



CONSULTING ENGINEERS

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## CIVIL ENGINEERING SERVICES REPORT

**PROJECT:**  
TENTED CAMP  
FOUNDERS ESTATE 5  
BOSCHENDAL ESTATE

**PROJECT NUMBER:** S6999/2021

**DATE:** 28 October 2021



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## 1 TERMS OF REFERENCE

MHA Consulting Engineers have been commissioned to undertake an investigation of existing services and to report on the services connections to the existing Tented Camp on Founders Estate 5 , Boschendal Estate.

The existing Tented Camp was unlawfully constructed and is currently serviced from the Boschendal Estate internal bulk reticulation infra-structure.

## 2 BACKGROUND

The services report is to support an application for a Temporary Departure for a portion of Portion 5 of Farm 1685, Paarl at Boschendal to regularise an existing Tented Camp.

The property affected is registered as Portion 5 of the Farm 1685 , Boschendal Estate , and is owned by Founders Estate 5 (Pty) Ltd, known as FE 5.

The current Tented Camp is considered a “Temporary site” , as it will be dismantled and removed when the area defined for development of a farmstead in terms of the Founders' Estates LUPO approvals of 2005 is developed .

The foundations for the top structures are not buried foundations. They are pre-cast concrete blocks filled with concrete placed on top of the ground , onto which the light-weight structures are fixed.

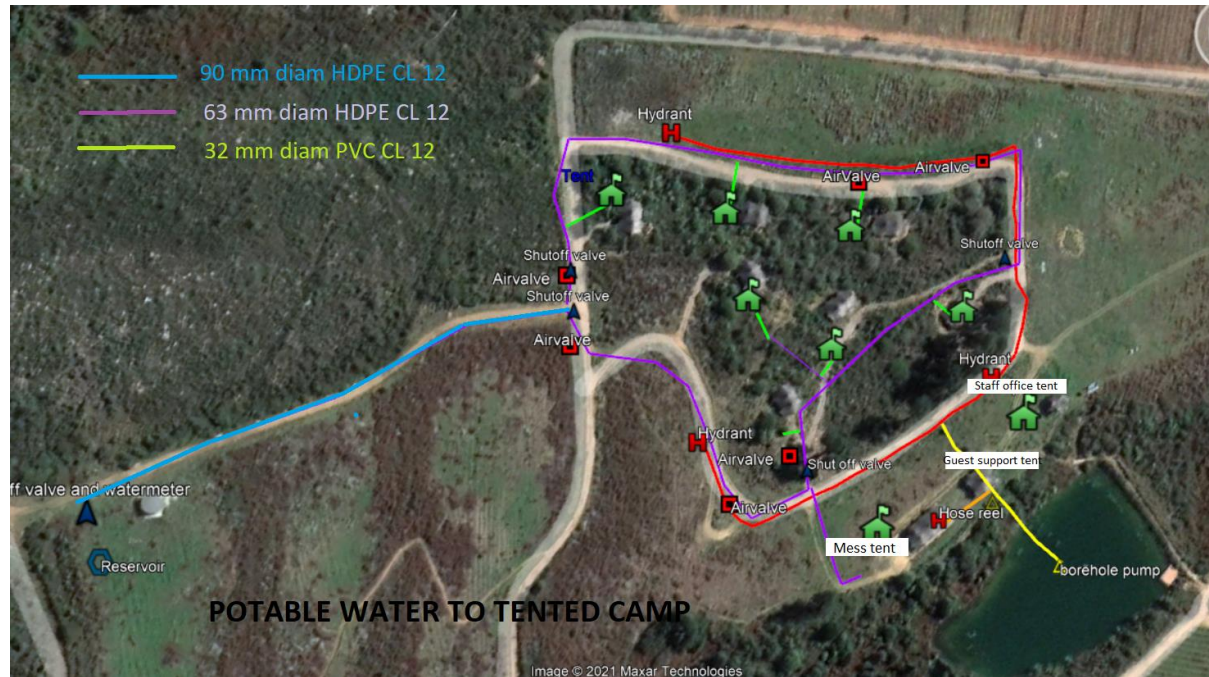
Services are buried in shallow trenches and covered with rock and loose material. This will enable un-intrusive removal of these services when the site is dismantled.

