Environmental and Social Impact Assessment

June 2017

SOL: Tina River Hydropower Project (Part 3)

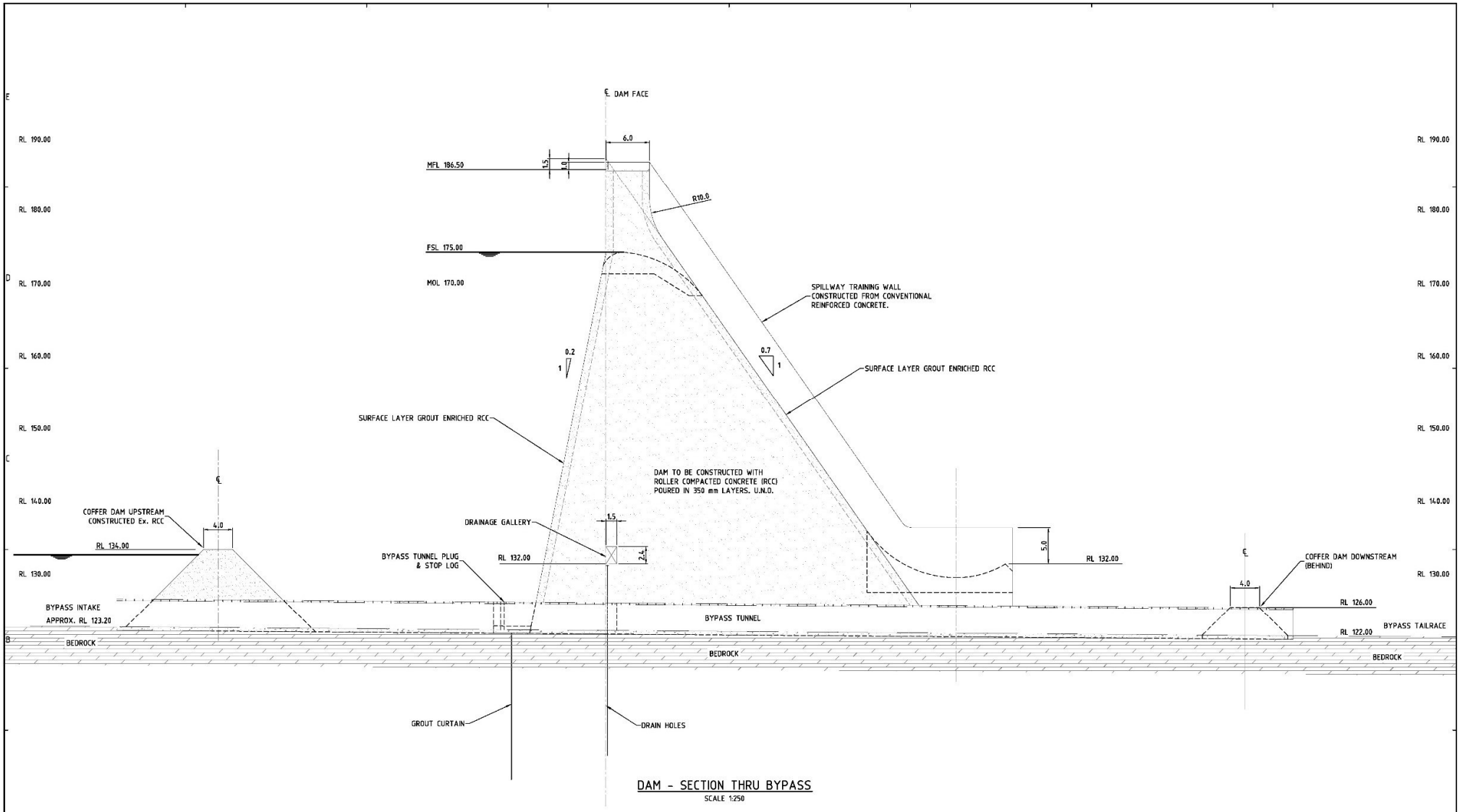
Prepared by the Government of Solomon Islands for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 9 June 2017)

Currency unit	–	Solomon Islands dollar (SBD)
SBD1.00	=	$0.1276
$1.00	=	SBD7.8308

NOTE

(i) In this report, "$" refers to US dollars.



DAM - SECTION THRU BYPASS
SCALE 1:250

5 2.5 0 5 10 15m
SCALE 1:250

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Figure 2-7 Dam section through by-pass tunnel

ALTERATIONS
UPSTREAM COFFER DAM RAISED
BYPASS TUNNEL LINE
BYPASS TUNNEL PLUG ADDED
02 P.T. RVDK

SIGNATURES INDICATED ARE ON ORIGINAL OR REVISIONS STORED IN PLAN ROOM.

REFERENCE

DRAWN P.Turnock
CHECKED
ASSURED R.V.D.K
ENGINEER
APPROVED
DATE
QUALITY ASS'D
AS ACCEPTED

Hydro Tasmania
the renewable energy business

CLIENT MINISTRY MINES, ENERGY RURAL ELECTRIFICATION
TITLE TINA RIVER HYDRO POWER DEVELOPMENT
FEASIBILITY STUDY
SITE 7C Opt 1
DAM-SECTION THRU BYPASS TUNNEL
DRAWING 303416-P3-007
SHT 02
SIZE A1
SCALE 1:250
REF No.
ISSUE

2.3.2 Reservoir

The reservoir will have a volume of 7Mm^3 at FSL and will extend upstream approximately 2.6 km with a surface area of about 0.28 km^2. Based on available hydrological data, the reservoir will take between 5 to 9 days to fill to sediment scour outlet (the deepest outlet at 155masl) is reached. An environmental flow will be maintained during reservoir filling,

Once the water level has reached 155masl, the scour outlet could release flow. Implementing a minimum environmental flow during filling will increase the time required to fill the reservoir as shown in the Table 2-2.

Table 2-2 Time required to fill reservoir under varying flow conditions

Inflow (m^3/s)	Days to fill (to reach 175masl) without minimum environmental flow	Days to fill (to reach 175masl) with 1m^3/s* environmental flow
3	26.8	Not determined
4	20.1	26.8
5	16.1	20.1
6	13.4	16.1
7	11.5	13.4
8	10.1	11.5
9	8.9	10.1
10	8.1	8.9

*as suggested in Section 12 and Appendix L.

2.3.2.1 Coffer Dam and Diversion Conduit

The diversion conduit will be comprised of 3 sets of 150 m long precast culvert units on a concrete base.

A section of the river will be excavated to install the diversion conduit. Excavation will commence from the 3rd month and be completed by the 5th month. Cofferdams will be built commencing in the 5th and 6th months. Both will be RCC structures and, therefore, will require temporary protection from potential river flood waters by pre-coffer dams. These pre-coffer dams will be constructed using material excavated from the diversion conduit excavations. These activities will require hydraulic excavators, rear dump haul trucks and bulldozers.

The diversion of the river will be sized to allow the construction work to continue during the majority of potential river flows.

The diversion will consist of three components: upstream cofferdam, diversion conduit to pass low level floods and downstream cofferdam. These elements will ensure protection from floods during

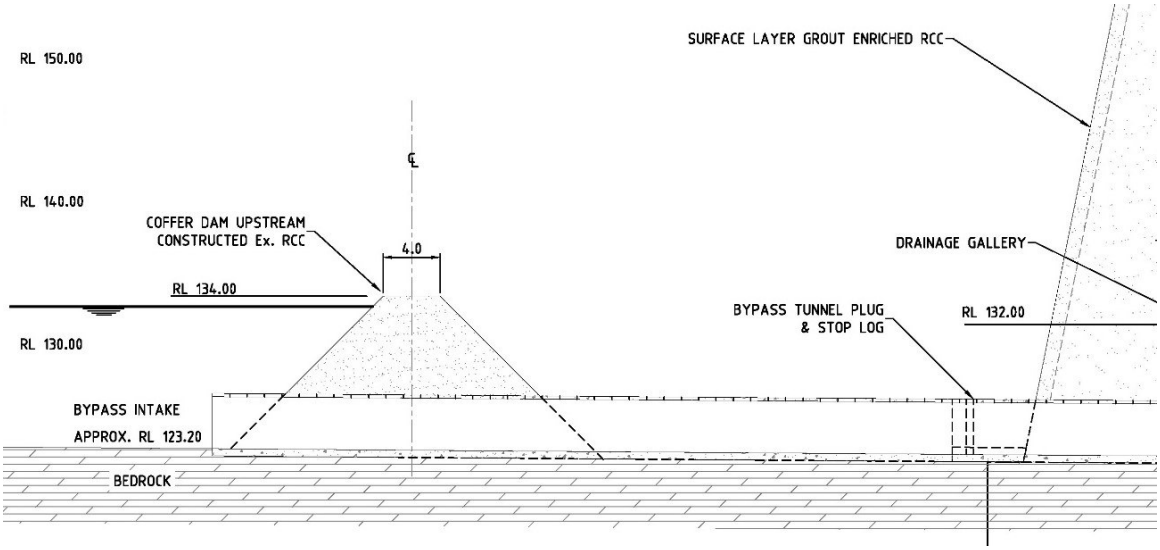
dry-season construction. The RCC dam will tolerate over-topping during the wet-season provided the foundation excavations and high-risk activities have been completed in the dry season.

The diversion will be sized to pass the yearly or 1:2 annual exceedance probability (AEP) flood (up to 360m³/s). An AEP of 2 means that every two years this peak flow could occur, or that every year there is a 50% chance that this peak flow occurs.

The diversion conduit will be 150m long and comprised of three 3.6 x 3.6m rectangular concrete culverts with a capacity of 360m³/s (see Figure 2-5). The Tina River will be diverted through the conduit. Allowing the construction of the main upper stream cofferdam and the downstream cofferdam. Cofferdams will be constructed from RCC. The upstream cofferdam will be set at 134masl, and the downstream cofferdam will be set at 126masl. The upstream cofferdam will be 11 m high and the downstream cofferdam will be 4m high.

Diversion closure will take place once the dam, spillway and intake are completed and will involve installing a gate at the upstream entrance to the conduit. A diversion plug will be installed (as shown in the Figure 2-8) allowing for the installation of an outlet controlled by a valve to ensure 1 m³/s minimum river flow during initial reservoir filling (Note: this outlet is not shown on drawings).

Figure 2-8 Diversion by-pass intake and by-pass plug



Source: Entura (2014)

2.3.3 Power Intake Head Race Tunnel

According to Entura (2014), the underground head-race tunnel construction will be excavated using drill and blast techniques for hard rock, and using road-header equipment for softer and weathered rock. Shotcrete or concrete lining of the headrace will also be required for permanent tunnel support. Construction excavation will be done from both ends to expedite progress. Other temporary services will also be required. This will include power, tunnel ventilation, compressed air and facilities for shotcreting and concreting.

Spoils may be used for road construction, as aggregate base, or for river diversion works downstream of the dam and adjacent to the powerhouse tailrace. The feasibility study did not

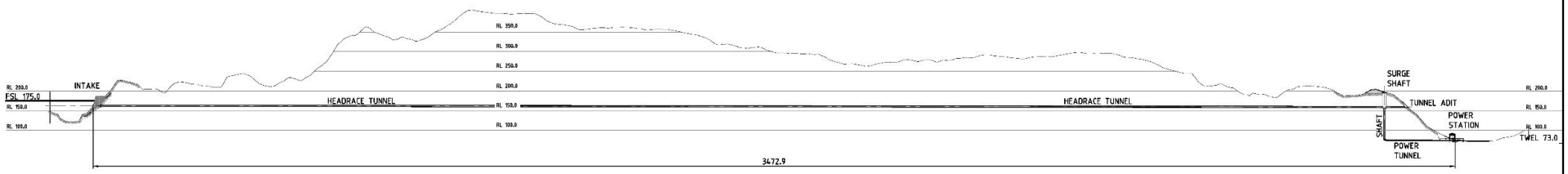
provide the quantity of spoil, but BRLi has estimated it to be approximately 24,300m^3, based on dimension of infrastructures.

