



EASTEN CREEK WASTE PROJECT
REVISED MAY 2017

ENVIRONMENTAL MANAGEMENT STRATEGY (EMS)

GREEN WASTE MANAGEMENT PLAN

Former QUARRY SITE AT OLD WALLGROVE ROAD EASTERN CREEK
MATERIALS PROCESSING CENTRE (MPC)
WASTE TRANSFER FACILITY associated with an adjacent
PROPOSED SOLID WASTE LANDFILL
Document Control

For controlled copies of this EMS the copy number is shown below and initialled in Red by Dial A Dump Industries and the ThaQuarry Unit Trust Project Manager.



REVISION HISTORY

Version	Date	Reasons for Change	Prepared By	Authorised by
1	June 2011	Initial commission	Legal	Group General Counsel
2	April 2012	Review	Legal	Group General Counsel
3	February 2013	Review	Legal	Group General Counsel
4	April 2014	Review	Legal	Group General Counsel
5	June 2015	Review	Legal	Group General Counsel
6	April 2016	Review	Legal	Group General Counsel
7	May 2017	Review	Legal	Group General Counsel



GREEN WASTE MANAGEMENT

CRITERIA

The relevant criterion is set out in Schedule 3 Conditions 30 and 31 within Development Consent MP 06_0239 dated 22 November 2009.

Condition 30 states as follows:

The Proponent shall not cause or permit the emission of offensive odours from the site, as defined under Section 129 of the POEO Act.

Condition 31 states as follows:

If the Independent Environmental Audit (see Condition 7 of Schedule 5) recommends that the green waste area (see plan Appendix 1) be enclosed to reduce the odour impacts of the project, then the Proponent shall enclose the area to the satisfaction of the Director-General within the timeframe specified by the Director-General.

ACHIEVEMENT OF REQUIREMENTS

Table 1.1 lists the consent conditions under Condition 30; provides a summary of the current compliance status and provides recommendations to achieve compliance and to improve the presentation of the program.

Table 1.1 Consent Conditions (Condition 30 of Schedule 3)

CONSENT REQUIREMENTS	COMPLIANCE STATUS
<i>The Proponent shall not cause or permit the emission of offensive odours from the site, as defined under Section 129 of the POEO Act</i>	Complies Refer this Management Plan



Table 1.2 lists the consent conditions under Condition 31; provides a summary of the current compliance status and provides recommendations to achieve compliance and to improve the presentation of the program.

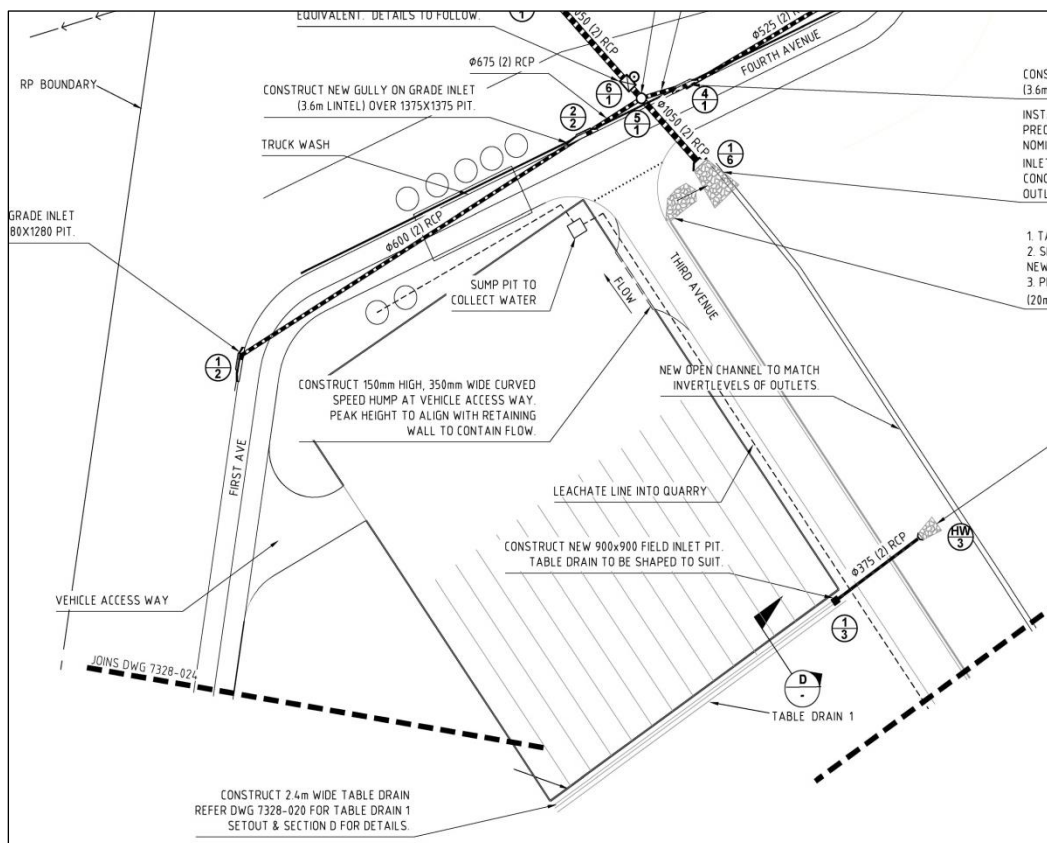
Table 1.2 Consent Conditions (Condition 31 of Schedule 3)

