

DESTINATION RIVER RESORT



BULK AND INTERNAL SERVICES REPORT FOR CIVIL AND ELECTRICAL ENGINEERING SERVICES

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EXECUTIVE SUMMARY

The purpose of this investigation is to compile a bulk and internal services report on the Destination River Resort development of Portion 18 Farm 387, Groblershoop, Northern Cape. The following summarizes the report:

1. Destination River Resort development extract water from the Orange River, store, treat and distribute it to buildings on site.
2. Access to the site will be from the existing access road running along the northern boundary of the site to Resort from the N8.
3. The electrical connection can be made available on the Eskom network after minor upgrades; however the existing supply is sufficient.

1. INTRODUCTION

Mr Leon Humphreys appointed BVi Consulting Engineers to investigate the existing services and compile a status quo report of the services available on Portion 18 Farm 387, Groblershoop, developed as Destination River Resort.

The site falls in the municipal area of Kheis Municipality within the ZF Mgcawu District Municipality, which is located in the central part of the Northern Cape Province close to Groblershoop. This report will mainly focus on the capacity of existing bulk and internal civil and electrical infrastructure at the Resort as well as bulk services provided by Kheis Municipality.

Destination River Resort self will act as the primary service provider for civil engineering services with the help of Kheis Municipality. Eskom provided part of the electricity. The remainder of the electricity need is generated by Destination river resort.

2. LOCATION

The site under investigation is located at the following coordinates, S 28°52'33.36", E 21°59'19.45"

Destination River Resort is situated next to the Orange River approximately 4km from the central business area of Groblershoop, to the left of the N8 National Road to Griekwastad.



Refer to Figure 1 below.

Figure 1: Locality

3. AVAILABLE INFORMATION

The following information were used for the compilation of this report:

DESCRIPTION	SOURCE
Existing water and sanitation services details	Destination River Resort Manager
Existing electrical reticulation network details (medium voltage overhead lines and transformers)	BVi Electrical Department
Layout and position of the site	BVi Uppington survey.
Site Development Plan	2C Luna Enterprise

4. TOPOGRAPHY

No geotechnical investigation was available at the time of this report. A site survey and investigation was carried out by BVi to establish a surface as well as typically expected soil conditions on the site.

The geological composition of the area forms part of the Gordonia formation, Kalahari group. In the higher areas away from the river. Calcrete of various thickness can be found that is overlaid with sandy dune sand. A yellowish sandy silt deposit can be found closer to



the river.

Figure 2: Typical terrain on property

Excavated material visible close to old trench excavations varied from soft to hard.

The site topography with regards to permanent buildings areas was found to have a downward slope towards the river of about 1 in 45. This makes it easy for civil services to be designed and constructed. Surface water drains across this area in the direction of the river.

Groundwater is not expected to be a problem on the site.

5. ZONING AND WATER USE LICENCE

The following Professional Service Providers are attending to the Zoning and Water Use Licence related matters:

- Macroplan attends to zoning related issues.
- Water Use Licence related matters are being attended to by Dr. Dirk van Driel from WATSAN Africa

6. BULK AND INTERNAL SERVICES

6.1 Access and internal roads

The N8 National Road runs along the South-Eastern boundary of the site. Entrance to the Destination River Resort development from the N8 National Road will be from the South-East, as indicated on the Google image below. A separate process to obtain SANRAL approval for access from the N8 to Destination River Resort is under



way.

Figure 3: Access from N8

The access roads from the access gate to the accommodation and restaurant area as well as a small portion of the Day Visitors Area are paved with cement brick paving blocks. The rest of the roads (access to the day area and service roads to pumps and water treatment plant) are gravel roads. Information with regards to the construction of road layers was no available. No problems with regards to collapsing of paved areas were observed. *(See layout in Annexure A & Figure 4 below)*



Figure 4: Access and Internal roads

6.2 Water

Figure 5 below (as well as Annexure B) shows the position, details and capacity with regards to components of the water supply system.



Figure 5: Destination River Resort water supply system

Destination River Resort pumps raw water directly from the river through an 80mm diameter Class 6 LDPE pipe to raw water HDPE lined storage reservoir. From there the water is treated in a water treatment package plant, stored in 5 x 10 m³ plastic tanks and this potable water is distributed through a 50mm diameter Class 4 LDPE pipeline to buildings and pools that forms part of Destination River Resort. Small booster pumps provided pressure to the western part of the accommodation buildings as well as the laundry.

Potable water is also pumped through a 32mm diameter Class4 LDPE pipeline from the 5 x 10 m³ plastic tanks to the sports field development.

Raw water for irrigation is fed under gravity from the HDPE lined raw water storage dams through a 50mm diameter Claass4 LDPE to the 2 Ha gardens and lawns. The map below shows the garden and lawn areas that are irrigated.



