will also be widened and improved to get the ore bodies transported to the stockpile area. The stockpile area will be paved with concrete to prevent water running to the surrounding areas. From the stockpile area the ore will be taken by conveyor system to the drying area where it will be sun dried to around 15% at least less than 20% moisture content before being loaded onto barges for loading onto the ocean going vessels.

As the operation is large, there will be other facilities established to service the operation. One of the most significant one will be port where barges will load the dried ore to take to the ocean going vessels. There will be a fuel storage block for the marine vessels such as the barges near to the coast to serve the marine vessels.

A camp site will be established to accommodate workers both for national and expatriate workers. The camp site will comprise of the following facilities:

- workers accommodation;
- staff accommodation;
- ablution blocks;
- fuel storages
- an office block;
- kitchen and dining blocks;
- storage blocks;
- food storage block;
- generator;
- security blocks;
- vehicle parking park;
- water supply system: tanks or pumped up water
- waste management systems

The roads will be improved with coronus gravel that characterizes most of the island surface. Specific source sites are plenty and have been used in the past by Mitsui and the current

logging operations. APID will identify other sources for its own uses which shall be included in its aggregate management guidelines.

5. DESCRIPTION OF THE EXISTING (BASELINE) ENVIRONMENT

5.1 PHYSICAL ENVIRONMENT/ RESOURCES

5.1.1 General Geography

Rennell Island is basically an uplifted coral atoll which is part of the Rennell- Bellona and Indispensable reef system complex in the southern most part of Solomon Islands. It is a long and narrow island with a length of 86 kilometres and an average width of 10 kilometres. It is located about 180 kilometres south of Guadalcanal and is aligned in a northeast direction in that location just as most of the large islands of the Solomon archipelago do. The island is a two lobed basin shaped atoll system with a total area of 840 square kilometres. As an uplifted coral atoll, it is extremely rocky with almost 80 percent of its landscape dominated by a typical karsts limestone system. The constituent parts of the former reefs and lagoon system can still be recognized in the present structure of the island: the outer reef slope, now forming the steep slopes on the coastal edges of the island; the rim, now forming the highest ridges encircling the coastal rim of the island; the inner reef complex, now forming the lowland forest of west Rennell and the old lagoon floor now forming the lake on East Rennell.

The two basins of Rennell Island; West and East Rennell, are well defined by the ridges that meet at the Kangava Bay area as well as the narrow waist or constriction formed by the existence of the bay itself. The narrow constriction and the partitioning ridge actually provides some kind of ecological barrier between west and east Rennell. The east Rennell basin is about 35 kilometres long and has an average width of 11 kilometres. Its total area is about 370 square kilometres. The outer rim of the basin was influenced by sea level changes during its uplift and is therefore terraced. The basin is also characterized by the freshwater lake Tengano which was the former lagoon. The lake with a total length of 29 kilometres; a width of 10 kilometres; and an area of 155 square kilometres is the largest enclosed water body in the insular Pacific.

The western basin, west Rennell, is 45 kilometres long and has a maximum width of 14 kilometres, with a total area of about 470 square kilometres. The raised outer rim was also influenced by a series of sea level event or changes during its uplift and is therefore, also terraced. The height of the rim ranges from 150 to 200 metres. As in a basin, the land surface descends gradually towards the central interior part of the island just above sea level. The inland interior is generally flat but still irregular with high and lower very rough and sharp surfaces. The lowland interior is characterized by lowland rain forests, swamps, rock pools sinkholes and depressions that contain the bauxite deposits.

The coastal areas are mostly inaccessible areas with steep slopes making access to the coral reefs and the sea generally difficult. Surrounding the islands are fringing coral reefs. The coral reef system does not encircle the full island but is more extensive on the northern coast than in the southern coasts. The coral reefs are pretty narrow averaging with a width from the coastal land at 30 metres. It is poorly structured and comprises mostly dead corals. Two significant bays characterise the island, the Lughughi and Kangava bays. There are no river or streams on Rennell but there are numerous sinkholes and caves that do provide water sources.

5.1.2 Geology

The whole Rennell area is thought to have been initially deposited as coralline algal limestone and then dolotomized. This dolomitic reef complex is overlain by younger undolotomized reef limestone. The recent structural evolution of Rennell is the result of post-dolotomisation uplift accompanied by block faulting. The north west part has emerged as a discrete block to a height of around 200 metres and shows no evidence of tilting. A major fault zone at Kagava Bay separates the northern and central blocks where the uplifted reefs have dropped vertically 30 metres. A major step fault also occurs across the northern part of lake Tengano.

The structure and geomorphology of Rennell and Bellona indicate that the Rennell Ridge on which they are situated is presently in a phase of active uplift following a long history of subsidence. The thickness of the sedimentary pile above basement on the Rennell Ridge is at least 500 metres. According to current theories of atoll formation, such a thickness of reef deposits could form only on a slowly descending basement platform. (Wingham, 1997) More relevant details of the geology of Rennell is contained in the geological report of this submission.

5.1.3 Climate and air quality

The climate of Rennell, as with all islands of the Solomon Islands is tropical and is sometimes influenced by prevailing trade winds. Prevailing trade winds in Solomon Islands are the southeast and northwest trade winds. The southeast trade occurs in the country normally from April to October, whilst the northwest trades occurs from November to March. The northwest trade winds usually bring about high rainfall and strong winds and annual cyclones. The low rainfall season during the southeast trades is more obvious in the large island of Guadalcanal where there is a large plain that acts as rain shadow area.

Average rainfall in the Solomon Islands ranges from 2500mm-3000mm per annum with high rainfall in the high ridges and mountains. Average daily temperature in Solomon Islands ranges from 23°C to 30°C. The monthly mean temperature in some weather township shows an increasing trend.

Rennell Island's tropical climate is characterized by high and uniform temperatures and humidity. The daily diurnal temperature is normally between 22.7°C and 32.2°C. The island, as with Bellona, is usually wetter and some degrees cooler than most of the larger islands of the country. Its annual rainfall is about 3000-4000mm. It is observed that two distinct climate exist with west Rennell being drier and humid than east Rennell which does get stormy due to the expanse of the lake.

For many years there had been no weather data from Rennell province due to the lack of a weather that could enable a more intense examination of the rainfall regime on the island. The islands tropical monsoonal climate is most probably influenced by its location south of the main Solomon group and the influences of the trade winds. The south east trade usually brings about a dry period from April to November with the driest period between May to August. The northwest trade usually occurs from November to April bringing with high rainfall and frequent cyclones on the island.

The islands being located south of the main Solomon group lies in the path of annual cyclones and is frequently hit by the cyclones that usually originate and pass through the Solomon group on southeast and southwest directions. Cyclone risk areas assessed in the past using track density show Rennell and Bellona having being one of the most risky area in the Solomon group. In fact cyclones have been the most influential factor in the vegetation, fauna and lives of the people of Rennell and Bellona. The island has experienced significant vegetation and forest destruction and faunal loss periodically. The current status of the forest and fauna is hence at

recovery stages and could have never reached any climax or optimal conditions due to such regular disturbances as that caused by cyclones.

Air quality throughout Solomon Islands is excellent as there are no large industries to influence air quality significantly. In the urban areas of Honiara, there could be some differences but in the rural areas, there are no major concerns on air quality. On Rennell Island, apart from the logging operations, there are no current major development activities that should raise concerns on air quality as it is of excellent quality in the ambient environment. The roads that exist on the island could be the only development that could bring about air quality concerns due to the dust that may come from moving vehicles but these are insignificant at present due to the small size of traffic using the roads.

5.1.4 Surface water and water quality

There is practically no issue with surface water on west Rennell as there are no streams or rivers on Rennell Island except for the large lake at Tengano which is on east Rennell and far from the tenement area targeted for this application. There are water in the sinkholes, rock pools, swamps and caves that litter the lowland areas. There are also water springs around the lake areas. The lake is however brackish and slightly saline with a range of 2.8 - 6.2 %, varying from one tenth to one fifth of the salinity of seawater with the elevated salt concentration being maintained by a subterranean duct system that connects it with the sea (Turton 2014). The elevated salt concentration is due to subterranean channels or ducts that connect the lake to the sea. In some of the caves the water level is said by the locals to rise due to high tides around the coast. This has not been fully investigated and could probably be due to sub surface flow during continuous heavy rain. Surface water is therefore an insignificant issue for Rennell. Sub surface water however, does exist as indicated by the water filled sinkholes, swamps and caves on the island. Sub surface water could be directed from the west Rennell lobe to the eastern part to Lake Tegano as it is slightly lower than the west Rennell segment.

The Tegano lake is quite a significant system due to its size, location and importance in the socio-economic and cultural status of the local communities. As mentioned above It is slightly saline with a maximum depth of 40 metres at the central areas and harbors significant endemic species. It has islands within it and is characterized by a beach forest and mangroves on its inner sides. The fact that the water level and salinity in the lake is rising is due to sea level rise and global climate change and has nothing to do with localized activities (Turton 2014). The proposed mining areas is at least more than 20 kilometres from the lake and impacts are expected to be insignificant to both the lakes aquatic and terrestrial fauna, compared to the logging activities that have already been allowed too close to the lake region. It has been recorded that the Taro plots of the villages around the lake edges have been affected by rising water level in the lake and thereby increase salinity and diseases, causing declining productivity.

