

Victorian Landfill BPEM Comparison Table - Appendices

Item	BPEM Requirement	Comment
C	Appendix C – Summary of Objectives and Required Outcomes	
C5	Best Practice Siting Considerations	
C5.1	Screening for Potential Sites	
	<p>Relevant BPEM objective <i>To identify and rank those sites that require the fewest engineering and management controls to meet the objectives of all State environment protection policies.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Future landfilling sites must be listed in the landfill schedule in the regional waste management plan. • Develop landfill sites in the sequence specified in the relevant regional waste management plan. • Ensure that the landfill is sited to protect groundwater, surface waters, and flora and fauna. • Ensure that sufficient buffer is available for the life of the landfill and for a minimum of 30 years following closure of the site. • Provide buffers in accordance with Table 5.2 and Table 8.2; where these are unavailable, demonstrate that risks are mitigated to the same standard. • Consider the most appropriate landfilling type to meet the requirements imposed by local conditions. • All new landfills must deposit waste at least two metres above the long-term undisturbed depth to groundwater, unless the operator satisfies EPA Victoria that sufficient additional design and management practices will be implemented and EPA determines that regional circumstances exist that warrant the new landfill. 	Regional Waste Management Plan (RWMP) is a Victorian document. Not relevant in WA.
C6	Best Practise Design	
C6.1	Environmental Assessment	
	<p>Relevant BPEM objective <i>To gain a thorough understanding of the environment where the landfill is to be sited in order to design the landfill to minimise impacts on the environment.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Assess metrological data. • Conduct a hydrogeological assessment to assess the potential for 	Covered in the Works Approval supporting documentation.

	<p>impacts on local groundwater quality.</p> <ul style="list-style-type: none"> • Investigate water management requirements. • Investigate landfill gas and odour control options. 	
C6.2	Site Layout	
	<p>Relevant BPEM objective <i>To ensure that the site layout minimises environmental and health and safety risks, encourages recycling and makes the most efficient use of onsite resources.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Site layout and filling sequence planned to ensure that landfill cells are open for the shortest period of time and site operations are optimised. • Minimisation of public access to the tipping face and, where appropriate, assurance that waste received at the landfill can be vetted and recycled. 	Covered in the Works Approval supporting documentation.
C6.3	Liner and Leachate Collection System	
	<p>Relevant BPEM objective <i>To maintain groundwater quality as close as practicable to background levels.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Design and construction of the best liner and leachate collection system practicable to prevent contamination of groundwater. • Design and construct the landfill liner such that the appropriate maximum seepage rate shown in Table 6.1 is not exceeded. • Implementation of the best practicable measures to meet all groundwater quality objectives contained in SEPP (Groundwaters of Victoria) below the landfill liner. • Where an attenuation zone has been designated, assurance that all groundwater quality objectives contained in SEPP (Groundwaters of Victoria) are met at the boundaries of the premises. • Geotechnically stable sub-base and liner. • Design and construction of the most robust liner and leachate collection system to ensure that the system will continue to achieve the objective in the event of several components of the system failing. • Maximum head of leachate on the liner surface not to exceed 0.3 metres. • Drainage layer to be at least 0.3 metres thick with a hydraulic conductivity of not less than 1×10^{-3} m/s. • Drainage layer extending over the entire base of the landfill. • Geomembrane liner must meet the minimum requirements 	Covered in the Works Approval supporting documentation.

