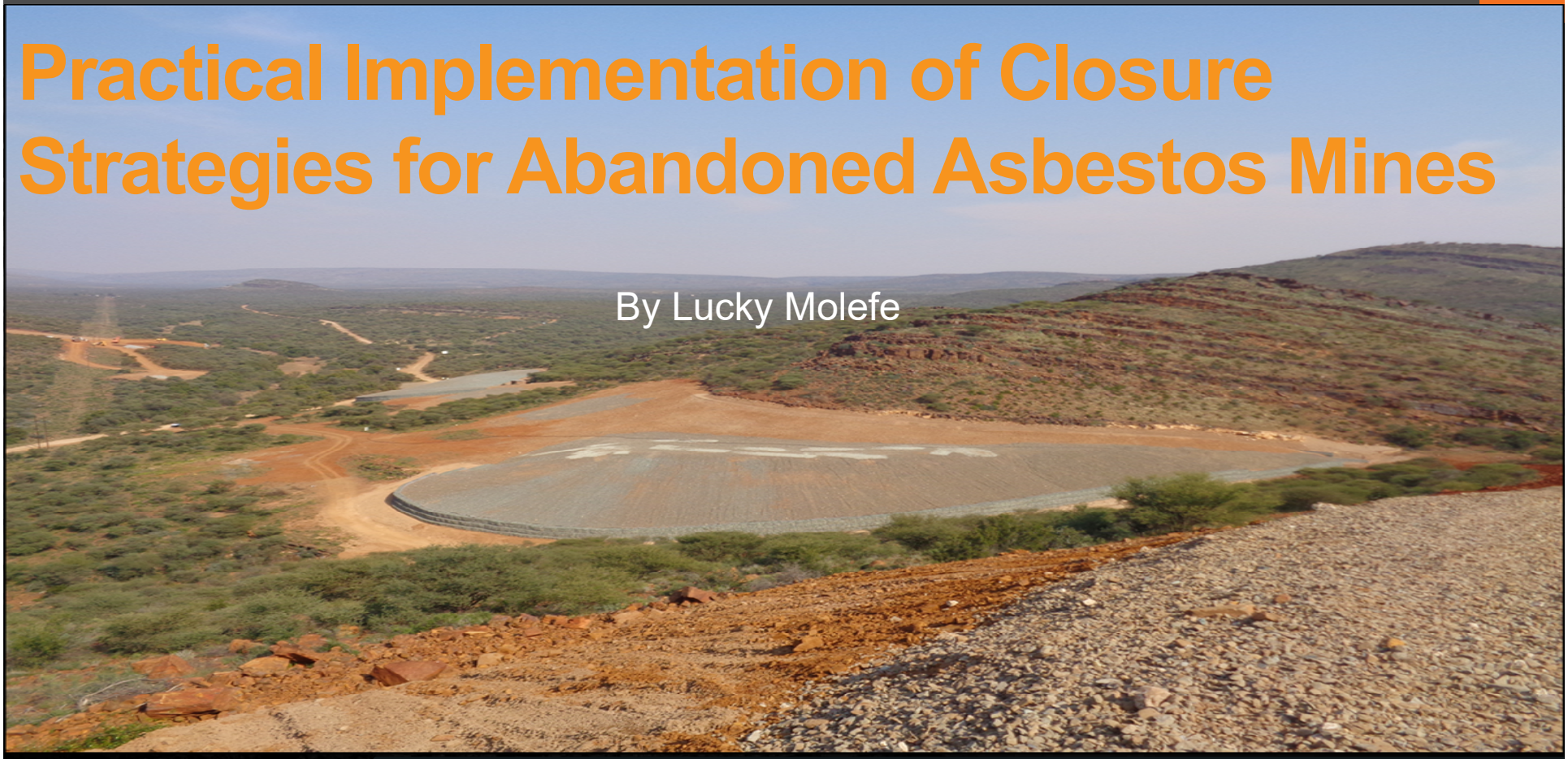
Practical Implementation of Closure Strategies for Abandoned Asbestos Mines



By Lucky Molefe

Design Philosophy

- Standard Protocol and Guidelines for the rehabilitation of Derelict/Ownerless Asbestos Mine Residue Deposits in South Africa
  - The primary aim
    - To minimise the dispersion of asbestos fibres
    - Must be self-sustaining, cost-effective solution with little to no required maintenance
  - The secondary aim
    - To return the disturbed area to an ecologically stable environment in equilibrium with its immediate surroundings

Design Philosophy

- The following design objectives are formulated for the closure concept and cost estimate:
  - Limit the mobilisation potential of asbestos through wind, water, human and/or animal foot traffic post closure;
  - Ensure the stability of the closure measures over the design life (surface and internal stability);
  - Integrate the closure measures into the natural landscape, where possible;
  - Ensure the closure measures are cost effective; and
  - Ensure self-sustainability (requiring minimal to no maintenance) over the design life.