The clearing of the forested areas where the bauxite deposits are and the improvement of the road network will be done on already degraded areas along the central interior of west Rennell and is not expected to have any localized significant impacts in the surrounding areas in terms of evapo-transpiration or other hydrological functions of the area. The extraction or mining of the bauxite pockets will be done in phases with progressive rehabilitation and re-vegetation and therefore is expected to return the sites to satisfactory condition that will not affect water quality issues. The water sources in the caves and sinkholes are currently in good condition and are important in their contribution to the sub surface flow on the island. Flooding is a non issue as surface water from rains is rapidly drained underground to the subsurface flow ie. there is rapid drainage all through the island especially within the central interior of the island basin where all

the pocket deposits are located. The coral rock or limestone system covering the interior land surface serves as an excellent filter and control of sediments coming from the development activities.

In terms of water quality, scientific data on the water sources in the caves, rock pools and sinkholes in the area were not collected but field observations indicated good quality water that are devoid of natural loads such as sediments and biodegradable debris. Local people sometimes use the water in the sinkholes and caves for washing and bathing and some who have no tanks use it for drinking. Most families and households now have rain water tanks that they use for collecting rainwater for drinking. For purposes of monitoring of water quality in the rock pools, caves etc certain parameters will be monitored. The following parameters that are to be covered under monitoring activities are given in the table below.

Table 1. Parameters to be used in the monitoring of water quality in the project

Physical Characteristics	Chemical Characteristics	Biological Characteristics
Colour Clarity Taste Odour Temperature Conductivity Suspended solids Content	Acidity/Alkalinity Reactivity Dissolved solids Hardness Nitrogenous matter Heavy metals (some)	Bacterial content (E.Coli), Dissolved oxygen, Biochemical oxygen demand (BOD)

5.2 ECOLOGICAL RESOURCES

5.2.1 Forests

Basic forest types have been identified in Solomon Islands and are well known. The common types are Grasslands, Swamps, Lowland Rainforest, Montane Forests and Secondary vegetation. These forest types are considered rich in diversity with an estimated 5000 species of flora that include 22 gymnosperms, 2821 angiosperms, and 367 pteridophytes (Hancock and Henderson, 1998).

The forests of Rennell Island are surprisingly in good condition given the frequency of natural disturbance, especially of cyclones that frequent the island. The forest or vegetation of the island are biogeographically unique and are markedly different from the forests of the main Solomon group. They also show lower diversity than the larger islands in the group. There are no endemic tree species on Rennell but there ten (10) endemic plant species. Notably, most of the common species of the larger islands of the Solomon group such as *Pometia pinnata, Vitex cofassus, Campnosperma brevipetiolate, Endospermum medullosum, Calophyllum kajewski, Gemelina moluccanum, Terminalia calamansai, T.brassii, Dillenia sp, and Parinari salomonensis* are missing from Rennell. The forest or vegetation of Rennell are basically of three types:

i) low or stunted mature forest of the karst ridge on the island perimeter;
ii) lowland tall forests of the island interior; and
iii) beach flora of the Lake Tegano margins which include mangroves

The forest of the karst limestone are located on the ridge crests and steeply sloping terraces and show similarities in composition and structure to both heath and upper montane Malesian forest sub forms but seem drier. The cycad, *Cycad rumphii* is present in this forest type. These karst

forest occur along the ridges encircling the perimeter of the island. The figure 15 shows this type of forest at highest elevation (185 metres) at Lughughi point

fig.15. Karst forest at Lughughi point (185 m)

The lowland tall forest occurs within the lowland areas and is the most extensive of the forest type due to the expanse of the lowland areas it covers. The forest comprises tall trees with an average height of 20 metres but with emergents of mostly taller ficus species. Dominant species are *Endospermum molaccanum, Elaeocarpus sphaericus,Terminalia sepicana, Sterculia parkinsonii, Berkella obovata, Pallaquim amboinense, Alstonia spectabilis and Eugenia sp.* Within the lowland tall forests are depressions where the bauxite pockets are and are currently characterized by degraded forests or secondary forests probably caused by subsistence activities within those depression pockets as they are the only areas where good soils are. There are also swamps within the lowland areas. These swamps are dominated by *Macaranga tanarius*, *Pandanus* sp. and ferns. Sometimes these swamps are planted with swampTaro.

The beach forest define the inner edges of the Tengano lake and also mangroves which may have been trapped in the lagoon when the island was uplifted. The smaller islands within the lake also do have the same vegetation. The beach forest is dominated by *Pandanus* sp. including endemic species. The coastal vegetation of the elevated rocky coasts of West Rennell are characterized by *Scaevola taccada, Macaranga tanarius, Pandanus, Intsia bijuga* and *Anacardium occidentale*. In other areas these coastal beach zone has been replaced by coconut palm plots or plantations.

5.2.2 Freshwater resources

The rivers, streams, ponds and lakes of Solomon Islands do have significant biota from aquatic fauna to aquatic freshwater plants. Not much information exist on the freshwater resources of Solomon Islands even though some work has focused on some islands in the past which provides some idea about the status of the quality of the system and its resources.

On Rennell Island, only the Tengano lake is the major system that could host major freshwater resources even though its slightly saline character gives way for other salt tolerant species to occur within the lake. On the other parts of the island, the water sources within the caves, water holes of sinkholes, rock pools and swamps do host some species but the only ones known at present are the freshwater eel and a small goby, *Eleotris sp* (Pagabu). Locals within west Rennell said that this fish is not eaten by the community. Tilapia which wa introduced to the lake Tengano is now a major source of protein for the Lake residents.

The major work on freshwater resources focused on the Tengano lake and was done by T. wolf. His work on freshwater resources which is already too outdated is summarized below:

Table 2. Summary of Freshwater resources of Rennell (from Wolf.T. 1965)

	species		species
*Sea snakes	2	odonata	12
*fishes	2	hemiptera	9
*Gastropods - onchidiidae	1	diptera	6
Gastropods - melaniidae	4	tricoptera	1
*prawns	2	coleoptera	5
*amphipods	4	arachnids	1
*tanaids	1	*polychaetes	1
ostracods	6	liogochates	1
copepods	8	*Nematodes - one marine	2

Total - 68 species *denotes species of marine origin

5.2.3 Terrestrial Wildlife

The terrestrial wildlife fauna of Solomon Islands is considered to be of international significance because of its diversity and endemicity. It has been recognized for some time that with the exception of Papua New Guinea, the Solomon Islands have a greater diversity of animal species than any other Pacific Island nation. Recent information show 223 bird species, 53 mammals, 80 reptiles, 21 frogs, 130 butterflies, 25 snails and thousands of insects. High percentages of these faunal groups are endemic to Solomon Islands. Eighty two percent of the birds are endemic, 36% of mammals, 33% of reptiles, 10% of frogs and 27% of the butterflies *(SIG, 2011*).

Rennell Island is the most studied island in the Solomon group with many scientific expeditions from many years back during the colonial period. Basic baseline information thus exists to assist local, provincial and national decision making relating to developments and general management on the island. Existing information show that the island is a classic example of on-going ecological and biological processes and is an important site for the science of island biogeography. It is hence considered as an important stepping stone in the migration and evolution of species in the western Pacific and for speciation processes, especially with respect to avifauna. Combined with the strong climatic effects of frequent cyclones, the island is regarded as a true natural laboratory for scientific study. The unmodified forest vegetation contains floral elements from the more impoverished Pacific Islands to the east and the much richer Melanesian flora to the west. It has been determined that, for its size, Rennell Island has a high number of endemic species, particularly among its avifauna and also harbors 10 endemic plant species (World Heritage Centre).

The wildlife includes 11 species of bat (one endemic) and 43 species of breeding land and water birds (four species and nine subspecies endemic respectively). The invertebrate life is also rich with 27 species of land snail (seven endemics) and approximately 730 insect species, many of which are endemic. The flora of Lake Tegano is dominated by more than 300 species of diatoms and algae, some of which are endemic. There is also an endemic sea snake in the lake.

During the field assessment for this exercise, the following were observed: *Zoosterops rennelliana* (Susubanggu) *Ducula pacifica* (gupe), *Colocalia sp* (swiftlets), *Woodfordia superciliosa* (gaga), *Threskiornis moluccus* (Taghoa, White ibis), *Halcyon chloris amoena* (kingfisher), *Geoffroyus heteroclitus hyacinthus* (ghisua), *Varanus indicus* (iguana), *Porphyrio porphyrio samoensis* (kagae), three unidentified birds, flying foxes, butterflies, wasps, and crickets. Most of the above are endemic speciess and subspecies of Rennell Island.

5.2.4 Marine Biodiversity

The marine biodiversity of Solomon Islands is also increasingly recognized as of international importance. It is now being recognized as part of the Coral triangle which is the global centre of marine biodiversity. This region extends from the Philippines in the north to Malaysia, Indonesia, Australia in the south and Papua New Guinea and Solomon islands to the east. Mangrove species have totaled more than 30 species, 10 species of sea grasses, 233 species algae, 485 coral species, 1019 species of coral reef fish, 9 species of dolphins, 8 species of whales, one dugong species, one estuarine crocodile, 19 species of sea cucumber (holothurians), 4 main species of crayfish, 6 giant clams, 3 species of pearl oysters, trochus and green snails.

The Templeton Crocker expedition collected 36 species of marine fishes on Rennell, 20 on Bellona and three on both islands, including a new flying fish of the genus *Cypselurus* from Rennell. A Danish expedition in 1951 added another species to the Rennell list including two small Blenniid species and one small Kraemeria which were new to science. With other visits from scientists, the fish list for Rennell has continued to grow.

A rapid assessment of the marine resources of Rennell Island and the Indispensable Reef by a group led by a somebody Babcock could have the latest new information but their findings have been very difficult to access during this exercise as it has been so commercialized that the very people who own and have rights to those information do not have free access to that information. Instead you have to buy it at high prices through buying a book before you can have access to it.

