



# GROOTDRAAI DAM

COORDINATES (degrees, minutes, seconds)

LATITUDE	LONGITUDE
26° 55' 05" S	29° 17' 42" E

## LOCATION

This dam is situated in the upper reaches of the Vaal River, upstream of Standerton in quaternary catchment C11L, South Africa.

## DESCRIPTION

The dam is a composite structure comprising a central concrete section with two earthfill flanks. The dam has a full supply level of 1,549 m, with a dead storage level of 1,533 m and reservoir bottom at 1,514 m.

## PURPOSE

The dam provides for the water needs of Sasol II and III petroleum from coal plant at Secunda, Eskom's Tutuka Power Station and to some extent the water requirements for the Matla and Duvha power stations.

It also serves as a flood control dam and has reduced the floods which have inundated Standerton in the past.

It is a component of the Usutu–Vaal Water Transfer Scheme. Apart from natural inflow from the Vaal River, it can store an additional 100 million m<sup>3</sup> of water per annum which is pumped from Heyshope Dam in the Usutu River basin across the watershed to the Vaal River. In turn, water is transferred from Grootdraai Dam to the Olifants River basin.

Grootdraai Dam supplies Tutuka Power Station. Other power stations in the Olifants catchment can also be supplied from Grootdraai Dam when the Usutu system cannot meet the full demand (although it is not desirable due to water quality issues), namely: Matla, Kriel and Kendall. Water is pumped from the Grootdraai Pump Station at Grootdraai Dam to the Knoppiesfontein Diversion Tank where the water is diverted to the Bossiesspruit Dam and to the Trichardsfontein Balancing Dam. Bossiesspruit Dam releases water to the Sasol–Secunda complex. From the Trichardsfontein Balancing Dam, water is released to Riefontein Weir and can then be pumped to various power stations (see above) as and when required. Duvha Power Station can also be supported from water released from Riefontein Weir to Witbank Dam.



Grootdraai Dam (source: SA Dept of Water Affairs)



## GROOTDRAAI DAM

It is estimated that over 45 years, the capacity of the dam could be reduced by 32 million m<sup>3</sup>/a due to siltation.

The total irrigation demand of 19.31 million m<sup>3</sup>/a is representative of the Grootdraai catchment. Return flows amount to 2.88 million m<sup>3</sup>/a, leaving a net demand of 16.43 million m<sup>3</sup>/a. The irrigation demand includes 0.336 million m<sup>3</sup>/a which is classified as a streamflow reduction activity.

## PHYSICAL INFORMATION

Dam name	River	Quaternary catchment	FSC* (million m <sup>3</sup> )	FSA (km <sup>2</sup> )	Owner	DWA code	Wall height (m)	Wall length (m)
Grootdraai	Vaal	C11L	356	38.78	DWA	C1R002	42	2,249

\* Live full supply capacity (SANCOLD, 2009)

Year of completion	Demands/abstractions (million m <sup>3</sup> /a)			1:50 yield (million m <sup>3</sup> /a)	Maximum spillway capacity (m <sup>3</sup> /s)
	Domestic	Irrigation	Other		
1978	103.48 †	19.31 ‡	42.794 †	98 ‡	11,500

† DWA, Directorate of Hydrological Services correspondence, 2012

‡ ORASECOM, 2011

## AREA-CAPACITY RELATIONSHIP

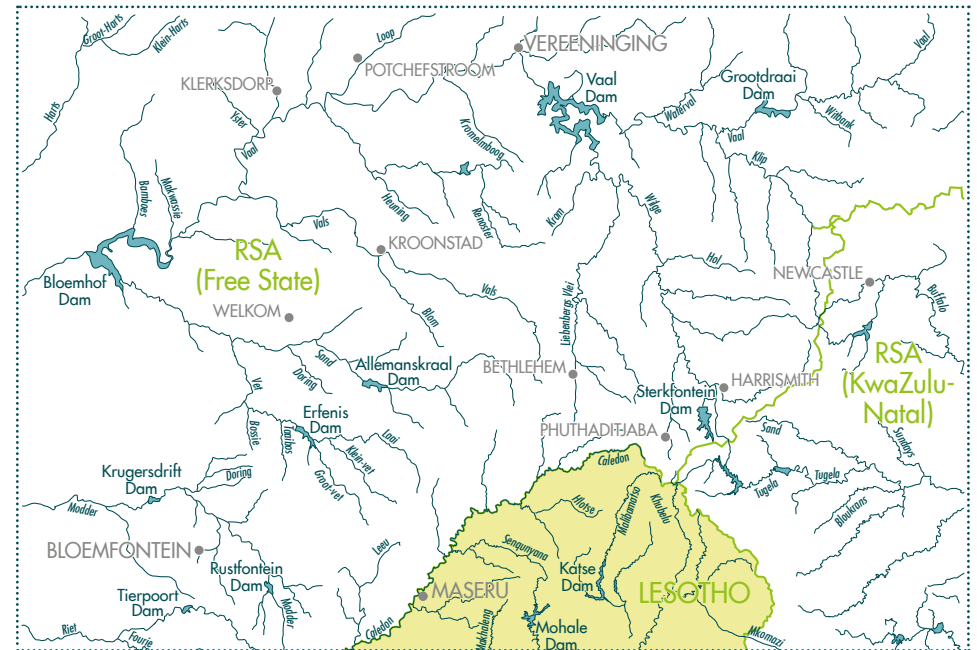
Elevation (m)	Storage (million m <sup>3</sup> )	Surface area (km <sup>2</sup> )
1,550	399.52	42.49
1,549	356.02	38.82
1,546	254.37	30.37
1,542	153.63	20.62
1,540	116.39	16.86
1,536	64.12	10.34
1,533	38.01	7.15
1,529	16.07	3.98
1,525	4.83	1.80
1,522	1.32	0.65
1,514	0.00	0.00



### OPERATING RULES

Grootdraai Dam, along with the Vaal Dam, the Vaal Barrage, Bloemhof Dam (all on the Vaal River) and Sterkfontein Dam (on the Wilge River, a tributary of the Vaal River) form part of the Bloemhof Sub-system, which is part of the greater Integrated Vaal River System. Woodstock Dam and the Driel Barrage (situated in the Thukela River catchment), form the Thukela Transfer Scheme into the Vaal catchment. The system is operated according to annual runs of the System Analysis Model.

The large scheme is operated as follows: The Thukela system supports Sterkfontein Dam until the dam is full. Grootdraai Dam does not support Vaal Dam, but when the Vaal Dam is at 15% storage or less, Sterkfontein will begin to support it. Abstractions at Sedibeng and Midvaal make use of local runoff and spills from upstream dams. When this is not adequate, the Vaal Dam supports the abstractions. The Vaal Dam will only begin to support Bloemhof Dam when Bloemhof Dam reaches its minimum operating level (1,213.6 m).



Dam network