The power intake will be located at 162.5masl and convey water to the power station.

The power intake will be located in the left abutment and will contain trash-racks, isolation gate and a mini-hydro pipe. A flushing outlet (scour outlet at 155masl) will be located upstream of the trash-rack to enable flushing of sediments that have been deposited over time near the intake.

Trash-rack screens will facilitate excluding floating and submerged material from entering the power conduit.

Following the power intake, a 3.3km underground head-race tunnel will convey water to a vertical surge shaft and then via a short power tunnel to the power station. The head-race tunnel will have an internal diameter of 3.3m. The tunnel system will be designed for flow rate up to 24m^3/s. The head-race tunnel will be built to ensure a minimum of 20m surficial material remains over the crown. Figure 2-9 illustrates the tunnel system.



TUNNEL - LONGITUDINAL SECTION
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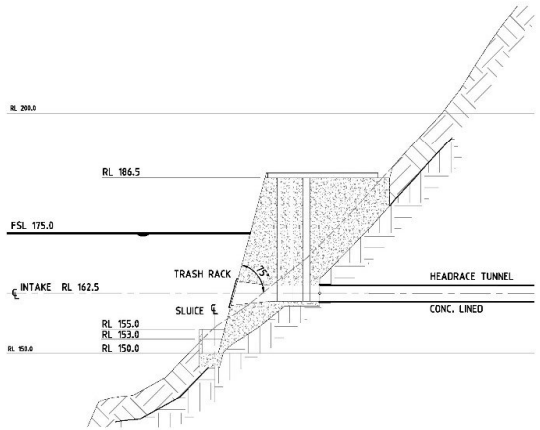
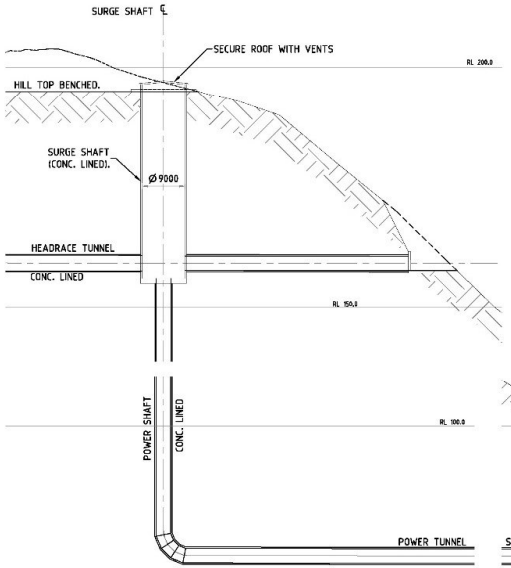


LONG'L SECTION AT INTAKE
SCALE 1:500



LONG'L SECTION AT SURGE SHAFT
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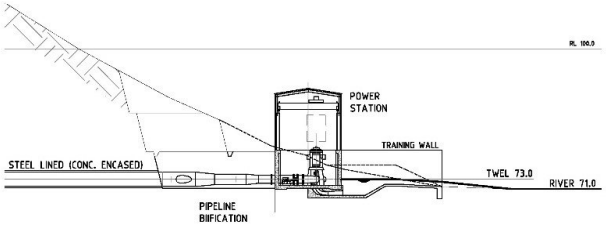
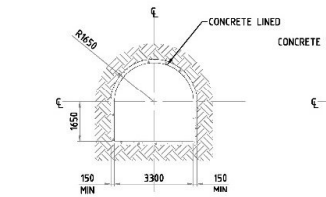
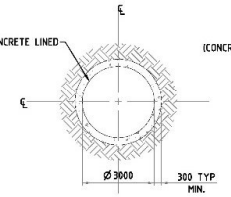


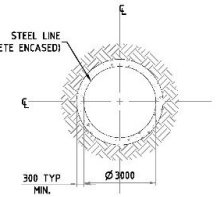
LONG'L SECTION AT STATION
SCALE 1:500



SECTION THRU HEADRACE TUNNEL
SCALE 1:100



SECTION THRU SHAFT
SCALE 1:100



SECTION THRU POWER TUNNEL
SCALE 1:100

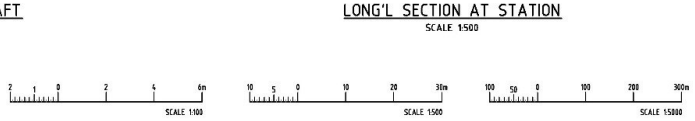


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Figure 2-9 Tunnel longitudinal section

ALTERATIONS			
02	SURGE SHAFT RELOCATED. HEADRACE TUNNEL ADJUSTED TO Ø3.3m. STATION AMENDED.	P.T.	RVDK

SIGNATURES INDICATED ARE ON ORIGINAL OR REVISIONS STORED IN PLAN ROOM.

REFERENCE

DRAWN	P.Turnock
CHECKED	
ASSESSED	R.V.D.K
APPROVED	
DATE	
CLIENT APPD	
AS BUILT	

Hydro Tasmania
the renewable energy business

CLIENT	MINISTRY MINES, ENERGY RURAL ELECTRIFICATION
TITLE	TINA RIVER HYDRO POWER DEVELOPMENT FEASIBILITY STUDY SITE 7C. Opt. 1 TUNNEL LONGITUDINAL SECTION
DRAWING	303416-P3-010
SHT	02
SCALE	1:4.00
SIZE	A1

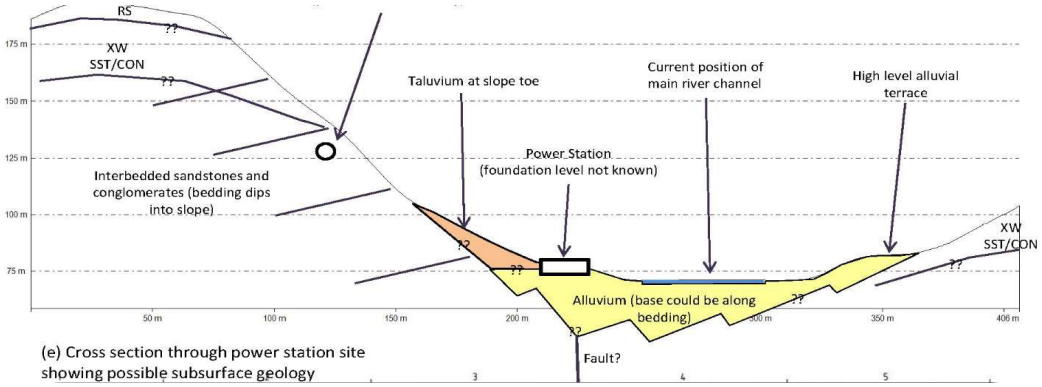
2.3.4 Powerhouse

The powerhouse will be built using conventional methods including:

- ¿ Foundation excavation and levelling
- ¿ Concrete foundations
- ¿ Steel superstructure erection
- ¿ Steel cladding
- ¿ Tailrace excavation

The construction of the power station will require significant site formation and foundation due to the presence of thick taluvial/ landslide debris underlain with alluvial material and due to the proximity of floods coming from the Tina River. Taluvial deposits are angular rocks blocks within fine-grained matrix typically in equal proportion. Figure 2-10 illustrates the geology at the power station site.

Figure 2-10 Geology at the Powerhouse site



Source: GeoRisk Solutions (2014)

The powerhouse will have a concrete substructure and a steel portal frame, and will be protected from a flood event of 1:1000 AEP. The powerhouse will comprise 3 x 5MW Francis turbines (with space to allow for a 4th machine which may be installed later). The building will be 47m long and 13.8 m wide (650m^2).

The power station will be operated to maximise power generation, so that during periods of high flow the station will be at full generation for much of the time. However, during low flows in the dry season, the river flow will be considerably less than the maximum generating capacity. During these periods, the station will operate on a daily/weekly cycle, generally following the load demand with maximum generation up to 18 m^3/s on weekdays during working hours, then shutting down during the night, as shown in Fig. 9. From an environmental perspective, it would be preferable for the night generation to reduce to minimum machine discharge (2.4 m^3/s) rather than zero flow. This will reduce the magnitude of fluctuations in flows, and better meet environmental flow requirements in the Tina River between the tailrace and Toni River confluence.

The powerhouse tailrace will enter the Tina River perpendicular to the river and will be protected from large floods by a concrete wall. A transformer substation occupying 440 m^2 of land will be located adjacent to the powerhouse. Figure 2-11 illustrates plan, profile and section views of the powerhouse.

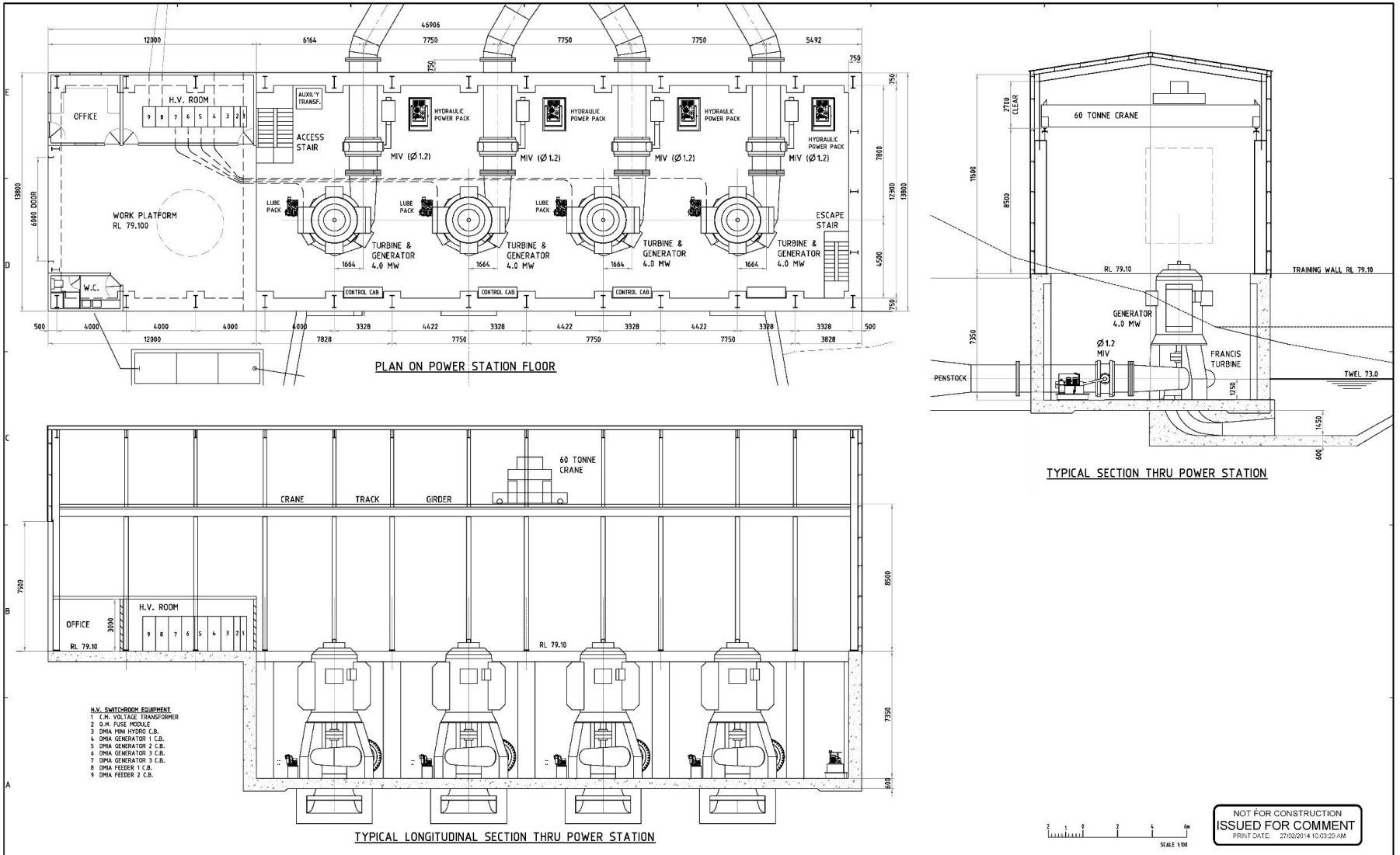


Figure 2-11 Power Station Arrangement

2.3.5 Riparian (Environmental Flow) Outlet

The Tina River gradually increases in gradient from its confluence with the Toni River to the head of the proposed reservoir. The average gradient between the Tina/Toni confluence and the power house site is 5.3 m/km, increasing to 9.3 m/km between the power house and dam. The morphology reflects the change in gradient with the substrate size and frequency of swift water habitat increasing with gradient. The river is characterised by runs and riffle, with relatively few rapids/torrents and pools.