Surrounding the island are fringing coral reef that are more extended on the northern coast than the southern coasts. The reef structure are typical of raised coral atolls with elevated beach rock areas that are mostly difficult to access from the land ward or seaward areas. The reef is usually characterized by two major zones: a channel zone that has very few coral but reef and sand patches attached to the beach rock tidal zone rocky coral beach and a coral zone on the outer edge which then drops suddenly to hundred of metres after the reef crest and reef slope. Figure 16 show the coral reefs and their typical zones.

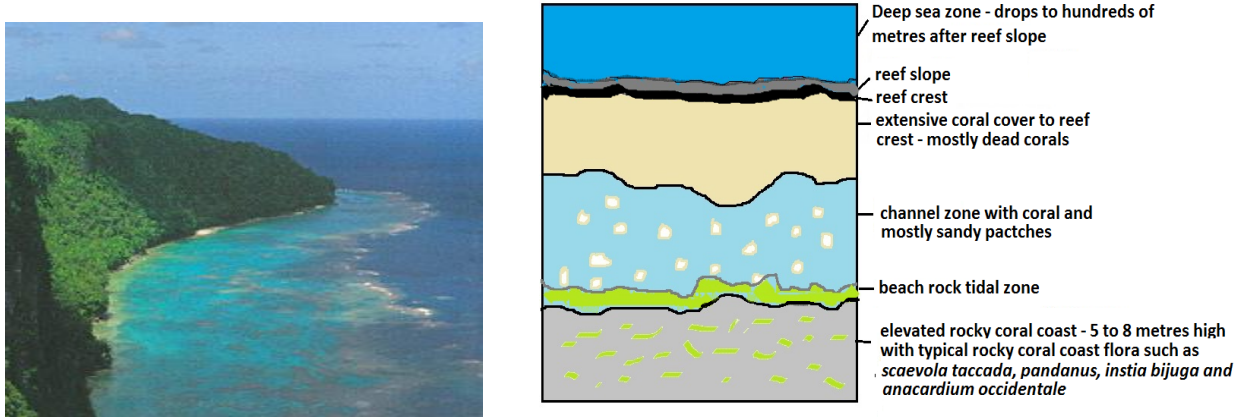

Fig. 15. Photo of typical reef on left, diagrammatic representation of coral reef zonation

The Ghotuma reef system is the main fringing reef surrounding the northern coast (insert photo) The main marine species known from the area are turtles, beechdemer, trochus, and coconut crab. During the field assessment, it was difficult to access the reef areas due to the elevated rocky coast.

5.2.5 Protected areas

Rennell Island hosts the first listed World Heritage site in the insular Pacific, The East Rennell World Heritage site. The site includes the Tengano lake which is the largest lake in the insular pacific. The site was listed as World Heritage site on December 5 1998. The listing of East Rennell is due to its outstanding universal values. The site has within it, all the unique species found on Rennell island and also all the forest types that are found on the island. The forests are however not as extensive as that on west Rennell due to its limited area of land. The area is said to be dependent on forests of West Rennell to maintain its outstanding universal value as the forest cover on East Rennell is said to be too small to enable it to maintain the unique wildlife populations therein. This means that the forest cover of west Rennell must be maintained in its natural state as possible for the east Rennell potion to maintain its unique biodiversity or its outstanding universal value.

In 2013 however, the World Heritage Committee has decided to place the East Rennell World Heritage Area on the List of World Heritage in Danger. The key reason for the listing was the occurrence of logging in West Rennell and the possible impact of this logging and associated invasive species on the World Heritage Values of East Rennell. Following that decision, further field work was commissioned and a report was completed in February this year, which made recommendations on actions to be taken so that the site could be delisted from the List of World Heritage in Danger. The recommendations comprised of a framework of indicators measuring the restoration of the site's attributes (biological values), integrity and management, summarized as follows:

- **3 attribute indicators** (forest cover, abundance indices for endemic forest avifauna, changes in water level and salinity of Lake Tegano).
- **3 integrity indicators** (status of logging and mining leases in West Rennell, abundance indices for invasive rats, biosecurity safeguards for other invasive plant and animal species).
- **1 management indicator** (adoption and implementation of the East Rennell Management Plan).(Turton 2014)

Of direct relevance to this project is the integrity indicators which includes the status of logging and mining leases, meaning that apart from the other indicators above, there must be no more logging licenses or mining leases issued for west Rennell for the East Rennell World Heritage site to maintain its integrity which can then allow it to be delisted from the List of World Heritage in Danger.

It is the view of this assessment however that since the heritage site is far from the actual mining area (12.1km) and since the mine will only target pockets that are already characterized by degraded forest areas (see fig.17) or secondary forests, the effects of the mining alone, on the eastern portion of the island where the heritage site is, will be minimal and insignificant. This is also believed to be so due to the fact that the mining will proceed from the western end of the island to minimize any assumed effects on the eastern portion of the island. The effects of the mining development on the forests of West Rennell will not be more than what has already been done by the local population or what is periodically caused by the regular strong cyclones that pass through the Rennell Bellona region.

fig. 17 showing degraded forest areas in 2012 (from Turton, 2014)

It is also the view of this assessment that geographically, east Rennell is already a large ecological unit of itself that can and does sustain itself. The narrow constriction or waist at Kangava bay and the ridges in that area is already a geographical and ecological barrier that negates the argument that east Rennell is totally dependent on the forest of west Rennell remaining in a natural state to maintain itself and its biodiversity. It is also believed that the recovery of forests and fauna of Rennell island after major disturbances has been positively consistent. This can be verified by the current status of the flora and fauna which have been subjected to major disturbances in the past by major cyclones, e.g. Cyclone Nina in 1994 caused major forest loss and damages. In terms of the avifauna which seems to be the group of most concern, most of the species are not long range species but are short- range and site specific in their movements ie. they do not move long distances within short periods. This means that most of the species remain within their own localities for long periods so if species are more localized in west Rennell for a long time, they would remain there and would not move long distances to East Rennell. The same would be true for species residing on East Rennell.

5.3 ECONOMIC DEVELOPMENT

5.3.1 Industries

The largest industry that is active on Rennell at present is the logging industry. There are currently two logging operations active on the island even though some licenses have already been issued but are yet to start operations. The active operation are by Samlinsan logging in the northern region and Pacific Crest in the south region. Some operations have been temporarily suspended. All these operations are located on west Rennell and do affect the integrity of the East Rennell World Heritage site. A proposal application went through the timber right stage for a large part of East Rennell covering most of the forest covered area of East Rennell but has not been successful due to lack of support from the local people.

Tourism was the one industry that was tagged along the nomination of East Rennell as a world heritage site and the local people have gone on to establish some facilities such as eco lodges and rest houses to attract tourism but after 16 years of world heritage listing which was said to bring tourists to Rennell, the local people are now very disappointed that very little tourist visit the site. The local people have said that they have not seen any benefit from the world heritage project and would prefer to consider other development options.

5.3.2 Infrastructure facilities

The only major infrastructure facility that exists within the project area (west Rennell) is the road that goes through the interior of the island linking the major villages along the way. The other major infrastructure is the airstrip at Tingoa township. Both of these developments were established by Mitsui mining and smelting company in the 1970s and are serving the people well. The current roads are improved by the logging companies using the road. Tingoa has a water supply system but has not been working for long time. Sanitation facilities are not well developed.

5.3.3 Transportation

The project development area has an existing road network established by Mitsui Mining and smelting company during the 1970s when they were prospecting for bauxite then. This road network is still being used by the local people. An airstrip also established in the 1970s is also being used and provides the major transport link for Rennell to the other parts of Solomon island through direct flights from and to Honiara. Shipping services also exist but are extremely unreliable and irregular. The government subsidized shipping services currently serves the island as well but this is also unreliable and irregular.

Locally the local people are also dependent on outboard motors for travel. In the lake, even though local traditional canoes were popular in the past, local people are increasingly using outboard motor powered canoes for their transport needs.

5.3.4 Land use

On Rennell Island current land use focuses on forestry developments - mostly logging, agricultural, and human settlements in customary land. In terms of agriculture, these are mainly coconut plots that are currently used for subsistence's purposes and subsistence gardens. There are also some small rice farms. Human settlements includes the Tingoa township, villages and playing fields, educational services such as schools,

cultural or religious establishments such as church buildings. On fig.1 one can see the location of the present villages which is mostly aligned with the existing road along the lowland interior of the island. On the lake, the four villages are located on the southwest end of lake sides.

Most of Rennell Island is under customary ownership land tenure, meaning that land is owned communally. Land is vested in the clan and all clan members have access to land through their lineages. Rennell communities are patrilineal with land passing down through the male line. Land tenure is overlapping with various clans having both primary and secondary rights for use of land and associated resources. (Wingham, 1997).

5.3.5 Power sources

There is no power system or networks in the project area except for the Telekom service at the Tingoa township. Villages however do have their own small portable generators that they use as required. Many are also now using solar power cells for their lighting purposes and other minor needs.

5. 4 SOCIAL AND CULTURAL RESOURCES

5.4.1 Population

In the 2009 census, Renbel province has a population of 3041 and an annual growth rate of 2.5%. This is about 1% of the total population of Solomon Islands (SISO 2011). Rennell island itself has a population of 2176. The west Rennell area where this project is located, that is covering wards 3, 4, 5 and 6 has a population of 1431. This is 47.1% of the provincial population and 65.8% of the Rennell Island population. This is 71.6 % of the total provincial population. A large component of the Rennell and Bellona population have now moved to Honiara or the Russell Islands in the central province. It is said that more than 40% of the population are either in Honiara or the Russell Islands due to lack of job opportunities and probably lack of socio-economic services

5.4.2 Socio-economic services

The table below shows socio-economic services available in the West Rennell or Island.