CONSENT REQUIREMENTS	COMPLIANCE STATUS
<p><i>If the Independent Environmental Audit (see Condition 7 of Schedule 5) recommends that the green waste area (see plan Appendix 1) be enclosed to reduce the odour impacts of the project, then the Proponent shall enclose the area to the satisfaction of the Director-General within the timeframe specified by the Director-General</i></p>	<p>Potential future requirement</p>

GREENWASTE MANAGEMENT

On arrival at the weighbridge, loads of greenwaste will be directed to the greenwaste area.

Incoming materials will be supervised at time of tipping to facilitate removal of contaminating or non biodegradable materials and also materials which bio-degrade at a slower pace and may thereby inhibit the overall process.



Engineered wood products (eg MDF) and preservative-treated and coated wood residues [eg Copper Chrome Arsenate treated timbers], each as defined in the Raw Mulch Exemption 2008, will also be removed at this stage.

Contaminant materials will be deposited into a receptacle for later disposal as general waste.



Larger items, logs or tree stumps will be removed at this stage to a separate location within the green waste area, and separately shredded to form woodchip.

Greenwaste material will then be shredded and deposited in windrows to undergo the decomposition process.

Up to 20,000t of green waste may be stockpiled on site at any one time.

Stockpiles of timber or unprocessed green waste will not be constructed more than 2.5 metres in height above or the height of the protective surrounding walls.

When greenwaste or wood waste is chipped or shredded, the following procedure should be followed:

- Every morning, each windrow should be tested with a temperature probe and the results recorded;
- The probe should be inserted its full length, in the middle and top of the pile, at a minimum of 6 locations;
- If any temperature readings exceed 70 degrees, the Landfill Manager is to be advised immediately. The windrow must then be turned to reduce the heat, and when re-stacked, the windrow should not exceed 1.5 metres high. The aeration pipes should be cleaned, and any maintenance required on them should be performed, before the windrow is re-stacked.

At the expiration of the biological process then the stockpile may be assessed and tested by reference to the Waste Classification Guidelines and the Raw Mulch General Exemption 2008.

Depending on the classification, the processed material stockpile may be disposed of by sale or by landfilling.

Water which contacts green waste (either in its processed or unprocessed state) is classifiable as leachate and must be dealt with accordingly by transfer to the leachate re-use treatment system (see below).



LEACHATE

Leachate generation in areas of greenwaste stockpiles is expected to be minimal. Leachate which is generated in these areas will be captured within a concreted and bunded area. The concrete platform will slope to a sump, from which the leachate will be either recirculated or pumped to poly tanks. It is proposed that the leachate shall be reused within the bunded area in a re-circulating system to encourage organic degradation and to minimise dust.