Services include:

1. Potable water from the farm reticulation system .
2. Fire water from the farm system
3. Foul sewer reticulation to a set of Bio-Disks as an interim system until the Boschendal estate bulk water-borne sewer reticulation system is installed. The new Farmstead units will then be connected to the new system.
4. Stormwater-surface discharge.
5. Telecommunications.
6. Electrical from the current Boschendal overhead reticulation system.

### 3 TENTED CAMP SERVICES

#### 3.1 POTABLE WATER



The image above is a schematic layout of the current potable water system.

The potable water is fed from a water storage reservoir as indicated. The reservoir and water supply line were constructed to service the tented camp.

The reservoir is supplied from the existing farm natural water reserve. There is a constant supply of natural spring water in very close proximity to the reservoir that keeps the reservoir water levels constant. The reservoir has an elevation of 413m AMSL.

The reservoir supplies water under gravity flow to the tented camp via a 90mm diam HDPE class 12 water main. A constant pressure under gravity head of 4.3 bar to 5,0 bar is achieved.

An in-line aggregate filtration system and water purification system has been installed to improve water quality. A new in-line ultra-violet water purification system will be installed prior to commissioning of the tented camp to ensure that regulated potable water standards are achieved.

The reservoir supply is connected to a 63mm diam HDPE CL12 water ringmain that is the secondary supply to the tented camp units.

Each accommodation unit is then connected to the ringmain with a 32mm diam PVC unit connection.



32mm PVC water connection to each unit with lever action isolating valve

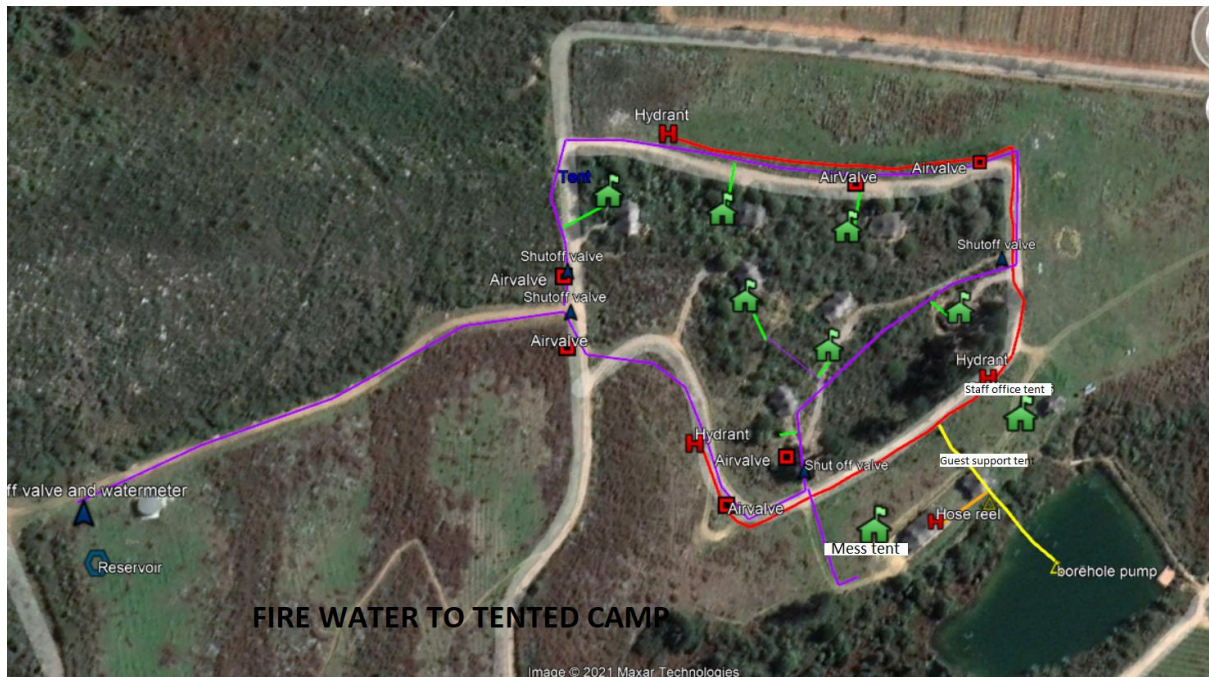
Anticipated potable water consumption :

- |                      |                            |           |
|----------------------|----------------------------|-----------|
| 1. Accomodation unit | 150l/day average x 8 units | 1200l/day |
| 2. Kitchen unit      | 250 l/day average x 1 unit | 250l/day  |

This is a very low consumption which is expected as these are not permanently occupied.