Table 2: Availability of Services in the development area (west Rennell only)

	Services	**West Rennell**	**Comments**
1.	Primary school	yes	New Place
2.	Secondary school	yes	New place
3.	Health centre	yes	Tingoa

4.	Retail shop/canteen	yes	Tingoa and villages
5.	Bank	nil	
6.	Police post	yes	Tingoa
7.	Post office	nil	
8.	Petrol township/depot	yes	????
9.	Transport vehicle(obm)	Yes	
10.	Transport vehicle (truck etc)	yes	Private and Govt
11.	Wharf	nil	
12.	Airstrip	yes	Tingoa
13.	Water supply	nil	Tingoa not working
14.	Market facility	yes	Not used
15.	HF radio	yes	private
16.	Mobile phone service	yes	Our Telekom
17.	Copra buyers	nil	Not enough for processing
18.	Timber buyers		In Honiara

5.4.3 Education

Even though social services do not appear to be well developed on the island, the Rennell Bellona province has scored higher social indicators than most of the provinces in the country. This may be due to the low number of the provincial population (which is only one percent of the total population) than the impacts of the existing social services which is very low.

The total number of schools in the province for the year 2009 to 2011 is given in the table 3 below. The pupil enrolment is also given in table 4. The number of early childhood centers in the province for the period 2009 to 2011 has been declining from 10 to 7 whilst there has been no growth in the number of primary schools at a total of 9 for the same period. There are two community schools in the province for the period 2009 to 2011 and 1 provincial secondary school. There is also one Rural Training Centre but no national secondary school. These figures are very low in terms of numbers but may be enough to cater for the school age population in the province which in terms of percentage enrolment are very high. It seems also that many pupils have gone to Honiara or other provinces for their education. The 2009 national population census show some interesting data from the province. In terms of the enrolment, the 6-12 years old, had an enrolment figure 97.3%, the 6-15 year olds had 96.3% and for 15-19 year olds, enrolment was 83.1 %. Literacy rate for 15 + years is 99.1 %, and 98.3% for 15-24%. These rates are very high in comparison to the larger provinces.

Table 3. Number of schools

School type	2009	2010	2011
Early Childhood	10	7	7

Education (ECE)			
Primary school (stand alone)	9	9	9
Community high schools	2	2	2
Provincial Secondary schools	1	1	1
National secondary schools	0	0	0
Rural Training Centres	1	1	1

Table 4 . Enrolment

School type	**2009**			**2010**			**2011**		
	Renbel	National total	% of national total	Renbel	National total	% national total	Renbel	National total	% national total
ECE	270	22092	1.2	184	22895	0.8	148	22817	0.6
PS	673	116619	0.6	637	119266	0.5	664	121720	0.5
JSS	260	25045	1.0	235	25642	0.9	250	27258	0.9
SSS	107	13598	0.8	145	14064	1.0	161	15525	1.0

ECE - Early Childhood Education, PS - Primary School, JSS - Junior Secondary, SSS - School Senior Secondary School

5.4.4 Health facilities

This assessment has determined that there is one main Rural health centre in the province which is based at the provincial capital at Tingoa. This is used by the whole population of the province. Other health clinics and aid post also exist in other villages. Access to the main health centre would be by road as it is located inland at Tingoa. Those from the lake and other coastal areas would therefore access the centre via boats and vehicles

5.4.5 Communications

Our telekom has extended its mobile communication to the province through its centre at Tingoa. This provides good coverage although access does not cover many other areas far from Tingoa areas. The only means available at present is through High Frequency radios (HF Radio) for some areas. Sometimes people have to travel other areas where there is mobile phone coverage for communication services.

5.4.6 Income generation

Income generation in the province is through employment with the provincial or national government agencies located at Tingoa and other parts of the province, and the private sector. Other means of income is royalties from logging, access fees from mineral prospecting, sale of beetle nuts (bought from Honiara), retail and canteens, some agricultural products from subsistence gardens, marine products (fish, coconut crab, trochus and beechdemer) and remittances.

In 2009, the national population census revealed that there are 232 employees, 5 employers, 35 self employed people, 23 doing voluntary work, 186 doing unpaid family work, 144 producing goods for sale and 660 people producing goods for own consumption. In terms of the economically active population or the total labor force, there were 1298 people with a labor participation rate of 62.8 % and an unemployment rate of 1%. The table 5 shows the income for private households as from the 2009 population census results for Renbel province.

Table 5. Sources of Household income and percentage

Household source of income	Percent of Household (%)
No income	17
Wages and salary	21
Own business	6
Sale of fish/crop/handicraft	35
house rent	2
Remittances	12
other sources:	7

From the above table, most households get their income from sale of fish, crops and handicraft. Households earning an income from wages and salary is the second highest in terms of the percent of households. Those getting their income from remittances came third. Interestingly, there is a high percentage (17%) of households who have no income.

5.4.8 ***Cultural heritage***

The people of Rennell and Bellona are ethnically Polynesian and their cultural heritage follows and adheres to other Polynesian societies culture in the Pacific. Their oral traditions traces their migration to Rennell back 26 generations from the Wallis and Futuna Island group in the central Pacific.

The Rennell and Bellona Islanders adhere to a patrilineal system of inheritance. Their traditional practices and customs norms are quite unique to their own communities and tribes. As such most of the lands in their areas are customary owned. Their use and management is done

according to traditional customs. The observation of traditional customs in all forms of community life is strictly adhered to. They still have their own native or indigenous language and do have social behaviors and norms quite different from the Melanesian societies of the main Solomon group. The people of Rennell and Bellona are also well known for their traditional body decorations (tatoo) and their carvings and handicrafts are well known in the country and the region. The many cultural figures lining streets and other establishments in the capital, Honiara, are examples of the works of the master carvers of Rennell and Bellona.

A comprehensive examination of cultural sites have not been made under this assessment but these are known to the locals and must be included in a cultural management plan once mining starts. The only items of cultural importance observed during this assessment are the graveyards which are within the immediate areas of the individual family groups or households. Most of the locals consulted informed that the mining pockets do not have taboo sites. Potential prehistoric sites will be addressed in a guideline to be adhered to during mining operations.

At East Rennell, the Lake Tegano played an important role during World War II as a Catalina Flying Boat base. At the end of the war nine Catalina planes were scuttled in the lake, where they remain today. Furthermore, the last naval battle for the Solomon Islands was fought offshore of Rennell Island, where the USS Chicago was sunk (Hadden 2007, quoted in Turton,2014). These cultural heritage should be subjected to further work with a view to improving their management.

6. ENVIRONMENT LIKELY TO BE AFFECTED BY THE PROPOSED DEVELOPMENT

6.1 The Physical Environment

The land, coastal sea areas and the waters in the rock pools or caves and lake, are the most likely ecosystem that could be affected to a level where increase concerns could be raised about the development. The lowland land areas where the bauxite pockets are and are targeted in this mining project would physically change as most of the soil will be removed leaving pockets of deep depressions on the land surface. The coastal sea areas could be affected by increase marine traffic with their wastes or oil pollutants. The waters could be potentially affected by the seepage or sub surface flow of unwanted hydrocarbons and sewage.

The lake is far from the mining areas and is not expected to be significantly affected by any physical aspects of the mining. The coastal seas are also far from the interior where the mining focuses on and is not expected to be seriously affected as well. The marine traffic can be the only aspect of the mining that can affect the coastal areas. The loading of the bauxite ore at the coastal areas has the potential of affecting the coastal sea should there be any accidents or errors in the processes occurring in the coastal area.

Ambient air quality in the project area is excellent and the development activity is not likely to cause any significant adverse changes to air quality. Dust that may be stirred by the transport vehicles, excavators or dozers and the exhaust fumes from the machines and generators may be the only sources of any pollutants that may affect air quality in the immediate area but this is expected to be insignificant, localized and temporary.

6.2 The Biological Environment

The status and condition of the forest and the marine environment seem very good at present but overharvesting of certain resources may have occurred. The fact that there is low population pressure in the area may still help in keeping the area from degraded and depleted of its resources.

The forests and marine ecosystems are the most likely ecosystems that could be affected to a level where increase concerns could be raised about the development. The forest covers the land, swamps and the terrestrial flora and fauna. The marine system refers to the coastal reef system and all marine biodiversity therein.

As there are no rivers or streams on Rennell there are no concerns on surface waters in relation to this mining project. The Tengano lake within the world Heritage site is far from the development activity and is of no significant concern. As there is rapid drainage of water from rain within the lowland basin areas of the island, there is no or very little concerns on pollution of water sources or sea areas as such waters is rapidly drained through the coral limestone on the subsurface of the land.

The loss of forest and hence the potential loss of wildlife however is real and should be carefully addressed. The fact that most of the targeted areas are already degraded areas nevertheless indicates that not much natural forest and natural wildlife will be seriously affected. The plan to progressively rehabilitate the mining pockets is hoped to return the areas to forested areas as soon as possible as can be seen from the recovery of those areas from natural events such as cyclones that frequent the area. The forest of Rennell is currently at a greater risk from logging than what is proposed for this mining which is targeting a small percentage of the forested land area.

