

# **WASTE DISPOSAL BY LANDFILL**

## **AN OVERVIEW OF LANDFILL OPERATIONS**



**Cleansing and Solid Waste Unit**

**DSW**

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# WHY LANDFILL?

- 'Disposal of waste on land'
- Oldest form of waste disposal
- Other waste management options ultimately rely on landfill
- Best Practicable Environmental Option (BPEO) for disposal of waste for the foreseeable future

# DSW LANDFILLS

- 3 landfills in the eThekweni Municipality operated by DSW :

- Bisasar Road Landfill Site situated in central Durban

- Mariannahill Landfill Site situated in the west

- Buffelsdraai Landfill Site situated in the north



# BISASAR ROAD LANDFILL SITE

- Situated 10 km north of the Durban CBD
- One of the busiest sites in Africa  
– 3500 TO 5000 tons of MSW daily
- Landfill footprint of 44 Ha

# MARIANHILL LANDFILL SITE

- New generation landfill opened in 1997 – located to ‘textbook standards’
- 500 – 700 tons of MSW daily
- Registered national conservancy - arguably first world wide

# BUFFELSDRAAI LANDFILL SITE

- New regional site commissioned in May 2006
- 100 Ha landfill footprint
- Design life of 75 years





# **BUFFELSDRAAI LANDFILL SITE**

**WELCOME - SIYAKWAMUKELA - WELKOM**

**HOURS: EVERY DAY ( MONDAY - SUNDAY )**

**ACCOUNT CUSTOMERS.....07h00 - 15h30**

**CASH CUSTOMERS.....07h00 - 15h30**

**ENTRY RESTRICTED ! AKUNGENI NOMA UBANI ! BEPERKTE TOEGANG !**

**\* FOR GENERAL WASTE DISPOSAL AND FOR SITE BUSINESS PURPOSES ONLY**

**\* ABAZOLAHLA UDOTI KANYE NALABO ABEZE NGOMSEBENZI KHUPHELA**

**\* SLEGS VIR ALGEMENE AFVALWEGDOENING EN TERREINWERKE BEDOEL**

**Permit Holder: Durban Water & Waste  
3 Prior Road, Durban**

**Responsible Person : J. Parkin M.Sc Eng.**

**Telephone (Office Hours) 031 3118820**

**Emergency (After Hours) 083-259-3687**

















# LANDFILL SITE OPERATION

- The operation of a landfill site can be compared to a large earthworks operation
- Waste is placed and compacted typically using purpose built landfill compactors and dozers
  - To prevent moisture ingress (increase run-off) and minimise leachate generation
  - To maximise airspace and improve stability
- Landfill equipment will typically include water tankers for dust suppression and road making equipment for upkeep of internal road networks



# TYPICAL LANDFILL OPERATIONS



Landfill Compactor

Landfill Compactor

Working Face

Lined slope

















# PROBLEMS ASSOCIATED WITH LANDFILLS

- Liquid and gaseous emissions as a result of degradation of organic waste matter
- Leachate - Potential for pollution of groundwater
- Landfill Gas ( $\text{CH}_4$  and  $\text{CO}_2$ ) - Explosion and fire hazard and green house gas emissions