Surveys of the river were carried out on 6-9 March 2016 and 11-15 July 2013. During the first survey, the proportion of the different habitat types was measured and cross-sections were identified in each of the habitat types. A large flood that occurred on the second day of the survey removed more than half of the temporary staff gauges that had been installed. This meant that only 3 cross-sections were surveyed in March, one pool, one run and one riffle. Water levels were measured at flows of 8.7 m^3/s and 19.7 m^3/s and these were used to develop rating curves at each cross-section. The second survey (11-12 July 2013) comprised cross-sections in 2 pools, 5 runs, 5 riffles and 2 rapids; a total of 14 cross-sections. The flow was 9.91 m^3/s on the 11 July and 9.66 m^3/s on the 12 July. Water level and flow measurements were taken on 15 July and 25 July for rating calibration when the flows were 8.28 m^3/s and 5.39 m^3/s, respectively.

The selection of an environmental flow depends on the balance between environmental effects and loss of generation and the relative values placed on the environment and generation. The assessment of environmental flow is set out in section 11.3.1.1. Provision of a 1 m^3/s environmental flow between the dam and powerhouse should maintain or improve fish and benthic invertebrate densities and total numbers for most species. An environmental flow of 1 m^3/s would maintain the riffle habitats that appear to be used by most fish species, although there would be a reduction in habitat for the Sicyopterus species, which can live in very swift water. Pools will also be maintained for Kuhlia and grunters. Moreover, trapping of sediment in the dam and subsequent coarsening of substrate in the river below the dam will improve habitat for all aquatic species and overall productivity and this improvement with an environmental flow of 1 m^3/s should result in fish densities that are similar to that in the Tina and Toni rivers at present.

The environmental flows will be released from the toe of the dam at the left abutment as shown in Figure 2-12.

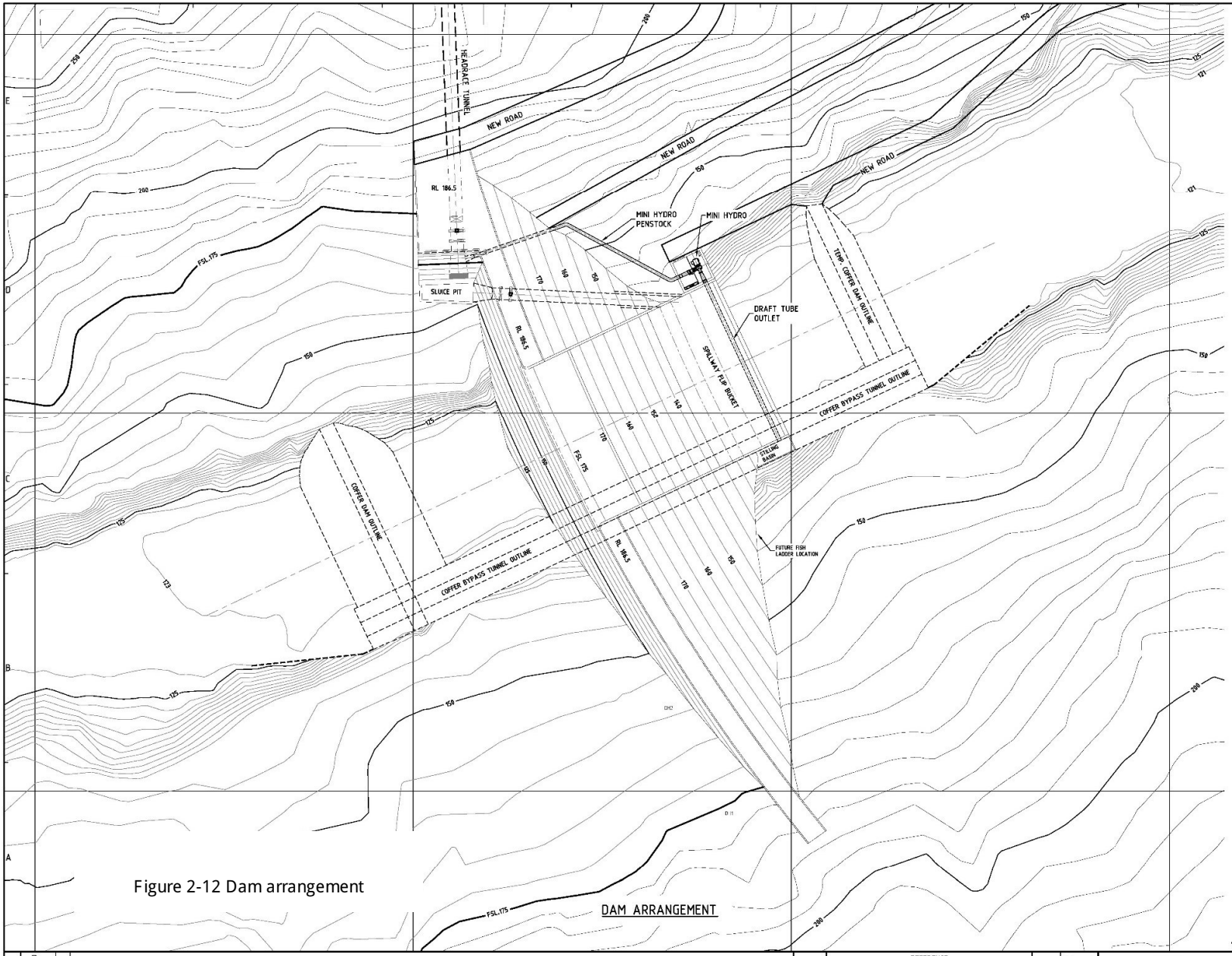


Figure 2-12 Dam arrangement

NOT FOR CONSTRUCTION
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ALTERATIONS

NO	DESCRIPTION	APPROVED
02	NEW ROADS ADDED UPSTREAM COFFER DAM RAISED BYPASS TUNNELS TO OPP RIVER BANKS	RVDK

SIGNATURES INDICATED ARE ON ORIGINAL OR REVISIONS STORED IN PLAN ROOM.

REFERENCE

DRAWN	P.Turnock
DESIGNED	
CHECKED	R.V.D.K
APPROVED	
DATE	
SIGNED (CLIENT)	
AS ACCEPTED	

Hydro Tasmania
the renewable energy business

CLIENT: MINISTRY MINES, ENERGY RURAL ELECTRIFICATION

TITLE: TINA RIVER HYDRO POWER DEVELOPMENT
FEASIBILITY STUDY
SITE 7C. Opt. 1
DAM ARRANGEMENT

DRAWING: 303416-P3-002 SHT. 02 A1

SCALE: 1:500

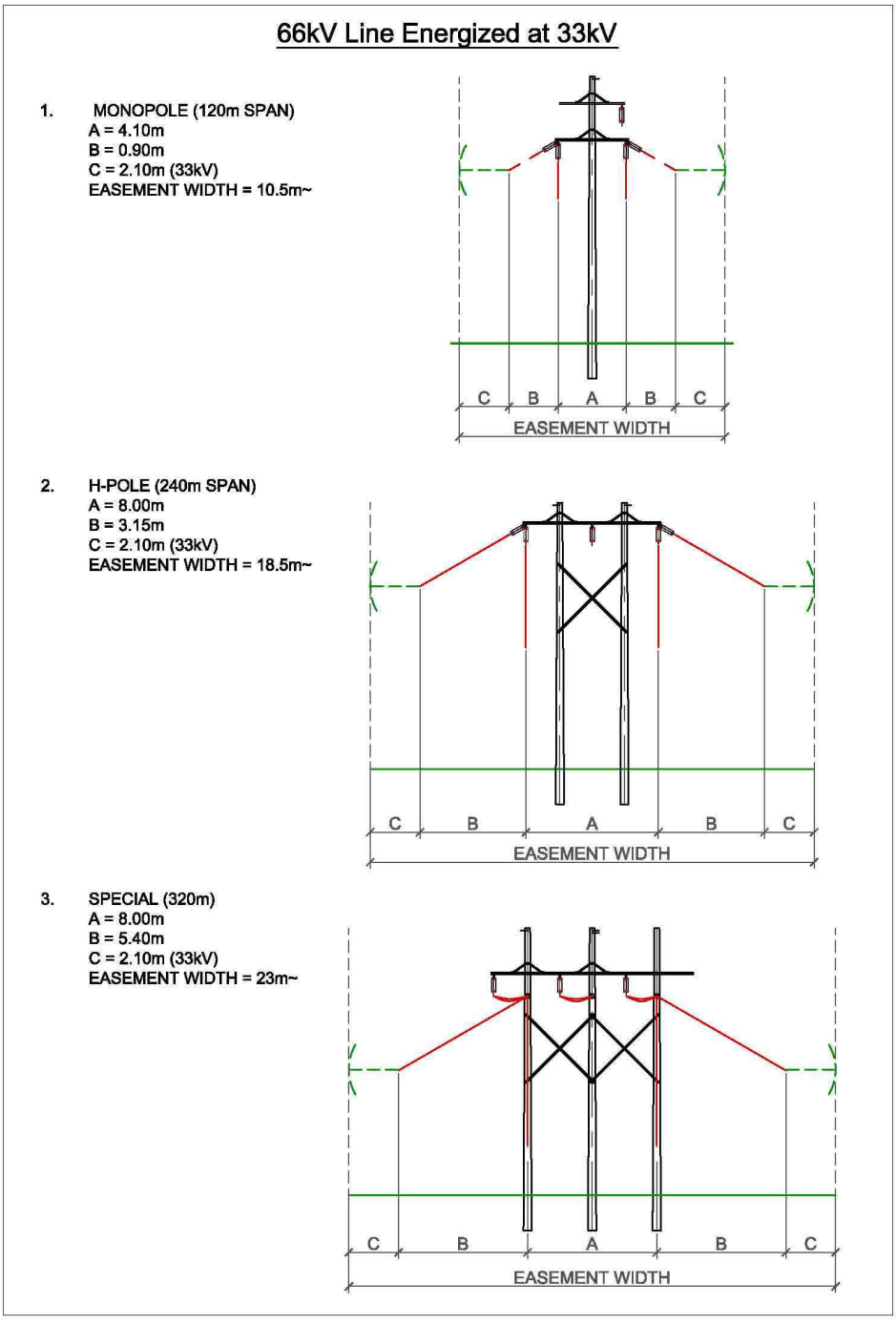
2.3.6 Transmission Line

Two 33kV, 22km long transmission lines, constructed on the access road are proposed to connect the TRHDP substation to the existing SIEA electrical grid at a substation located at the Kukum Highway junction, which in turn, will connect to the Lungga diesel power station. The transmission line will be designed to enable it to be upgraded to 66kV in the future.

The transmission line will be constructed within the purposely acquired road reserve from Black Post to the TRHDP substation above the Power station. The land through which the access road and transmission line are constructed is highly modified, by commercial and casual logging; Oil Palm plantations and relatively intensive settlement. Minor earthwork and complete forest clearing will be required along the right-of-way. The total width of right-of-way for the transmission lines and access road will be up to 50m. Vegetation clearing and control is included in the discussion on access road construction and operation (see Section 13 - ESMP).

