

**To: Ms Kathleen Stoup
Rotary Club of Carlisle, PA**

**RE: REVISED - Proposal for the installation of a PROtector water purification system,
Kilimambogo, Kenya**

30th June 2012

Dear Kathleen,

Further to the meeting and site visit at the Immaculate Heart of Mary Hospital in Kilimambogo, I would like to put forward our proposal for the installation of a PROtector water purification system that will cater for the current and future needs of the community.

We have designed a smaller system that will cater for all of the 'potable' needs of the wider community, i.e. clean and safe water for drinking and cooking only. A population of up to 4,000 will be provided for at a standard allocation of 5 litres, per person, per day. The system has the following key features:

- Production of 1m³/h
- Product water 100% compliant with WHO drinking water standards (fluoride and salt reduced)
- Solar ready (i.e. able to run from solar equipment provided by others)
- Option to run from a generator (provided by others)
- Fully automatic operation (no need for dedicated staff)
- Recovery rate of 50% (i.e. 1 litre of wastewater generated for every 1 litre of treated water produced)
- Installation, servicing and technical support provided by Buchanan Equipment Ltd, our local partner / agent based in Nairobi

The following pages feature the proposed set up and layout of the PROtector system; the breakdown of the expected water quality; the breakdown of the capital costs required; the breakdown of the operational costs for various options; the scope of supply; and the terms of payment.

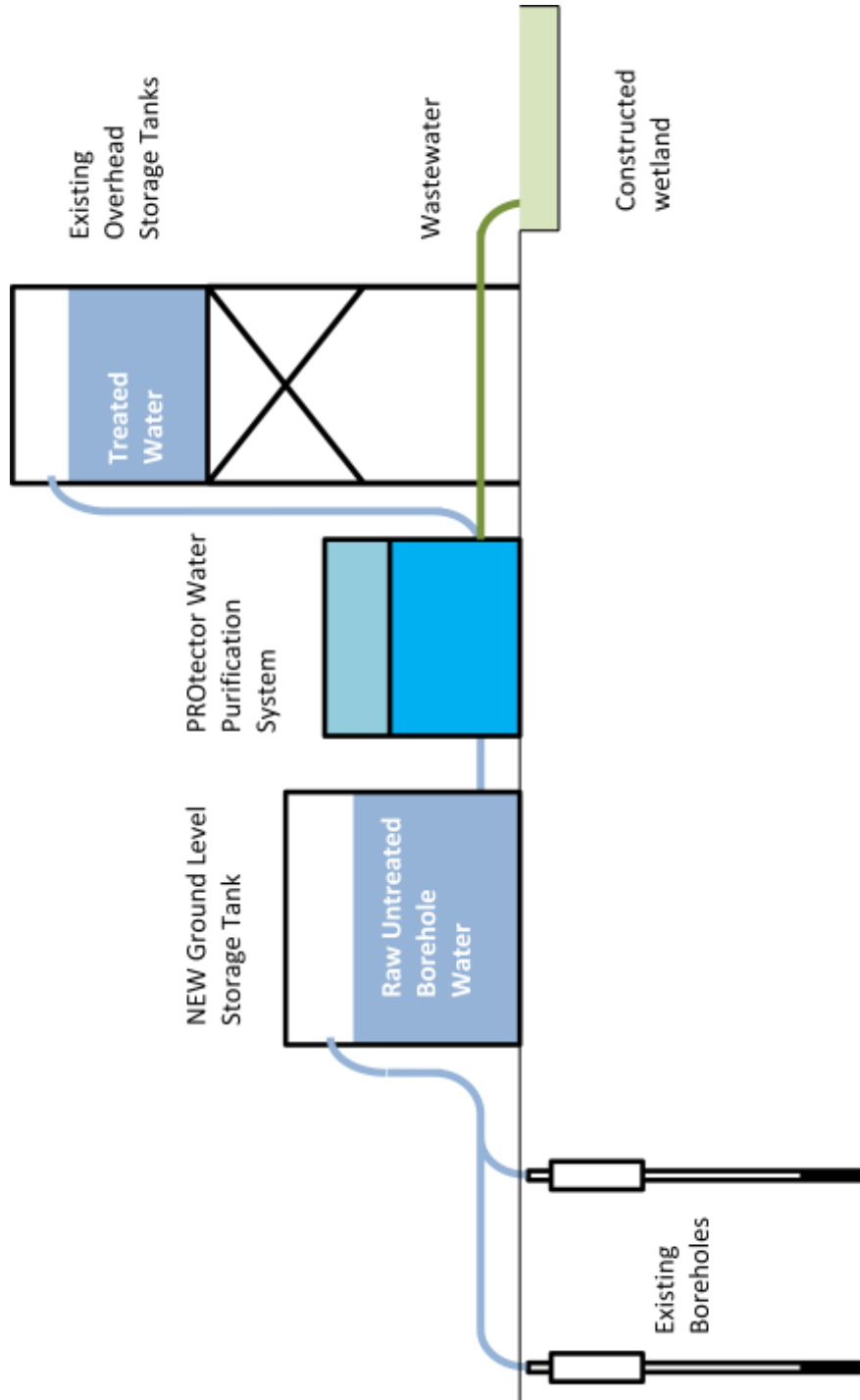
We believe that the proposed system will vastly improve the safety and sustainability of the community water supply. I trust that you will find the proposal of real interest, and I look forward to taking our discussions further very soon.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'George Rose', is written over a light blue circular stamp.

