

## MAJUBA ASH DISPOSAL FACILITY: ASH/REHAB DAM 1 AND TEMPORARY STORM WATER STORAGE DAM: CONSTRUCTION SEQUENCE

**Submitted to:**

*Majuba ADF*

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## 1. INTRODUCTION

BEAL Africa was appointed by Eskom to assess the possibility of utilizing a Temporary Storm Water Storage Dam i.e. coffer dam within the footprint of AD 1 (Ash Dam 1). The purpose of the Temporary Storm Water Storage Dam would be to accommodate the 1:10 year storm water run-off from the north eastern portion of the existing ADF. The main reason for the Temporary Storm Water Storage Dam would be to attempt to ensure that the work area of AD 1 (Ash Dam 1) and RD 1 (Rehab Dam 1) could be more accesable from a construction point of view during the construction period of AD / RD 1. It is understood that the design intent is to attempt to reduce the occurance of flooding of the construction area during construction. However, it is also understood that the Temporary Storm Water Storage Dam only caters for the 1:10 year flood run-off from the north and north eastern portion of the existing ADF (Area A on Drawing Number: B700-C-SWDA-01: See Annexure A).

The addition of a Temporary Storm Water Storage Dam (coffer dam) within AD 1 (Ash Dam 1) is only a temporary addition in an attempt to assist with the construction of AD 1 and RD 1. This addition does not negate the original dam design by Jones and Wagener from a design assumption, flow as well as final capacity perspective. The Jones and Wagener SWMP (Stom Water Management Plan) as well as WUL (Water Use Liscense) remains as approved.

Upon completion of construction of AD 1 (Ash Dam 1) and RD 1 (Rehab Dam 1) the Temporary Storm Water Storage Dam i.e. coffer dam, within the footprint of AD 1 (Ash Dam 1) will have been removed.

## 2. CONSTRUCTION SEQUENCE: JONES & WAGENER (PTY) LTD

From the Jones and Wagener Report No.: JW227/16/F224-Rev0B it follows:

“In terms of the construction sequence of the storm water infrastructure associated with Package 2, the key item is associated with the construction of the Rehabilitation and Pollution Control dams. It is imperative that capacity is always available in the system to cater for storm water in the event that an extreme rainfall event is experienced during construction. The following is proposed to ensure that this is achieved:

- With regard to PCD5, it is proposed that the dam be subdivided and only half of the dam is lined at a time such that the other half can be utilised to capture and manage storm water.
- On the western side, it is proposed that RD2 be built first to collect storm water from the western side of the ADF.
- Once RD2 is built, AD3 can be emptied to RD2, and AD3 can be excavated and lined while RD2 continues to operate as AD3 did previously.
- Once AD3 is operational, dirty storm water from the ADF can be redirected from RD2 to AD3, and the two dams can start to operate as both rehabilitation dams and PCDs respectively.
- It is proposed that the excavation and lining of AD2 be done in the dry season as this dam is a buffer storage dam and needs to be available during the rainy season to store excess water collected in AD1. It is recommended that AD2 be modified before work on AD1 is started so as to provide sufficient backup capacity during construction at AD1.

- On the eastern side, it is proposed that AD1 is drained and a division wall be constructed in AD1 as per the proposed division wall between AD1 and the proposed RD1. AD1 should then be excavated to its design capacity and lined, while RD1 is used to collect storm water runoff from the ADF. Once AD1 is constructed, the storm water can be redirected to AD1, while RD1 is excavated and lined.

In terms of the construction sequence of the storm water infrastructure associated with Package 2, it is important that the upslope clean water cut-off berms and canals are in place before the canal embankment is constructed. The clean water stilling basin at the 30 year fence line is part of the Package 1 works and therefore will be in place before the construction of the canal embankment. The canal embankment will cut off a portion of the catchment draining to the river system and therefore cause extra water to pond in the pan area, making construction in this area challenging. Therefore it is important that the upslope catchment is diverted around the canal embankment and into the river system.