Design Philosophy

- Define extent of contamination of a given site

- Site investigation
  - Walking the site / visual inspection
  - Topographical survey
  - Geotechnical investigation

- Rehabilitation elements are identified
  - Adits and shafts
  - Asbestos workings / shallow excavations
  - Residue deposits
  - Watercourses

Residue Deposits

- Determine characteristics of the residue deposits in terms of nature of contamination, particle size and shape of material, angle of deposit slopes

Adits / Shafts and Workings

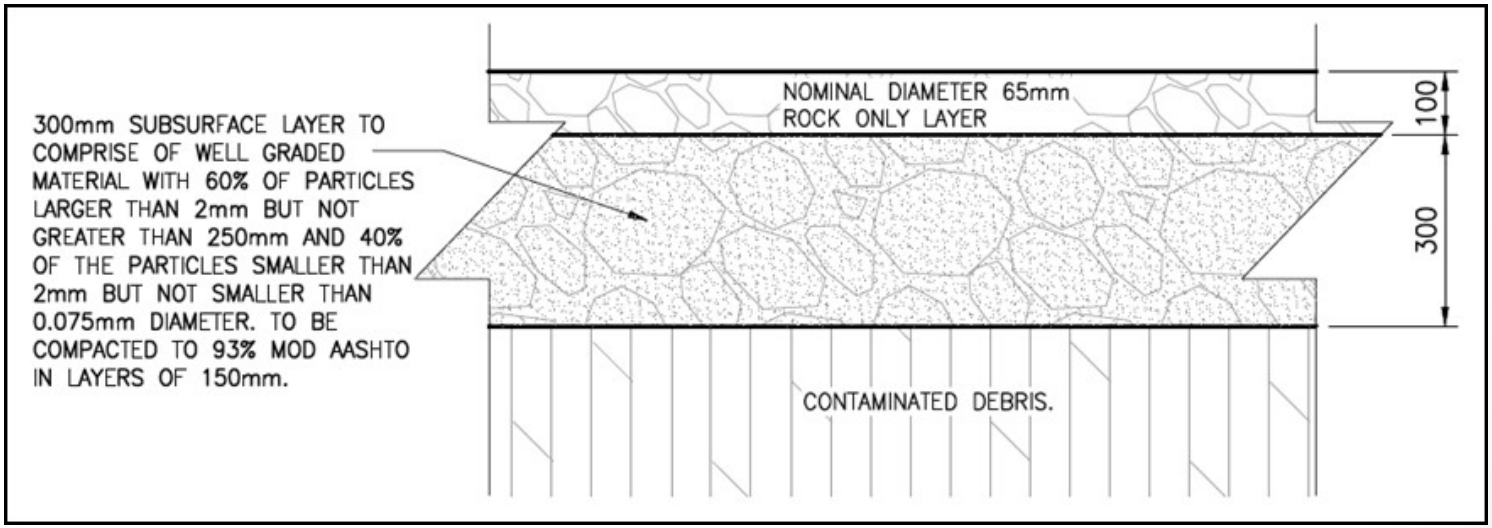
- Adits / shaft openings are inspected and measured

Watercourses

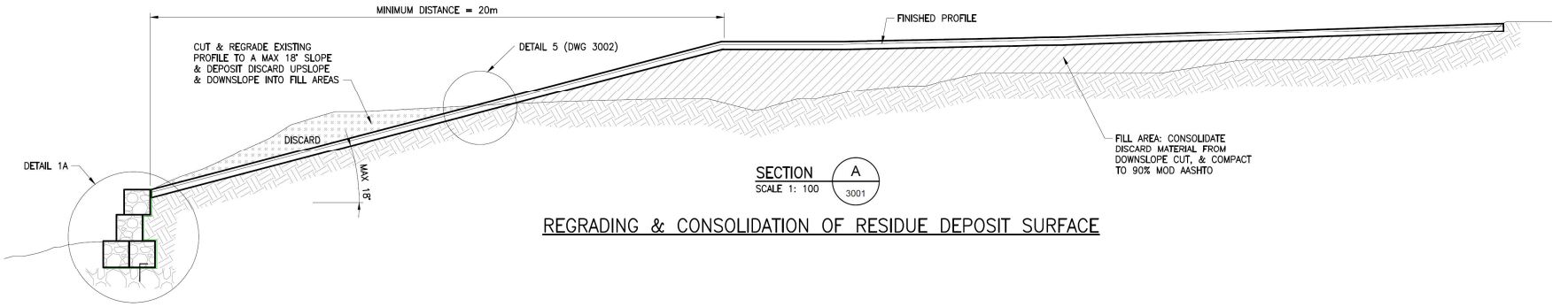
- Watercourses are inspected for evidence of contamination resulting from erosion of residue deposition