## 3.2 FIRE WATER



The tented camp has a hydrant main as indicated on the image above.

This is not a closed ring-main system. This is an open loop system.

The ringmain is supplied from a high pressure submersible borehole pump currently drawing water from the farm dam.

This water is un-filtered ( filtration is not required).

The water pressure is unknown at this stage . The system will be checked to ensure that at least a constant 4 Bar pressure and the required flow is achieved at each fire hydrant standpipe.



Typical hydrant standpipe .  
There are 4 strategically placed around the units

### 3.3 FOUL SEWER



There are three independent foul sewer disposal systems.

All accommodation units including the mess tent are connected to a water-borne piped system that discharges into a Kingspan Bio-Disk sewerage disposal unit.

Each unit is connected to a 110mm diam uPVC sewer main that flows under gravity flow to the Kingspan Bio-disk unit.

The three systems are indicated in the image above.





Individual units connected to sewer mains

The Kingspan Bio-disk system is an Internationally accepted sewerage treatment system. The system used for the tented camp treats the raw effluent via its patented system to liquid discharge quality of "General Limits".

**Wastewater Solutions**

## BioDisc® HOW IT WORKS

The Rotational Biological Contactor (RBC) is central to the operation of each Kingspan Klargester BioDisc®. It supports a biologically active film or biomass onto which aerobic micro-organisms, naturally found in sewage, become established. Natural breakdown of sewage can then occur as described below.

UNIT SIZE	SINGLE HOUSE		MULTIPLE HOUSES	
	BA	BA-K	BB	BC
Preparation Equipment	1 House up to 4 bedrooms	1 House up to 7 bedrooms	2 houses up to 8 bedrooms	3 houses up to 12 bedrooms
Overall diameter / width (mm)	3950	3950	3950	2400
Standard shaft length (mm)	750*	750*	750*	600*
Standard shaft (mm)	830	830	830	680
Depth from invert to base (mm)	1400	1400	1400	800
Pipework Diameter (mm)	100	100	100	100
Storage storage period (approx)	12 months	9 months	6 months	7 months
Standard power supply	Single Phase	Single Phase	Single Phase	Single Phase
Motor rating	0.3kW	0.3kW	0.3kW	0.3kW
Weight (gross) standard units	0.380	0.418	0.418	0.650

\* BA-BB 400/200    \* BC 1000

**ROTATING BIOLOGICAL CONTACTOR (RBC)**

The RBC comprises banks of vacuum formed polypropylene media supported by a steel shaft. This is slowly rotated by a low energy consumption electric motor and drive assembly.

**BioDisc® from Kingspan Klargester**

For further technical information and videos on the BioDisc® treatment plant visit our website at [kingspanklargester.com](http://kingspanklargester.com)

The anticipated treated water discharge volumes would be 75% of the anticipated water consumption.

$$0,75 \times 1450 \text{ l/day} = 1088 \text{ l/day}$$



The treated water discharge currently flows into the natural landscape through a “soak-away” system ( graded rock and stone trench) and guaranteed by Bio-Disc to have achieved standards of “General Limits” as published by the National Water Act ( see below) . Sampling is done regularly and the system recycle process is adjusted to ensure compliance , particularly with respect to the Nitrate levels.

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DEPARTMENT OF WATER AFFAIRS – GENERAL AND SPECIAL AUTHORISATION

Discharge limits and conditions set out in the National Water Act, Government Gazette No. 20526, 8 October 1999

