INVESTIGATION, PRELIMINARY DESIGN & FEASIBILITY STUDY FOR

REWA RIVER WATER SUPPLY SCHEME

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Employer: Water Authority of Fiji
Country: Fiji Islands
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1  PROJECT BACKGROUND INFORMATION

1.1  Suva – Nausori Water Supply System Overview

The Suva-Nausori water supply system services around 95% of the population of the Greater Suva Area (GSA), including the towns of Lami and Nausori and nearby rural areas under the control of the Suva Rural Authority. The water supply system extends from Togalevu Village, approximately 10km west of Lami, to Raralevu 5km east of Nausori Town, and the Rewa Delta about 15km east of Suva City. The northern extremity of the system takes in Sawani, on the north bank of the Waimanu River. The extent of the existing Suva-Nausori water supply system is shown in Figure 1.

The water supply system comprises of six sources, three raw water pumping stations, two treatment plants, 18 reservoirs and eight treated water pumping stations. A schematic connectivity diagram of the Suva-Nausori water supply system is shown in Figure 2.

Savura Pumping Station transfers water from Headworks 1 and 2 and Cascade Weir – three small weirs on relatively small catchments that dry up quickly in extended dry periods. The Upper Waimanu Intake Pumping Station transfers water from the Waimanu River to Tamavua WTP either directly or via Headworks 3 (a small raw water storage also known Savura Dam which also has a small catchment draining into it). The Lower Waimanu Intake Pumping Stations transfers water from the lower reaches of the Waimanu River directly to Waila WTP and is the sole source of raw water for this WTP.

Tamavua WTP was commissioned in 1961 and is located at Wailoku Road at an elevation of RL124m. The plant comprises of 2 centri-floc clarifiers and 8 rapid sand filters. The current design capacity of Tamavua WTP is around 60 ML/d, with average production around 55 ML/d. Waila WTP was commissioned in 1982 and is located 3.5km west of Nausori at an elevation of RL18m. The plant has 3 centri-floc clarifiers and 7 rapid sand filters. The current design capacity of Waila WTP is 100 ML/d, with average productions around 95 ML/d.

1.2  Existing System Operations

The existing water supply system has capacity to deliver approximately 150ML/d from two separate water treatment plants – Waila and Tamavua WTP – under normal operating conditions. However, the headworks are vulnerable to supply interruptions during extended dry periods. Tamavua WTP is supplied from multiple river i / creek offtakes, some of which can experience large reductions in flows during prolonged dry periods. Consequently, Tamavua WTP is primarily dependent on extractions from the Waimanu River during extended dry periods, resulting in both WTPs being dependent on the same river source.

A yield assessment undertaken for the 1999 Master Plan estimated that the current system yield is around 110 ML/d, based on 70% of minimum flows in the Waimanu River being available for extraction. Waimanu River minimum flow was estimated to be around 150 ML/d and was estimated to occur on average 1 day every 14 years (ie 0.02%of the time).

Intermittent supply areas have been identified within the distribution network based on anecdotal and field evidence. Many of these intermittent supply areas are caused by bulk supply or headworks issues, i.e. they cannot adequately be supplied during periods of low river flows. Modelling confirms this observation, as most areas identified can be adequately serviced when bulk supply issues are eliminated. There are several areas however that suffer from low pressures during peak hour demand periods. Many of these occur in rural areas where lengthy mains and unrestricted connections combine to temporarily reduce pressures. WAF is currently extending a successful program used in Nadi-Lautoka, which targeted identification and rectification of intermittent supply areas.
This schematic is not to scale and provides a simplified overview of system connectivity and layout.
The recent modelling of the existing network has been used to assess capacity under current demands. With consideration to the fact that some intermittent supply areas may not be using as much water as they would if 24-7 supply was available, it was found that the distribution network largely had sufficient capacity to deliver flows as and when required. One conclusion from this result is that the current interruptions in supply are largely caused by pipeline failures and the duration required to respond to and rectify the failures. It is anticipated that as the ongoing mains replacement program continues, major failures will become less frequent, and major trunk upgrades of the system (in excess of those needed for specific localized growth) will not be required.

It is noted that the future development areas identified in the Master Plan are quite favourably located with respect to the existing system. The largest single development is Waila City, and its close proximity to the Waila WTP means that it may be directly supplied via new infrastructure (pipes and reservoirs) from the treatment plant without placing additional demands on the existing trunk and reticulation network. Similarly, but to a lesser extent, growth in the Cunningham area can be serviced from spare capacity within existing trunk mains with the only major infrastructure requirement being additional local storage.

1.3 Water Demands

Multiple demand projection scenarios were determined by WAF for the current Great Suva-Nausori Water & Wastewater Master Plan (WWMP) assuming different rates of Non-Revenue Water (NRW) reduction and average domestic consumptions changes due to demand management. The adopted demand projections are based on the most realistic and achievable NRW and demand management outcomes and are considered prudent for water supply planning purposes.

The table below shows the key demand components that make up metered consumption, includes allowances for significant reductions in NRW and provides estimates of projected average day and peak day demands to 2033.

Table 1: Suva-Nausori Demand Projections

<table>
<thead>
<tr>
<th>Year</th>
<th>2013</th>
<th>2018</th>
<th>2023</th>
<th>2028</th>
<th>2033</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Serviced Population*</td>
<td>260,638</td>
<td>290,854</td>
<td>319,947</td>
<td>350,505</td>
<td>384,349</td>
</tr>
<tr>
<td>Average Domestic Consumption L/p/d</td>
<td>202</td>
<td>210</td>
<td>200</td>
<td>190</td>
<td>180</td>
</tr>
<tr>
<td>Domestic Consumption ML/d</td>
<td>52.6</td>
<td>61.1</td>
<td>64.0</td>
<td>66.6</td>
<td>69.2</td>
</tr>
<tr>
<td>Commercial Consumption ML/d</td>
<td>17.1</td>
<td>18.5</td>
<td>20.0</td>
<td>21.8</td>
<td>23.6</td>
</tr>
<tr>
<td>Government Consumption ML/d</td>
<td>3.8</td>
<td>4.4</td>
<td>4.6</td>
<td>4.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Metered Allowance from NRW ** ML/d</td>
<td>0</td>
<td>4.1</td>
<td>6.9</td>
<td>9.2</td>
<td>11.3</td>
</tr>
<tr>
<td><strong>TOTAL METERED CONSUMPTION</strong> ML/d</td>
<td>73.5</td>
<td>88.1</td>
<td>95.5</td>
<td>102.4</td>
<td>109.1</td>
</tr>
<tr>
<td>Non-Revenue Water (NRW) %</td>
<td>51%</td>
<td>42%</td>
<td>36%</td>
<td>31%</td>
<td>27%</td>
</tr>
<tr>
<td><strong>TOTAL NRW</strong> ML/d</td>
<td>76.5</td>
<td>63.8</td>
<td>54.5</td>
<td>46.8</td>
<td>40.4</td>
</tr>
<tr>
<td><strong>AVERAGE DAY DEMAND</strong> ML/d</td>
<td>150.0</td>
<td>151.9</td>
<td>150.1</td>
<td>149.2</td>
<td>149.5</td>
</tr>
<tr>
<td><strong>PEAK DAY DEMAND</strong> ML/d</td>
<td>168.4</td>
<td>173.9</td>
<td>173.9</td>
<td>174.8</td>
<td>176.8</td>
</tr>
<tr>
<td>WTP Capacity Shortfall *** ML/d</td>
<td>18.4</td>
<td>23.9</td>
<td>23.9</td>
<td>24.8</td>
<td>26.8</td>
</tr>
</tbody>
</table>

Notes:
- * Total Population Serviced includes extension in service area to an additional 4,000 people
- ** Metered Allowance from NRW includes additional metered consumption resulting from NRW reduction program
- *** Current WTP Capacity is 150 ML/d

Source: WAF WWMP (2015)
The NRW component of demand is projected to fall from 51% to 27% over the 20 year horizon.