	<p>specified in section 3 of Appendix D.</p> <ul style="list-style-type: none"> • Geosynthetic clay liner must meet the minimum requirements specified in section 3 of Appendix E. • Geotextile cushion layer must meet the minimum requirements specified in section 3 of Appendix F. • A geotextile filter layer must be placed between drainage layer and waste 	
C6.4	Construction Quality Assurance	
	<p>Relevant BPEM objective <i>To ensure that materials, construction methods and installation procedures deliver a landfill meeting design criteria.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Development and implementation of a Construction Quality Assurance (CQA) plan to ensure that the liner and leachate collection system meets the requirements of the specifications and drawings. • A statement from an accredited testing authority be obtained stating that the installed liner and leachate collection system meet the requirements of the specification and drawings. • Development and implementation of a CQA plan to ensure that the stability of sub-base and liner are achieved. • The installation of geomembranes must meet the requirements of section 5 of Appendix D. • The CQA plan for geomembranes must address the issues raised in section 6 of Appendix D and should follow the suggestions unless an alternative provides an equivalent or better outcome. • The installation of geosynthetic clay liners must meet the requirements of section 5 of Appendix E. • The CQA plan for geosynthetic clay liners must address the issues raised in Section 6 of Appendix E and should follow the suggestions unless an alternative provides an equivalent or better outcome. • The installation of geotextiles must meet the requirements of section 4 of Appendix F. • The CQA plan for geotextiles must address the issues raised in section 5 of Appendix F and should follow the suggestions unless an alternative provides an equivalent or better outcome. 	Covered in the Works Approval supporting documentation.
C6.5	Water Management	
	<p>Relevant BPEM objectives <i>To protect beneficial uses of receiving waters and to avoid any adverse environmental impact on surface and ground waters.</i></p> <p>Required outcomes of the BPEM</p>	Covered in the Works Approval supporting documentation.

	<ul style="list-style-type: none"> • Segregation of stormwater, leachate and groundwater. • Wherever practical, reuse of water onsite. • Management and treatment of leachate to: <ul style="list-style-type: none"> • Prevent it from escaping into surface waters or groundwater. • Prevent offensive odours offsite. • Minimise human contact with the leachate. • Assurance that waste discharges to surface waterways are minimised and do not cause water quality objectives to be breached. 	
C6.6	Groundwater Management	
	<p>Relevant BPEM objective <i>To protect the beneficial uses of groundwater and to minimise the risk posed by the landfill to those beneficial uses.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Implement a groundwater monitoring program in accordance with <i>Landfill licensing guidelines</i> (EPA publication 1323). • Ensure that the landfill liner cannot be damaged through groundwater pressure. • Minimise risk to groundwater by siting landfill in accordance with section 6.2 (site layout) and utilising a liner and leachate collection system in accordance with section 6.3 (liner and leachate collection system). 	Covered in the Works Approval supporting documentation.
C6.7.1	Landfill Gas	
	<p>Relevant BPEM objective <i>Ensure that no safety or environmental impacts are caused by landfill gas.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Undertake a site-specific landfill gas risk assessment. • All practicable measures must be taken to achieve the landfill gas action levels detailed in Table 6.4. • Develop and implement an appropriate landfill gas management system. • Implement a landfill gas monitoring program in accordance with the <i>Landfill licensing guidelines</i>, EPA publication 1323. • Implement a landfill gas remediation action plan acceptable to EPA if the action Levels in Table 6.4 are exceeded. • The landfill gas management system is updated and is in compliance with the landfill gas management hierarchy. • Notify EPA Victoria within 24 hours of detection of any exceedance of the action levels detailed in Table 6.4, except for onsite exceedance rectified within 24 hours. 	Covered in the Works Approval supporting documentation.

