

Improved Landfill Management

Landfill Environment and Monitoring

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Dust

- Cover excavation and haulage
- Landfill operations
- Exposed daily cover, crushing, stockpiles
- Roads, external and internal
- Sealed roads, spray seals, recycled C&D waste
- Dust suppression, polymer (Gorilla-Snot®)
- Water bowser
- Dry weather, wind speed and direction

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Dust control

- Dust from vehicles tracking on dry roads



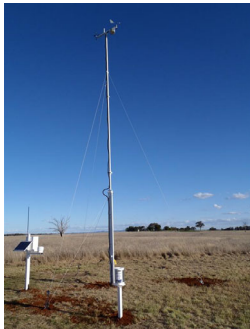
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Dust suppression on haul road



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Landfill weather station



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Litter

- Waste characteristics
- Landfill design and operation
- Windbreaks
- Compaction of waste, placement of cover
- Litter fencing - permanent and temporary
- Boundary fences
- Litter patrols, Litter Critter vacuum
- Birds
- Approach roads, public signage – cover your load
- Wind speed and direction

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Odours

- Waste characteristics
- Proportion of putrescible/organic waste
- Cover
- Weather conditions, wind direction
- Turbulence
- Leachate ponds
- Odour suppressants
- Some areas with landfills that have ongoing odour issues – community concern

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Birds

- Waste composition
- Cover practices
- Litter
- Bird borne disease
- Bird strike aeroplanes, nearby airfields, EPA buffer requirements
- Migratory birds to landfills identified as factor in spread on antibiotic resistance
- Gas powered guns to frighten off birds

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Scavenging birds at tip face



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Birds on landfill



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Other animal issues

- Waste composition
- Cover practices
- Rodents
- Foxes
- Feral pigs
- Kangaroos, damage to liners, covers
- Insects – impact on visitors and staff

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Rainfall

- Stormwater generation
- Erosion and sediment control
- Detention pond capacity
- Stormwater discharge quality, flocculation
- Leachate generation
- Keeping clean and dirty water separate
- Use clean water for dust suppression, wheel wash and rehabilitation
- Leachate dam capacity
- Tanker removal
- Mud carried offsite by vehicles

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Pressure washing truck tyres prevents tracking dirt off-site



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Wheel wash

- Bowral landfill, NSW



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Weather station

- Needs to be operational
- Needs to be accessible
- Data needs to be available
- Monitor current and impending weather daily
- Staff, operators need to be responsive
- Record
 - Wind speed and direction
 - Rainfall
 - Temperature

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Landfill weather station



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Weighbridge and weather station, Tamworth landfill, NSW



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Leachate monitoring

- Quantity
- Quality
- Leachate level in cells
- Hydrostatic head on liner
- Watch for leachate seeps
- Watch for leachate contamination of “clean” stormwater
- Keep “clean” and “dirty water separate
- Monitor moisture conditions and temperature in waste as indicator of landfill gas generation and potential for spontaneous combustion

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Groundwater monitoring



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Groundwater monitoring

- Background levels measured up gradient
- Downgradient monitoring for a range of parameters and at frequency determined by licence
- Contaminated groundwater difficult to remediate and takes a long time
- May need to do water balance calculations to manage water releases

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Store and release cover monitoring



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Surface water monitoring

- Levels in stormwater and leachate ponds
- Manage releases to landfill if recirculating leachate or bioreactor landfill
- Monitor temperature (thermocouple – robust, thermistor – more accurate) and moisture conditions in cells

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Stormwater pond (water tested pre-release) – flocculation sometimes required



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Landfill gas monitoring

- Observe effects on cover vegetation, especially if cover shows signs of cracking in dry weather
- Portable/hand held gas analyser
- Monitoring bores
- Temperature monitoring
- Identify hot spots
- Spontaneous combustion is the cause of many landfill fires



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Long term monitoring

- May be required long after closure
- Monitor settlement (GPS, survey, drone survey)