Average domestic consumption was initially assumed to increase slightly once planned raw water and WTP augmentations are implemented as demands are currently suppressed during peak demand periods, with peak day demands well above current WTP production capacity. Household consumptions were then assumed to gradually decline from a high of 210 L/p/d to around 180 L/p/d by 2033, with further reductions expected beyond 2033.

1.4 Capacity Limitations

There is a current shortfall in both bulk water supply capacity and water treatment capacity during peak demand and extended dry periods. Table 1 above summarises the future population and demand projections for the Suva-Nausori water supply system. The table shows average day demands remaining fairly steady over the next 15 years due to benefits assumed from significant reductions in non-revenue water (NRW). However, peak day demands are expected to steadily increase over the next 20 years, in line with the increase in metered connections due to strong population growth.

Current WTP capacity is around 150 ML/d, based on the combined production capacity of Tamavua WTP and Waila WTP. However, both of the WTPs are heavily dependent on the Waimanu River during extended dry periods and based on historical performance and a yield assessment undertaken as part of the previous Master Plan, the Waimanu River is not capable of supplying the full 150 ML/d during low flow periods.

With peak day demands estimated to be around 168 ML/d currently, there is clearly a significant shortfall in bulk water supply and WTP capacity which is leading to water shortages or low pressures in vulnerable areas of the water supply system (high level areas, particularly at the extents of the system) during peak dry demand periods. Peak day demands are expected to increase to around 177 ML/d within 20 years. Based on these peak demand figures, the shortfall in current bulk water / WTP capacity is around 18 ML/d, increasing to 27 ML/d by 2033.

Based on a 10-15 year design horizon, the proposed capacity for the new water supply source and WTP is 30 ML/d. With peak day demands expected to exceed 200 ML/d within 25-30 years, a second stage upgrade capacity of around 70-80 ML/d has also been assumed.


2 PROPOSED PROJECT – REWA RIVER WATER SUPPLY SCHEME

WAF for many years has proposed a new source on the Rewa River to extract and treat run of river flows. Originally the new source was intended to pump to Waila WTP, however, due to concerns with future salinity levels in the lower reaches of the Rewa River and the potential for mining activity within the Waidina River catchment, the current proposal is to construct a new source of supply further upstream on the Rewa River. The new location of the intake provides additional security against salinity impacts that are likely due to climate change and rising sea levels.

The Rewa River Water Supply Scheme will involve the design and construction of a new water supply source and water treatment plant (WTP) for the Suva-Nausori water supply system. Key project components include a new river intake and pumping station on the Rewa River, a new 30ML/d WTP, a 3ML clear water reservoir and pumping station, a 3ML reticulation reservoir and 26km of DN750 pipeline to connect to the existing water supply system servicing Nausori and surrounding areas.
An overview of the proposed Rewa River Water Supply Scheme is shown below in Figure 3

The project will have the following key benefits:

1. Address an existing shortfall in bulk water supply and water treatment during peak demand periods, therefore improving water supply reliability/continuity across the Suva-Nausori water supply system during extended dry periods.

2. Provide additional bulk water supply and water treatment capacity to allow the servicing of areas not currently supplied with reticulated water and also to service future growth within the Suva-Nausori water supply system.

3. Improve security of supply on the eastern side of the Rewa River (ie Nausori and surrounds).

2.1 Description of Proposed Infrastructure

The proposed Rewa River Water Supply Scheme will be designed to provide immediate additional treated water supply capacity of 30ML/day to make up for current and projected shortfalls until about 2033. To service future peak demands beyond 2033, a second stage upgrade is proposed to increase treated water supply capacity to 70ML/d.

Key components of the proposed Rewa River Water Supply Scheme, their required function and capacity are outlined below.

2.1.1 Intake

A new screened raw water intake is required on the western bank of the Rewa River at a location approximately 600m upstream of the confluence of the Waidina River.

The raw water intake will extract, screen and deliver raw water (via a lift pumping station) to the proposed WTP. The required capacity of the raw water intake is 70ML/day.

Configuration of the raw water intake must enable safe operation over a wide range of river flow conditions from high flood level to very low flows. In addition, the intake must be able to cope with varying levels of debris and sediment loading from the Rewa River.

An effective and low maintenance raw water screening system is required to manage trash and debris loads as well as deposition of sediment within the intake.

The design must provide safe access to the intake structure by operations staff for cleaning and maintenance of screens. All weather access to the intake structure must be provided for flood events up to and including a 1% Average Exceedance Probability (AEP) event.

2.1.2 Raw Water Lift Pumping Station

A Raw Water Lift Pumping Station will be required to transfer flow to the proposed WTP. The required installed pumping capacity of the Raw Water Lift Pumping Station is 30ML/day. All associated electrical and mechanical works will be sized meet this initial capacity requirement.

All pumping station civil works structures are to be sized to accommodate an ultimate installed pumping capacity of 70ML/day.
Associated infrastructure including electrical switchroom building, transformers and crib / maintenance facilities are to be located above the 1% AEP flood level.

2.1.3 Water Treatment Plant

The indicative dimensions of the proposed WTP site are approximately 250m by 150m. This should allow for sedimentation, filtration, chemical dosing, backwash facilities and sludge handling, as well as room for a reservoir, treated water pumping station and associated electrical and control infrastructure. There should also be enough room for some residences for operators, which will ensure that the plant can continue to be operated even when the road to the WTP is flooded.

The WTP will be required to treat raw water extracted from Rewa River across a wide range of flow levels and water quality conditions.

Overall WTP site bulk earthworks and preliminary design arrangement is required to accommodate infrastructure for 70 ML/day ultimate treatment capacity.

The clear water reservoir is to be designed to provide minimum 3 hours contact time at 30 ML/d consistent with WAF's other treatment plants. Provision is to be made on site for a further reservoir to maintain contact time when the plant capacity is increased.

Treated water pumping station and pipeline is to be designed for ultimate 70 ML/d capacity but with initial installed pumping capacity of 30 ML/d.