	<ul style="list-style-type: none"> The landfill gas flares must have auto ignition and flame arrestor beneath the combustion zone. 	
C6.7.2- C6.7.4	Odour, Dust and Air Toxics	
	<p>Relevant BPEM objective <i>To ensure that air quality objectives are met, and that there is no loss of amenity from odour or dust.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> Prevention of any offensive odours beyond the boundary of the premises. Control all dust emissions from the landfill site. 	Covered in the Works Approval supporting documentation.
C6.8	Bioreactor Landfills	
	<p>Relevant BPEM objective <i>To maximise the rate of degradation of biodegradable wastes and achieve the same or better levels of environmental protection as a conventional landfill</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> Protection of liners from higher temperatures that will develop in the waste mass. Install landfill gas collection systems progressively, and the final system is in place no later than two years after placement of waste in any cell or sub-cell. Design and use of monitoring systems for moisture control, gas generation and temperature. Avoidance of the creation of low-permeability barriers within waste mass. An accredited management system that provides a high level of assurance that construction and operational performance will be consistent with or better than that required of a conventional landfill. 	No applicable – facility is not considered a bioreactor landfill.
C6.9	Noise	
	<p>Relevant BPEM objective <i>To ensure that policy and guideline noise requirements are achieved and that there is no loss of amenity from noise from the landfill site.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> In the Melbourne metropolitan area, compliance with the noise limits prescribed by SEPP (Control of Noise from Commerce, Industry and Trade) No. N-1 1989. Outside the Melbourne metropolitan area, compliance with noise guidelines issued by EPA. 	<p>The WA equivalent is the <i>Environmental Protection (Noise) Regulations 1997</i>.</p> <p>Covered in the Works Approval supporting documentation.</p>
C6.10	Traffic Considerations	

	<p>Relevant BPEM objectives <i>To minimise nuisance from traffic movement.</i></p> <p>Required outcomes of the BPEM Minimisation of safety concerns, noise and road grime on external roads.</p>	Covered in the Works Approval supporting documentation.
C6.11	Site Security and Fencing	
	<p>Relevant BPEM objective <i>To prevent the unauthorised entry of people or livestock.</i></p> <p>Required outcomes of the BPEM Design fencing to minimise unauthorised access to the site.</p>	Covered in the Works Approval supporting documentation.
C7	Best Practise Operation	
C7.1	Environmental Management	
	<p>Relevant BPEM objective <i>Protect the environment by managing environmental risks.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Ensure that a site specific environmental management procedure is in place to manage key risks and provide for contingencies. • Training of all relevant staff in the implementation of the site's environmental management procedure. 	Covered in the Works Approval supporting documentation.
C7.2	Financial Assurance	
	<p>Relevant BPEM objective <i>To provide a financial assurance for environmental management costs incurred during the operation, closure and aftercare of a landfill.</i></p> <p>Required outcomes of the BPEM All licensed landfill operators are to maintain a financial assurance acceptable to EPA.</p>	<p>The WA EPA has the ability to impose a financial assurance on a project if it is deemed that there is significant public risk associated with the development. The requirement for a financial assurance is not a mandatory requirement in WA.</p> <p>The SAT determination included a condition for Opal Vale to lodge a cash bond (\$120,000) with the Shire to act as a performance guarantee against the satisfactory completion of the rehabilitation of the site.</p>
C7.3	Waste Minimisation	
	<p>Relevant BPEM objective <i>To divert suitable wastes from landfill.</i></p> <p>Required outcomes of the BPEM Removal of recyclable materials from the waste stream, where feasible.</p>	Covered in the Works Approval supporting documentation.
C7.4	Waste Acceptance	
	<p>Relevant BPEM objective <i>To ensure that only allowed wastes are deposited at the landfill.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Landfill operator to ensure that non-conforming waste is not disposed of at the landfill site. • Provide signs advising the types of wastes allowed at the site. • Implement a procedure to deal with the dumping of non-conforming 	Covered in the Works Approval supporting documentation.

	waste at the landfill site.	
C7.5	Waste Pre-Treatment	
	<p>Relevant BPEM objective <i>To reduce the long-term risk posed by the waste and to improve general landfill performance.</i></p> <p>No required outcomes</p>	Covered in the Works Approval supporting documentation.
C7.6	Waste Placement	
	<p>Relevant BPEM objectives <i>To place waste in a manner that is mechanically stable, controls litter and birds and that maximises the degree of compaction.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Maintenance of an active tipping area that is as small as possible. • Compaction of all waste deposited in the landfill. • Assurance that waste is placed so that all unconfined faces are mechanically stable and capable of retaining cover material. 	Covered in the Works Approval supporting documentation.
C7.7	Waste Cover	
	<p>Relevant BPEM objective <i>To ensure that wastes are covered appropriately, to mitigate against any environmental or health impacts.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Covering of the waste, at least daily, with soil or another approved cover material for all sites that accept putrescible waste and maintain the cover. • Close cracks in old, exposed cover layers to contain landfill gas and odour. • No use of acid sulfate soil as daily cover. 	Covered in the Works Approval supporting documentation.
C7.8	Litter Control	
	<p>Relevant BPEM objective <i>To keep the landfill and surrounding environment in a litter-free condition.</i></p> <p>Required outcomes of the BPEM That no litter from the landfill operations reaches beyond the boundary of the premises.</p>	Covered in the Works Approval supporting documentation.
C7.9	Fires	
	<p>Relevant BPEM objectives <i>To prevent landfill fires and efficiently extinguish any that should occur.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Maintenance of a water supply capable of being delivered to any point on the landfill. • No fires must be lit at the landfill or near areas where wastes have been or are being deposited. 	Covered in the Works Approval supporting documentation.

