

KEI MOUTH ECO ESTATE
PRELIMINARY POTABLE WATER SUPPLY
TECHNICAL REPORT

Prepared by

EAST CAPE WATER TREATMENT

Revision 0

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TECHNICAL REPORT

1.0 Summary

This report covers the potable water supply requirement for the Kei Mouth Eco Estate Development.

All volumes and flow rates for this development have been extracted from the engineers report.

2.0 Introduction

The raw water requirement shall be obtained from 2 No. dams positioned within the bounds of the development and each shall have an estimated capacity 27,500 Kl and the dams shall collect the run off from the surrounding catchment area.

Based on the calculated demand from the development of 29200 Kl per annum the combined storage of 55000 Kl shall be adequate to meet the needs.

It is proposed that the dams be positioned and constructed as off channel dams adjacent to the natural drainage water course and with the raw water transferred to the dam off channel dams by means of a transfer pipe.

The extraction volume from the natural drainage water course shall not exceed 10% of the average annual minimum rainfall for the catchment area.

In the initial stages of the development these storage off channel dams shall be the sole supply of water to the complex with the introduction of a borehole supply at a later date should it prove necessary.

A small bore pipe line shall connect the upper level dam to the lower level dam and this upper dam shall supplement the demand from the lower dam.

A treatment plant comprising of chemical dosing, clarification, sand filtration and chlorination shall be construct at the lower level dam site as shown on the layout drawing and the treated potable water shall be pumped the a 160 Kl storage reservoir position at an elevation which allows for a gravity feed to the development.

3.0 Technical Details

3.1 Dam Raw Water Extraction

The raw water shall be extracted from the lower dam by gravity directly to the treatment works.

As determined in the engineers report, the daily volume of 80,0 m³ shall be produced over a 16 hour period at 5,0 m³ per hour.

3.2 Raw Water Gravity Main to Treatment Works.

The raw water gravity main to the treatment works shall be a 63mm Class 10 diameter HDPE pipe with an estimated length of 100 metres.

3.3 Raw Water Storage

No raw water storage is proposed due to the gravity feed from the dam.

3.4 Purification Plant

3.4.1 Chemical Dosing & Flocculation

At suitable flocculent (identified by test work at a later date) shall be introduced to the raw water by means of a chemical metering pump and a chemical storage day tank for the flocculation and coagulation of the suspended solids in the water.

3.4.2 Settling / Clarification

Settling clarifier shall be of the Dortman type having a 60 degree conical bottom and operating on the sludge blanket principal and be of Glass Fibre Reinforced Plastic construction

The unit shall have a diameter of 2,5 metre which allows for operation of 1,02 metres per hour up flow velocity.

3.4.2.1 Clarifier Desludging

Desludging of the clarifier shall be carried out utilising a hand operated valve positioned at the bottom of the cone and discharge the waste sludge to a holding collection sump within the security fenced area of the plant. The excess water from the sludge sump shall be recovered and recycled back to the treatment works.

There shall be no waste water disposal from the plant.

3.4.3 Sand Filtration

The sand filter shall comprise of a 1,20 metre diameter steel pressure filter vessel complete with all nozzles for inlet, outlet, backwash inlet and backwash outlet all sized to meet the flow requirements for the function.

The filter media shall be a single media 0,70mm diameter silica quartz filter sand and have a 600mm bed depth.

The filter vessel bottom nozzle plate shall be fitted with PVC nozzles allowing for a single media and producing an even distribution during the back wash cycle.

The filter backwash cleaning cycle shall incorporate an air scour cycle and air shall be introduced at a flow of $27\text{m}^3/\text{m}^2/\text{hour}$.

The backwash flow rate shall not be less $30\text{m}^3/\text{m}^2/\text{hour}$ ($34\text{m}^3/\text{hour}$)

3.4.4 Backwash Water Supply.

The water supply for backwashing shall be potable water and stored in a dedicated tank and pumped to the filter when required at the correct flow rate.

The backwash waste water shall be directed to the waste water pond and after settling of the solids be recycled back to the plant.

3.4.5 Sanitation

The sanitation of the filtered water shall be by the introduction of a solution of HTH chlorine at a concentration not exceeding 1,0 % and to achieve a final residual of 0,20 mg/l at the point of consumption.

3.3.6 Treated Clear Water Storage.

The treated water storage shall have volume as determined by the engineers report, (160 Kl) which shall allow for a 48 hour storage capacity and the firefighting requirement.

The treated water storage vessel shall be closed to prevent the introduction of sunlight rays and or animal, bird and dust contamination.

4.0 Plant Operation

The plant operation shall be manually controlled and require the attendance of an operator for a two (2) hour period daily and be responsible for the chemical tank replenishment, desludging of the clarifier and backwashing of the filter.

5.0 Technical Specifications.

Design Flow	1,3888 l/sec (5,0 m ³ /hour)
Daily Capacity	80 m ³ in 16 hours
Clarifiers	
Up flow velocity	1.019 m / hour
Desludge frequency	Daily at start of shift
Sludge production volume	0,60 m ³ @ 2% concentration per day based on 200mg/l loading.
Sand Filters	
Filtration Rate	4,42 m ³ /m ² /hour
Air Scour Rate	27 m ³ /m ² /hour free air
Air Scour Duration	3 Minutes
Backwash Rate	30,0 m ³ /m ² /hour
Backwash Flow	33,0 m ³ /hour
Backwash Duration	5 minutes
Backwash Volume	2,75 m ³

6.0 Appendices

- a) Process and Instrumentation drawing.



W. G. Low