2.1.4 Treated Water Transfer Pipelines

The main delivery pipeline from the treatment plant to the reticulation reservoir (8.5km) is to be designed to be located primarily in the road reserve. The pipeline from the reticulation reservoir to the connection with the existing water supply system (17.7km) will also be located in the road reserve as far as possible.

A preliminary hydraulic analysis indicates that a DN750 main is required to transfer treated water from the new WTP to the existing water supply system. Whilst a DN600 main may be sufficient to transfer the initial capacity of 30ML/d, the equivalent of a DN750 main is required to transfer the ultimate capacity of 70ML/d. Increasing the pipe capacity in the future from a DN600 to DN750 capacity would require laying a duplicate DN600. It is therefore considered more economical to construct a single DN750 pipeline now.

2.1.5 Reservoir

A new 3 ML reticulation reservoir is proposed along the pipeline route near Waitolu. Sufficient land will need to be acquired for this new reservoir, and for additional storage to be constructed in the future if required. An indicative area of approximately 100m by 50 m is proposed. Access will also be required from the road to the new reservoir site.

This reservoir will also enable water supply to be extended to several villages in this area that are not currently serviced by WAF.
2.1.6 Connection to Existing System

The additional 30ML/day supply capacity will supply the eastern portion of the existing Suva - Nausori water network primarily, the Raralevu Reservoir (TWL 50m) and Sawani Supply zones. Both of these zones are currently supplied by Waila WTP.

This will alleviate some demand on Waila WTP which, combined with overall reductions in NRW, will provide supply capacity to meet a forecast increase in demands from key development areas in the central Suva – Nausori corridor currently serviced by Wainibuku Reservoir (TWL 81m).

Connections to the existing system are proposed to be made at:

1. Sawani DN150 reticulation main (multiple interconnections)
2. Waila WTP Pumping Station (on DN375 delivery main to Raralevu Reservoir)
3. DN375 near intersection of Princes Road and Waila Rd

The proposed arrangement of the Rewa Water Supply Scheme is shown in Figure 3 below.

The proposed location of the intake, WTP, delivery pipelines and Waitolu Reservoir are provided in the google earth *.kmz file included in Attachment 1. Note that all proposed site locations and boundaries are indicative only and shall be confirmed in the field by the Consultant.

3 OBJECTIVES OF THE ENGAGEMENT

The objectives of the engagement are to:

1. identify any gaps or deficiencies with previous feasibility investigations and related studies;
2. investigate and confirm suitability of the proposed sites for intake, WTP, reservoir and pipeline routes;
3. determine system performance requirements and preliminary sizing of each component to increase treated water supply capacity to the GSA by 30ML/day initially, and ultimately 70ML/day;
4. identify options for configuration / staging of the works and determine the most cost effective arrangement of infrastructure which also maximises benefits of the scheme
5. determine water treatment objectives, assess treatment process options and identify a preferred option in the context of current WAF water treatment operations capability and operator skill level;
6. develop preliminary designs and cost estimates for delivery of the proposed works;
7. review construction requirements and constructability issues; and,
8. determine overall feasibility of the proposed Rewa Water Supply Scheme.
4 SCOPE OF WORK

The scope of work under this engagement involves review of previous investigations / studies, site survey and investigations, determine preliminary sizing of proposed infrastructure, development and assessment of options for configuration / staging of the works, preparation of preliminary designs and cost estimates and completion of a detailed feasibility study for the proposed Rewa River Water Supply Scheme.

The scope of work has been divided into a number of major tasks:

- **Task 1 – Review of Previous Investigations, Studies & Background Data**
- **Task 2 - Site Survey & Investigations**
- **Task 3 – Options Assessment**
- **Task 4 – Preliminary Design & Cost Estimates**
- **Task 5 – Detailed Feasibility Study Report**

The scope of work for each major task includes, but is not limited to, the requirements listed under the following Sections 4.1 – 4.5. Undertake all necessary investigations and engineering design work and provide all things to achieve the stated objectives of the engagement including submission of the specified deliverables.

4.1 Task 1 – Review of Previous Investigations, Studies & Background Data

Review the findings of previous preliminary feasibility assessments, related studies and background data including but not limited to the listing provided in Section 4.1.1.

Prepare a list of all documents and data reviewed by the Consultant together with an assessment of relevance to this engagement, accuracy and reliability. Identify any significant gaps in data and make recommendations for further investigations that may be required.

Submit a detailed list of any additional data requirements or further investigations that may be necessary for completion of the consultancy to the WAF Project Manager within 1 week of the date of letter of acceptance.

4.1.1 Previous Reports, Documents and Background Data To Be Provided To The Consultant:

- ADB Handbook for Economic Analysis of Water Supply Projects
- Historical flood data for the Rewa River at the upstream gauging location (Navolau) for the period 1968 - 2006.
4.2 Task 2 - Site Survey & Investigations

Undertake all field surveys and further investigations necessary to confirm adequacy of proposed sites in terms of access, sizing, elevation, flooding risk, geotechnical conditions, power supply and any other constraining factors.

4.2.1 Initial Site Visit

Undertake a joint inspection of the proposed sites including Intake, WTP and Reservoir with representatives of WAF. Also undertake a walk-over visual inspection of the pipeline routes to confirm suitability.

Submit initial written commentary on suitability of proposed sites (subject to further geotechnical and hydraulic investigations) and any significant constraints observed within 3 days of initial site visit.

Confirm extents of proposed sites and pipeline with WAF Lands Section prior to proceeding with site survey and geotechnical investigation activities.

4.2.2 Topographic Survey & Location of Services – Intake, WTP & Reservoir Sites

Undertake detailed topographic site surveys of:

1. Intake / Raw Water Pumping Station site (approximately 60m x 60m)
2. Proposed Water Treatment Plant site (approximately 250m x 150m)
3. Waitolu Reservoir site (approximately 200m x 50m)

Identify all legal land boundaries, easements, road reserves and location of existing dwellings, structures, services and infrastructure as well as other potential constraints.

Prepare and submit survey drawings for each site in electronic format (AutoCAD *.dwg or *.dxf file format). Show all land boundaries, easements, road reserves, ground contours at 1.0m intervals and locations of all existing services and structures.
All surveys to be completed by a Registered Surveyor (Fiji). All elevations to be referenced to Fiji Mean Sea Level datum.

**Survey Work By Others**

Property identification survey, pegging of legal boundaries and establishment of control survey marks at the site of the proposed Intake, WTP and reservoir sites will be completed by others. Topographic survey of the existing unsealed access road from Viria Rd to south eastern corner of Water Treatment Plant Site will also be completed by others. A copy of this survey information will be provided to the Consultant in hardcopy and electronic (*.dwg / *.dxf) format.

### 4.2.3 Preliminary Route Survey - Pipelines

Undertake a preliminary survey of the pipeline route to identify the extent of the road reserve boundaries, location of existing services and infrastructure and any other major constraints such as areas of geotechnical instability, to aid in selection of preliminary pipeline alignments.

Identify and locate all major services including water mains, sewer mains, telecommunications services, overhead power poles, stormwater culverts, bridges and other infrastructure along the pipeline route.

