

STORMWATER & EROSION MANAGEMENT PLAN

for croplands on RE Ptn3 Coniston 699MS, Waterpoort

1. Introduction

Soil erosion, the transport of the upper layer of soil and rock from one location to another, is a form of soil degradation. Water and wind erosion are the two primary causes of land degradation, while intensive agriculture and deforestation are, *inter alia*, amongst the most significant human drivers of erosion.

Water erosion is caused by the uncontrolled runoff of water over an area cleared of vegetation. The control of runoff from irrigated fields is of the utmost importance for good production yield and sustainable utilization of the soil. The cause of runoff can be twofold: (a) over irrigation and (b) rainfall.

The loss of soil from farmland may be reflected in reduced crop production potential, lower surface water quality and damaged drainage networks.

Excessive (or accelerated) erosion causes both "on-site" and "off-site" problems. On-site effects include decreased agricultural productivity and (on natural landscapes) ecological collapse, both due to loss of nutrient-rich upper soil layers. In some cases, the eventual end-result is desertification. Off-site effects include sedimentation of waterways, eutrophication of water bodies as well as sediment-related damage to roads and houses. There are however many prevention and remediation practices that can curtail or limit erosion of vulnerable soils.

2. Good irrigation management practices

The following is regarded as good irrigation management practice and will be implemented on the Coniston lands by Koedoepan Boerdery (Pty) Ltd:

- Over irrigation will be avoided at all costs.
- Only drip irrigation will be used.
- Leaking pipes or pipe bursts will be mended as soon as possible to prevent water running in the irrigated area.
- Irrigation equipment will be maintained and regularly serviced.
- Proper irrigations scheduling will be done using soil moisture probes and irrigation scheduling software.
- The following techniques are available and will be used to ensure that effective irrigation scheduling is done:
 - Digging of profile holes
 - Soil moisture probes
 - Long and short-term weather forecasts
 - The fork method
 - Tensio-meters
 - The measuring and recording of evapotranspiration (Et0) from installed weather stations.

A combination of these methods will be used in irrigation scheduling on an ongoing basis.

3. The control of runoff caused by rainfall

The following is standard practice and will be followed in the preparation of all irrigated fields to ensure good drainage and water channelling:

- Lands will be levelled with a soil plain to prevent ponding of water and to ensure there is no standing water.
- Contours of the entire area designated for cultivation and associated infrastructure will be surveyed, to ensure that water collecting in the lands will be channelled out of the lands and diverted to the drainage lines.
- The contours will be designed and surveyed at a 3m vertical elevation between individual contours.
- Contours will not be longer than 300m and will have a 1%-1.5% slope over the length of the contour to ensure the slow drainage of water.
- In cases where the area is level and a 3m vertical elevation is not possible over 100m an additional contour can be made.
- The contour height and form should enable a tractor to traverse without damage to the tractor or its attachments.
- Contours must be kept clean of any obstructions and debris. Obstruction leads to the accumulation of water and possible contour failure.
- A drainage canal will be constructed to accommodate runoff from the contours.
- The drainage canal will duct the water to natural drainage lines.
- Drainage canals will have the following characteristics:
 - They will be located at the lowest geographical point of the area to collect runoff.
 - They will be designed and shaped to accommodate the calculated cumulative runoff from the area to curb erosion.
 - They will be planted with grass.
 - They will be checked and maintained regularly, according to a maintenance schedule.
 - Gabions will be installed where slopes are steep or where soils are very sandy, to minimise velocity and scouring.
 - Where drainage channels join natural drainage channel an outlet made of drums welded together to form a pipe should be installed to curb erosion.
- A V-shaped plough should be used between the rows to assist draining from the lands.
- Planting ridges will be built as high as possible, in such a way that water cannot accumulate in the rows.
- Planting on ridges will assist in the channelling of water to the contours.



Creating contours and ridges in preparation of croplands