6.3 Social Environment

The Rennell Island communities of this project area are rural subsistence communities that continue to struggle to improve their livelihood as in most of the rural communities of Solomon Islands. Social services are still poor and are similar to other rural villages and communities throughout the country. As for most rural areas in Rennell, these communities do not have access to improved services such good educational and health facilities, transport services, commerce and business services, communication facilities etc. Accessing better services mean travelling to the capital Honiara as very little is even offered at the provincial capital Tingoa

The communities however have strong traditional and religious structures and practices that are still used to guide and control their way of living in the communities. The religious affiliation of the communities has very strong influence on their daily living. Two major Christian denomination are active in Rennell, the Seventh Day Adventists and the South Seas Evangelical Church. It should be noted however, that the communities are still affected by new and urban influences and do have social problems such as alcohol abuse.

The proposed development activity has the potential of increasing the income of the communities through marketing of their produce to the project site, employment and other dues such as land rentals that they may get from their agreements with the developer. The company has already agreed with the landowners on some micro-scheme projects which should assist the communities to increase their income and thereby their livelihood. The amount of income that should come from the mining development should have significant positive impacts as the population of the recipients community is very small. Increase income will surely lead to improved standard of living if increased income is used well and managed. On the other hand increase income also can bring about increase social problems such as alcohol and drug abuse.

7. RELEVANT POTENTIAL IMPACTS

The assessment was done under the following subject areas and identified the main potential adverse impacts of the mining project described below.

7.1 Impacts on water quality

Impacts on water quality is mostly associated with surface water flow. Since there are no issues with surface water flow on Rennell, impacts on water quality are insignificant. The fact that water flow is in fact subsurface or subterranean, the issue of adverse impacts on water quality is insignificant. The Rennell mining does not involve any chemical in the extraction of the ore, significant pollution issues are non-existent. The only potential pollutants are oil spills from vehicles and machines and liquid wastes including sewage that could potentially enter the subsurface or subterranean system. The fact that any chemicals or liquid waste that enter the subsurface flow or subterranean system would have to drain through soils and a limestone subsurface and be trapped and changed by those layers, adverse impacts are expected to be nonexistent or insignificant.

The immediate concerns on water quality would be on the rock pools, caves and swamps near or closer to the mining pockets or storage areas where traffic would be high. In the coastal areas, marine water quality could be affected by waste oils, oil spills and bilge water from marine vessels. The concerns that surface water on the lake could be affected by subterranean flow is a very remote possibility unless large quantities of chemicals or liquid waste are released onto the land surface. It should be noted however that most households in Rennell now use water tanks for their sources for drinking water. They still have to maintain their natural sources for drinking during drier periods.

7.2 Impacts on air quality

Impacts on air quality can come from the dust produced during construction and maintenance of roads, construction of storage and drying areas and construction of camp or accommodation areas. The exhaust fumes from the moving vehicles can also impact on air quality if there are too many using the roads at any one time for a long time. All of these are expected to be insignificant, localized and temporary. It is expected that roads will be diverted from the main village areas for safety purposes and also for limiting exposure to potential air quality impacts.

7.3 Impacts on terrestrial wildlife

Impacts on terrestrial wildlife or fauna may be one of the most important impacts as far as adverse impacts from this mining operation is concerned. This is simply due to the reason that many aspects or components of the mining operation will involve the removal or clearance of vegetation or forest. This will occur in the mining pockets, establishment of new roads and improvement of existing ones, and establishment of the storage areas and camp site.

The whole area covered by the mining pockets, however, are already degraded forest area and impacts on terrestrial wildlife or fauna are therefore not expected to be significant. This is also due to the total area of the mining pockets being very small compared to the total area of the degraded forest. The estimated total area of the pockets and where all the roads and hauling roads will be is about 67 square kilometres,

which is about only eight percent of the total land area. There will be more than 90% of land with forest cover to serve all ecosystem services on the island.

The fact that mining will occur in the bauxite pockets, means that corridors will exist to aid wildlife that have adapted themselves to the degraded or secondary forests. Even if the areas covered by the road network are added to the total area affected by the operation, the total areas covered by the mining will still be very small compared to the remaining areas of the degraded forest areas. The progressive rehabilitation of the mining pockets is expected to help wildlife recover should there be significant adverse impacts on the terrestrial wildlife.

Increasing and continuous noise from moving vehicles and machines could have adverse impacts on the wildlife and measures will have to be taken to ensure that there is less noise or unnecessary noise is limited.

7.4 Impacts on coastal and marine resources

Since this mining operation is centered on the central interior of the west Rennell basin, potential impacts on coastal and marine resources could not be on the same scale as impacts that could occur on the immediate mining areas and along the road routes or network. Since there is no issue on surface water flow, there is no issue about soil erosion or even coastal erosion. The only concerns would be on the port areas, where marine vessel traffic would be high and there is potential for oil spills and release of solid wastes or waste water or bilge water that could bring new alien organisms to the marine environment there. The potential of hydrocarbons getting through the sub surface or subterranean system to the coasts and the marine exist but unless there are substantive amounts of those chemicals released deep into the sub surface, no significant adverse impacts are expected.

7.5 Impacts on Soils

The biggest impact on soil is its loss or removal from the mining pockets. Overburden on mining pockets will however be stored near the pockets and be used to rehabilitate the depressions or craters that will be left behind after mining each pockets. APID will further examine other means of rehabilitating the pockets immediately after mining in each pockets, such as bringing in soils from other islands to fill those pockets.

Other impacts on soils include contamination by oil spillage from machines, compaction on mining areas and on road networks. There are no issue on soil erosion except on small patches of roads that may have cut through higher ground. Spillage onto soils can become an issue on the camp site where hydrocarbon based fuels are stored and used. They can also be an issue along the road where vehicles travel. These impacts can occur both during construction and operation phases of the development but the chance for this to occur is very small due to the amount of fuel that will be allowed to transported on the road at any one time.

7.6 *Impacts on health*

As this mining operation involves the simple removal of bauxite ore that is in the form of soil and involves a simple operation without any chemical processing, no direct adverse health impacts are expected. All components of the mining operation do not involve significant health risks to the mining workers and the community. Exposure to dusts and exhaust fumes do exist but are not expected to cause significant concerns. All aspects of the operation do not add or produce any undesired materials to the environment that could significantly endanger

health. The increase presence of people in the development areas of West Rennell or Rennell in general may however increase interaction between people both from within the communities and outside and may increase the potential to increase STIs, HIV and other diseases. The movement of people and the location of mining camp etc will need to be well managed to address this concern. APID will assist with the recruitment of appropriate medical personnel including doctors to take of workers health and community health.

7.7 Impacts on public access

The main public access in the project area is the main road that goes through the interior from Kagua area in West Rennell to the Tengano lake area in East Rennell. The road also extends to some areas on the coasts. New logging roads has extended this road network and has allowed access to new areas on land and otherwise other inaccessible areas e.g. log pond area at Lavena in the northern end of west Rennell. The sea areas are also used by the communities for access to other areas but sea traffic is very low. The main concern will be on the main road as there will be a substantial increase in traffic volume which will have significant concerns on public access and safety.

New roads will be established to allow free movement of mining transport vehicles to move to and from the mining pockets to the storage and the port areas. This will keep the current main public road free for the community to use without endangering their free movement and safety.

The local people will still have their foot tracks to use for their traditional uses. The improved road network is expected to aid and improve the rural peoples' access to their land and terrestrial resources inland. The sea traffic would not be heavy to necessitate stringent control measures within the port area or harbor. All marine vessels will observe marine safety procedures and rules to ensure safe travel in the sea area around the project development site. A traffic management plan will be formulated to guide all aspects of road and sea transport.

7.8 Impacts on Socio-economic issues

It is expected that substantial positive socio-economic impacts will accrue from the project than negative or adverse impacts. One of the major indirect impacts of the development would be the improvement of social services in the Tingoa township and throughout the villages and communities as the project generates increase income for the government, the province and communities.

Resolving land issues is one major potential issue of the project. It is understood however, that land issues especially on land tenure and ownership are already known as the former Mitsui Mining company has already carried out the necessary process in identifying landowners and tribes through an acquisition process in the past. This then makes it so easy for this project in terms of the land acquisition process as required under the Lands and Titles Act. It is understood as well that most landowners have already signed the necessary documents for the lease of their land for this mining project.

In terms of employment opportunities, there are significant opportunities for the people in the province as about 600 people are expected to be employed in the mining project. This will include about 100 expatriate workers. The major drawback however will be that the population of Rennell and Bellona is too small to provide all the labor force required which means that people from provinces will have to be recruited to work in the mine. There is therefore going to be a high influx of people from other provinces descending on West Rennell which could give rise to clashes in cultures and could result in negative social consequences.

There is significant income earning opportunities from the project through employment as referred to above and numerous other spin off benefits that can empower people to increase their income and improve their livelihood in the rural areas. This assessment has determined that the project has already implemented major benefit schemes required under its agreement with the landowners. This will help meet school fees and other obligations of the people such as in their traditional, social and religious activities. The project will also stimulate other economic activities such as in marketing of produce for income, and other rural business opportunities such as in the transport and energy sectors. Increasing income however could also increase other social problems such as increase in alcohol consumption or drug abuse which give rise to undesirable and anti-social behaviors in the communities.

There is also concerns that the local population will be able to participate fully in providing related services required by the mining operation due to lack of skills and expertise for those required services sectors. Otherwise these opportunism could be taken those who can from other provinces.

7.9 Impacts of climate change

Impacts of climate change from the development could be due to loss of vegetation from the pocket areas, road areas and other infrastructure areas. Emissions from all machines are sources of green house gases that contribute to the effects of climate change. These are considered negligible and insignificant. Impacts of climate change on the development could be related to increasing frequencies and intensity of extreme events such as rainfall, storm surges and cyclones. In the lake, rising water level has already impacted on the lake agriculture with the declining production of Taro. Since the mined out pockets and all unused hauling roads will also be progressively rehabilitated and re-vegetated, this will add to mitigating the impacts of climate change.