All water in the greenwaste area will flow towards a sump, in which will be positioned an electronically operated submersible pump, operated automatically by float switch. At a predetermined sump level the pump will operate to recirculate the water to the stockpile at the farthest end of the system, or to one of two 50kL poly tank reservoirs.

Increases in leachate volume which cannot be usefully utilised or stored in the poly tank will be treated for removal to the sewer. Excess leachate will be piped from the poly tank to the leachate sump at the base of the quarry, which is in turn pumped to the leachate treatment system. It is expected that this volume will be maximum of 10m³ per day..

STOCKPILE BAYS - CONFIGURATION AND CONSTRUCTION

Stockpile bays should be rectangular in design and generally in the configuration shown in the plan on page 4. On the eastern wall of the greenwaste management area there will be a cored hole foreach of the green waste bays in the external concrete wall to facilitate the introduction of the aeration pipe.

The Proponent proposes the use of a product referred to as BioMagic, which acts as an oxidising agent to speed up the bacteria consumption of waste in order to reduce or eliminate odours.



Covering of Windrows

Each windrow of shredded material will be covered end to end with suitable material to minimise the inflow of water and the release of odour to atmosphere.

The covering will remain in situ until the biodegradation process is complete.

After a resting period of eight weeks the product will be tested and available for sale or alternatively be blended, tested and available for sale.

It was assumed that the total area of the green waste windrows occupies no more than 5,000m². Green waste windrows were modelled as area sources using CALPUFF (Version 6.113). Odour emissions in the dispersion model were multiplied by the recommended near-field peak-to-mean ratios for different source types to predict odour levels for nose response times.

Odour from the green waste windrows have been estimated to be a significant proportion (22 percent) of the total odour emissions from the site; with green waste composting contributing approximately 1,200 ou.m³/s out of a total 5,907 ou.m³/s in neutral conditions and 1,300 ou.m³/s out of a total 5,435 ou.m³/s in stable conditions.

Material used for covering may be a gore-tex type fabric or simply the previous batch of compost or mulch prepared in the same area. The covering affords other benefits:

- Covering protects the composting organics from losing too much valuable heat and moisture.
- Covering makes it more difficult for vermin and vectors to get to the raw organics.
- Covering reduces fly propagation and rodent attraction.
- Covering □ controls and minimises the risk of fire.
- Covering minimises emission of biogas, and



- Covering also decreases litter generation.

Reducing Water infiltration

Covering prevents the compost from getting too wet in the event of rainfall. When covered, the weather has less influence on the composting process, which means there will be better moisture control.

This ability to control the moisture content means an aerobic composting environment can be more easily maintained. As well as this, the covers limit run-on and infiltration of water, meaning there is less potential for odorous leachate to be formed as rainfall is kept out of the composting material.

Whilst moisture is necessary for active decomposition, if too much moisture is present then water occupies the pore-spaces in the composting material, reducing the ability for oxygen to disperse throughout the compost.

Mixing and Turning to be avoided during unfavourable weather conditions.

Activities that result in peak odour events (such as mixing, turning, aeration, screening, etc) should be avoided during unfavourable dispersion conditions such as calm/low wind speeds and stable atmospheric conditions.

Process controls, including recommended pH, temperature, C:N ratio, etc, should be obtained from appropriate best practice guidance including:

- AS 4454 – 2003: Composts, Soil Conditioners and Mulches (**Standards Australia 2003**);
- NSW DECCW Environmental Guidelines for Composting & Related Organics Processing Facilities (**DEC, 2004**); and
- General best practice guidelines for composting (**Sustainability Victoria 2009** and **WMAA, 2004**).



Aeration Equipment to be used during the active phase

The use of aeration equipment in any composting situation is recommended, to prevent formation of anaerobic conditions. The primary effect of aeration on the formation of odorous compounds is related to its impact on oxygen concentration. Oxygen concentration determines the biochemical process at work (anaerobic vs aerobic) and the compounds that form as a result.

