ENGINEERING SERVICES REPORT – FARM KLIPHOEK No. 1196, VELDDRIF

ELEMENT Consulting Engineers

A FIFTH DIMENSION TO ENGINEERING

Compiled by:

H Hickman PrTechEng
Tel.: 022 713 5204
Cell: 082 463 5116
e-mail: hhickman@eceng.co.za

On behalf of:

Kliphoek River Resort (Pty)Ltd
Mr J. Kotzé
Cell: 076 344 2891
e-mail: kliphoekinfo@kliphoek.co.za

28 February 2017

1. Introduction

This Engineering Services Report has the aim of briefly setting out a philosophy for the design and the construction of the internal engineering services as well as an analysis of the existing services.

Each one of the internal engineering services will be dealt with individually.

It should be noted that the philosophy detailed in this Preliminary Report is based on or subject to:

- Experience gained on past projects in the area.
- A topographical survey still needs to be done.
- The incorporation of existing design and geotechnical data from previous development.
- A preliminary township layout supplied by *CK Rumboll & Partners*
- Negotiations with and information received from Bergriver Municipality

Liaison with the relevant engineering departments of the Local Authority will be undertaken to finally agree services standards, materials to be used etc. prior to undertaking the final services design. The outcome of these workshops will be used to amend the information contained below as required.

2. General

The following documents have been used as the base for the design criteria and standards for the provision of the internal civil engineering services:

- Guidelines for the Provision of Engineering Services in Residential Townships (Red Book).
- Guidelines for Urban Stormwater Management, Draft UTG4.
- Structural design of Urban Roads, Draft UTG3.
- All materials and labour to comply with the latest edition of the relevant SABS specifications.

The development is currently zoned as Resort Zone 1.

The development currently consists of 15 residential units and will be developed to the attached *CK Rumboll* Site development plan.

3. Locality

The development is situated at 32°49'55.85" South, 18°12'39.04" East.

ENGINEERING SERVICES

The current infrastructure to service the existing development will be incorporated in the analysis below.

4. Potable Water

The potable water reticulation network will be designed based on the following criteria:

Consumption & Flow

- An average daily consumption all the units is tabled below.

Reference	Description and number		Consumption guidelines	Consumption	
1	Restaurant & conference	120 seats	65 litre/seat	7800	litre/day
4	Camp site	2 sites	a)	1440	litre/day
7	Existing housing units	15 houses	b)	9000	litre/day
8	New Housing Units	5 houses	b)	3000	litre/day
9	New Housing Units	4 houses	b)	2400	litre/day
10	Existing house	1 house	1200 litre/house	1200	litre/day
13	Camp site	8 sites	a)	5760	litre/day
17	Camp site	16 sites	a)	11520	litre/day
18	Camp site	8 sites	a)	5760	litre/day
				47880	litre/day
		0.554	l/s @ PF2=	1.108	litre/s

a) 120 litre/occupant and 6 occupants/site

b) 150 litre/occupant and 4 occupants/unit

- A Peak Factor of 2 is suggested by the design guidelines as the peak consumption
- Maximum static head of 90m.
- Minimum static head of 25m.
- Maximum velocity allowed of 1,5m/s under peak flow conditions.
- Consumption metering will be done at the entrance to the Resort.

Fire Flow

- Fire risk is set at Low Risk and the Resort will handle this themselves directly from the adjacent river.

Materials

- Minimum pipe diameter of 50mm uPVC for the main supply line and 40mm Polycop for supply to individual portions.
- Pipes are SABS approved, standard lengths, Class 9 pipes on a bed suitable for flexible pipes.
- All uPVC pipes to utilize standard uPVC push-type pressure fittings.
- Valves to be jointed to each other or to pipes by means of C.I. short collars.
- Minimum cover on water pipes to be 1m.

- Specifications for isolation valves, air release valves (if required) and valve and hydrant chambers will be compatible with the Local Authority standards.
- On completion of construction, the Engineer will supervise and certify the scouring, chlorinating and testing of all water lines.