Neon 19/3.75 Type AAAC 1120 aluminium alloy conductors will be used to transmit electrical energy. Entura (2014) provided specifications for pole-mounted step-down transformers of 33kV/415V to be located at each village along the access road, to distribute electricity to communities. 2-13 provides examples of the types of transmission towers that may be installed.

Figure 2-13 Examples of transmission line pylons



Source: Entura, 2012

2.3.7 Project Support Facilities

2.3.7.1 Access Roads and Traffic

The main access road will start at the junction between Kukum highway and the existing Black Post gravel road. Black Post Road will provide access to the Project site on most of its current alignment (approximately 10km).

Figures 2-14 and 2-15 are photographs of Black Post Road.

Figure 2-14 Beginning of Black Post Road near Kukum Highway

Figure 2-15 Blackpost Road close to villages

The access road will bifurcate from the existing Black Post Road before reaching Marava. This segment of access road will necessitate about 1.5km of new road construction. Black Post Road stops at Mangakiki. Beyond this point, only an old timber harvesting road is still visible across remnant forests and secondary forests. The dam, powerstation and tunnel sites are currently inaccessible by vehicle. The new section of access road will follow this old timber harvesting road for about 2.6km, and will be extended to the South through an area of secondary and primary forests (see Section 6 ¯ Biological Environment Baseline - Terrestrial) to access the dam site on the left bank of the river.

All roads presented in Table 2-4 will require upgrade/refurbishment to accommodate the passage of construction traffic in both directions. This will involve widening, forest and vegetation clearing, and construction of road subgrade, road base, and roadside drainage (including installation of culverts).

Along the existing Black Post Road (up to Mangakiki), the access road will not require any forest clearing but will be widened. This widening will result in encroachment into disturbed habitat dominated by grassland (see Section 10 ¯ Assessment of Impacts on the Biological (Terrestrial) Environment). Beyond Mangakiki, parts of the access road will be constructed along timber harvesting trails, where forest clearing and earth-work will be required. According to Entura (2014). The presence of steep slopes along this section of road alignment will require significant engineering, including high cuts, high fill embankments and retaining walls.

Figure 2-17 shows a photograph of a section of the timber harvesting trail, as it currently exists, beyond Mangakiki, This section of timber harvesting trail will become part of the right-of-way along which the access road will be constructed. The access road will be routed through areas of forest that will need to be cleared.

Figure 2-16 Timber harvesting trail beyond Mangakiki

Under contract to TRHDP, dam constructors will be responsible for subcontracting a local timber harvesting company to undertake forest-clearing activities if needed. Entura's Feasibility Study (2014) identified two quarry sites both in the reservoir area. However, no access roads were identified to connect to these quarries sites. For the purposes of the ESIA, it has been assumed that these access roads will follow topographic contour lines and use the same design specifications as the other access road(s).

The access road from Mangakiki to the dam site will follow the 160masl to 200masl topographic lines, and will enable traffic to pass in both directions. According to GeoRisk Solutions (2014), the access road at the dam site will follow a tortuous ascent in a tributary valley towards the left bank of the River. The main road (sealed road) to Honiara, also called Kukum Highway, will be used to transport material, equipment and pre-fabricated office trailers to the project site. Table 2-4 identifies the different roads that are required to support project construction and operation.

Table 2-4 Access roads

Road	Type	Length (km)*	Width (m)**
Permanent existing Black Post road	Unsealed	13.3	Approximately 15m (the total right of way is up to 50m to allow room for the two transmission lines)
Permanent access road to powerhouse (extension of Black Post road)	Sealed	1.45	
Permanent access road to dam (extension of Black Post road)	Sealed	4.7	
Temporary access road to intake portal	Unsealed	0.25	Unknown
Permanent road to dam base and mini-hydro	Sealed	0.66	Unknown
Temporary access road to quarries**	Unsealed	1.5	Approximately 15m

*This width includes the right-of-way for the transmission line. Lengths are subject to change when final design is completed.

**It is assumed that access roads will follow topographic contour lines and have the same width as the other access road. It is suggested not to seal this access road to allow vegetation to regrow once material extraction over.

Small landslides occasionally occur along steep sections and may be exacerbated by the construction of the road. Retaining structures, such as gabion walls, or the removal of upslope colluvium may be required to minimize the risk of landslides occurring during construction and operation of the access road. It is anticipated that daily traffic volumes will be comprised of light, medium and heavy vehicles. The anticipated traffic volume between the construction sites and Honiara is estimated to be in the order of 25 to 40 round trips per day. Additional trips for spoils disposal are expected to take place within the Core Area. Most of the heavy vehicles on the road are expected to be associated with the transport of cement, fly ash, rebar, substation transformers, transmission line towers, and electro-mechanical machinery for installation in the powerhouse.

2.3.7.2 Work Areas and Project Offices

The work area will require 130m x 90m (11,700m^2) of land. It will need to be cleared of vegetation and levelled. Soils will be removed and stockpiled.

The site for Project offices, stores, work areas such as batch plant, crushing areas and pugmill will be located close to the dam on an area of approximately 11,700m^2. The fly ash warehouse will be located in this work area. Other supporting infrastructures locations and characteristics were not defined at the time of ESIA writing.

According to Entura (2014), it is likely that explosives will be needed throughout the construction phase, especially during tunnel excavation, stripping of the dam's foundation and quarrying aggregate for concrete and road paving. Explosives will be handled and stored in accordance with local legislation and statutory requirements. Explosive storage facilities will be isolated from the project office and fabrication, equipment storage and maintenance areas,

and will be secured within earth bunds and have sufficient security to prevent theft and misuse.

2.3.7.3 Staff and Workers ˇ Accommodation

The maximum number of staff on site at any one time is estimated to be in the order of 100 during the construction of the dam. During the first construction season, the maximum number of staff will in the order of 80. Staff will include experienced expat labour and locally sourced semi-skilled and unskilled labour. Accommodation for non- local workers will not be located on site to avoid the presence of non-local workers close to local communities. The housing of non-local workers in Honiara and Lungga will help mitigate adverse impacts on local communities. Employment preference is to be given to Malango and Bahomea communities. It is the responsibility of the Developer to explore accommodation options including in east Honiara, and at Lungga and Henderson, for workers living outside of Malango and Bahomea.

The provision of other utilities on site such as sewage treatment, potable water, electricity and telecommunications is expected to involve minor earthworks.

2.4 BOOT STRUCTURE

The Project aims to mobilize private financing which is expected to be one of the largest investments ever to be made in Solomon Islands. Given that the Project is the first utility-scale hydropower project in the remote island state where all resources need to be imported, the Project ˇs construction cost is relatively high at close to $140 million.

It is expected that the Project will be developed as a build-own-operate-transfer (BOOT) scheme. The preferred bidder (Korea Water Resources Corporation and Hyundai Engineering consortium) [KW-HEC] has been selected competitively through an open and transparent tender process under the guidance of International Finance Corporation (IFC). K-Water is wholly owned by the Government of South Korea (an SOE) and has extensive experience of investing in, owning and operating Hydro power stations. Hyundai Engineering Company, a subsidiary of Hyundai Corporation, is one of the largest Engineering construction companies in the World. Together KW and HEC have invested in the successful construction and operation of Hydropower projects in Pakistan and Georgia.

Depending upon the structure and sources of project financing, the financing cost and contingencies could add as much as $60 million to the project cost. The high project cost will put an upward pressure on the power purchase agreement (PPA) tariff, and disincentives SIEA from switching to clean and renewable energy.

Therefore, the Solomon Islands Government (SIG), with the support of IFC and the International Development Association (IDA; World Bank) is seeking concessional funds from the Green Climate Fund (GCF) and other sources in order to reduce the financing cost to strengthen the Project ˇs economic viability and to support SIEA ˇs transition from diesel power to renewable hydropower.

KW-HEC, has been granted an exclusive development right to prepare the project within a period ending on June 30, 2017, by when the PPA should be signed. HEC will be primarily responsible for the Engineering Procurement and Construction (EPC) development; K-Water will be responsible for the Operation and Maintenance contract during the BOOT period. The BOOT concession period is expected to be for a period of 30 years from commissioning,

approximately 34 years from mobilisation. The expected approximately USD140M EPC budget includes nearly USD 2 M for environmental investigations and monitoring; the budget for ongoing maintenance and operation includes nearly USD 1M per annum for training and capacity building. Plans include employment and training for more than 50 locally recruited staff.

The debt-equity ratio is expected to be 75:25. KW-HEC is prepared to collectively hold 51% of the equity ($26 million) while SIG intends to hold the balance of 49% ($24 million). As the high cost of equity could be a significant element of project cost, IDA may lend to SIG to hold equity stakes in the Project Company while agreeing to a much lower return than KW-HEC.

The equity investment will be through a Special Purpose Company (SPC) which will hold the development licence; will lease the Core Land from the Tina Core Land Company (a SIG-Landowner JV) for the term of the BOOT; and transfer the project to the Government at the end of the BOOT period.

Concessional debt financing is anticipated from the Economic Development Cooperation Fund (EDCF) of the Korea Exim Bank; Green Climate Fund (GCF); IFC; and IDA. ADB's public sector financing window (Asian Development Fund [ADF]) and commercial window (Private Sector Operations Department [PSOD]) are also considering financing the Project.

2.5 ACTIVITIES ADJACENT TO AND WITHIN THE PROJECT AREA

This section of the ESIA outlines activities within the project area that have had, or continue to have, an influence on the environment and on the local population economy. This section helps to highlight any potential cumulative impacts of other existing or reasonably foreseeable projects or programs (see Section 13). Sources of information regarding the activities in the project area were derived from environmental and social baseline studies undertaken for preparing the initial ESIA, bibliographical sources, and previous project reports (pre-feasibility and feasibility studies). Additional information on each of the activities discussed in the following subsections is provided throughout the ESIA report.

Three main activities occur in areas surrounding the project area: timber harvesting, mining and palm oil extraction. These activities provide sources of income for many people in the area, from royalties, or through employment opportunities. In addition, people's life may be improved with the building of schools, clinics, houses and roads. Nevertheless, despite many benefits on livelihood, health and education, these activities may have caused adverse impacts to accrue to the natural habitat.