Figure 6: Destination River Resort irrigation areas.



The photos below shows components of the water supply system.

Photo 1: River pump



Photo 2: HDPE lined raw water storage dams



Photo 3: Water Treatment Plant



Photo 4: Water Treatment plant and 5 x 10 000 litre potable water storage tanks

The water demand, with all facilities 100% occupied, is 254 m³/day. With a summer peak factor of 1.5 the maximum demand is calculated at 381 m³/day. This figures represent a weekend/holiday in summer. The annual average daily demand will be considerably lower.

Table 1 (*Annexure C*) shows the calculated volumes as well as the capacities of the

DESTINATION RIVER RESORT WATER INFORMATION									
RAW WATER					POTABLE WATER			TOTAL QTY	
NO	DESCRIPTION	UNIT	QTY	USAGE (m3/unit /day)	THEORETICAL TOTAL RAW WATER QTY (m3/day)	QTY	USAGE (m3/unit /day)	THEORETICAL TOTAL POTABLE WATER QTY (m3/day)	THEORETICAL TOTAL WATER QTY (m3/day)
1	Gate Security	Persons				5	0.1	0.50	0.50
2	Office	Persons				3	0.1	0.30	0.30
3	Laundry	Persons				82	0.02	1.64	1.64
4	Restaurant	Persons				40	0.12	4.80	4.80
5	Tented accommodation	Persons				18	0.15	2.70	2.70
6	Chalets	Persons				24	0.15	3.60	3.60
7	Prefab rooms	Persons				24	0.15	3.60	3.60
8	New accommodation flats	Persons				16	0.15	2.40	2.40
9	Day facility	Persons				300	0.06	18.00	18.00
10	Stadium Potable Water	Persons				315	0.02	6.30	6.30
11	Stadium irrigation water	Ha	0.6	0.008	48.00				48.00
12	Resort irrigation water	Ha	1.5	0.008	120.00				120.00
13	Resort swimming pool water	%				250	0.01	2.50	2.50
TOTAL CALCULATED AVERAGE NEED PER DAY					168.00			46.34	214.34
FLOW SUMMER WITH SUMMER PEAL FACTOR OF 1.5					252.00			69.51	321.51
					UNIT	ACTUAL CAPACITY	ACTUAL CAPACITY	THEORETICAL CAPACITY	% OF THEORETICAL CAPACITY
RIVER PUMP CAPACITY (19m3/h for 18 hours)					m3				342.00
RISING MAIN (1.2m/s 20 hours))					m3				342.00
RAW WATER STORAGE CAPACITY					m3	147.00			147.00
FILTRATION PLANT CAPACITY (20 hours/day)					m3/h			120.00	120.00
POTABLE WATER STORAGE CAPACITY					m3			50.00	50.00
PEAK FLOW IN BULK SUPPLY POTABLE PIPELINE (PF =10)					l/s			5.36	5.36
									2.00
					UNIT	ACTUAL CAPACITY	ACTUAL CAPACITY	THEORETICAL CAPACITY	% OF THEORETICAL CAPACITY
RIVER PUMP CAPACITY (19m3/h for 18 hours)					m3				342.00
RISING MAIN (1.2m/s 20 hours))					m3				342.00
RAW WATER STORAGE CAPACITY					m3	147.00			147.00
FILTRATION PLANT CAPACITY (20 hours/day)					m3/h			120.00	120.00
POTABLE WATER STORAGE CAPACITY					m3			50.00	50.00
PEAK FLOW IN BULK SUPPLY POTABLE PIPELINE (PF =10)					l/s			5.36	5.36
									2.00

water infrastructure components as well. This table shows the worst case secenario.

Table 1: Calculated required volumes and capacity of water supply system.

6.3 Sewer

Destination River Resort development discharge sewage from all buildings to five conservancy tanks through The internal sewer system consist of 110mm Ø uPVC



Class 34. (green lines) as indicated on die drawing. (Figure 7 & Annexure E)

Figure 7: Destination River Resort sewer network & position of conservancy tanks

The maximum sewage run-off is expected to be 33 000 l/d from calculations of sewer production per unit as indicated in the table below as well as **Annexure F**

This figures represent a weekend/holiday in summer. The annual average daily flows will be considerably lower. **Occupation figures**