Odorous compounds that are a problem essentially only in anaerobic conditions include hydrogen sulfide and organic sulfides. Without oxygen, odorous compounds form and accumulate more readily and to a greater extent, increasing the intensity, unpleasantness and duration of the odours. Maintaining aerobic conditions can greatly reduce odour emissions.

In order to facilitate and expedite the biodegradation process, blown air will be introduced to the base of each windrow of shredded material via perforated HDPE or steel pipes. One pipe will be located per bay/windrow.

The introduction of air converts a potentially anaerobic process into an aerobic process and consequently reduces the incidence of foul odours.

At the end of the composting/biodegradation process the cover will be removed and pipe will be withdrawn from each windrow to enable free access of plant and machinery for loading out and transportation.

Pipes will be cleaned and maintenance performed at the end of each biodegradation cycle, when the pipes are removed from each windrow. Additional cleaning and maintenance of pipes will be performed if the temperature of the windrows are found to be above 70 degrees, and also if offensive odours are detected.



TESTING PROTOCOLS

The manufactured soil created by the abovementioned process shall require testing before it may be re-used. The material requires testing for two aspects.

- a) to assess the material classification the DECCW Waste Classification Guidelines and the Raw Mulch Exemption and
- b) to assess the material for marketing classification purposes in accordance with the Australian Standards AS 4419 (soils) or the appropriate DECCW Standard whichever is appropriate.

The testing requirements of AS 4419 have been constructed by reference to the requirement for soil as a growing medium. The criteria which AS 4419 applies includes:

- Bulk density
- Organic matter content %
- Wettability
- pH
- EC (Electrical conductivity)
- Ammonium
- Toxicity
- NDI (Nitrogen Drawdown)
- Permeability (Hydraulic Conductivity), and

Large Particles.

ODOUR (Benchmark Table BM 36)

The operator will take steps to reduce odour by ensuring that offensive and odorous wastes are not accepted at the MPC, or if accepted are disposed and covered as quickly as possible.

Odour monitoring will be undertaken on a daily basis by the Site Manager and the designated Site Environmental Officer.



If the Site Manager or the Site Environmental Officer detect odours or if complaints are received from the public regarding offensive odours arising from the Waste Management Facility remediation action must be taken.

Remediation Actions,

Odorous wastes disposed of the Landfill will be treated with lime and rapidly covered with other waste and daily cover material to reduce odour emission. Extremely odorous wastes must be rejected at the gatehouse, but if arriving at the MPC building will be advised to the gatehouse and instructions on disposal or rejection awaited.

An odorous point source found to have its origin within a greenwaste stockpile must be located and removed for disposal appropriate to the waste classification.

Stockpiles must be kept covered during any biodegradation process.

Stockpiles must not be permitted to biodegrade in an anaerobic condition.

Normally if the waste does not contravene any of the other unacceptable wastes categories it will be disposed rapidly and immediately covered.

Wastes will be covered with 150 mm of daily cover, alternative daily cover (including sealed container bases) at the end of each daily shift or in the case of odorous or offensive wastes immediately following disposal at the tipping face.

Wastes will be continuously compacted throughout the days tipping operations to prevent odour or access by vermin.

EMISSIONS OF POLLUTANTS TO ATMOSPHERE (Benchmark Tables BM 15-19) GREENHOUSE GAS EMISSIONS GREENWASTE ARE A (Benchmark Table BM 17)

Decomposition of green waste in windrows at the greenwaste area is expected to be minimal.



Testing in and around stockpiles will be as follows:

- Greenwaste stockpiles will be constructed as described above.
- Leachate collection sumps will collect run off leachate and re-circulate it for re-use to aid the biodegradation and dust control (in respect of processed woodchip and greenwaste).
- Wood waste stockpiles both processed and unprocessed will be limited in size individually to <2,000 tonnes each.
- Stockpiles should not be anaerobic under normal circumstances, but will be tested quarterly at 2 metre intervals along their surfaces for the presence of CH₄.