Existing services

According to information Element Consulting Engineers sourced from the *GLS/CES* Bulk Master planning in the area, an existing 160mm diameter pipeline is situated 1,5km from the site and a 50mm pipe feed the current development with an 80m static pressure or a 65m dynamic pressure. The Developer will do upgrading for their water supply if required but Element Consulting Engineers are however of the opinion that this will be very unlikely.

Calculation of Potable Water demand
AADD: 47 880 l/day or 0.554 l/s

5. Foul Sewer

The sewer system will be designed as a conventional waterborne, gravity reticulation network towards a series of conservancy tanks strategically placed and suitably sized. Currently the Bergriver Municipality services the existing tanks and the *status quo* will likely remain the same.

The design of the sewer system is based on the following:

Discharge & Flow

- An average discharge of 80% of the water AADD was assumed.
- No Peak Factor is taken into consideration as the drainage will be towards storage tanks
- A stormwater infiltration rate of 15%.
- A minimum flow velocity of 0,7m/s achieved at least once per day.

Materials

- Pipes are standard lengths, Class 34 heavy duty, solid wall uPVC pipes for both the main lines and the individual house connections.
- Minimum pipe diameter is 110mm for erf connections.
- A minimum cover of 0,8m over pipes.
- Maximum distance between manholes of 90m – when applicable.
- The design will be such that maximum manhole depth does not exceed 1,5m to invert – when applicable.
- Pre-cast concrete ring manholes of square brick manholes (suitably waterproofed) with flexible pipe connections will be used – when applicable.
- On completion of construction, the Engineer will supervise and certify the testing of all sewer lines and storage tanks

Existing services

The development will drain in a northerly direction towards strategically placed conservancy tanks.

Calculations of Sewerage run-off

ADWF: 47 880 l/day x 80% = 38 304 l/day
PWWF: 38 304 l/day + 15% = 44 050 l/day

6. Stormwater

No provision will be made for stormwater. It is assumed that the stormwater will be managed to flow freely towards the Berg River.

7. Roads

The design criteria for roads within the development are as follows:

Layout

- Gravel roads with adequate interim maintenance.
- No kerbs will be used
- Minimum longitudinal grade on roads is 0.5%.
- Minimum cross grade on roads is 3%.
- This new development will mainly consist of large open areas.

Materials

- Subgrade: CBR - 10 to 15 minimum (in-situ sand / soil).
- Subbase: CBR - 45 minimum at 95% Mod AASHTO (processed crushed stone of G5 quality).
- All road construction materials to be specified with due consideration for intended application, climatic conditions, level of stormwater system incorporated etc.

Finishes

The road pavement will be structurally designed for the appropriate traffic loads and desired rural esthetics.

- A 300mm deep compacted in-situ layer (sand).
- A gravel Subbase layer with compacted thickness of 150mm.

Alternative:

- A 300mm thick compacted in-situ layer (sand).
- A gravel Subbase layer with compacted thickness of 100mm.

- Interlocking concrete grass blocks on wheel track width on a 25mm thick sand bedding layer.

Existing services

The development connects to an efficient existing rural road system and no additional work is proposed.

8. Electricity

Existing Electrical Services:

The existing Eskom services to the remainder of Farm 1196: Kliphoek River Resort was confirmed by Eskom and is currently being fed from two 100kVA transformers on the Velddrift F1 feeder, located ±8.3km from the substation. The exact size of the LV supply point will need to be confirmed on site during the final design/application process.

Electrical Services upgrades:

For the proposed extensions, an estimated 170kVA is needed and the current supply is thus sufficient. Eskom confirmed that currently there is enough capacity available for the proposed development.

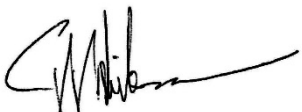
9. Communication

No provision will be made for telecommunications during construction.

10. Solid Waste

The Local Authority will collect household solid waste at a strategically collection point for removal to the municipal dumping site.

We trust that you will find the contents of this report helpful. If you have any questions, please contact the compiler indicated on the covering page.



.....
JG Hickman PrTechEng