Obtain additional topographic survey detail at select locations for preliminary design purposes including but not limited to: all major bends and fittings, high points and low points (ie air valve and scour locations) as well as bridge crossings and / or trenchless crossings.

Acquire existing ground surface elevation data along the proposed pipeline alignment to aid hydraulic designs and preparation of preliminary pipeline design drawings.

Minimum required accuracy of elevation data along pipeline routes +/- 0.5m. All elevations to be referenced to Fiji Mean Sea Level datum.

### 4.2.4 Photographic Record – Proposed Pipeline Alignment

To assist with selection of pipeline alignment, prepare a sequential photographic record of the proposed pipeline route with photos taken at maximum 100m intervals and at the following locations:

- Road intersections
- Bridge crossings
- All major services crossings
- All village boundaries
- All major pipeline bends and fittings (ie likely air valve and scour locations); and
- At any significant constraint or restriction of the pipeline route (ie areas of geotechnical instability, existing services and public infrastructure etc).

Each photo shall capture the full extent of the road reserve and be Geo-Tagged with information including GPS coordinates, altitude, bearing & azimuth, pipeline route chainage (m), time and date. Minimum resolution (file size) of each photographic image is 2MB.
Pipeline chainage reference point 0.0m shall be set as NE boundary corner of WTP site, or otherwise be consistent with preliminary design drawings (ie plans and longsections) to be prepared by the Consultant.

Indicate proposed pipeline alignment on each photograph with details of any constraints.

4.2.5 Hydrographic & Topographic Survey of Intake Site & River Cross Sections

A hydrographic & topographic survey of the intake site on the Rewa River is necessary to confirm the preferred location for the intake structure and to provide input data for the flood assessment.

Undertake a detailed hydrographic survey across the full extent of the Rewa River for a minimum of 200m upstream and 100m downstream of the proposed intake location. Continue detailed topographic survey of river banks up to minimum 18m above average river level, or the expected maximum flood level.

Locate extents of all firm rock strata within the detail survey area by probing the river bed.

Undertake additional hydrographic / topographic survey cross sections of the Rewa River as required for development of an accurate hydraulic flood model. As a minimum, survey the following cross sections of the Rewa River which are located relative to proposed Intake Location:

- Upstream: 300m, 400m, 500m and 1000m.
- Downstream: 200m, 300m, and 500m.

Requirements for spacing of cross sections for hydraulic flood modelling of the Rewa River are to be confirmed by the Consultant.

4.2.6 River Flood Level Assessment for Intake & WTP Site

The Rewa River is the widest river in Fiji, and its watershed is the largest watershed in Fiji, covering an area of 3,092 km² which is about 1/3 of the total area of Viti Levu. This watershed receives high rainfall of 2,500 – 4000 mm annually, one of the highest for Fiji. Consequently, the Rewa River has a history of severe flood events that have caused significant damage and loss of life, particularly in the lower reaches and delta area.

Future flood events on the Rewa River have the potential to disrupt the operation of the Intake, Raw Water Pumping Station and WTP. It is essential that all key infrastructure such as access roads, operational facilities and electrical switchboards are located above the designated flood levels. Structures such as the Intake which are located within the flood zone are to be designed to withstand flood events including associated debris load / impacts.

The Consultant is to undertake a river flood level assessment for the proposed Intake / WTP site near Viria on the Rewa River. As, well the consultant shall get up to date flood data from meteorology department.

Review all previous flood studies and historical flood data for the Rewa River including the Cyclone Kina event (1993). Data is available for upstream and downstream gauging locations (Navolau, Kasavu / Drakeinakelo and Nausori) for the period 1968 - 2006.
Develop a hydraulic flood model of the Rewa River along the reach where the Intake site is located using an appropriate proprietary hydraulic analysis software such as HEC-RAS or equivalent.

Allowing for the impacts of Climate Change, determine the river flood levels at the Intake site corresponding to each of the following Annual Exceedance Probabilities (AEP): 50%, 20%, 10%, 2% & 1%.

Identify and make recommendations for key design parameters including but not limited to: river flow velocity, suspended sediment and bed loads, potential scour depth and debris loading on structures.

**4.2.7 Geotechnical Investigation – Preliminary**

A preliminary geotechnical investigation is required to provide an overview of site geology and to assist with selection of sites for key structures and preferred routes of pipelines. Geotechnical information is also required to enable estimation of soil and rock engineering parameters to enable development of preliminary designs and cost estimates.

Specific requirements for geotechnical investigations at the site of proposed works are listed below:

- **Intake site** – develop no less than 2 no. geotech boreholes extending to rock stratum (refusal) plus an additional 4m depth (rock coring).
- **WTP site** – develop a spread of no less than 6 no. geotech boreholes across the site extending to a minimum depth of 15m, or to the level of rock stratum (refusal) plus an additional 3m depth (ie rock coring), whichever is lesser.
- **Pipelines** – develop geotech boreholes along the proposed pipeline route at minimum intervals of 1000m, at major change in direction (ie 90 degrees) and at all major geological interfaces. Boreholes to extend to a minimum depth of 3m below grade.
- **Waidina River and Waimanu River crossings** - develop a borehole at each side of the river crossing (on the proposed pipeline route) extending to a minimum depth of 15m, or to the level of rock stratum (refusal) plus an additional 3m depth (ie rock coring), whichever is lesser. Liaise with Fiji Roads Authority to obtain any relevant geotechnical information that may be available from previous bridge construction works.
- **Waitolu Reservoir site** – develop no less than 2 geotech boreholes extending to a minimum depth of 15m, or to the level of rock stratum (refusal) plus an additional 3m depth (ie rock coring), whichever is lesser.

Survey the location of each borehole site as executed and record the ground surface level relative to Fiji’s mean sea level datum. Record presence and depth of groundwater if encountered.

Undertake sampling and laboratory testing of soils for work, health safety and environmental risks including but not limited to:

- Acid Sulphate Soils (ASS);
- Contamination (ie hydrocarbons, organophosphates, organochlorides, heavy metals, asbestos and other hazardous materials or compounds);
• Aggressive soils (ie elevated sulphate content);

Prepare a geotechnical investigation report documenting each of the key sites with borehole logs and detailed assessment of geotechnical conditions and soil classification. Identify depth and extent of any rock strata present.

The report must identify any potential areas of instability and any other risk factors affecting the stability of structures and pipelines. The report shall provide recommendations for selection of suitable engineering design parameters and foundation systems to support the proposed structures at each location.

The report shall also provide an assessment of the following:

• Groundwater impacts;
• Excavatability of each soil / rock stratum;
• Potential for re-use of excavated material in terms of grading and fill compaction requirements;
• Short and long term soil consolidation characteristics of natural soil and fill material with assessment of the risk of differential settlement.

4.3 Task 3 – Options Assessment

4.3.1 Water Treatment Options Assessment

Undertake site inspections of WAF’s existing Wailia and Tamavua WTP’s including Upper and Lower Waimanu River Intakes.

