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Email: jan@janbrink.co.za
Our reference: JB2049-02
Your reference: Bosse Dam
2020-10-03

Langkloof Plase (Pty) Ltd
PO Box 689
Oudtshoorn, 6620
Att: Mr H Jonker (hein.jonker@opsa.co.za)

Sir,

RE-ASSESSMENT OF BOSSE DAM SURVEY, SCHOONBERG FARM

INTRODUCTION

The previous correspondence; JB2049-01, dated 2019-12-12, has reference.

Mr Mkhanyiseni Zimu, on behalf of the Breede-Gouritz Catchment Management Agency (BGCMA) commented on the inaccuracy of the basic topographic survey that was used and included in the above correspondence. It was indicated that a more accurate survey would assist them in their evaluation of the dam capacity before and after the upgrade/rehabilitation.

Mr Monty Jacobs of Jacobs Opmetings completed an accurate topographic- and bathymetric survey of the dam on behalf of Jan Brink Consulting Engineering in September 2020.

This letter addresses the re-assessment of the volume of the dam before and after the upgrade based on the new survey data.

DESCRIPTION AND CONDITION

General

The slight changes of the main dimensions and pertinent figures of the dam are tabulated below, based on the more accurate new survey data obtained.

Table 1: Summary of dam dimensions

Location	33°49'06" S	22°37'40" E	
Wall type	Earthfill	**Wall height**	10.5 m
Storage capacity	163 500 m³	**Spillway type**	Bywash
Crest length	273 m	**Crest width**	9m

Spillway

The dam's original spillway was located on the right flank, but the owner elected to move it to the left. Currently there is only a small trench visible downstream of the dam wall in the vicinity of the old spillway and it is difficult to obtain any levels of the original spillway as it is now covered by the fill of the new embankment (see Figure 1).

Storage Capacity

The dam's storage capacity was calculated by taking into consideration the difference between the new survey levels of the dam basin surface and a base level surface at 604,814 m.a.s.l. in AutoCAD Civil3D (see Bosse New Dam FSL 604.814_New Survey). This was then used to compile the capacity curve attached to the end of this report. The dam's capacity at full supply level (FSL), i.e. just before water starts flowing over the new spillway, is approximately 163 000 m³.

The Contractor for the remedial works estimated that they removed approximately 30 000 m³ of fill material from the basin to be used for the embankment. The bulk of this was, however, excavated above the full supply level and does not contribute significantly to additional storage capacity (see Figure 2).

As the old spillway and full supply level could not be determined, it was not possible to make an accurate estimate of the original storage capacity. Based on the level of the remainder of the downstream return channel of the old spillway, a rough FSL of 603,500 m may be extrapolated. This would indicate a capacity of approximately 134 000 m³, which is ±29 000 m³ less than the new capacity.

Storage management

It is technically possible to lower full supply level and consequently the storage capacity by excavating a significant volume of material and constructing a new downstream channel.

Storage may also be managed by releasing water through the new outlet pipe that was installed during the upgrade project. This will require accurate level markers in the dam basin.

CONCLUSION

The new survey allowed an accurate determination of the dam's current capacity and can be used for record purposes and water management.

The original capacity could unfortunately not be calculated, but it must be accepted that it was some 20 000 to 30 000 m³ less than the upgraded dam.

It should be noted that the dam in is current condition is safer than it was before the upgrades and that the new outlet pipe allows more operational flexibility.

Compiled by:	**Date:**	**Signed:**
JA Brink Pr. Eng.	2020-10-02	

Attached:

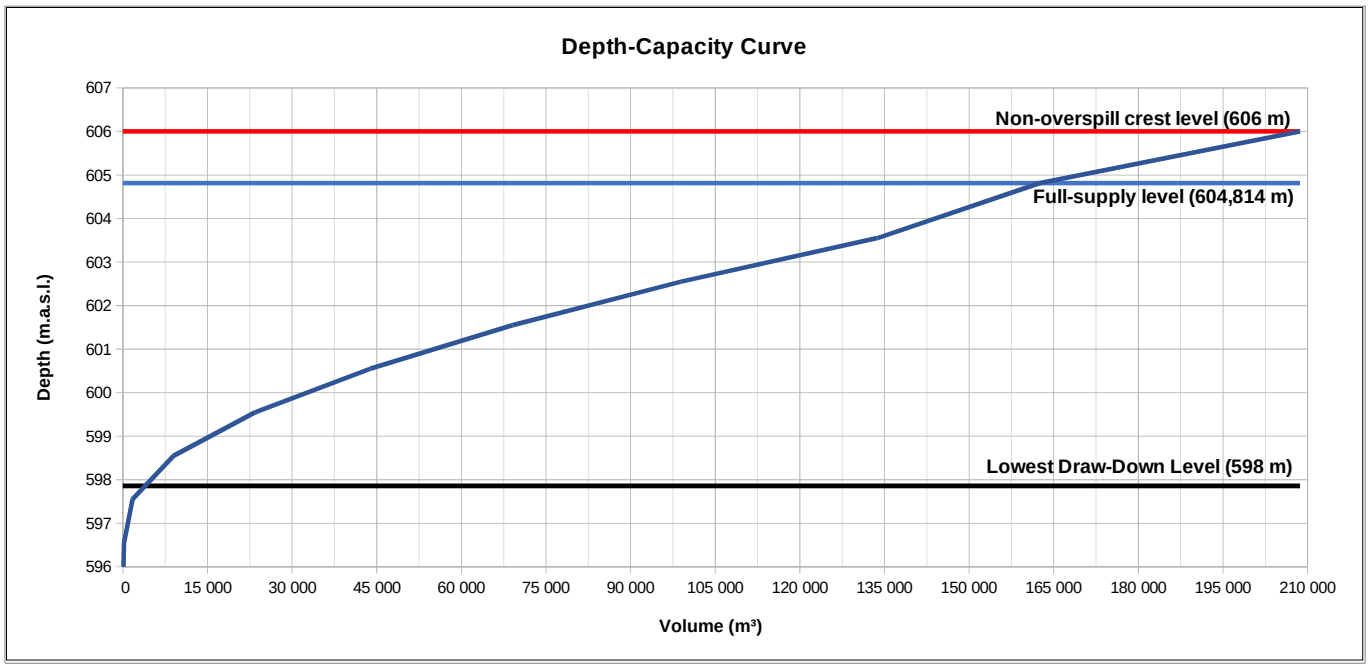
1. Photographs
2. Capacity curve
3. Bosse New Dam FSL 604.814_New Survey