Photo 5: Sewer conservancy tank

NO	DESCRIPTION	UNIT	QTY	QTY	QTY	QTY	QTY	USAGE PER UNIT	QTY	QTY	QTY	QTY	QTY
			CONSERVANCY TANK No. 1	CONSERVANCY TANK No. 2	CONSERVANCY TANK No. 3	CONSERVANCY TANK No. 4	CONSERVANCY TANK No. 5	m3/unit /day	CONSERVANCY TANK No. 1	CONSERVANCY TANK No. 2	CONSERVANCY TANK No. 3	CONSERVANCY TANK No. 4	CONSERVANCY TANK No. 5
1	Gate Security	Persons				5		0.05	-	-	-	0.25	-
2	Office	Persons				3		0.05	-	-	-	0.15	-
3	Laundry toilets	Persons					10	0.1	-	-	-	-	1.00
3a	Laundry	m3					130	0.08	-	-	-	-	10.40
4	Restaurant	Persons		40				0.08	-	3.20	-	-	-
5	Tented accommodation	Persons		9	9			0.1	-	0.90	0.90	-	-
6	Chalets	Persons		24				0.1	-	2.40	-	-	-
7	Prefab rooms	Persons		24				0.1	-	2.40	-	-	-
8	New accommodation flats	Persons			16			0.1	-	-	1.60	-	-
9	Day facility	Persons	245					0.04	9.80	-	-	-	-
TOTAL									9.80	8.90	2.50	0.40	11.40
TANK VOLUME		m3							15.30	16.42	18.00	6.48	10.80
STORAGE CAPACITY		DAYS							1.56	1.84	7.20	16.20	0.95

Table 2: Calculated required volumes and capacity of sewer system.

The Groblershoop Sewage Treatment Works (Oxidation Ponds) was upgraded recently. Kheis municipality has confirmed in a letter (*See Annexure G*) that the capacity of the oxidation ponds are sufficient to accommodate sewage load from Destination River Resort. **Figure 8**, shows the position of the Oxidation ponds in



relation to Destination river resort 5.5 km away

Figure 8: Groblershoop Oxidation Ponds

6.4 Storm Water

The area's storm water drainage is shown in **Figure 11** below. The area is relative



small and flat and no problems are foreseen in this regard.

Figure 11: Drainage of the targeted area

Drainage through the accommodation and offices area generally occurs in a south western direction over the property into the dry river parallel to the main stream of the Orange River. The day facility drains from the middle to the main stream of the Orange River and to the dry river

Storm water run-off are be handled overland and accommodated within the proposed roads while complimenting the existing natural drainage scenario within and around the property. Storm water will therefore generally still follow current drainage paths to existing natural features. Areas at risk of erosion due to storm

water run-off within the site are suitably stabilised to prevent any erosion damage that might occur, although the gentle gradient across the site should not present major challenges in terms of storm water management

6.5 Solid Waste

The solid waste is internally handled as follows.

Solid waste will be collected daily by resort personnel and transported to municipal dump site or on request at shorter intervals and handled by the municipality as this development falls close to the town of Groblershoop and in the general area of service by the municipality. Attached in **Annexure A** is a letter from Kheis Municipality confirming that they will provide this bulk service. This Kheis municipal letter further confirms that the capacity of the solid waste disposal site is sufficient to handle the solid waste produced by the resort.

The image below (**Figure 13**) shows the position of Destination River Resort in relation to the Groblershoop solid waste disposal site as well as the connection road



(6.2 km) between the resort and the solid waste disposal site.

Figure 13 : Groblershoop Solid Waste Disposal Site

6.6 Electrical Reticulation and Bulk Electrical Supply

6.6.1 Introduction

This property was sold to the developer without an electrical connection point.

The Developer has applied with ESKOM for a 50kVA 3Phase connection point early 2017, point was supplied by Eskom in June 2017.

The Developer indicated that the max demand during the festive season experienced in 2017 & 2018 was approximately 85kVA which were supplemented with a 200kVA standby generator, during the off peak seasons and weekends max demand is 42kVA approximately.

6.6.2 The Existing Electrical Installation

The existing electrical installation on the resort conforms to the minimum SANS 10142 standards. The load management system with the 200kVA standby Generator that the Developer has in place in peak season works well – *refer to AS-BUILT Electrical Reticulation drawing attached and COC issued to ESKOM.*

6.6.3 Proposed Extension to the Electrical Network

It is normal and good practise the connection point should be able to accommodate the maximum demand in this case 85kVA +10%, it is therefore recommended that the Developer upgrades the connection point to 100kVA.

6.6.4 Electrical bulk services discussion

Recently a 132kV overhead line was constructed and runs through the Developers property after negotiations with ESKOM, the Developer indicated that the upgrade of the existing electrical connection point should not be a problem when required.

In this instance, the Developer will be responsible to upgrade / replace the current 50kVA transformer on the property.

7. CONCLUSION

The following conclusion, related to the provision of bulk services, can be reached:

- Municipal services directly to the site of the development are limited, but connection to bulk municipal infrastructure is possible in terms of water supply.
- Electricity supply to the property at the stage in time is sufficient with the load management system currently in place.
- Through management of the on-site services, the effect of municipal services, where connection is plausible, should be kept to a minimum.