**Wastewater limit values applicable to discharge of wastewater into a water resource**

SUBSTANCE/PARAMETER	GENERAL LIMIT	SPECIAL LIMIT
Faecal Coliforms (per 100 ml)	1 000	0
Chemical Oxygen Demand (mg/l)	75*	30*
pH	5,5-9,5	5,5-7,5
Ammonia (ionised and un-ionised) as Nitrogen (mg/l)	3	2
Nitrate/Nitrite as Nitrogen (mg/l)	15	1,5
Chlorine as Free Chlorine (mg/l)	0,25	0
Suspended Solids (mg/l)	25	10
Electrical Conductivity (mS/m)	70 mS/m above intake to a maximum of 150 mS/m	50 mS/m above background receiving water, to a maximum of 100 mS/m
Ortho-Phosphate as phosphorous (mg/l)	10	1 (median) and 2,5 (maximum)
Fluoride (mg/l)	1	1
Soap, oil or grease (mg/l)	2,5	0
Dissolved Arsenic (mg/l)	0,02	0,01
Dissolved Cadmium (mg/l)	0,005	0,001
Dissolved Chromium (VI) (mg/l)	0,05	0,02
Dissolved Copper (mg/l)	0,01	0,002
Dissolved Cyanide (mg/l)	0,02	0,01
Dissolved Iron (mg/l)	0,3	0,3
Dissolved Lead (mg/l)	0,01	0,006
Dissolved Manganese (mg/l)	0,1	0,1
Mercury and its compounds (mg/l)	0,005	0,001
Dissolved Selenium (mg/l)	0,02	0,02
Dissolved Zinc (mg/l)	0,1	0,04
Boron (mg/l)	1	0,5

\* After removal of algae

The solid waste is collected by the Boschendal estate management on a regular basis , which at this stage is a quarterly cycle and disposed of at a Municipal discharge site.



Current bio-disc system in the landscape

### 3.4 STORMWATER

There is no formal Stormwater disposal system.

The free-form tented structures discharge stormwater onto the ground and this flows naturally into the landscape.



General rainfall flows naturally into the landscape.



### 3.5 TELECOMMUNICATIONS



WiFi has been provided as per the attached image above.

The installation includes:

- A pole mounted receiver antennae disc ( see image)



- Reticulated 25mm black conduit as shown above. This conduit will be buried at the “road” crossings at a shallow depth of 500mm and will be loose laid through the vegetation connecting the various tents.
- The conduit will contain the ethernet cables. There are no power cables in these conduits.

This system will be removed when the tented camp is dismantled and removed.



### 3.6 ROADS



The road network is informal and as shown on the image above.

There has only been vegetation removal in the road reserve areas and the roads follow the natural terrain and contours.

Light passenger vehicles that do not have high clearance and 4x4 capabilities will not be able to use these roads.

The idea is that all guests park at the end of the accessible road and are then ferried to their accommodation units by a single vehicle provided by the service provider.

The tents are linked by a series of informal footpaths for guest access.



Typical ring road

## 3.7 ELECTRICAL

The tented camp has fully functional electrical reticulation system in place. The layout is as shown on the diagram below. The essential details of the system is described as follows:

### 3.7.1 MAIN ELECTRICAL SUPPLY POINT

The main supply is connected from an existing Farm overhead line feeding an existing 315kVA Transformer. That transformer supplies a kiosk alongside it – Kiosk “A”

A 150A 380V 3-phase supply is fed from Kiosk “A” to an adjacent 380V / 3,3kV step-up transformer which then feeds via an underground cable at 3,3kV to the Tented Village Main Supply Point.

### 3.7.2 TENTED VILLAGE MAIN SUPPLY POINT

The main supply point at the Tented Village contains a 3,3kV / 380V step-down transformer which supplies a feed into a kiosk – Kiosk “B” that is connected to the changeover panel of the Standby Generator. Kiosk “B” is the main feeder to the Tented Village and contains supplies to: Staff Accommodation, Mess tent, Fire Pump Panel and a feeder to Kiosk “C”.

#### KIOSK “C”

Kiosk “C” contains supplies to: Tent 5, BioDisc Panel 1, BioDisc Panel 2 and a feeder to Kiosk “D”

#### KIOSK “D”

Kiosk “D” contains supplies to: Tent 1, Tent 2, Tent 3 and a supply to Kiosk “E”