8. PROPOSED SAFEGUARDS AND MITIGATION MEASURES

In terms of the impacts, the clearance of forest or vegetation in the mining pockets and along the existing and new road routes, storage areas and in the camp site will give rise to various impacts. The volume of traffic used in the operation and all other activities within the camp site, storage areas, drying areas and the port loading areas are other major components that can give rise to adverse impacts. The proposed safeguards or mitigation briefly enumerated below will address all potential impacts. Many of the measures proposed are standard mining industry measures and will be further detailed as the process to proceed with actual mining on the ground continues.

8.1 Water quality

- Water quality issues are insignificant but water management strategies covering various aspects of the company's operation will be formulated to address water quality issues.
- Used water especially at camp site will be directed to temporary storage areas or settling ponds before discharged to relevant locations that are environmentally acceptable.
- Fuel storage areas will be bunded to trap potential oil leakage.
- All vehicles will be equipped with oil spill kits and will not be allowed release oils or related chemicals to the natural environment except on designated or approved sites or waste receptors.
- Wash down areas will be established for any machines and vehicles used on camp site to trap liquids that need to properly disposed off.

- Soil erosion is not an issue in this project due to the nature of the soil and landscape or topography but erosion and sediment control measures including drainage ditches, chutes, pocket ponds, infiltration trenches and ponds, sediment control ponds, fences, traps and dams etc, will be used where applicable in the various components of the operation to control, collect and trap potential eroded materials and sediments
- Road construction will proceed where possible only during dry periods to limit disturbance on soil surface which could increase sediment loads during rapid drainage in those areas.
- Debris, spent fuel or oil, and waste material shall not to be dumped into swamps, rock pools, caves, lake or sea but collected and disposed off in accordance to an established waste disposal regime for the operation.
- Rehabilitating and re-vegetating all used areas in the mining pockets, unused access roads unused storage areas etc to limit potential impacts to water bodies.
- Oil and chemical spill kits will be provided on mining sites, storage areas, camp sites and port loading area to use when oil spill and chemical spills occur.

8.2 Air quality

- Machines and vehicles used will be well maintained to ensure their efficiency and lessen air pollution within the operational areas.
- During very dry periods when wind can continuously stir up dust, the operation relevant areas will be dampened to minimize dust to the workers and villages.
- Exposed areas at camp site will be properly landscaped and vegetated with relevant grass species to limit dust from stirred up into the air.
- New roads will be established away from the current main road to limit dust cover to villages and settlement areas
- Roads will be constructed to accepted standard to limit dust production from moving vehicles.

8.3 Wildlife

- Mining operation will commence from the west portion of West Rennell to limit potential impacts to the East Rennell WHS
- Mining will proceed in phases i.e. a few pockets will be mined at any one time, to limit large areas being cleared at any one time.
- All mined areas and unused access or hauling roads will be progressively rehabilitated with the aim of re-vegetating them to forest areas (where landowners do not have other preferred development options after mining)
- APID will adhere to international best practice to ensure management of wildlife conforms to high standards
- APID will assist in the implementation of the East Rennell WHS management plan e.g. in eliminating the spread of invasive rats and addressing plant pathogens currently affecting Taro within the Lake areas
- Harvesting of wildlife in the project area will be forbidden or restricted and allowed only with the permission of the landowners
- Cutting or harvesting of trees not required for the operation will be forbidden at all times
- Unnecessary activities that has the potential to disturb wildlife e.g. Increase unnecessary noises will be forbidden.
- Oils and chemical spill management plans will be established and adhered to, to ensure wildlife are not affected by such incidences

8.4 C*oastal and marine resources*

- Water management strategies covering various aspects of the company's operations will be used to address water quality issues which can affect the coastal marine environment.
- Used water especially at camp site and was down areas will be directed to temporary storage areas or settling ponds before discharged to relevant or designated locations that are environmentally acceptable.
- Fuel storage areas will be bunded to trap potential oil leakage to ensure that any spillage does not end up in the marine environment.
- Wash down areas will be established for any machines and vehicles used to trap liquids and oils that need to be properly disposed off.
- Potential adverse impacts to the coastal areas and the marine environment exist within the coastal infrastructures such as in the port loading area but erosion and sediment control measures including drainage ditches, chutes, pocket ponds, infiltration trenches and ponds, sediment control ponds, fences, traps and dams etc, will be used where applicable in the various components of the operation to control, collect and trap potential eroded materials and sediments
- Road construction within the coastal areas will proceed where possible only during dry periods to limit disturbance on soil surface which could increase sediment loads during rapid drainage in those areas.
- Debris, spent fuel or oil, and waste material shall not to be dumped into streams, lake or sea but collected and disposed off in accordance to an established waste disposal regime for the operation.
- Rehabilitating and re-vegetating used areas within the coastal areas, access road, areas covered by conveyor system, where required to limit impacts to water bodies.
- Any oil or chemical spill will be immediately contained and cleaned up using spill kits that will be made available for use in such circumstances.
- Harvesting of marine resources will be controlled within the coastal areas in liaison with the local communities and fishermen.
- All marine vehicles serving the project will be required to observe pollution prevention procedures and standards

8.4 Soils

- Overburden will be stored next to the mining pockets to rehabilitate and re-vegetate the pockets progressively after each pocket has been mined.
- Extra sources of soil to rehabilitate the mined out pockets will be identified within the island. Other sources from outside the province will be considered and be subjected to further investigations.
- Road construction activities will conform to international best practices as accepted and adhered to by the company
- Sediment/oil traps will be placed on relevant sites at all times to trap oil leaks from machines or vehicles
- All areas subjected to any earth works or construction will be progressively rehabilitated to a landform to ensure soil stabilization and improved visual amenity.
- Soil erosion is not an issue in this project due to the nature of the soil and landscape or topography but erosion and sediment control measures including drainage ditches, chutes, pocket ponds, infiltration trenches and ponds, sediment control ponds, fences, traps and dams etc, will be used where applicable in the various components of the operation to control, collect and trap potential eroded materials and sediments
- All bare surfaces will be rehabilitated and re-vegetated where relevant
- All Construction work on the land surfaces especially roads shall be conducted on dry periods when rain frequencies are low.

8.5 Impacts on Public Access and safety

- A new main mining road will be established for mining transport alone to and from the mining pockets to the storage areas.
- Foot tracks going through development sites will be clearly marked to ensure local users find their way through their traditional hunting and harvesting areas.
- Local users will be allowed to use the main access road but with strict observations of road safety rules
- Adequate signage boards will be placed at relevant project sites to inform local communities of any issue relating to public access and safety
- Berthing procedures at the jetty or port area will be put up on notice boards to advice the public of access and safety issues in that area especially when using outboard motor powered or traditional canoes .

8.6 Impacts on health

- Waste management plans and procedures will be implemented to manage wastes produced from the construction and operation phases of the project.
- All possible measures as detailed above will be taken to ensure that the water sources such as rock pools, caves, sinkholes, and coastal seas are not polluted or affected by the activities of the project
- First aid kits will be made available on camp site for health requirements
- Health awareness programs covering STI, HIV and other health issues will be conducted in liaison with health authorities in the province
- APID will assist in the provision of an expatriate doctor position to assist in improving the health services in the province and to specifically focus on the health needs of the workers in the mining project.
- APID will assist the province in emergency evacuations o the referral hospital in Honiara

8.7 Impacts on Socio-economic issues

- APID will assist where possible on any social services in the communities in accordance with any existing agreements and in liaison with community leaders and the province.
- APID will not allow alcohol consumption or sale of alcohol and alcohol related products in all facilities of the mining operation except on approved locations which will be established in consultation with the province and community chiefs and leaders.
- APID will liaise with community, church and tribal chiefs and leaders to resolve issues arising from any aspects of its activities
- Community relation officers will be identified to assist in addressing and resolving social issues including community issues arising from its activities
- APID has already implemented a micro projects scheme which will be continued for the benefit of the local community.
- APID prioritizes employment for the local people of Renbel province. Employment of others outside of the province will be entertained where there is none available from the province.

8.8 Impacts on Climate Change

- climate proofing of all related infrastructures and related activities
- rehabilitation and re-vegetation of mined out areas and unused hauling roads
- improving efficiency of all machines and vehicles to limit excessive emissions
- Ensure all buildings are build to standard and withstand strong winds and cyclones
- Port areas are high enough to make allowances for sea level rising and especially during storm surges, cyclones and other extreme events
- Road surfaces are constructed to standard and well maintained to limit effects on surrounding environment during continuous heavy rain.
- ensure that all related facilities are not located on areas vulnerable to strong winds, storm surges and rising sea level.

8.9 Environmental Management Plan outline

The following general outline for a management plan will be detailed further for implementation purposes.