2.5.1 Mining in Adjacent Catchment

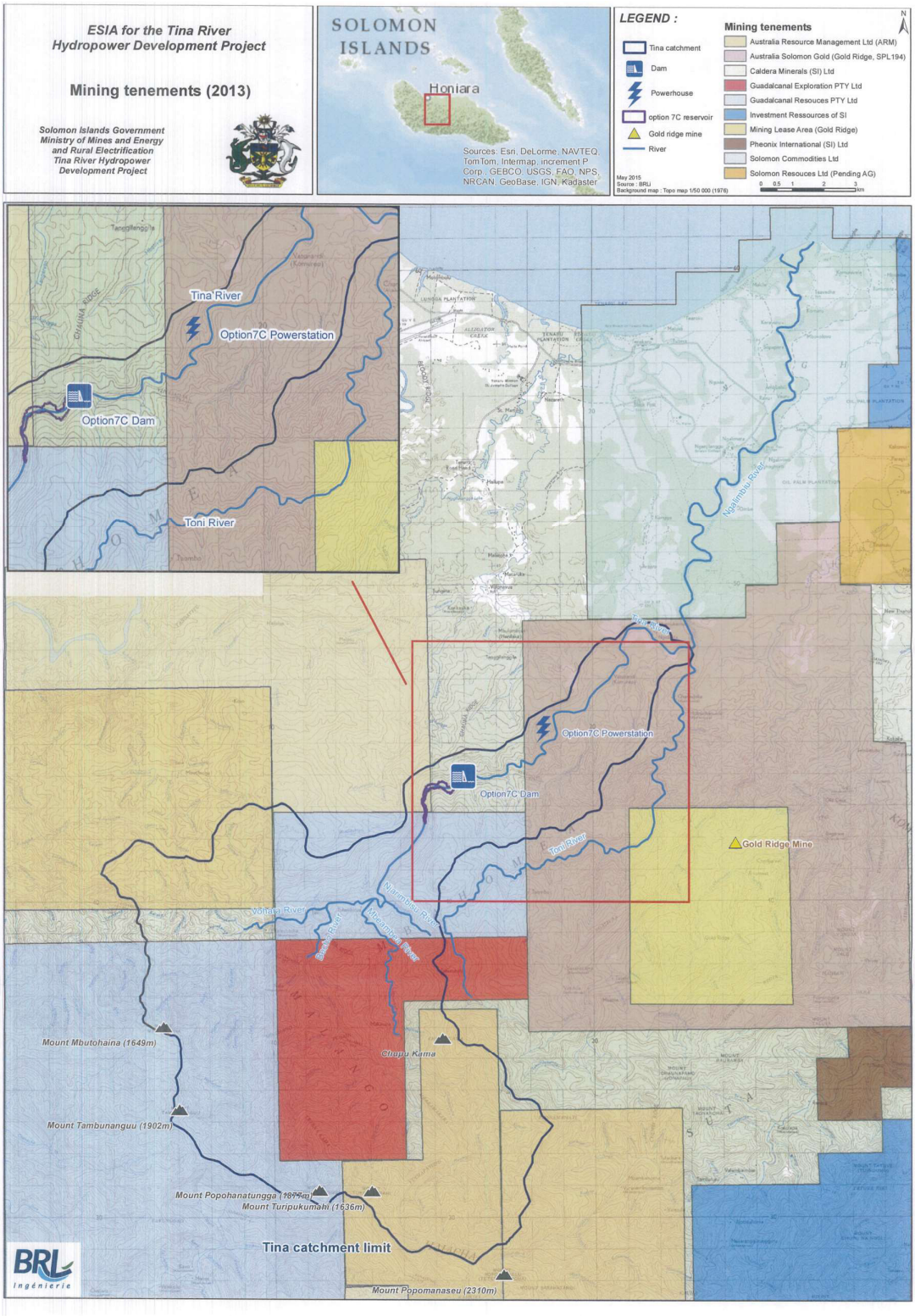
Even though mining activities are much localized, they often lead to groundwater and surface water contamination due to siltation and the release of chemicals used in drilling and mineral processing. There are no gold panning activities on the Tina River or within the Toni River catchment. Chupu Kama, in the Tina River catchment area was prospected in the late 1990s. However, gold assay results were sub-economic (Veronica Webster Pty. Limited, 2012). Prospecting has been carried out in the montane region of Tina River catchment. Today there are no mining activities in the Tina River catchment or in the Toni and Ngalimbiu river catchments. Gold Ridge Mining Limited (GRML) is located in the Tinahulu and Chovohoi

catchments (both rivers are part of the Metapona River catchment). Prospecting tenements have been granted almost everywhere in central Guadalcanal including ten tenements in the Tina catchment as shown Figure 2-15 (obtained from MMERE).

Gold Ridge has been granted a Special Prospecting License (SPL 194 or Vunusa Tenement), which includes an area overlapping both the Toni and Tina river catchments. SPL 194 covers an area of 130km^2 that surrounds the 30km^2 Mining Lease (No 1/1997). Gold Ridge was negotiating with landowners for land access some of which are also landowners within the TRHDP area. This SPL covers both the Toni and Tina river catchments, as shown in Figure 2-17.

Gold Ridge operations were suspended in 2014, and the Mining Lease (No 1/1997) has now been cancelled. SPL 194 is expected to expire shortly. Today, local entrepreneurs are looking to reopen the mine. Whether SPL 194 will receive an extension or not is unknown. Notwithstanding, it is assumed that if SPL 194 could be renewed, it would represent a potential worst-case scenario for mining impacts within the catchment.

Figure 2-17 Map of mining tenements



2.5.2 Oil Palm Plantations in Lower Catchment

Oil palm industries can contribute to pollution of rivers and coastal areas from fertilizers (mainly nitrogen based) and pesticides. Pollution can also originate from overflowing mill effluent storage ponds. Surface water pollution is particularly aggravated during floods. Oil palm plantations are located downstream of the project site. However, no information regarding water quality was available at the time the initial ESIA was prepared. Mill storage ponds and nearby water courses are regularly sampled for Biochemical oxygen demand (BOD), pH, Total Suspended Solids (TSS), oil and grease. Some oil palm fields drain into the Ngalimbiu River and others drain into the Metapona River. GPPOL has implemented an Integrated Pest Management program that aims to make the use of pesticides more efficient and reduce pollution.

2.5.3 Timber Harvesting in Middle and Upper Catchment

According to WWF (2005) and Pikacha (2008), timber harvesting is the major threat to Solomon Islands forests, as they are exploited faster than their regeneration rates. Timber harvesting causes biodiversity loses, by either killing species or destroying their habitats. It also causes soil erosion, water quality impairment, and may facilitate the establishment of invasive species in remote areas. The opening of the canopy reduces humidity levels near the ground and increases insolation destroying the habitats of many amphibians. Timber harvesting also has adverse impacts on aquatic dependent wildlife. Increased sedimentation, tree felling and frequent collapsing of timber harvesting bridges may obstruct small channels and streams (Polhemus et al., 2008).

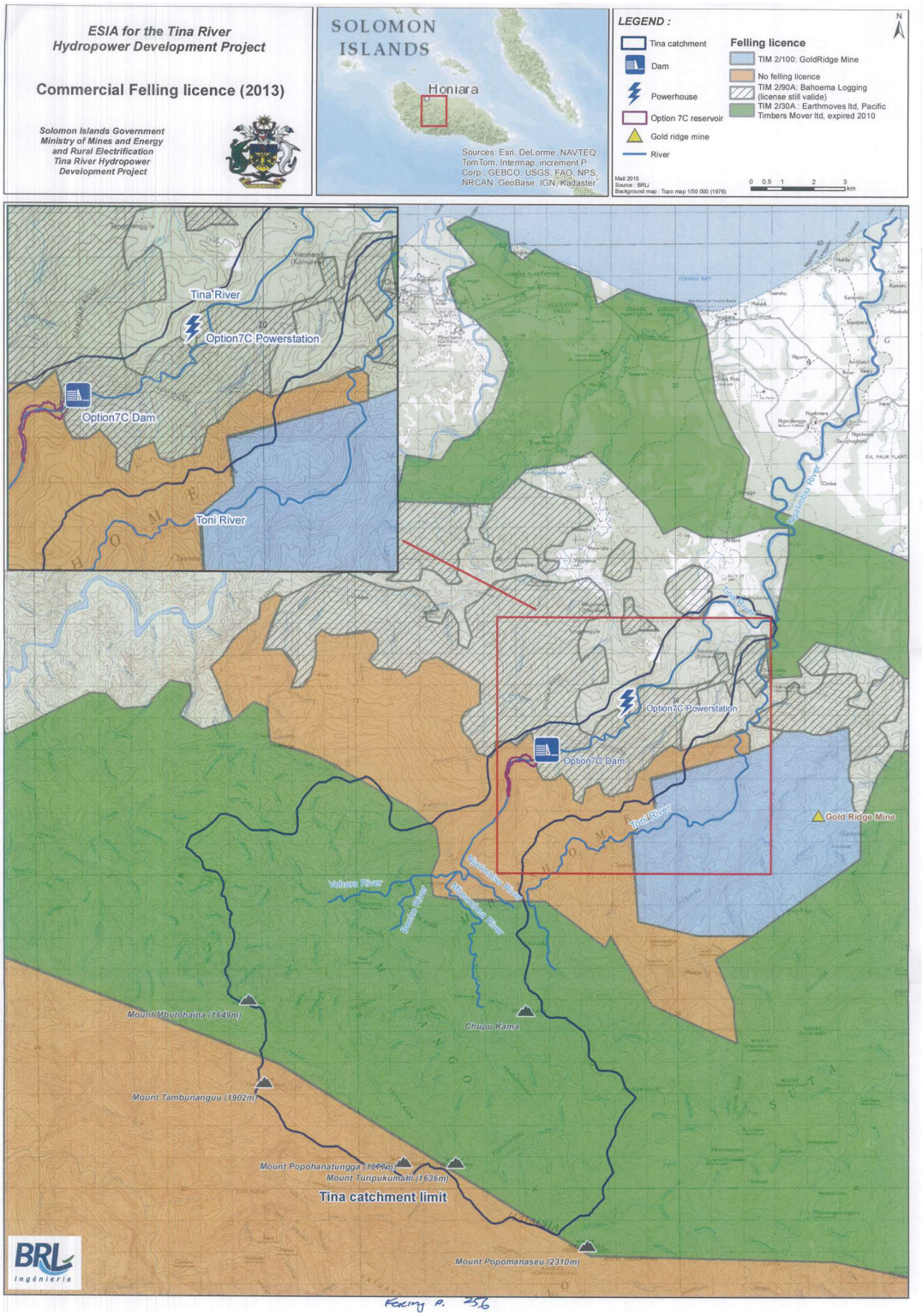
Many areas on the left bank of the Tina River are, or were, being exploited for timber harvesting either commercially (with a timber license) or privately by local villagers. According to national laws, timber harvesting activities are forbidden in areas above 400masl. Based on field visits and the use of Google Earth Imagery, it was possible to observe that most timber harvesting activities were selective timber harvesting, which only involved removing commercially valuable trees. Selective timber harvesting is less damaging to the environment than clear-cutting, since selective timber harvesting has less impact on topsoil erosion. During field visits in August 2013, the sound of chain saws could be heard from Senge to Mangakiki. However, no clear-cut areas were observed. Most timber harvesting activities represent a potential threat to water quality and could increase siltation processes in the reservoir as well as be an initiator of landslides if timber harvesting was to intensify upstream of the dam.

Another problem associated with timber harvesting activities is that no environmental or social impact assessment has been carried out on these activities. It is, therefore, difficult to determine the extent of such activities, or their impacts. License agreements between timber harvesting enterprises and the customary owners of lands are informal and the extent of the exploitation is not precisely known. Officially, according to the Ministry of Forest and Research (2013), there are (or were) three timber licenses within the Tina River catchment, as follows:

- TIM 2/30A : Earthmovers Ltd, Pacific Timber Movers Ltd (Expired in 2010);
- TIM 2/90A: Bahomea Timber harvesting (License is still valid).

Figure 2-18 is a map obtained from MFR that shows the timber harvest licenses recorded as of 2013. It reveals that the majority of the Tina River catchment is, or was, under a timber license.

Figure 2-18 Timber harvesting licenses (2013)



2.5.4 Gravel Extraction in the Ngalimbiu River

Some private operators have permits to extract gravel from the Ngalimbiu River. Local communities also extract gravel along the Tina River on a much smaller scale (see Section 2.5.5 and Section 13 Cumulative Impact Assessment). Operators pay royalties to landowners of the downstream communities. During both baseline surveys (from July 2013 to September 2013) and mitigation workshops (February 2014), it was impossible to obtain information on the amount of gravel extracted. In theory, a list of the current permit holders should be available from the projects˘parent government department but no records are available.

According to a report published by the Pacific Islands Applied Geoscience Commission (SOPAC)[2] Secretariat (2006), river aggregate deposits are composed largely of igneous rock fragments with lesser limestone constituents. Igneous rock fragments comprise plutonic rocks and slightly lower volcanic rocks. In 2005, extraction covered an estimated 10,000m^2 on Ngalimbiu River. According to the SOPAC report, there is a need to develop transparent and efficient mechanisms to manage gravel resources.

The main issue concerning gravel extraction associated with constructing the dam is the alteration of sediment continuity downstream and the progressive halt of gravel replenishment.