Facilitate a round table / workshop style discussion with WAF Operations staff of no more than 3 hours at each site to review historical and current performance of existing assets, operational issues, WAF operational experience / capabilities and areas for improvement.

Investigate and assess potential water treatment options for the proposed Viria WTP based on raw water quality data provided and expected range of water quality parameters. Recommend a preferred option based on treatment objectives, capital costs, operation and maintenance costs. Selection of preferred technology must be consistent with WAF’s current experience and capability of managing existing water treatment facilities.

This information forms the basis for the development of the preliminary design of the proposed WTP.

4.3.2 Preliminary Sizing and Staging of the Delivery Pipeline

Assess options for staging of the pipeline construction works from WTP to Waitolu Reservoir through to the point/s of connection at Waila and near Rewa Bridge ie.

1. construction of a smaller sized main initially to provide 30ML/day capacity
2. construction of a duplicate main in the future (2020 / 2025 / 2030) to provide a total of 70 ML/day capacity
Determine preferred staging option based on a 30 year Net Present Value (NPV) analysis taking into account such factors including but not limited to:

- Pipeline material, fittings and construction costs (including any future bridge / trenchless crossings)
- Pumping energy costs calculated using Fiji Energy Authority (FEA) tariff rates
- Operation and maintenance costs (estimated on $/km per annum basis)

Consideration shall also be given to practicalities of constructing a parallel main along the proposed route in the future based on the Consultant’s preliminary pipeline route survey and discussions with Fiji Roads Authority (FRA).

4.4 Task 4 – Preliminary Design & Cost Estimates

Based on the outcome of the investigations and options assessment, prepare preliminary designs and develop cost estimates for each of the following system components:

- Intake & Raw Water Lift Pumping Station
- Water Treatment Plant
- Clearwater Tank & Pumping Station
- Delivery Pipelines (Pressure and Gravity Mains)
- Reservoir (Balance Tank)
- Access Roads, Drainage
- Bridge Crossings / Trenchless Crossings
- HV Power Supply Upgrades
- Supervisory Control and Data Acquisition (SCADA) of all components.

4.4.1 General Requirements

- Prepare preliminary designs for the Rewa River Water Supply Scheme and covering proposed alignments and layouts including details for land acquisition (in addition to that already proposed), liaison with other parties, survey works and hydraulic calculations.
- Provide digital copies for all survey and preliminary design drawings, calculations and all correspondence with WAF and other stakeholders including but not limited to FEA and FRA;
- Investigate, describe, enumerate and document all components of the works;
- Prepare preliminary cost estimates for each of the main system components the intake, raw water pumping station, water treatment plant, clear water pumping station, delivery pipe works, storage reservoirs, access road and electrical power supply upgrades. Preliminary cost estimates are to be benchmarked against similar
recent works undertaken in Fiji. Submit details of key pricing assumptions including supply of materials, major plant & equipment and labour rates.

Some specific requirements for preliminary designs are listed below. Note however this is not intended to be an exhaustive list of requirements.

4.4.2 Intake & Raw Water Lift Pumping Station

Select the preferred location for the intake, raw water pumping station and connecting pipelines and services. Identify land ownership where not already identified by WAF Land Section and wherever construction work is required.

Determine preferred arrangement of intake structure and raw water lift pumping including, intake, screen system, intake channel and raw water pumping station configuration. Assess requirements for river bank stabilisation requirements, structure foundations and scour protection.

Specify the required pumps to meet the duty requirements of the pumping station. WAF's minimum requirement is for a duty and standby pump (i.e. n+1 redundancy).

Determine access arrangements and provisions for removal and maintenance of screens and raw water pumps.

4.4.3 Water Treatment Plant

Develop an overall site plan and hydraulic profile of the proposed WTP to ensure the preliminary design is suitable for the first stage of 30 ML/D with ultimate upgrade to 70 ML/D. The site works should cover provision for quarters for WAF staff who will man the treatment plant in future.

Preliminary design of the WTP shall consider access requirements and include sludge and backwash disposal facilities. The facilities proposed should consist infrastructure for sludge treatment and disposal meeting relevant discharge standards without returning sludge to the river.

Incorporate flow and level measurement into the design as well as telemetry systems. The telemetry systems shall meet the requirements of WAF new SCADA system linking to the National Control Centre that will be established at Wailoku.

The preliminary design report for the WTP shall include but not be limited to:

- Basis of design and adopted assumptions, with consideration of treatment process performance requirements and raw water quality
- Summary of water treatment options assessment
- Design development and process configuration, with reference to and further development of the work presented in the Options Assessment
- The preliminary design, dealing with each major component or process comprising the proposed WTP
- Overall site staging plan to accommodate initial 30ML/day and ultimate 70ML/day treatment capacity
• Preliminary capital cost estimate for 30 ML/day treatment plant
• Recommendations for further items to be addressed during the concept & detailed design phases of the project

4.4.4 Clear Water Tank & Pumping Station

Select a location for the clear water storage reservoir and connecting pipelines and services. Identify land ownership where not already identified by WAF Land Section and wherever construction work is required. Location of the clear water tank and pumping station shall consider arrangements for operational security and future augmentation.

Design the number and size of booster pumps required to lift treated water to the proposed Waitolu Reservoir.

Select pumps to meet the pump duty requirements for the pumping stations. WAF's minimum requirement is for a duty and standby pump (ie. n+1 redundancy).

Determine the telemetry requirements for pump station and controls to meet the requirements of the WAF new SCADA system that will be procured by WAF as a separate work with provisions for linking to the National Control Centre that will be established at Wailoku.

Prepare a preliminary design of the pumping station. Perform an hydraulic analysis of the treated water transfer system to optimise the combination pumps and pipeline sizes of the initial 30 MLD and ultimate 70 MLD rate.

4.4.5 Delivery Pipelines

Determine the status and ownership of all land required for the selected pipeline route(s) where this is outside areas already identified by WAF Land Acquisition staff. Liaise with WAF Land Section who will negotiate with the various land owners/lessees before proceeding with survey or preliminary design.

Liaise with all service authorities over route selection and preliminary design and incorporate their requirements into the design.

Check the adequacy of the nominated pipe diameters to satisfy the anticipated demand for the region served and satisfying the operational requirements under the ultimate development scenario.

Undertake a risk assessment for the pipeline components to aid in the selection of materials for pipes and fittings, method of installation, and to address risks to the security of raw water supply.

Prepare drawings of preliminary pipeline design including plans and longsections. Indicate locations of all required air valves and scour arrangements.

Undertake a water hammer analysis to assess the potential impact of transient surge pressures resulting from such events as pump stoppage and rapid valve closure. Determine what surge suppression controls are required and review pipe material selection to confirm adequacy.

Determine preferred pipeline materials, sizing and specifications. Describe general trenching, installation / jointing, minimum cover and thrust restraint requirements.
4.4.6 Reservoir (Balance Tank)

Select a location for the proposed Waitolu storage reservoir and connecting pipelines and services. Identify land ownership where not already identified by WAF Land Section and wherever construction work is required. Ensure that the site allows for future duplication of the reservoir to increase bulk water supply security.