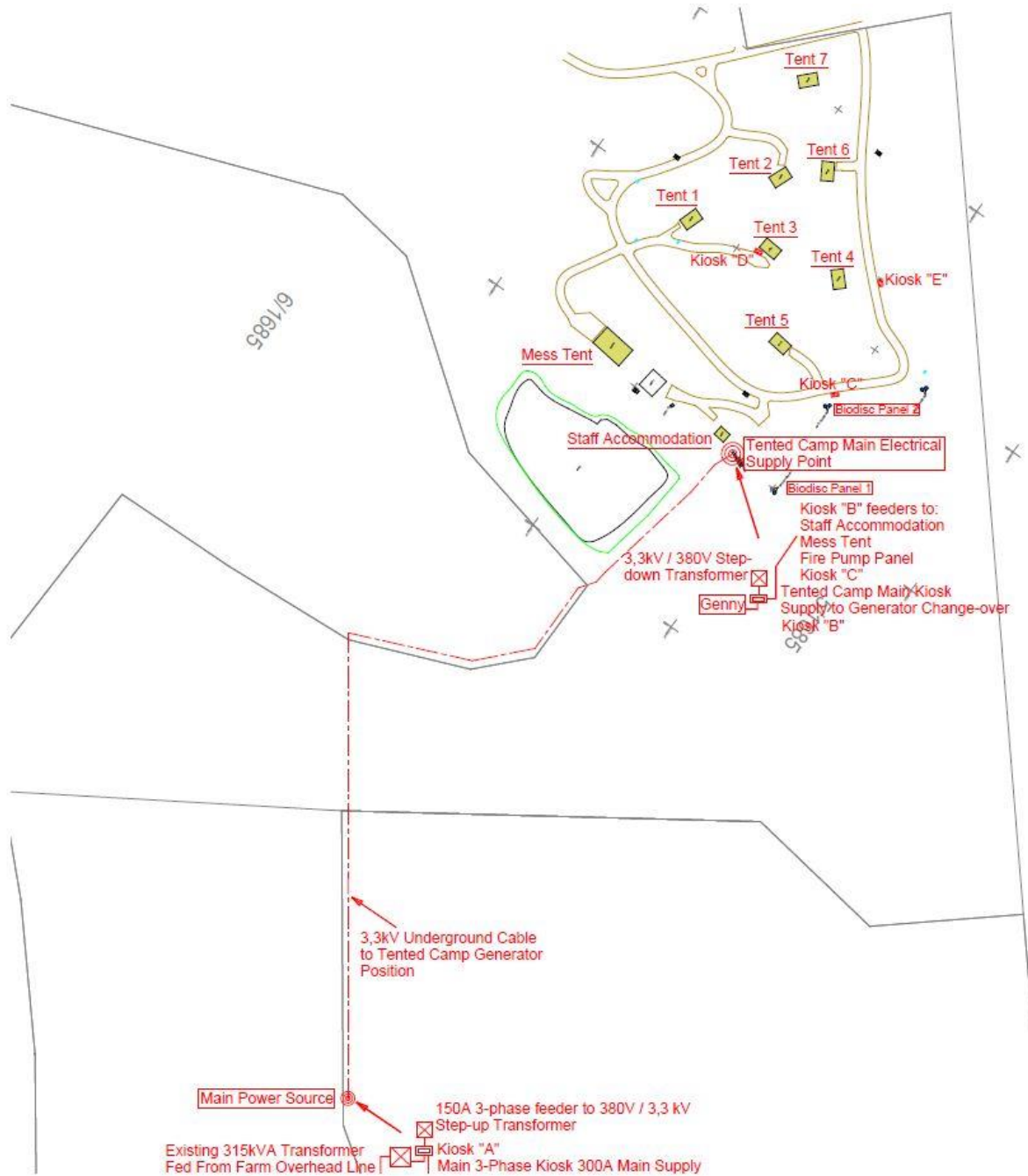
#### KIOSK “E”

Kiosk “E” contains supplies to: Tent 4, Tent 6 and Tent 7.

The existing Electrical Reticulation system is considered of satisfactory size to cater for the ongoing use of the Tented Village. We would recommend that a full inspection is carried out to ensure continuing compliance with SANS 10142 regulations and that a Certificate of Compliance is supplied if one does not already exist.

Further it is recommended that the generator is tested and a full maintenance program is instituted to ensure ongoing faultless service so that the fire main pumped system is not compromised.

3.7.3 ELECTRICAL RETICULATION DIAGRAM





## 4 RECOMMENDATIONS

AS the current tented camp is considered “temporary” until Founders Estate 5 is developed, we would recommend that the current services provided be maintained and serviced.

All services should be tested and checked to ensure integrity and full functionality.

These system must be regularly checked and flushed .

These services are adequate for the immediate and future requirements of the tented camp.

## 5 CONCLUSION

The services as indicated will have minimal affect on the surrounding environment as well as a minimal affect on the bulk service infra-structure of Boschendal Estate.

The consumption of water is minimal and the foul sewer discharge can be comfortably accommodated.

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