2.5.5 Local Population Pressures on Natural Resources

The population of the Solomon Islands has increased considerably over the past few decades (Solomon State of Environment, 2008). Increased population leads to increasing pressure on water usage and water pollution; increasing hunting and fishing; and habitat fragmentation due to timber harvesting. The water quality decreases when moving downstream along the Tina River due to sanitation problems (increase in coliform bacteria). Until recently, agricultural activities were limited to gardens that have had minimal impact on the water quality of the Tina River. More details on local population pressures on natural resources are provided in Section 12 ¯ Assessment of Socio-community Impacts, and Section 14 Cumulative Impact Assessment.

2.6 PROJECT PLANNING AND INSTITUTIONAL REQUIREMENTS

2.6.1 Project Planning Impacts

Planning for a project of the scale of TRHDP in this context requires the establishment of constructive relationships with leaders and the project-affected communities. It is important that these relationships are developed and sustained over time. In this regard, consultation

[2] The Pacific Islands Applied Geoscience Commission (SOPAC) was an inter-governmental regional organisation dedicated to providing services to promote sustainable development in the countries it serves. In 2010, its functions had been transferred to the Secretariat of the Pacific Community (SPC) and the Pacific Regional Environment Programme (SPREP), thus ending SOPAC as a separate entity. Today, SOPAC is a division of the SPC with its main office in Suva, Fiji.

regarding plans for a hydro-electricity scheme on the Tina River began in 2009, and has continued since then.

As outlined earlier, TRHDP planning activities have included community awareness raising and social networking, and consultation with tribal chiefs, local leaders, village communities, and organisations in Bahomea, Malango, and Ghaobata. Through such interactions, the PO has become an important organisation among local communities, and is seen as having the power to shape their future economic and social lives. In terms of institutions, the PO appears to be closer to the Bahomea community and its leaders than any other government agency.

The TRHDP PO's growing involvement in local affairs, and its relationship with local communities, has been facilitated by the establishment of a network of part-time community liaison assistants (CLAs). These assistants provide information and news about the project to their villages, help organise events, and provide support to project planning activities. Furthermore, the project officers appear to make efforts to be accessible to the people of Bahomea, and the Honiara-based PO receives a steady stream of visitors from the area, often seeking assistance with problems. In the context of post-Tension relations with government, the PO and its network of liaison people appear to have been a positive development.

2.6.2 Institutions

As part of its planning, in 2009, the SIG created the Tina River Hydro Landowner Council (LC), an elected body of tribal representatives with which government could negotiate to obtain access to the area, so that project feasibility studies could be carried out. Government made a payment of an Access Fee of SBD 100,000 per member to the 27 clans and sub-clans making up the council, to assist in forging an access agreement. Working with the already established Bahomea HOC and the Malango HOC, the LC also began work on identifying the rightful landowners within the proposed project areas.

Due to representational issues, the apparent proliferation of stakeholders, politicisation of the process, and associated rent seeking, the PO reduced its support for the LC and started working instead with a community consultative group, referred to as the Bahomea Land Identification Committee (BLIC). This is a voluntary group of the most knowledgeable Bahomea elders who wanted the landowner identification process to progress without it becoming politicised or corrupted. There has since been dissatisfaction among some members of the (now defunct) LC, despite the Government's legal endorsement of the current land identification arrangements. At the same time, the HOC was initially supported by the TRHDP PO in resuming its traditional leadership role in customary land and cultural affairs. The TRHDP has, therefore, already had a mixed effect on the institutional situation in the project area[3].

During the construction, the developers and contractors will have a strong influence in local communities. Their activities are likely to affect all villages in the Tina area in some way, and there will be more contacts between the communities and the project than at present. The developer should continue to consult directly within affected peoples with the community via

[3] Crucially, since the SIA fieldwork and associated consultations, the landowning tribes for the Option 7C Core Area have publicly asserted their rights over decision making over their land, rejected the institutional validity of the Landowner Council, and endorsed the alternative BLIC process (see, for example, Core Land Tribes press release, 24/6/2014)

community liaison committees. The SIG will need to monitor the developer and the contractors in regard to their performance in this area.

Consultation and negotiation will place an increasing burden on community representatives. It is doubtful that the local communities and institutions have the capacity to cope with the amount of work and the complexity of issues arising from the project planning and implementation. Dealing with matters as diverse as compensation for damage to land owner property, cultural heritage protection, benefits sharing and river management, will require that local communities obtain additional capacity, such as affordable, honest, and independent legal advice. Legal advice to land owners is currently available from the Public Solicitor's Office.

2.6.3 Group Formation and Stability

There is no catchment-wide social or political organisation representing those most likely to be affected by the proposed development. The LALRP provides information on the co-operative societies formed to represent landowning groups who are resident of a number of different communities across Malango and Bahomea.

A number of villages want to be able to represent themselves in negotiations with the project and government over compensation and do not want this role to be captured by the HOC or the LC. Some villages have formed their own informal groupings such as the `Up Stream Community_(USC) ¯ involving Valekocha, Komureo, Namopila, Pachuki, Senge and Koropa.

In the downstream Ghaobata villages, where a number of landowner and interest organisations were established to deal with the Gold Ridge mining companies, and the operators of the palm oil plantation, there is also a strong call to have their interests and concerns addressed in a separate organisation. The SIG and PO need to pay more attention to the involvement of the downstream Ghaobata communities in planning decisions.

The desire for separate representation by some communities is understandable, given that there is distrust of landowner trustees and other leaders, and people who have acted previously as agents for timber harvesting companies, etc. The proliferation of groups seeking direct and localised representation in dealings with the project has the potential to increase the risk of internal conflicts or require special attention by the PO and its advisers.

2.7 IMPLEMENTATION SCHEDULE

According to Entura (2014), the Project was estimated to take approximately three years to construct and commission, following award of the prime contract. Major construction would start the third month after the award of the contract.

The following indicative schedule indicates the various phases involved in the construction activities:

- ¿ Roads and access (Separate Contract) 340 days starting after Initialling of PPA.
- ¿ Contract award: Third Quarter 2017
- ¿ Design process; 8 months commencing with Contract award.
- ¿ Mobilisation and establishment: 6 months from contract award
- ¿ Dam, (including diversion and coffer dams) 22 months starting 6 months after contract award with the establishment of quarries and crushing and stockpiling aggregate.

- ¿ Intake and head-race tunnel, 22.5 months starting with head-race tunnel and surge tower excavation. (Dual headings, 36 metres per week; 22.5 months); tunnel lining (80m per week; 10 months
- ¿ Powerhouse construction, 381 days starting after mobilization.

Note: the dam construction will almost certainly constitute the critical path because it is dependent on flow conditions in the river and hence on the pattern of wet/dry seasons. Tunnelling can continue independent of weather once established

2.8 PROJECT OPERATION

Details of power station operation, and utilisation of available water resources in wet and dry seasons will be determined as a result of complex computer modelling. However, the evaluation of available energy from the 29 years of simulated flows, compared with the normal patterns of demand in Honiara, and accepting Solomon Power assessment of load growth, has enabled some calculations to be made.

Wet year inflows will see the station able to operate at full capacity for most of the time ¯ with unused water being spilled around 40% of the time. In the driest three years on record (i.e. an event with about 10% probability) the station will only rarely be able to utilise all three machines.

In those dry years it is expected that the hydropower station will be used to reduce the need for diesel capacity in the high demand times of the week ¯ between 8 a.m. and 6 p.m. If diesel produced a steady 8MW for the whole of this period of the day, the hydro could produce all of demand which exceeded that base load, in any circumstances modelled. The hydro could also meet all demand above a 6 MW baseload, for all but 4 weeks in the driest year.

This modelling assumes that in these relatively rare, dry events, the inflows over-night (apart from the environmental flow) will be used to restore lake levels. Flows during these night time periods would be restricted to the environmental flow plus minimum machine outflow (2.4 m^3/s) above the Toni River.

2.9 PROJECT COSTS

The capital cost of the Project is estimated to be US$133.3million (Entura). This is based on an initial project that consists of 3 turbines, but with space for an optional fourth turbine if demand and hydrology make that viable. An additional 4th turbine, would add another US$3.4million.

2.10 PROJECT DECOMMISSIONING

It is expected that the TRHDP would have an operating life of 80 to 100 years, and that at the end of this lifespan, it would probably be decommissioned. Decommissioning would involve draining the reservoir, excavating sediments from within the former reservoir, removing the dam, restoring former natural flow regime to the river channel, draining and blocking the power headrace tunnel, removing the penstocks and powerhouse, and removing the

switchyard. The various impacts associated with decommissioning would be examined in a separate ESIA that would be prepared at that time.

3. INSTITUTIONAL AND LEGAL FRAMEWORK

3.1 INSTITUTIONAL FRAMEWORK

This section presents information on the government agencies and NGOs that will most likely play a role in the Project implementation and, where appropriate, discusses their policies, objectives and mission statements as they pertain to TRHDP.

3.1.1 Ministry of Mines, Energy and Rural Electrification (MMERE) and TRHDP Project Office (PO)

The Ministry of Mines, Energy and Rural Electrification (MMERE) is responsible for mining, energy and water resources in the country. It consists of a number of strategic divisions: mines, geology, water resources, and energy divisions, each headed by a director. MMERE's corporate division provides administrative logistical support to all other departments. The administrative head of MMERE is the Permanent Secretary, and the political lead is the Minister. MMERE plays a strategic role in the current development phases of Solomon Islands through the emerging mining sector, the focus on developing sustainable energy supply for the country, and the increasing pressure on water resources.

The Energy Division (ED) is the lead agency directly implementing the Project through the TRHDP PO. The TRHDP PO consists of approximately ten local and expatriate staff, supported by contractors, and includes expertise in engineering, project management, legal, customary land, community relations, public relations, biology and social sciences. As the key government agency responsible for the TRHDP, the PO provides overall coordination and support on matters relating to government policy, land and project implementation and is responsible for meeting the requirements of major donors, such as the World Bank. In the context of the ESIA, the PO plays a critical role in ensuring the information required for the ESIA is provided by other government agencies and stakeholders.

The ED plays an oversight role and ensures that the PO implements the Project according to the directions set by the government. A major constraint faced by the energy division is the limited number of officers available to manage quite a broad range of issues relating to energy in the country. In this context the PO provides dedicated personnel for the Project.

MMERE will also play a key role in overseeing the procurement, engineering design and construction of the access road from the Black Post turnoff to the dam site. Current indications are that the capacity of the MMERE is sufficient to respond to the large-scale TRHDP development with the support of the TRHDP PO and donor agencies. TRHDP PO has engaged an international road specialist to assist with this role.

Through its Policy Goal within MMERE, the Solomon Islands Government Translation and Implementation Framework states that:

> 'The mineral and energy resources are used in a sustainable, innovative, environmentally conservative and socially acceptable manner that enhances the well being of people and helps toward making Solomon Islands energy efficient'.[4]

[4] NCRA Government Policy Statement

The Solomon Islands National Energy Policy 2014 underpins the role of the ED and outlines the National Government's policies for the planning and management of the energy sector over the next 10 years (2014-2024). to the vision of the Policy is to unlock :the development potential of Solomon Islands' economic base through a dynamic and effective energy sector'.[5]

The Policy's stated mission is that it:

> 'Provides the base for appropriate coordination, planning, promotion, development and management, and efficient use of energy resources'.[6]

The role of the MMERE and its Energy Division and PO in implementing these policies is, therefore, critical as preparations are made for the TRHDP development.

3.1.2 Solomon Islands Electricity Authority

The Electricity Act establishes the Solomon Islands Electricity Authority (SIEA), operating under the brand of Solomon Power, as the central entity to generate electricity in the Solomon Islands. SIEA is in charge of all matters related to electricity production and transmission/distribution, including ensuring standards of safety, efficiency and economy. It also advises the Government on matters related to electricity and can make recommendations as to regulatory instruments. The SIEA is set up as a "corporate body", with independent liability and the capacity to independently enter into contracts[7].