Determine preferred reservoir construction materials (ie proprietary steel with liner versus concrete) and wind & seismic loading design criteria.

Provide commentary on provisions for inlet / outlet and valving arrangement, overflow discharge structure and access road requirements. Determine level controls, SCADA and telemetry arrangements for efficient operation of the Clearwater pumping station and reservoir system.

4.4.7 Access Roads, Drainage

Liaise with WAF Operations and FRA and determine appropriate design standards for construction of access roads and associated drainage structures.

Prepare preliminary civil design drawings of proposed access roads and drainage including plans, typical cross sections, pavement details and details of major drainage structures.

4.4.8 Bridge Crossings / Trenchless Crossings

Undertake a visual structural inspection to assess the possibility of utilising existing bridge structures for crossing of the Waidina and Waimanu Rivers particularly with respect to river flood levels and risk of debris impact. Liaise with FRA to confirm feasibility of proposed aerial crossings using existing bridge infrastructure.

Review alternative trenchless technology options for crossing of the 2 rivers and provide indicative costs for comparison.

Recommend preferred methodology for construction for each of the major river crossings.

4.4.9 HV Power Supply Upgrades

WAF will be required to liaise with Fiji Energy Authority (FEA) regarding design and construction of high voltage power supply upgrades that may be required to support the new infrastructure.

Following preliminary selection of key items of plant and mechanical equipment, the Consultant shall determine the total WTP site power requirements for 30ML/day production capacity including: raw water pumping, treatment plant operation, clear water reservoir pumping and operation of all associated site facilities.

Submit an equipment list with all major drives and corresponding power demands utilised for calculation of maximum site power requirements.

Submit a summary report on site power requirements to assist FEA with scoping of lead in HV power supply upgrade works. The report should also include recommendations for and site specific redundancy requirements (ie HV electrical transformers and associated equipment) that will be operated and maintained by FEA.
WAF will undertake formal consultation with FEA regarding final scoping and procurement of HV power supply upgrade works.

### 4.4.10 Preliminary Design Report & Cost Estimates

Prepare a preliminary design report documenting the configuration, sizing and operational requirements of the Rewa River Water Supply Scheme together with indicative pipe / material selections and a methodology for construction.

Provide preliminary cost estimates for construction of the scheme including indicative project management, design and supervision costs.

Submit a draft version of the report on Preliminary Design Report and drawings to WAF for review. WAF will require 5 working days to complete its review and return a single set of consolidated set of review comments.

Address all WAF comments in writing. Finalise the Preliminary Design Report incorporating WAF review comments unless addressed otherwise.

### 4.5 Task 5 – Detailed Feasibility Study Report

Prepare a Detailed Feasibility Study Report documenting all investigations and preliminary design work undertaken to assess the feasibility of the Rewa River Water Supply Scheme.

The report shall document:

- List of documents and data reviewed by the Consultant including and assessment of accuracy and relevance
- Suitability of proposed location of infrastructure and any recommended changes
- Summary of the proposed arrangement of infrastructure, sizing and construction methodology (note: further details are to be provided in the Preliminary Design Report appendix)
- Summary of requirements for land acquisitions
- Economic analysis presenting the capital cost for design and construction and the expected operation and maintenance cost of Rewa River Water Supply Scheme in accordance with ADB handbook for economic analysis of water supply projects
- Estimated total power requirements for Intake, raw water pumping, WTP operation, clear water pumping
- Total water production and delivery cost per KL
- A comparison with actual WAF operation and maintenance costs for its existing Waila and Tamavua WTPs.

Appendices of the Detailed Feasibility Study shall include:

- Working notes from Initial site visit
- Site survey drawings
• Geotechnical investigation report
• Minutes of meeting with WAF Operations staff (Waila & Tamavua WTP)
• Minutes of meetings with all stakeholders including FEA and FRA
• Details of land acquisition requirements
• Summary report on site power requirements
• Preliminary design report & drawings
• Preliminary capital cost estimates

Submit a draft version of the report on Detailed Feasibility Study to WAF for review. WAF will require 10 working days to complete its review and return a single set of consolidated set of review comments.

Address all WAF comments in writing. Finalise the Detailed Feasibility Study report incorporating WAF review comments unless addressed otherwise.

5 DESIGN CRITERIA/STANDARDS/REQUIREMENTS

The works shall be designed and constructed in accordance with current relevant AS/NZ standards, codes and good engineering practice.

Should reference be made to other Standards, the WAF General Manager, Project Management Unit shall be consulted and approval obtained prior to their application of another design standards for the Project.

The Consultant shall review, amend and adopt any existing frequently adopted details used by WAF on its project. The review process shall incorporate the requirements of WAF.

6 DRAWINGS AND SPECIFICATIONS

The Consulting Engineers will produce all engineering drawings for reproduction and distribution using A3 size paper.

If standard specifications are used for contract documentation they should be thoroughly reviewed and amended to suit the specific requirements of the project and the physical, social, economic and political environment in Fiji.

Engineering drawings shall provide sufficient information and detail to be used for further design development.

7 GENERAL CONSULTANCY MATTERS

The selected consultant is expected to maintain a close liaison with the WAF’s General Manager PMU, or nominated representative during the period of consultancy.
The consultant is required to either establish a temporary local office or work in association with a local consulting company. In addition the Project Manager during the design phase will be expected to be located in Suva, Fiji.

The consultant shall allow adequate time for meetings and liaison with all relevant parties, particularly at commencement of the project. Written confirmation of agreements/decisions should be obtained from other parties where these are key elements of the design process.

Formal meetings between WAF and the Consultant will be held on a minimum of a fortnightly basis chaired by WAF where the Consultant is required to update WAF on the progress of the consultancy and all key findings and decisions. Agendas for discussion, minutes of the meetings shall be prepared by the WAF and submitted to the consultant accordingly.

In addition, provide regular informal update reports via email correspondence including proposed programming / coordination of activities, requests for information and any significant issues that required WAF inputs or decision.

The Consultant shall comply with the requirements of the Health and Safety at Works Act (1996) and all associated legislation in all aspects of their work, including appropriate provisions in documents prepared by the Consultant. Submit Safe Work Method Statements (SWMS) for all major field activities required as part of this consultancy.

The Consultant’s design, documentation and supervision services shall be compatible with the provisions of the proposed Sustainable Development Act of Fiji, which is currently at draft stage.

8 DRAWINGS TO BE SUBMITTED

The Consultant shall prepare and submit the following documents and where applicable, in both electronic and hardcopy formats. All documents shall be discussed with the nominated WAF representatives. Where Draft and Final documents are required, the Consultant shall obtain WAF comments on the Draft and incorporate those comments in the Final version of the document.

Documents to be supplied during the course of consultancy and the number of copies required are tabled below.