George Rose

Proposed Setup of PROtector Water Purification System



The existing boreholes (including the one drilled in 2011) would feed raw untreated water into a new ground level storage tank adjacent to the PROtector. The PROtector would then draw and treat the water from this tank and feed the product water up to the existing overhead storage tanks.

Although this would necessitate the construction of a new ground level storage tank, most of the existing infrastructure already on site would be utilised – thus optimising previous investment and minimising modification work.

The PROtector treatment system uses ‘nanofiltration’ (NF) membranes to remove cysts, bacteria, viruses, proteins and excessive levels of salt and fluoride from contaminated water supplies. NF is a healthy and economical alternative to reverse osmosis (RO) filtration, using around a third of the energy whilst retaining a healthy balance of essential minerals in the product water.

The wastewater produced by the NF treatment process will be very brackish and high in sodium. We therefore propose that the wastewater should be treated in a ‘constructed wetland’ planted with halophytic and natrophilic species (salt and sodium loving plants) which will remedy the quality of the wastewater prior to discharge or reuse. It should be noted that this proposal does not extend to the provision of such a wetland, although we understand that a separate plan is being made for the management and treatment of all wastewater at the site.

Expected Water Quality

Parameter	Raw Water*	WHO Guideline	Treated Water
Sodium (Na)	500ppm	<200ppm	37.59ppm
Bicarbonate (HCO ₃)	1223ppm	<250ppm	91.14ppm
Chloride (Cl)	40ppm	<250ppm	2.69ppm
Fluoride (F)	15ppm	<1.5ppm	1.15ppm
Total Dissolved Solids (TDS)	1848ppm	<500ppm	133.59ppm
pH	8.6	6.5 – 7.5	7.82

**Please note that the raw water data used has been provided by the client. The expected treated water quality is therefore subject to this data being accurate, and a true representation of the raw water quality of the boreholes in the Kilimambogo community.*

Breakdown of Capital Costs

<i>Item</i>	<i>Cost USD</i>
Manufacture & supply of 1 PROtector water purification system, 1m ³ /h, featuring: 1 ea. stainless steel centrifugal transfer pump 1 ea. stainless steel multistage booster pump 4 ea. 4x40 High rejection Nanofiltration membrane elements 2 ea. FRP membrane pressure vessels Pre-filtration Automatic membrane flushing Integrated control panel complete with instrumentation Solar inverter Powder coated steel frame and panels Monthly maintenance service for 12 months (including provision of spares and repairs). Option to extend term of monthly service at additional cost (recommended)	\$22,000.00
Packaging & ocean freight from Minneapolis, USA to port of Nairobi, Kenya ¹	\$3,000.00
Clearing & forwarding of consignment from port of Nairobi to Kilimambogo ²	\$1,500.00
Installation of PROtector water purification system, including: Construction of concrete foundation slab Offloading of PROtector and anchoring to slab Connection of raw water, treated water and wastewater discharge pipework	\$4,000.00
Commissioning & Training ³	\$2,500.00
<i>Subtotal</i>	<i>\$33,000.00</i>
Budgetary estimation of solar equipment cost (4kW capacity) – supplied by others	\$12,000.00
TOTAL	\$45,000.00

Notes:

1. Budget purposes only: Actual shipping costs will be between \$2,750-\$4,000 depending on final 'crated' dimensions and freight rates at the time of shipping.
2. Budget purposes only: Actual clearing and forwarding costs may vary due to factors outside of the control of PROtector Systems (i.e. local taxes, duties, transport costs etc.)
3. Budget purposes only: The cost of commissioning and training is based purely on the cost of flights and accommodation for our engineer to travel from the US and spend up to 2 weeks on site.

Breakdown of Operational Costs

Solar Option	Monthly maintenance ¹	\$100.00
	Total monthly cost	\$100.00

Mains Electric Option	Monthly maintenance ¹	\$100.00
	Monthly electricity cost ²	\$90.00
	Total monthly cost	\$190.00

Diesel Generator Option	Monthly maintenance ¹	\$100.00
	Monthly diesel cost ³	\$500.00
	Total monthly cost	\$600.00

Notes:

1. Maintenance charge covers monthly service and inspection, including replacement of filters and any minor repairs / adjustments / modifications as required to keep the system at optimal performance. Please note that this charge only applies after 12 months from the date of commissioning (i.e. following the warranty period).
2. Current cost of electricity in Kenya is taken to be USD \$0.15 / kWh. **If this is different, then costs will need to be re-calculated.**
3. Current cost of diesel in Kenya is taken to be USD \$1.39 / litre. **If this is different, then costs will need to be re-calculated.**
4. All options are based upon an operational power consumption of 1.00kW @ 20 hours per day = 20kWh per day.

Scope of Supply

Construction of ground level 20m³ storage tank, 3.6m dia x 2m deep – NOT INCLUDED

All interconnecting pipework between PROtector, ground level storage tank, overhead storage tanks and wastewater lagoons – INCLUDED

Supply of solar panels, charger, batteries and associated framework, cables and fittings – NOT INCLUDED (although a formal quotation is available upon request)

Payment Terms

Payment should be made using an irrevocable letter of credit (LC) with PROtector Treatment Systems, LLC as the beneficiary. Terms are as follows:

50% deposit required upon placement of purchase order (PO)

50% balance required upon completion of commissioning and training



Project Contact

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