SIEA consists of a Chairman and four members who, together, form its Board, as well as a general manager, who acts in an ex-officio capacity. The General Manager is appointed by SIEA, whereas, the five members of the Board are all appointed by the Minister of MMERE. SIEA is free to appoint any other members of staff, and is largely self-regulated[8].

SIEA will play a critical role in the purchase and distribution of power from the Project. SIEA will enter into the Power Purchase Agreement (PPA) with the selected Developer and it is intended that through that agreement SIEA will have contractual rights to enforce the Developer's obligations under the ESIA.

The organisation is going through an institutional reform with support from the World Bank to increase its revenue collection capacity and improve its services.

3.1.3 Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM)

The Ministry of Environment, Climate Change, Disaster Management and Meteorology (MECDM), has four divisions, each with their own respective directors. The Meteorology division, the Climate Change Division, Disaster Management Division and Environment and Conservation Division.

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[5] Solomon Islands National Energy Policy 2014

[6] Solomon Islands National Energy Policy Framework

[7] Electricity Act

[8] Ibid.

The Environment and Conservation Division (ECD) is the key department responsible for assessing, monitoring and mitigating the environmental and social impacts of developments in Solomon Islands. The Environment Act 1998, Wildlife Protection Act 1998, and the Protected Areas Act 2010, together with their respective regulations, guide its mandate. MECDM's Strategic and Corporate Plan 2012-14 identifies five strategic areas (listed below) as core functions of the Ministry.[9] Within each of these strategic areas, target issues are also identified.

- Strategic Area 1 - Conservation and Management of SIs' Environment
  - Conservation and management of biodiversity
  - Protected areas network
  - Waste management and pollution control
  - Development control
  - Environment Training
- Strategic Area 2 - Climate Change
  - Policy and legislative framework
  - Mitigation strategies
  - Adaptation strategies
  - International representation
- Strategic Area 3 - Meteorology
  - Policy and Legislative review
  - Meteorological Forecasting, operations and monitoring
  - Early Warnings (tsunamis and extreme events)
  - Quality management systems
  - Data & Information management system
  - Research
- Strategic Area 4 - Disaster Management and Risk Reduction
  - Governance and Institutional Framework
  - Operational effectiveness and capacities
  - Public awareness and village disaster risk planning
  - National Disaster Management Office (NDMO) capacity and capability
- Strategic Area 5 - Corporate Services
  - Management Teamwork, direction and coordination
  - Performance management
  - Communication and information flows
  - Staff development and skills upgrading
  - Trainings, selection and recruitments
  - Logistics and asset management
  - Financial Planning and management
  - Corporate planning and reporting

The ECD will play an important role under the Environment Act in evaluating the environmental and social impact assessment for the Project, conducting community consultation and issuing the development consent for the Project. The ECD will also play a key role in monitoring the environmental impacts of the Project.

[9] MECDM Corporate Plan 2012-2014

The increasing number of large scale developments in the country has put a lot of pressure on the division, which has limited capacity in terms of staff and technical ability to assess and monitor environmental and social impacts. While ECD has developed considerable experience addressing the social and environmental issues facing the neighbouring Gold Ridge Mine, ECD would benefit from technical inputs and analysis of water quality and other parameters by third parties. Third party inputs will be incorporated in the final design of the ESMP where relevant.

3.1.4 Ministry of Lands, Housing and Survey (MLHS)

The complex task of administering land lies with the Ministry of Lands, Housing and Survey (MLHS).The key legislation governing the Ministry's mandate is the Land and Titles Act.

The Commissioner of Lands is empowered under the Lands and Titles Act with the administration of registered land in the country. While customary lands are beyond the Commissioner's jurisdiction, it is the Commissioner's role to acquire and oversee the registration of customary land for development.

With respect to the Project, the Commissioner of Lands had responsibility to oversee the acquisition of the customary land required for the Project under the Land and Titles Act. MLHS is also responsible for enacting the subdivisions and transfers of registered land required for the road and transmission line corridor. As the land access components of the Project are managed by SIG, the impact of land acquisition and safeguards relating to this are set out in the Land Acquisition and Livelihoods Restoration Plan.

The Registrar of Titles serves a core function in formally registering land transactions.

The Geographic Operations Group (GOP) provides technical support to other core functions within the MLHS. Surveyors are posted to provinces and are included in the Lands & Survey Provincial Operations Group. With the devolution of the Town & Country Planning Boards to Honiara City Council and the Provinces, physical planners have been re-tasked to provide professional advice and support to these Boards where operational.

The Policy, Management and Regulation Executive Committee provides policy direction to the Ministry, and monitors the achievements of its programs[10]. The Administrative Support Services provides administrative services and support to the whole of MLHS. The Human Resource (HR) unit has responsibility for overseeing and supporting human resource development within the Ministry.

The land administration system was inherited from the colonial period, well before independence in 1980, and more than 20 years of poor governance and a lack of funds has diminished the Ministry's capacity. Efforts to support the development of the MLHS have been ongoing since 1999, with support from Ausaid's Solomon Islands Institutional Strengthening of Land Administration Project (SIISLAP), which ran from 1999 to 2007[11]. MLHS also receives some ongoing support from the Pacific Community (SPC).

[10] Ministry of Lands, Housing and Survey Corporate Plan.

[11] Solomon Islands Institutional Strengthening of Land Administration Project (SIISLAP)

3.1.5 Ministry of Forestry and Research (MFR)

The Ministry of Forestry and Research (MFR) was created by the Coalition for National Unity and Rural Advancement (CNURA) Government in January 2008.

The MFR undertakes its duties under the framework of the Forest Resources and Timber Utilisation Act 1969 (FRTU Act).

The FRTU Act, as amended, is the main law governing the use and management of forests in Solomon Islands. Repeated efforts to revise the FRTU Act in recent years have failed to obtain Cabinet approval

The Act assigns responsibility for managing the felling and milling of trees for commercial use to the MFR's Commissioner of Forests.

Section 4 (1) of the FRTU Act establishes that it is an offence to fell trees or remove timber for sale except if it is:

- under and in accordance with the terms and conditions of a valid licence;
- for a purpose declared by notice of the Minister to be exempt from a valid licence; or
- other purposes not applicable to the Project such as use for firewood or under the authorisation granted to a licenced mill.

Section 4(2) of the FRTU Act provides that "any person who fells trees or removes timber from any land shall, until the contrary is proved, be presumed to have felled that tree or removed that timber for the purpose of sale". Whether a timber licence is required for TRHDP will likely depend on whether the timber felled is ultimately sold.

While eight amendments to the FRTU Act have occurred, along with a number of additional regulations, it remains out-dated and principally focused on the role of the MFR in licensing and monitoring the logging industry, including focusing on the allocation of rights and licenses to fell and mill trees. Even in this area, it has significant weaknesses. These include provisions for high levels of discretionary power by forest and tax officials, and limited guidance on levels of license allocation and best practices for timber harvesting.

The FRTU Act covers both forests on registered land and customary land, with any licensee required to have entered into an agreement with the landowner of the plot(s) on which the trees are situated. This requires an agreement of the allocation of timber rights to be obtained from all groups having rights over the land. This process is straightforward on registered lands, but becomes more complex on unregistered customary land where rights holders must first be identified, and then sufficient time allocated for rights to be contested.

With respect to the TRHDP, any trees felled will be within the area of land acquired and registered for the Project. This will reduce the complexity of the timber rights process. If a felling licence is required the registered owner of the land will sign the timber rights agreement for the land and a profit-a-prendre will be registered on the certificate of title. The land valuation conducted as part of the acquisition process outlined in the Land Acquisition and Livelihoods Restoration Plan (LALRP) included an assessment of the commercial timber value of the forests on the acquired land.

A Felling License does not involve any separate environmental permitting processes in addition to the development consent required from the Director of the ECD under the Environment Act. In practice many logging operations fail to obtain development consent.

3.1.6 Ministry of Culture and Tourism (MCT)

The primary role of the Ministry of Culture and Tourism (MCT) is to develop, protect and promote Solomon Islands˘ culture, art and heritage. MCT is an entity that hosts the national museum. Tabu sites and cultural heritage is the responsibility of the National Museum of Solomon Islands.

The National Museum will need to be consulted regarding valuing and undertaking on site assessments if there is proposed disturbance or removal of a tambu site for development purposes.

3.1.7 Ministry of Development Planning and Aid Coordination (MDPAC)

The Ministry of Development Planning and Aid Coordination (MDPAC) was created from the former Department of National Reform and Planning in the mid-2000s. MDPAC is responsible for:

- The preparation and subsequent monitoring of implementation of the National Development Plan. The current plan is the National Development Strategy 2011-20.
- The preparation and formulation of the annual Development Budget Estimates. The SIG prepares two budgets each year, the recurrent budget and the development budget.
- Aid coordination. MDPAC is responsible for coordinating development partner activities and for securing donor funding for new projects/programmes. This is a critical aspect of successful preparation of the annual Development Budget. Aid coordination also includes frequent liaison with aid donor representatives and for the organisation of high level talks with some development partners.

MDPAC is the lead coordinating agency for donor-funded projects and, therefore, is a key stakeholder. The Ministry has shown considerable competence in managing and coordinating donors in the country and has been and will be involved in the TRHDP in this regard.

3.1.8 Ministry of Infrastructure and Development (MID)

The Ministry of Infrastructure and Development (MID), Department of Infrastructure (DI) plays a key role in the public administration of Solomon Islands, and is responsible for roads, wharves, airstrips and government workshop facilities. In the past twenty years, the government and donors have invested a little more than one billion Solomon dollars in transport infrastructure throughout the country. The country˘s internal problems, including inadequate funding, reduced DI˘s capacity for ongoing and systematic infrastructure maintenance. Consequently, much of that infrastructure is now in need of complete reconstruction. DI˘s mission is to enhance the prosperity, wellbeing and participation of the community by providing an integrated, efficient and affordable infrastructure and transport system; supported by ethical, professional, proficient and valued staff.[12]

The work of DI focuses on the sustainability of rural and urban livelihoods[13]. Its scope includes:

- Provide quality advice to support the Government˘s reforms and priority activities

[12] Ministry of Infrastructure and Development Corporate Plan

[13] ibid

- Implement major reforms in line with Government policy
- Offer individuals and industry in various parts of the country a satisfactory and safe transport system at affordable cost
- Ensure compliance and a regulatory framework that delivers safe, reliable and efficient transport services
- Ensure that financial resources are targeted to best achieve Solomon Island's transport system needs
- Communicate the benefits of transport reforms
- Effectively plan the upgrade and rehabilitation of infrastructure, government housing stock, fleet, plant and machinery
- Effectively provide transport planning that supports other sectors in the economy through an integrated approach, targeting Economic Growth Centers and vital social infrastructures
- Promote development of a professional, technical, proficient, able, capable and dedicated workforce
- Ensure and provide opportunities for more private sector participation.[14]

3.1.9 Guadalcanal Provincial Government

Guadalcanal Province is divided into 21 Electoral Wards. Elections are held every 4 years for the 21 Members of the Provincial Assembly. The Premier is the political head of the Province and also presides over the Provincial Executive. The Speaker presides over the Provincial Assembly meetings. The Provincial Assembly is the highest law-making body in the Province. It enacts and passes ordinances for the proper conduct, welfare and livelihood of Guadalcanal citizens.[15]

Currently, there are 10 Executive Members or Provincial Ministers including the Premier. Similar to the national government, each Minister is responsible for a certain portfolio. The portfolios are as follows:

1. Office of the Premier, including Finance & Education

2. Ministry of Planning and Economic Development/Deputy Premier

3. Ministry of Natural Resources

4. Ministry of Reconciliation and Rehabilitation

5. Ministry of Health, Medical and Social Services

6. Ministry of Agriculture & Lands

7. Ministry of Geana Regional Affairs

8. Ministry of Tasimauri Regional Affairs

[14] ibid

[15] Guadalcanal Province - Reform and Rural Regional Development and Empowerment Policy Framework (2011-2015)

9. Ministry of Tasimate Regional Affairs

The administrative head of the Province is the Provincial Secretary who coordinates all administrative and management units in the Province. The incumbent is seconded from the Public Service on a fixed-term appointment. In this regard, the Provincial Secretary and other seconded officers have a dual responsibility. While they are responsible to their supervisor at the national level, they are also required to equally fulfil their duties to the Province.