Potential impact	Mitigation measures	Responsibility
Water quality	Water management strategies covering various aspects of the company's operation will be formulated to address water quality issues	
	Used water especially at camp site will be directed to temporary storage areas or settling ponds before discharged to relevant locations that are environmentally acceptable.	
	Fuel storage areas will be bunded to trap potential oil leakage.	
	All vehicles will be equipped with oil spill kits and will not be allowed release oils or related chemicals to the natural environment except on designated or approved sites or waste receptors.	
	Wash down areas will be established for any machines and vehicles used on camp site to trap liquids that need to properly disposed off.	
	Erosion and sediment control measures(e.g. drainage ditches, chutes, pocket ponds, infiltration trenches and ponds, sediment control ponds, fences, traps and ditches) will be used where applicable to control, collect and trap erosion materials and sediments	

	Road construction will proceed where possible only during dry periods to limit disturbance on soil surface which could increase sediment loads during rapid drainage in those areas.	
	Debris, spent fuel or oil, and waste material shall not to be dumped into swamps, rock pools, caves, lake or sea but collected and disposed off in accordance to an established waste disposal regime for the operation.	
	Rehabilitating and re-vegetating all used areas in the mining pockets, unused access roads, unused storage areas etc to limit potential impacts to water bodies.	
	Oil and chemical spill kits will be provided on mining sites, storage areas, camp sites and port loading area to use when oil spill and chemical spills occur.	
	Water quality measurements will be taken regularly in selected caves, sinkholes or rock pools in the project areas for monitoring purposes	
Air quality	Machines and vehicles used will be well maintained to ensure their efficiency and lessen air pollution within the operational areas.	
	During very dry periods when wind can continuously stir up dust, the operation relevant areas will be dampened to minimize dust to the workers and villages.	
	Exposed areas at camp site will be properly landscaped and vegetated with relevant grass species to limit dust from stirred up into the air.	
	New roads will be established away from the current main road to limit dust cover to villages and settlement areas	
	Roads will be constructed to accepted standard to limit dust production from moving vehicles.	
Wildlife	Mining operation will commence from the west portion of West Rennell to limit potential impacts to the East Rennell	

	WHS	
	Mining will proceed in phases ie a few pockets will be mined at any one time, to limit large areas being cleared at any one time.	
	All mined areas and unused access or hauling roads will be progressively rehabilitated with the aim of re-vegetating them to forest areas (where landowners do not have other preferred development options after mining)	
	APID will adhere to international best practice to ensure management of wildlife conforms to high standards	
	APID will assist in the implementation of the East Rennell WHS management plan eg. in eliminating the spread of invasive rats and addressing plant pathogens currently affecting Taro within the Lake areas	
	Harvesting of wildlife in the project area will be forbidden or restricted and allowed only with the permission of the landowners	
	Cutting or harvesting of trees not required for the operation will be forbidden at all times	
	Unnecessary activities that has the potential to disturb wildlife eg. Increase unnecessary noises will be forbidden.	
	Oils and chemical spill management plans will be established and adhered to, to ensure wildlife are not affected by such incidences	
Coastal and Marine Resources	Water management strategies covering various aspects of the company's operations will be used to address water quality issues which can affect the coastal marine environment.	
	Used water especially at camp site and was down areas will be directed to temporary storage areas or settling ponds before discharged to relevant or designated locations that are environmentally acceptable.	
	Fuel storage areas will be bunded to trap potential oil leakage to ensure that any spillage does not end up in the marine environment.	
	Wash down areas will be established for any machines and vehicles used to trap liquids and oils that need to be properly disposed off.	
	Erosion and sediment control measures including drainage	

	ditches, chutes, pocket ponds, infiltration trenches and ponds, sediment control ponds, fences, traps and dams etc, will be used where applicable in the various components of the operation *to control, collect and trap potential erosion materials and sediments*	
	Road construction within the coastal areas will proceed where possible only during dry periods to limit disturbance on soil surface which could increase sediment loads during rapid drainage in those areas.	
	Debris, spent fuel or oil, and waste material shall not to be dumped into streams, lake or sea but collected and disposed off in accordance to an established waste disposal regime for the operation.	
	Rehabilitating and re-vegetating used areas within the coastal areas, access road, areas covered by conveyor system, where required to limit impacts to water bodies.	
	Any oil or chemical spill will be immediately contained and cleaned up using spill kits that will be made available for use in such circumstances.	
	Harvesting of marine resources will be controlled within the coastal areas in liaison with the local communities and fishermen.	
	All marine vehicles serving the project will be required to observe pollution prevention procedures and standards	
	Overburden will be stored next to the mining pockets to rehabilitate and re-vegetate the pockets progressively after each pocket has been mined.	
	Extra sources of soil to rehabilitate the mined out pockets will be identified within the island. Other sources from outside the province will be considered and be subjected to further investigations.	
	Road construction activities will conform to international best practices as accepted and adhered to by the company and as required by the Ministry if Infrastructure Development.	

	Sediment/oil traps will be placed on relevant sites at all times to trap oil leaks from machines or vehicle	
	All areas subjected to any earth works or construction will be progressively rehabilitated to a landform to ensure soil stabilization and improved visual amenity.	
	Erosion and sediment control measures including drainage ditches, chutes, pocket ponds, infiltration trenches and ponds, sediment control ponds, fences, traps and dams etc, will be used where applicable in the various components of the operation *to control, collect and trap potential erosion materials and sediments*	
	All bare surfaces will be rehabilitated and re-vegetated where relevant	
	All *Construction work on the land surfaces especially roads shall be conducted on dry periods when rain frequencies are low.*	
Public Access and safety	A new main mining road will be established for mining transport alone to and from the mining pockets to the storage areas.	
	Foot tracks going through development sites will be clearly marked to ensure local users find their way through their traditional hunting and harvesting areas.	
	Local users will be allowed to use the main access road but with strict observations of road safety rules	
	Adequate signage boards will be placed at relevant project sites to inform local communities of any issue relating to public access and safety	
	Berthing procedures at the jetty or port area will be put up on notice boards to advice the public of access and safety issues in that area especially when using outboard motor powered or traditional canoes .	
Health	Waste management plans and procedures will be implemented to manage wastes produced from the construction and operation phases of the project.	

	All possible measures as detailed above will be taken to ensure that the water sources such as rock pools, caves, sinkholes, and coastal seas are not polluted or affected by the activities of the project	
	First aid kits will be made available on camp site for health requirements	
	Health awareness programs covering STI, HIV and other health issues will be conducted in liaison with health authorities in the province	
	APID will assist in the provision of an expatriate doctor position to assist in improving the health services in the province and to specifically focus on the health needs of the workers in the mining project.	
	APID will assist the province in emergency evacuations o the referral hospital in Honiara	
Socio-economic issues	APID will assist where possible on any social services in the communities in accordance with any existing agreements and in liaison with community leaders and the province.	
	APID will not allow alcohol consumption or sale of alcohol and alcohol related products in all facilities of the mining operation except on approved locations which will be established in consultation with the province and community chiefs and leaders.	
	APID will liaise with community, church and tribal chiefs and leaders to resolve issues arising from any aspects of its activities	

	Community relation officers will be identified to assist in addressing and resolving social issues including community issues arising from its activities	
	APID has already implemented a micro projects scheme which will be continued for the benefit of the local community.	
	APID prioritizes employment for the local people of Renbel province. Employment of others outside of the province will be entertained where there is none available from the province.	
Climate change	climate proofing of all related infrastructures and related activities	
	rehabilitation and re-vegetation of mined out areas and unused hauling roads	
	improving efficiency of all machines and vehicles to limit excessive emissions	
	Ensure all buildings are build to standard and withstand strong winds and cyclones	
	Port areas are high enough to make allowances for sea level rising and especially during storm surges, cyclones and other extreme events	
	Road surfaces are constructed to standard and well maintained to limit effects on surrounding environment during continuous heavy rain.	

	Ensure that all related facilities are not located on areas vulnerable to strong winds, storm surges, coastal flooding and rising sea level.	

9. OTHER APPROVALS AND CONDITIONS

9.1 *Registration under the Companies Act*

APID Limited has already been registered in Solomon Islands under the requirements of the Companies Act

9.2 *Foreign Investment Board Approval*

APID Limited has already been approved by the Foreign Investment Board and has a FIB certificate

9.3 *Prospecting Licence*

APID limited currently has a valid Prospecting Licence issued by the Minister of Mines through the advice of the Minerals Board

9.4 *Surface Access Agreement*

APID Limited has already concluded a Surface Access Agreement with the land owners as part of its Prospecting Licence requirements and has already got on board all the landowners for this mining lease application.

9.5 *Development consents*

APID Limited will be applying for a Development Consent with a detailed EIA for the Rennell operation covered by its current prospecting license.

10. MAIN FINDINGS AND RECOMMENDATIONS

The West Rennell Mining development project proved a commercially viable bauxite deposit of more than 26 million tonnes through its prospecting activities under its current prospecting license. The bauxite deposit had in fact been proven in the early seventies by Mitsui Mining and Smelting company of Japan. With the confirmation of the commercial deposit, the Asia Pacific Investment and Development Limited stands prepared to acquire a mining license to mine the deposit.

At the national level, existing polices and legislation promote the exploitation of mineral resources whilst taking appropriate considerations to their effects on the natural and human environment. The main legislation relevant to the mining sector is the Mines and Minerals Act, whilst the Environment Act is the main legislation taking care of environmental issues that may arise from the exploitation of those mineral resources through mining activities. The current NCRA government policy statement and existing national development polices promote the exploitation of mineral resources but maximizing benefits to landowners or resource owners.

The area targeted for this mining is west Rennell which is the west half of the bi-lobed Rennell Island, whose east half has been designated a World Heritage Site in 1998. The island itself is relatively younger than the large islands of the Solomon group. It is an uplifted coral atoll which is part of the Bellona Island to the north, and the larger indispensable reef to the south. Due to its isolated location in the southern most part of the country, Rennell Islands has been found to host unique biodiversity and has outstanding universal value. The island being an uplifted former coral atoll is a basin shaped formation with its highest point surrounding the perimeter of the island and the basin interior, its lowlands. In fact the island is a two basin formation separated by the narrow constriction at Kangava Bay and the high ridges in the same area.