With respect to the perimeter canals, these will be extended in a phased way. As ashing advances, the dirty water canals will be extended to the full extent of that contaminated area. For example, as part of Package 2, this means that the western dirty water canal will be extended to the full extent of the initial and second lined area (i.e. Area 2). On the eastern side, due to the extent of the canal embankment, the canals will extend beyond the associated contaminated area. For future packages, both the western and eastern canals will be timeously extended to the end of the next area which is being prepared and lined for ashing.

Rehabilitation of the existing ADF is not covered at this stage of the storm water management plan (SWMP). However, in the future, as rehabilitation of both the existing ADF commences and concurrent rehabilitation occurs, so too will the clean water canals be extended to the extent of rehabilitation. On the western side of the facility, the existing dirty water canal will be converted to a clean water canal, that will (in the future) drain to the proposed RD2, by crossing over the proposed new western dirty water canal.

Please refer to drawing F224-22-001 and F224-22-002 for a layout showing the entire storm water related infrastructure associated with Package 2."

### 3. CURRENT CONSTRUCTION SEQUENCE

- PCD5 is nearing completion.
- On the western side, RD2 has been completed and is near being commissioned.
- Once RD2 is built, AD3 can be emptied to RD2, and AD3 can be excavated and lined while RD2 continues to operate as AD3 did previously.
- Once AD3 is operational, dirty storm water from the ADF can be redirected from RD2 to AD3, and the two dams can start to operate as both rehabilitation dams and PCDs respectively.
- The construction of AD2 is currently underway.
- It is proposed that the excavation and lining of AD2 be done in the dry season as this dam is a buffer storage dam and needs to be available during the rainy season to store excess water collected in AD1. It is recommended that AD2 be modified before work on AD1 is started so as to provide sufficient backup capacity during construction at AD1.

#### 4. ASH/REHAB DAM 1 AND TEMPORARY STORM WATER STORAGE DAM: CONSTRUCTION SEQUENCE

Once works on AD/RD 1 start all other Rehabilitation and Pollution Control dams will have been completed. All new pumping infrastructure will have been completed and be in place.

The enabling pipe works of AD/RD 1 will have to be completed before the dam construction works on AD/RD 1 start.

All water pipelines feeding into AD1 from the station need to be bypassed to feed directly to AD2 & AD3.

Up to the stage when the temporary coffer dam is constructed the Haul Road Sump 3 (HRS3) can be used as a temporary discharge point. A pump will be installed at HRS3 that will feed into the existing pipeline between AD1 pumpstation and AD3. From this line water can also be discharged into AD2. During this time AD1 pump station will not be operational as AD1 will be empty.

Once the coffer dam is complete the pipelines from the station should have been rerouted around the works area to discharge into the silt trap upstream of the coffer dam. This will allow the water to be pumped via the existing infrastructure. The water level in the coffer dam must be managed very strictly and the water level should be kept as low as possible to ensure sufficient capacity for storm events.

On the eastern side, of area 2 it is proposed that the dirty water as well as associated dirty water canals at and around PCD5 be re-directed and contained for controlled discharge from PCD5 into the dirty water canal leading to AD/RD1. AD1 is to be drained and de-silted focusing on the area where a division wall is to be constructed in AD1 as per the proposed division wall between AD1 and the proposed RD1. Following which the de-silting operation is to focus on the area where the temporary storm water storage dam (coffer dam) is to be constructed. The division wall is to be constructed as soon as said area has been de-silted followed by the temporary storm water storage dam (coffer dam) and its associated pen stock extension. Only the spillway of the coffer dam is to be lined. RD 1 should then be excavated to its design capacity and lined, while the coffer dam within AD1 is used to collect storm water runoff from the ADF. Once RD1 is constructed, stormwater can be redirected to RD1, the temporary storm water storage dam (coffer dam) removed, following which AD1 is excavated to its designed capacity and lined.

#### 5. CONSLUSIONS

Once all needed information is obtained from the Station and all discussions relative to the macanical installation has been concluded, the above proposed construction sequencing can be finalized.

Following which all relevant construction drawings can and will be updated.



J. A. P. (Arno) Van Der Merwe

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## ANNEXURE A : DRAWING