<table>
<thead>
<tr>
<th>Document</th>
<th>Number of Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site survey drawings</td>
<td>1 e-copy, 2 hard copies</td>
</tr>
<tr>
<td>Geotechnical investigation report</td>
<td>1 e-copy, 2 hard copies</td>
</tr>
<tr>
<td>Minutes of meeting with WAF Operations staff (Waila &amp; Tamavua WTP)</td>
<td>1 e-copy</td>
</tr>
<tr>
<td>Minutes of meetings with Stakeholders, FEA and FRA</td>
<td>1 e-copy</td>
</tr>
<tr>
<td>Summary report on site power requirements</td>
<td>1 e-copy, 2 hard copies</td>
</tr>
<tr>
<td>Preliminary design report</td>
<td>1 e-copy, 2 hard copies of Draft</td>
</tr>
<tr>
<td>Preliminary design drawings</td>
<td>1 e-copy, 2 hard copies of Draft</td>
</tr>
<tr>
<td>Detailed Feasibility Study Report (Draft)</td>
<td>1 e-copy &amp; 5 copies of Draft</td>
</tr>
<tr>
<td>Detailed Feasibility Study Report (Final)</td>
<td>1 e-copy &amp; 5 copies of Final</td>
</tr>
</tbody>
</table>
9 PERSONNEL

The names of all key personnel who would be involved in the various components of this Consultancy shall be provided together with their curriculum vitae. A signed statement from each of the personnel stating their availability for the project shall be provided.

Changes in personnel are at the discretion of WAF and will generally not be allowed. Any changes found essential shall be substituted by a more senior and appropriately experienced staff member.

10 TIMING OF STAGES

The work shall be carried with completion dates for the various components no later than indicated by the milestone dates tabled below. Note that:

a) Milestone dates are relative to the date of the letter of acceptance.

b) The Project Time Table shall be completed as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Completion by Week No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilisation</td>
<td>Week 1</td>
</tr>
<tr>
<td>Task 1 – Review of Previous Investigations, Studies &amp; Background Data</td>
<td>Week 2</td>
</tr>
<tr>
<td>Task 2 - Site Survey &amp; Investigation</td>
<td>Week 6</td>
</tr>
<tr>
<td>Task 3 – Options Assessment</td>
<td>Week 8</td>
</tr>
<tr>
<td>Task 4 – Preliminary Design &amp; Cost Estimates</td>
<td>Week 10</td>
</tr>
<tr>
<td>Task 5 – Detailed Feasibility Study Report</td>
<td>Week 12</td>
</tr>
</tbody>
</table>

WAF requires the consultancy engagement to be completed within 12 weeks of issuing a letter of acceptance. Where an alternative project timetable is proposed, the Consultant shall submit an outline program setting out the sequence, duration and interdependency of major tasks including but not limited to the above listed tasks.

11 INDEMNITY

The Consultant shall indemnify the Principal against any claim, demand, action, suit or proceeding that may be brought or made against the Principal by any person in respect of any financial or consequential loss or expense incurred by that person by reason of any act, default or neglect of the Consultant in the performance of the work under the Consultancy, as a consequence of any delay by the Consultant in executing or failing to complete work under the Consultancy and from any costs and expenses that may be incurred by that person in connection with any such claim, demand, action, suit or proceeding.

12 PROFESSIONAL INDEMNITY INSURANCE

Notwithstanding the provisions of the current conditions of engagement as issued by the Fiji Institution of Engineers, the successful consultant will be required to hold Professional Indemnity Insurance with a minimum cover equivalent to F$5,000,000 over the duration of the proposed services.
The Consultant shall submit evidence of the Professional Indemnity Insurance to the WAF within 14 days of award of consultancy.

13 PUBLIC LIABILITY INSURANCE

The successful Consultant(s) will be required to hold Public Liability Insurance. The minimum Public Liability Insurance required is F$10,000,000 or equivalent in foreign currency.

The Consultant shall submit evidence of the Public Liability Insurance to the Principal within 14 days of award of commission.

14 CATEGORY OF SERVICE REQUIRED

As listed in the document described herein:

- Investigation
- Survey
- Preliminary Design Service
- Reporting & Documentation Service
- Additional Services (as may be necessary)

15 PAYMENT FOR SERVICES

Payment will be made on submission of invoices at the times for the amounts indicated in the schedule below.

**PAYMENT SCHEDULE**

<table>
<thead>
<tr>
<th>Deliverable Component</th>
<th>Percentage of Lump Sum Fee Payable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1 – Review of Previous Investigations, Studies &amp; Background Data</td>
<td>5% of design fees</td>
</tr>
<tr>
<td>Task 2 – Site Survey &amp; Investigation</td>
<td>20% of design fees</td>
</tr>
<tr>
<td>Task 3 – Options Assessment</td>
<td>10% of design fees</td>
</tr>
<tr>
<td>Task 4 – Preliminary Design &amp; Cost Estimates</td>
<td>25% of design fees</td>
</tr>
<tr>
<td>Task 5 – Detailed Feasibility Study Report</td>
<td>40% of design fees</td>
</tr>
</tbody>
</table>

16 FEE BASIS

The Consultancy is a lump sum contract inclusive of all of the Consultants fees, charges and disbursements.

Consultants shall submit an itemised list of costs indicating estimated times (in working days) that will be spent by each of his personnel on the project together with their rates and estimated disbursements (in Fiji Dollars inclusive of VAT) for both field and home office inputs.

Consultants may submit alternate fee proposals. In such cases, Consultants must also submit separate fee proposals.
17 TAXES AND DUTIES

The Consultants and their personnel shall be liable to pay all such taxes, duties, fees, levies and other imposition as may be levied by the Fiji Islands Revenue and Customs Authority.

18 CONDITIONS OF TENDER

Definitions

a) ‘Tender’ means the offer comprising the technical and fee proposal by the Consultant to execute the scope of work outlined in this Terms of Reference (TOR).

b) ‘Tenderer’ means a separate legal entity who has provided their name and contact details to the Principal, has paid any required deposit or price for Tender Documents and has received Tender Documents;

c) ‘Tender Conditions’ means these Tender Conditions;

Contact for Clarification or Further Information:
Sonam Lata
Address: Level 6, Manohan Building, Wainivula Rd, Nasinu
Mobile: +679 9126559
Email: sonam.lata@waf.com.fj

18.1 Tenderer to Acquire Information

It is the responsibility of the Tenderer to obtain all information relevant to this Terms of Reference (TOR).