Guadalcanal Province has been mandated by an Act of parliament to perform three different functions in the provision of services to the people, including `legislative matters, provincial services and statutory functions_. However, some of the statutory functions have not been transferred from the national to the provincial government at the time the ESIA was prepared.

Regarding legislative matters, Guadalcanal Province has been responsible for the following: facilitating the marketing of products; collecting land taxes to raise revenue; forming the Guadalcanal Town and Country Planning Board; providing water to some rural villages; and establishing corporate bodies for the provision of provincial services, including some economic activities. The provincial minister responsible for natural resources has been vested with certain powers to facilitate some forestry operations under the Devolution Order No. 1 of the Forestry Resources and Timber Utilisation Act 1970. As well, the police have been collecting revenues from commercial vehicles under the Traffic Act.

Provincial governments, under Schedule 3 of the Provincial Government Act 1997 (PG Act), have been given responsibility for minor local matters such as the licensing of local businesses, bars, hotels, markets, fire protection and waste disposal. They have not been empowered with control over the delivery of services for the people.

With respect to the Project, the Guadalcanal Provincial Government˘s newly constituted Town and Country Planning Board will have a role in granting planning consent for the Project under the Town and Country Planning Act. This consent is separate to the development consent to be issued by the ECD of MECDMM under the Environment Act.

The Province will also have a key role in issuing business licenses for the developer and other sub-contractors under the Guadalcanal Province Business and Hawkers Licence Ordinance.

The Provincial Government may also have a role in the application of ministerial powers under the River Waters Act under a devolution order. This will require confirmation in consultation with SIG.

3.1.10 Ministry of Agriculture and Livestock Development (MAL)

Established in the 1950˘s the Ministry of Agriculture and Livestock Development (MAL) is one of the oldest ministries, and has played a key role in the development of the country. Its levels of capacity have, however, shifted significantly over time, with staff numbers reducing from over 400 in the late 1990˘s to 169 in 2007 (GoSI 2007, MAL 2007). Over 80% of the country˘s population still relies on subsistence agriculture as a key element of its livelihood strategy. Improvement of small-scale agricultural production is a key goal for national growth.

The MAL is currently subdivided into four departments, each with its own director:

- The Livestock and Quarantine Department ¯ Aim is to formulate and regulate policies; provide livestock development and extension services in the provinces; breed and distribute livestock and disseminate information; and conduct research into indigenous animal species.

- Extensions and Training Department - The department's staff is supposed to work directly with villagers in rural areas. Around 100 extension staff are planned for the provinces, mostly men, with up to 10 in each province, except Western Province and Malaita, which will have 20 each. In many cases, the majority of staff are based in the provincial capital.
- Research Department - In the past this department, which is based at Dodo Creek, played a major role in the delivery of services, both directly to farmers via on-farm field trials and demonstration plots at its field stations, and via technical support to the Extensions and Training Division. With the destruction of the research station and the displacement of research staff, the department is unable to function effectively.
- Planning and Management Department - This department includes the land use-planning unit. It had a general role in coordinating the activity and policy of the other MAL departments.

Whilst MAL has no direct inputs in the Project, development activities to compensate for impacts on livelihoods could be agriculturally based and therefore their inputs in any such initiatives will be important. Land based compensation measures are discussed in the Land Acquisition and Livelihood Restoration Plan.

3.1.11 Ministry of Finance and Treasury (MFT)

The Ministry of Finance and Treasury (MoFT) is responsible for facilitating the provision of sound advice on monetary, budget and fiscal policy to the Solomon Islands Government. The mission of the Ministry is to provide leadership to the Solomon Islands community in financial matters and deliver high quality, professional financial and economic services to the Minister of MFT, the SIG, other ministries, and the wider community.[16]

MoFT's services include statistics and economic management to support government decision-making processes and the implementation of good governance practice.[17] Core tasks of the Ministry include financial reporting, revenue collection, border protection, government payments, preparing and managing the annual recurrent budget and advising the Government on a range of financial policies including economic reforms.[18]

To achieve its mission, MoFT delivers services through its divisions and units:

- The Customs and Excise Division
- The Inland Revenue Division
- The Budget Unit
- The Economic Reform Unit
- The Debt Management Unit
- Statistics,
- Internal Audit,
- Corporate Services[19]

[16] Ministry of Finance Corporate Plan

[17] ibid

[18] ibid

[19] ibid

MoFT has been very active in structuring and sourcing the financing for the Project. It will continue to perform functions on behalf of the Government through the Implementation Agreement with the Developer and possibly also through an equity shares and/or on-lending arrangement to the Project Company.

3.1.12 Public Solicitors Office

The Public Solicitors Office provides legal assistance and representation and comprises of three key units:

- The Criminal Unit;
- The Family Protection Unit; and
- The Landowner's Advocacy and Legal Support Unit (LALSU).

LALSU provides free legal advice sessions and formal representation to landowners and communities across the country relating to land use and ownership, with an emphasis on logging, mining, protected areas and large scale developments. LALSU also conducts regular legal awareness trips to each province, runs test cases and is active in advocating for policy and law reform impacting on customary land owners. LALSU works closely with NGOs in the environment space and has strong relationships with the Ministry of Environment, Climate Change and Disaster Management.

With respect to the Project, LALSU has provided a series of awareness sessions on legal rights to communities in the Project area. LALSU has also provided assistance to identified landowning owning tribes in the compulsory acquisition process. This is discussed in further detail in the Land Acquisition and Livelihood Restoration Plan.

3.1.13 Civil Society / Non-government Organisations (NGOs)

There is a range of civil society groups and non-government organisations (NGOs) that are likely to play important roles in the development of the TRHDP. The involvement of civil society groups will be important in the review of the ESIA, in particular, the implementation of mitigation measures adopted in the environment management plan. The role of many of the civil society groups in the country can be described as geographically constrained, or, on a national level, sporadic and reactive when issues arise. Often, this is the result of the perception that political interference dominates major development projects and programs in the country.

Table 3-2 includes a list of civil society groups / NGOs that may become involved in the project at some stage.

Table 3-1 Key NGOs

Civil Society/NGO	Focus area	Potential involvement
Transparency Solomon Islands (TSI)	Transparency and Governance in Solomon Islands	Benefit distribution and the nature of agreements between communities, landowners and investor
Solomon Islands Development Trust (SIDT)	Rural development	Community projects and development
The Nature Conservancy	Environmental conservation and promotion of protected areas	Advocacy with respect to environmental impacts
Live and Learn Environment Education (LLEE)	Environment Education	Education and awareness on the potential environmental impact on livelihoods for communities and on gender inclusion and leadership
Red Cross	Social and health issues and advocacy	Advocacy and training on health issues and opportunities from the Project
National Council of Women (NCW) and Guadalcanal Provincial Council of Women	Advocate women's rights and gender equality	Ensuring gender issues are fully addressed and that issues affecting women are taken into account.
World Wide Fund for Nature (WWF)	Environmental advocacy and promotion of protected areas	Environmental and conservation advocacy

3.1.14 Key Stakeholders

There are a number of other stakeholders that will play direct and indirect roles in the TRHDP. These stakeholders are important for the reasons indicated in Table 3-3, and are described throughout the report.

Table 3-2 Key stakeholders

Stakeholder/Organization	Importance to Project	Key focus areas/Lessons learned
Gold Ridge Mining Ltd (GRML)	Close proximity to the Tina Hydro Project. Many villagers worked or received royalties from GRML when operational.	é landownership issues é benefit distribution é lessons learned from addressing environment and social issues
Guadalcanal Plains Palm Oil Ltd (GPPOL)	Close proximity to the Tina Hydro Project. Many villagers work for GPPOL or receive royalties.	é land issues é benefit distribution é dispute settlement é community engagement. é addressing environment and social issues
World Bank /DFAT/Green Climate Fund/EDCF/IDA/ADB	Main or potential funding agencies	é World Bank Environment and Social Safeguards é World Bank (WB) Performance Standards é ADB Safeguard Policy Statement (2009)
Financial Institutions including Pan Oceanic Bank and ANZ	Management of financial benefits for landowners from the project including establishing bank accounts for individuals and trust accounts for minors	é financial services to landowning groups and compensation recipients é financial literacy to communities

3.2 ACTS, REGULATIONS AND ORDINANCES

This section describes the acts, regulations and ordinances that are relevant to the Project and helps to describe what is required prior to the implementation of TRHDP. This section also presents requirements from national and provincial legislation to ensure the compliance and will assist in the development of mitigation measures in the course of the ESIA.

Table 3-4 presents a summary of the Solomon Islands regulatory regime (see Annex 10 for a more complete analysis).

Table 3-3 Solomon Islands Acts and Regulations

Name of Act or regulation	Implication for the Project
Constitution of Solomon Islands	The Constitution provides additional safeguards for the compulsory acquisition of customary land.

Name of Act or regulation	Implication for the Project
Solomon Islands National Energy Policy 2014	The Policy outlines the National Government's policies for the planning and management of the energy sector over the next 10 years.
Agriculture Quarantine Act 1982	An Order of the Minister may prohibit or regulate the importation or landing of: (a) animals and animal products; (b) plants; (c) earth; and (d) other things by, or by means of, which it appears to the Minister that any disease or pest might be introduced.
Environment Act 1998 and Environment Regulation 2008	The TRHDP is a prescribed development under schedule 2 (section 16) of the Environment Act 1998 and, therefore, requires the preparation and submission of an Environment Impact Statement (EIS) through the Environment and Social Impact Assessment (ESIA) Process. The scope of the Environment Act and its Environment Regulations encompass a number of processes, and procedures, and the establishment of an institution, to regulate them. The following key issues are addressed by the legislation: é Provides the guiding principles and definition for environmental management. é Establishes the Environment and Conservation Division as a key institution responsible for managing environmental issues in the country. é Sets out the procedures for undertaking and approving Environmental and Social Impact Assessments. é Develops requirements for robust stakeholder engagement processes through public consultation as part of assessment and decision making process. é Requires the formulation of appropriate environmental and social safeguards as part of the environment and social impact assessment process (section 31) é Requires environmental monitoring of the development (section 31) é Establishes the Environment Advisory Committee as the appeal body where the Developer or any person may, within 30 days of the publication of the Director's decision, appeal against the Director's decision concerning the issuing of development consent.

Name of Act or regulation	Implication for the Project
Fisheries Management Act 2015	The Act is concerned with the conservation, management and development of fisheries and marine resources. The Act provides a regime for licensing commercial fishing as well as for establishing fisheries management plans that can cover commercial and non commercial fishing. The Act may become relevant to any future use of the reservoir for commercial fishing, whether as a livelihood development project for communities or otherwise. It would also be relevant if any fisheries management plan were applied to the Tina River.
Forest Resources and Timber Utilization Act 1969	The Act requires a felling licence to be obtained to fell any trees for the purposes of sale. Whilst the intention of law is not to cover vegetation removal for construction or other purposes, there is a possibility that a `felling license_ could be required for the project if any commercially valuable trees felled are later sold, whether by the developer or landowners. Further consultations will be undertaken with the Ministry of Forestry based on the amount of vegetation to be removed during the construction phase of the Project.
Labour Act 1996	This Act makes provisions for the protection of workers and their rights. It establishes the Office of the Commissioner of Labour to address all labour related issues. The legislation broadly covers the roles and powers of the office, identifies the commissioner as the relevant administrative body, and outlines specific guidance on minimum wages and hours of work for all workers in the country. It also makes provision for the manner in which contracts for employment are made for both national and foreign workers. The provisions of both the Labour Act and the Immigration Act will be important during the construction phase.