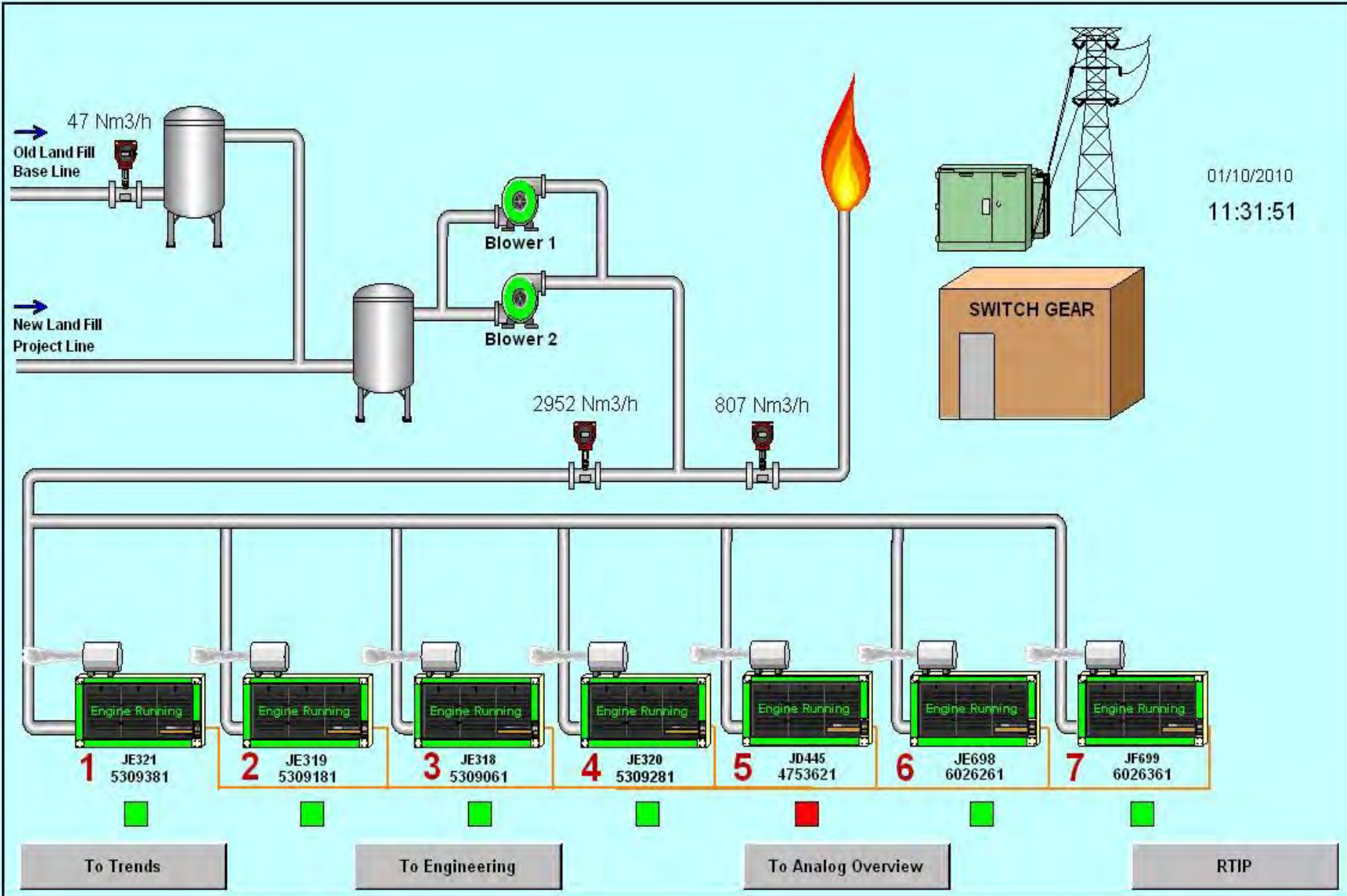
# LANDFILL DEGRADATION PROCESSES

## Landfill Gas

- Arises as the end product of waste degradation
- Consists primarily of methane and carbon dioxide, together with a number of trace components
- Changes in gas composition over time due to sequence of waste decomposition

# FLARING





01/10/2010  
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# PROBLEMS ASSOCIATED WITH LANDFILL EMISSIONS

## Leachate

- Potential watercourse and groundwater pollution if released uncontrolled to the environment
- Typically consists of high levels of ammonia (toxic) and organic matter (creation of septic conditions)







# ODOUR MANAGEMENT SYSTEM

*The OMS provides the landfill operator with a real-time visual prediction of the odour plume every ten minutes thereby enabling the implementation of mitigation strategies.*