The forest of Rennell are unique and are quite different from the forests of the larger islands of the Solomon group. The three types of forests are karst forest, lowland forest of tall trees in the island interior and beach forests of the island lake Tengano. The wildlife includes 11 species of bat (one endemic) and 43 species of breeding land and water birds (four species and nine subspecies endemic respectively). The invertebrate life is also rich with 27 species of land snail (seven endemics) and approximately 730 insect species, many of which are endemic. The flora of Lake Tegano is dominated by more than 300 species of diatoms and algae, some of which are endemic. There is also an endemic sea snake in the lake.

Even though the area targeted for this development is in a rural situation that usually are devoid of development activities, the area also experiences some development activities that already have significant and long term impacts within and outside of the targeted area. These include the road, the world heritage site, airstrip, township, past prospecting activities and human settlements. Adverse environmental impacts on the island have not only been caused by human influences of anthropogenic activities but natural events such as cyclones and other extreme events such continuous heavy rains. The island is located within the cyclonic path and is subjected each year to cyclones. In fact it is in very risky area in terms of cyclones and its consequential impacts. The island seems to have adapted itself to these events and could have developed a natural resilience to such extreme natural events.

The mining method proposed for the mining of the bauxite is a simple method and does not involve high or sophisticated technology. It involves clearing the bauxite pockets of vegetation and digging the bauxite ore (soil) and transporting them to a base, drying them and loading them to ocean going vessels using barges. The ore is then taken to overseas smelters where it processed into the required alumina product.

The benefits expected from the development are significant both for the resource owners and the provincial and the national government. This assessment has determined that the main potential adverse impacts arising from the operation are as follows:

- Loss of cultivable subsistence land
- Potential for hydrocarbons to enter subsurface and surface water flow
- Short term decrease in biodiversity due to reduction in forest cover from mining and road areas, and other infrastructural areas
- Loss of outstanding universal value in Protected area (World Heritage Site)
- Public access on main roads affected (limited due to volume of traffic)
- Increase in lifestyle diseases due to increase income
- Low entrepreneurial participation by locals
- Relocation of village, houses and other amenities (from mining pockets)
- Increase in alcohol and substance abuse/antisocial behaviour
- Declining social/cultural norms and behaviour
- Impacts of climate change on various components of the development

The following main mitigation measures have been proposed and will further detailed in an Environmental Management Plan.

- Mining will commence from the most western end of Rennell to limit potential influences to the East Rennell WHS
- All mining pockets will be progressively rehabilitated and re-vegetated
- Environmental Management Plan will be formulated to take of all issues
- Waste Management Plan will be formulated for waste management
- Water Management strategies
- Traffic Management Plan
- APID will assist in implementation of World Heritage Site Management Plan – eg assist in eradication of invasive species or Taro nematode problems

This assessment has found that this mining operation will be a clean and sustainable operation in mining industry standards as it involves simple mining techniques (conventional strip mining) and does not produce undesirable hazardous products, and no waste ore due to no significant processing of ore on site. It does not involve any chemical processing on site and thereby no such issues as tailings and waste water exist. All ore is taken and processed overseas. Apart from the loss of forest cover and its consequential impacts, most environmental issues are insignificant. It is recommended that APID be given a license to mine the resource but to adhere to environmental management plans and other guidelines to be detailed further to assist the operation so that the human and natural environment is taken care of and sustainably managed.

11. INFORMATION SOURCES

The following information sources have been used and consulted for the formulation of this report.

1:50,000 Topographic map of Tigoa, Lavagu and Lake Te'ngano, Rennell -Bellona province
SIEMIS – Sol Islands Education Information Management System
Ministry of Forests and Research
Ministry of Environment, Conservation and Meteorology
Kagua community, West Rennell
Field Assessment and Reconnaissance work in Rennell (18/03- 20/03/2014)
Directory of Wetlands in Oceania (Asian Wetlands Bureau)
A Guide to useful plants of Solomon Islands (Henderson and Hancock)
Environment Act 1998
Environment Regulations 2008
Guideline for PER/EIS (MECM)
Mines and Minerals Act
Solomon Islands National development Strategy 2011 – 2020
Solomon Alluvial Mining – Public Environment Report
Statistical Bulletin – Basic Tables, 2009 Solomon Islands Population and Housing Census,
NCRA Policy statement
Solomon Islands 4th National report to the Convention on Biological Diversity

12. CONSULTATION LIST

People consulted for this assessment

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Honiara

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Tia Masolo - Deputy Director, ECD
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13. Bibliography

1. Henderson, E.P., Hancock, I.R., (1988). A Guide to the Useful Plants of Solomon Islands. Ministry of Agriculture and Lands,. Honiara. Solomon Islands

2. Lees, A. (1990). A Protected Forests System for the Solomon Islands. Maruia Society. Nelson. New Zealand.

3. Qopoto, C. 2012, Rennell Island Bauxite Deposit, Renbel Province, Prospecting License: PL 04/08. Quarterly Reports, 2012. Asia Pacific Investment and Development Limited. Honiara, Solomon Islands

4. Scott, D.A. (ed) 1993. A Directory of Wetlands in Oceania. IWRB, Slimbridge and AWB. Kuala Lumpur. Malaysia.

5. SIG, (undated) *Provincial Profile of the 2009 Population and Housing Census, Rennell- Bellona.* Statistics Office, Honiara. Solomon Islands

6. SIG. (2000). Report on the 1999 Population and Housing Census. Statistics Office. Honiara. Honiara. Solomon Islands

7. SMM Solomon Limited. 2012. Solomon Islands Nickel Project, Environmental Impact Statement, Santa Isabel Island, Vol.1, Honiara, Solomon Islands

8. Solomon Alluvial Mining, 2010. Solomon Alluvial Mining Project Public Environment Report. Honiara, Solomon Islands.

9. Solomon Islands Government, 2011. Solomon Islands National Development Strategy 2011-2020. Ministry of Development Planning and Aid Coordination, Honiara, Solomon Islands

10. Solomon Islands Government, 2011. Statistical Bulletin 06/2011 – Report on 2009 Population and Housing Census. Statistics Office, Honiara, Solomon Islands.

11. Stanley, S.A. (2013) *REDD Feasibility Study for East Rennell World Heritage Area, Solomon Islands*. SPC/GIZ Regional REDD+ Project, Climate Protection through Forest Conservation in Pacific Island Countries.

12. Turton, S.M. (2014) *East Rennell World Heritage Area: Assessment of the State of Conservation of World Heritage Values Project Final Field Report*. James Cook University, Cairns.
13. UNESCO World Heritage Centre – East Rennell. http://whc.unesco.org/en/list/854

14. URS Sustainable Development. 2006. *Solomon Islands Forestry Management Project (SIFMPII). National Forest Resource Assessment Update 2006.* Honiara, Solomon Islands.

15. Wein, Laurie. 2007. “East Rennell World Heritage Site Management Plan”. Honiara, Solomon Islands.

16. Wingham, E.J. (1997) Nomination of East Rennel, Solomon Islands, by the Government of Solomon Islands for inclusion in the World Heritage list of Natural Sites. New Zealand Official Development Assistance Programme, Ministry of Foreign Affairs and Trade.

Annex 3: Letter from Lake Tengano World Heritage Site Association

Lake Tegano World Heritage Site Association

East Rennell

Rennell /Bellona Province

23rd January 2017

Permanent secretary

Ministry of Mines and Energy

Honiara

Dear Sir.

Re: LETTER OF OBJECTION TO MINING PROPOSAL, EAST RENNELL.

The administration process of the mining proposals to East Rennell was indeed erroneous, unprocedural and life threaten.

Our lake Tegano management committee is very conscious about the social and Environmental impact of such development to our vulnerable Lake Tegano.

Lake Tegano is a fresh brackish water that the whole population of East Rennell depend entirely for survival.

With this, our lake Tegano World Heritage committee had deliberated and we reiterated to terminate any intended mining proposal to East Rennell world Heritage boundary.

Our management committee is firm to uphold the conservation principles signed by the state party during the convention to include East Rennell in the World heritage status in 1998.

Currently our East Rennell management committee, state party and stakeholders are committed to pursue the legal protection of the site.

Great opportunities from World Heritage conservation program will sustainably benefit the people of East Rennell in the future rather exploiting our Resources.

We are anticipated and looking forward for your prompt and kind respond.

Thank you

Yours sincerely

Mr Fred Mamata,

Secretary

.....

Mr George Tauika,

Chairman

.....

CC: Ministry of Environment and conservation

: Renbel provincial Govt

: MP, Rennell/ Bellona constituency

Lake Tegano World Heritage Site Association

East Rennell

Rennell /Bellona Province

23rd January 2017

Permanent secretary

Ministry of Forestry

Honiara

Dear Sir.

Re: LETTER OF OBJECTION TO LOGGING PROPOSAL, EAST RENNELL.

The administration process of the logging and mining proposals to East Rennell was indeed erroneous, unprocedural and life threaten.

Our lake Tegano management committee is very conscious about the social and Environmental impact of such development to our vulnerable Lake Tegano.

Lake Tegano is a fresh brackish water that the whole population of East Rennell depend entirely for survival.

With this, our lake Tegano World Heritage committee had deliberated and we reiterated to terminate any logging proposal to East Rennell world Heritage boundary (Agapogavu).

Our management committee is firm to uphold the conservation principles signed by the state party during the convention to include East Rennell in the World heritage status in 1998.

Currently our East Rennell management committee, state party and stakeholders arecommitted topursue the legal protection of the site.

Great opportunities from World Heritage conservation program will sustainably benefit the people of East Rennell in the future rather exploiting our Resources.

We are anticipated and looking forward for your prompt and kind respond.

Thank you

Yours sincerely

Mr Fred Mamata,

Secretary

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Mr George Tauika,

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CC: Ministry of Environment and conservation

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: MP, Rennell/ Bellona constituency