Further, the Tenderer shall be deemed to have:

a) Examined the Terms of Reference, the site and its surroundings, and any other information made available in writing by the Principal to the Tenderer for the purpose of Tendering.

b) Examined all information relevant to the risks, contingencies, and other circumstances having an effect on their Tender and which is obtainable by the making of reasonable enquiries.

c) Satisfied itself as to the correctness and sufficiency of its Tender and that its Tender price covers the cost of complying with all the obligations provided for or implied from the Terms of Reference and of all matters and things necessary for the due and proper performance and completion of the Commission.

d) If the Tenderer finds any discrepancy, error or omission in the Tender Documents, the Tenderer shall notify the Contact Officer immediately in writing giving details of the ambiguity, discrepancy, error or omission and in any case before the date and time for closing of Tenders.

e) Disclosure of Information:

The Tenderer, its employees or agents shall not disclose or make public any information or material acquired or produced in connection with or by the performance of this assignment without prior approval of the Principal.
f) Conflict of Interest

A Tenderer with a conflict of interest shall immediately disclose the conflict of interest to the Principal. If a conflict of interest or a risk of a conflict of interest arises after lodgement of the Tender and prior to the completion of the Tender process, the Tenderer shall immediately disclose that conflict of interest to the Principal.

g) Evaluation of Consultants Proposals:

Tenders shall be evaluated against the criteria presented on the Evaluation Criteria Data Sheet attached as Attachment 2. Evaluation shall be undertaken immediately upon receipt of submissions.

h) The Tenderer shall submit with the Technical Proposal (refer Item 21 below) a program, in the form of a preliminary time-scaled network (Gantt Chart), clearly showing the scheduling of tasks to meet the proposed milestone data stated in Item 10.

19 SUBMISSION BY THE CONSULTANT

In making a submission to undertake this Consultancy, the Consultant must use two envelopes.

One envelope containing the Consultant’s Technical Proposal(s), must be clearly labelled:

FEASIBILITY STUDY, INVESTIGATION & PRELIMINARY DESIGN

FOR

REWAS RIVER WATER SUPPLY AND SCHEME

Technical Proposal

The “Fee Proposal” envelope should only contain the financial aspects of the submission including the lump sum fees and shall be sealed and placed inside the ‘Technical Proposal’ envelope.

Submissions will first be evaluated on the basis of the ‘Technical Proposal’, and those who satisfy the Evaluation Criteria (Attachment 2) will have their ‘Fee Proposal’ envelope opened.

In the ‘Technical Proposal’ the Consultant must include a detailed Program or Timetable which clearly sets out the times by which certain tasks of the various components of the project will be achieved and the time and manpower inputs proposed by the Consultant. The Consultant’s progress will be monitored against the program submitted and progress payments made accordingly. The Consultant will be expected to take remedial action in case of any slippage.

Tender Deposit: All tenders must be accompanied by a bid security of F$10,000.00 in the form of a bank cheque. The bid security shall be attached to the Technical Proposal(s).
The submission, with the relevant details, proposals, and tender deposit shall be submitted by 04:00pm on 30th June, 2015. The envelope containing the submission inclusive of technical and fee proposal(s) (within a sealed envelop) and tender deposit(s) shall be hand delivered to tender box at the following address:

Att: The Chief Executive Officer  
Street Address: Level 2, Manohan Building, Wainivula Road,  
Nasinu  
"Rewa River Water Supply Scheme"

### 20 TENDER VALIDITY PERIOD

The Tender shall remain valid and open for acceptance for a period of 120 days from the time and date for the closing of Tenders. The Tenderer may withdraw its Tender after the expiration of, but not during, this period. The Tender shall not lapse by reason of any discussions or correspondence between the Principal and the Tenderer which occur during this period.

### 21 PROPOSED PROGRAMME

The proposed programme for the tender process is outlined below.

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenders Invited</td>
<td>22 May 2015</td>
</tr>
<tr>
<td>Tenders Close</td>
<td>30 June 2015</td>
</tr>
<tr>
<td>Finalisation of Tender Evaluation by Tender Board</td>
<td>14th July 2015</td>
</tr>
<tr>
<td>Award of Tender</td>
<td>30 July 2015</td>
</tr>
</tbody>
</table>

### 22 ATTACHMENTS

The following attachments are provided for the information of Tenderers. The Principal neither warrants nor guarantees the accuracy of the information presented in the attachments.

| ATTACHMENT 1                        | Google Earth *kmz file – Proposed Arrangement of the Rewa River Water Supply Scheme |
| ATTACHMENT 2                        | Tender Evaluation Criteria |
| ATTACHMENT 3                        | Specimen Memorandum of Agreement |
Investigation & Preliminary Design & Feasibility Study
Rewa River Water Supply Scheme
Evaluation Criteria

A. Mandatory Criteria

The tenderer shall meet the following requirements to qualify for technical evaluation

   a. Site selection, concept and/or detailed design of at least 1 water intake structure of 20 – 200 ML/day capacity within the last 5 years;

   b. Concept and/or detailed design of at least 2 no. potable water treatment plants of 20 – 200 ML/day capacity within the last 5 years.

Tenderers must submit evidence of completion of the above assignments in order to pass minimum technical qualification criteria. Submit project data sheets with client’s email and direct telephone phone contact details.

B. Technical Evaluation

The evaluation criteria that will be applied for the Technical Proposal are as follows:

<table>
<thead>
<tr>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I) Experience in the region and other developing countries</td>
</tr>
<tr>
<td>(II) Adequacy of the proposed Work Plan and Methodology in responding to the TOR</td>
</tr>
</tbody>
</table>

C. Financial Evaluation

Tenderers who pass the technical evaluation will have their financial proposal opened and points awarded in accordance with the following formula:

\[ S_t = \left( \frac{F_m}{F} \right) \times 100 \]

Where \( S_t \) = points to be awarded

\( F_m \) = lowest financial proposal

\( F \) = amount proposed by individual firm

D. Final Evaluation

Proposals will be ranked according to their combined technical and financial scores using the following weights

<table>
<thead>
<tr>
<th>(i)</th>
<th>Technical</th>
<th>65%</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ii)</td>
<td>Financial</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>TOTAL SCORE</td>
<td>100%</td>
</tr>
</tbody>
</table>
SPECIMEN MEMORANDUM OF AGREEMENT

This Agreement dated this day of .............................................. 

between [Name of Client] ................................................ 

of [Address of Client ] .................................................... 

_______________________ 

[Name of Consultant] .................................................. 

of [Address of Consultant] ............................................ 

_______________________ 

(hereinafter called “the Client”) of the one part 

and [Name of Consultant] ................................................ 

of [Address of Consultant] ............................................. 

_______________________ 

(hereinafter called “the Consultant”) of the other part 

WHEREAS, the Client desires that certain Services should 

be performed by the Consultant, namely ....................... 

and has accepted a proposal by the Consultant for the performance of such Services.

THE CLIENT AND THE CONSULTANT AGREE AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in Clause 1.1 of the General Conditions.

2. The following documents shall be deemed to form and be read and construed as part of the Agreement, namely:

   a) The Terms of Reference prepared by Client dated 08th May, 2015
   b) Consultant’s Tender Submission dated ____________________;
   c) Letter of acceptance by the Client dated ____________________;
   d) Acceptance of offer by the Consultant dated ____________________;
   e) Consultant’s Professional Indemnity Insurance;
   f) The Client/Consultant Model Services Agreement;
   g) Particular Conditions..................(to be agreed);
   h) The appendices, namely:
      • Appendix 1: Scope of Services...................(to be agreed)
      • Appendix 2: Personnel, Equipment, Facilities and Services of Others to be Provided by the Client...................(to be agreed)
      • Appendix 3: Remuneration and Payment...................(to be agreed)
      • Appendix 4: Time Schedule for Services...................(to be agreed).