# MARIANNHILL LANDFILL SITE

## A CASE STUDY

### *Closed Loop Design*

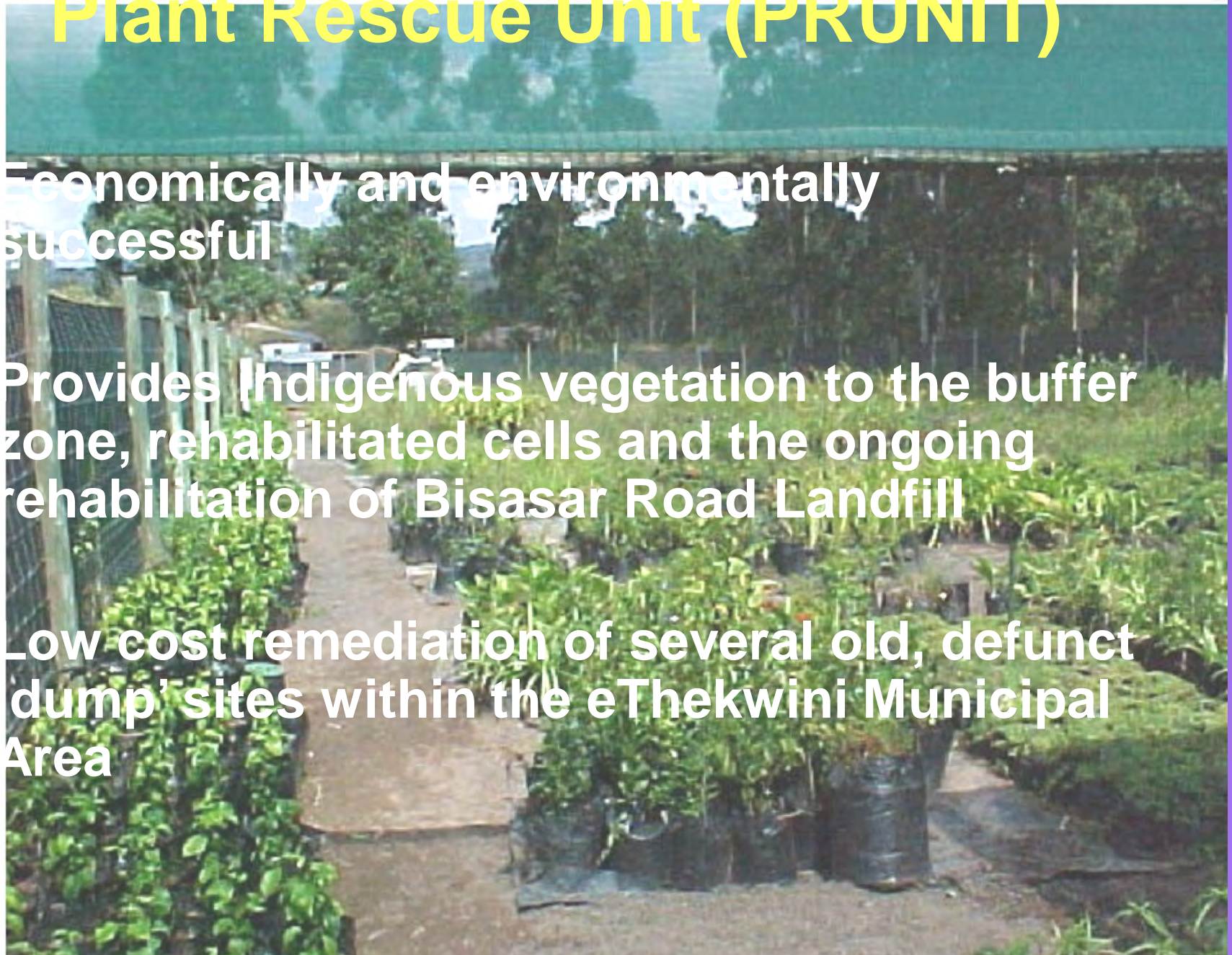
- Is a recognised conservancy
- Provides an educational base to schools
- Leachate is treated in a sequencing batch reactor and used for dust suppression and irrigation
- Vegetation in areas demarcated for landfill is rescued and re-used once cells are completed
- LFG to electricity