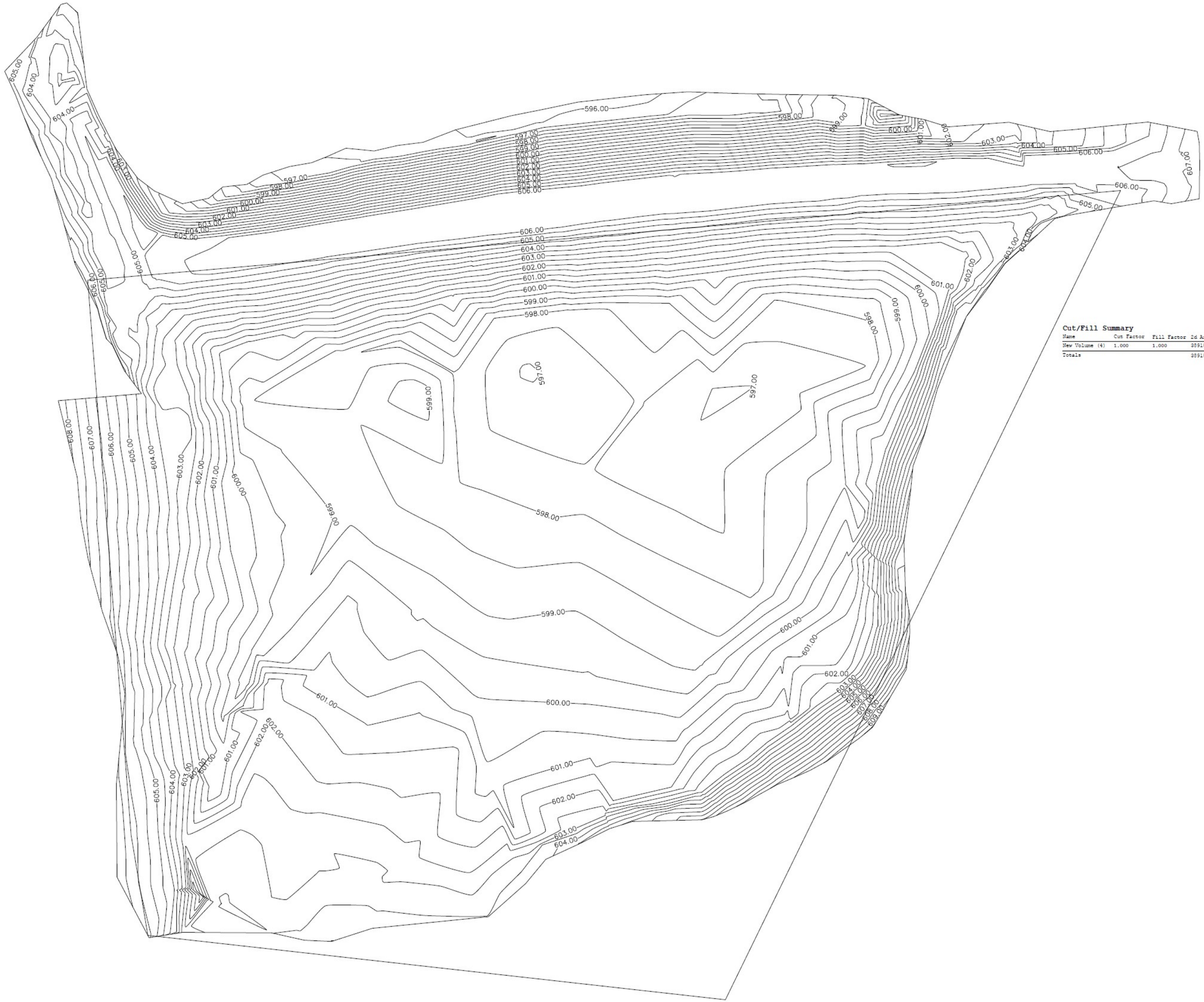
PHOTOGRAPHS

Figure 1: Old spillway downstream channel

Figure 2: Excavation of fill for embankment material

CAPACITY CURVE (UPGRADED DAM)





Cut/Fill Summary

Name	Cut Factor	Fill Factor	2d Area	Cut	Fill	Net
New Volume (4)	1.000	1.000	38918.21sq.m	164708.76 Cu. M.	2181.00 Cu. M.	162527.76 Cu. M.<Cut>
Totals			38918.21sq.m	164708.76 Cu. M.	2181.00 Cu. M.	162527.76 Cu. M.<Cut>