Design Solutions

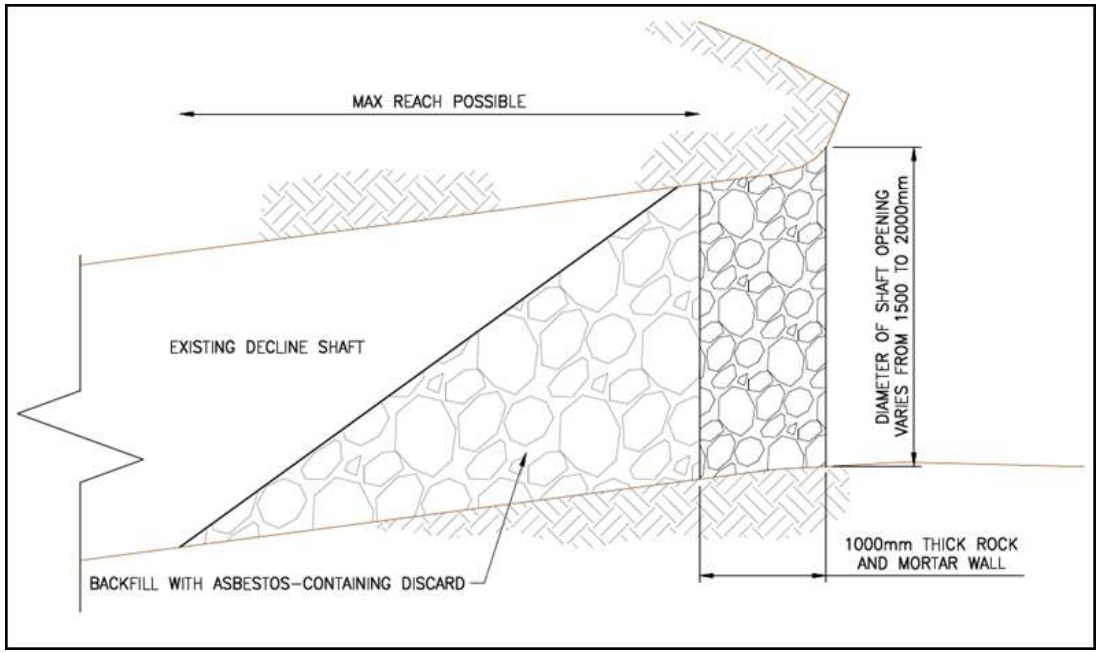
- Limiting erosion to prevent mobilisation of asbestos material
  - Cover design (Rock Cladding)
  - Rock cladding has been proven to be effective on moderately steep slopes or areas where vegetation is not effective or difficult to establish



- Stabilising slopes of residue deposits



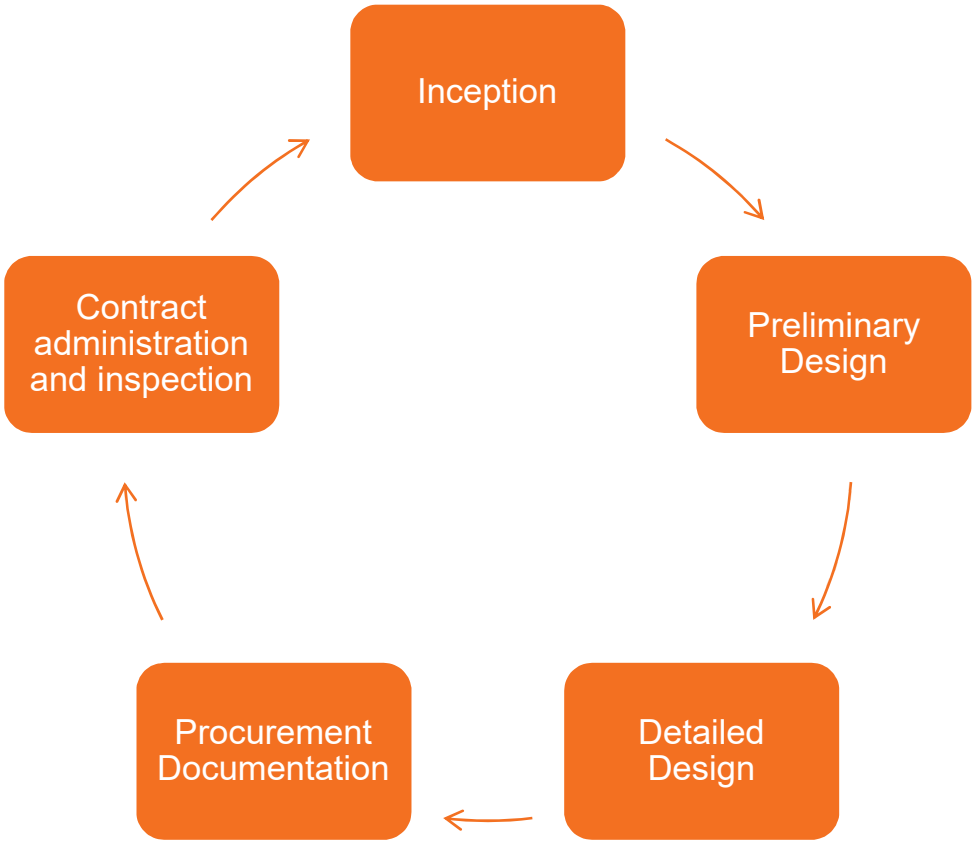
- Adit closure



Design Solutions

- Storm controls may include
  - Gabions / reno mattresses
  - Contour berms / bunds
  - Retaining walls
  - Stormwater diversion channels
  - Energy dissipaters

Project Lifecycle



Questions