# Plant Rescue Unit (PRUNIT)

Economically and environmentally successful

Provides Indigenous vegetation to the buffer zone, rehabilitated cells and the ongoing rehabilitation of Bisasar Road Landfill

Low cost remediation of several old, defunct 'dump' sites within the eThekweni Municipal Area













# MANAGEMENT TOOLS

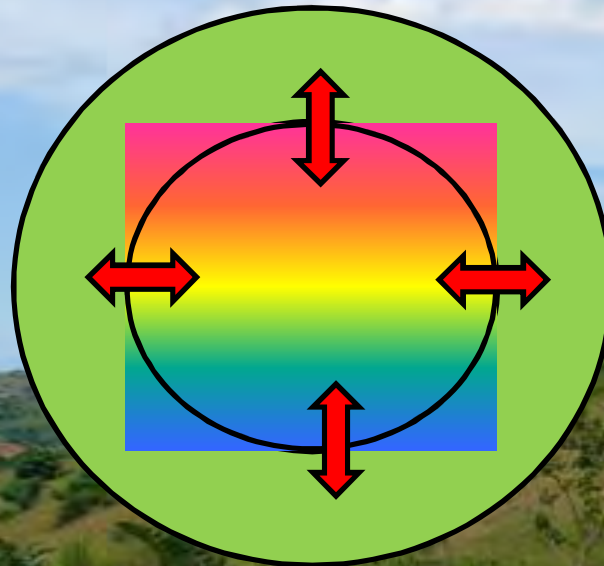
Wind Breaks for Wind Scatter





# MANAGEMENT TOOLS

## Closure Rehabilitation



# ENVIRONMENTAL ASSET CONCEPTS

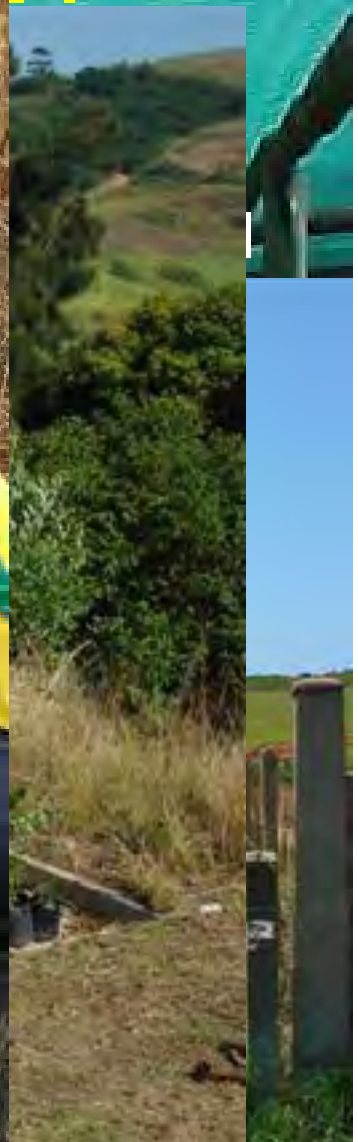


# ENVIRONMENTAL ASSET



ENVIRON

ET



# ENVIRONMENTAL ASSET CONCEPTS

Topsoil













# Landfill Gas

**GREENING DURBAN 2010**

**BUFFELSDRAAI LANDFILL SITE  
Community Reforestation Project**

In working towards a Climate Neutral 2010 FIFA World Cup™ in Durban - and as part of the Municipal Climate Protection Programme - the eThekweni Municipality, in partnership with Durban Solid Waste, Wildlands Conservation Trust and local communities, is re-establishing indigenous forest in the buffer area of the Buffelsdraai Landfill Site. The trees will capture and store several thousand tonnes of carbon dioxide, thereby helping to minimise the impact of climate change. Local community members are involved in growing the indigenous trees, and in planting and maintaining them for the project.

The project has been funded by DANIDA.

**DURBAN** **DMOSS** **DSW** **WILDLANDS**







# Reforestation / Tree Preneur







**ANY QUESTIONS?**

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**[www.landfillconservancies.com](http://www.landfillconservancies.com)**