	<ul style="list-style-type: none"> That all practical steps have been taken to prevent landfill fires. 	
C7.10	Contingency Planning	
	<p>Relevant BPEM objectives <i>To ensure that all potential incidents are considered and that appropriate measures are planned to deal with them.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> A contingency plan is in place. All likely impacts are covered in the preparation of the contingency plan. All staff are trained in the implementation of the contingency plan. 	Covered in the Works Approval supporting documentation.
C7.11	Management of Chemicals and Fuels	
	<p>Relevant BPEM Objective <i>To manage the storage and handling of chemicals and fuels so as to minimise the risk of impact on the environment.</i></p> <p>Required outcomes of the BPEM Storage and handling flammable and combustible liquids in accordance with the provisions of the AS 1940–2004 ‘The storage and handling of flammable and combustible liquids’.</p>	<p>WA equivalent is <i>Code of Practise for the Storage and Handling of Dangerous Goods.</i></p> <p>Covered in the Works Approval supporting documentation.</p>
C7.12	Disease Vector Control	
	<p>Relevant BPEM objective <i>To minimise disease vectors emanating from the landfill by denying pests food and shelter.</i></p> <p>Required outcome of the BPEM Cover waste daily.</p>	Covered in the Works Approval supporting documentation.
C7.13	Noxious Weed Control	
	<p>Relevant BPEM objective <i>To manage the landfill site so that it does not become a source of noxious weeds.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> Minimise the introduction of noxious weeds to the site. Eradicate any noxious weeds that have established themselves onsite. 	Covered in the Works Approval supporting documentation.
C7.14	Performance Monitoring and Reporting	
	<p>Relevant BPEM objective <i>To monitor and report on the performance of measures taken to protect the environment from potential impacts from a landfill and to identify and address any arising environmental issues.</i></p> <p>Required outcomes of the BPEM</p>	These aspects will be covered by standard licence conditions and will subsequently become operational activities.

	<ul style="list-style-type: none"> • Preparation of a verified monitoring program in accordance with <i>Landfill licensing guidelines</i> (EPA publication 1323). • Monitoring of the environment in accordance with the verified monitoring program. • Submission of an annual performance statement. 	
C8	Best Practice Rehabilitation and Aftercare	
C8.1	Rehabilitation	
	<p>Relevant BPEM objective <i>To ensure that landfills are rehabilitated to minimise the seepage of water into the landfill and maximise the collection and oxidation of landfill gas from the landfill.</i></p> <p>Required outcomes of the BPEM</p> <ul style="list-style-type: none"> • Preparation, early in its design, of a rehabilitation plan for the landfill, including a detailed consideration of afteruse options for the site. • That the seepage through the landfill cap is no more than 75 per cent of the anticipated seepage rate through a basal liner that meets best-practice requirements. • Design and construction of the best cap practicable to prevent pollution of groundwater and degradation of air quality. • Design and construction of the most robust cap to ensure that the system will continue to protect the environment in the event of several components of the system failing. • Progressive rehabilitation of the landfill. • Geomembranes to be used in landfill cover systems must meet the requirements specified in section 4 of Appendix D. • Installation of geomembranes in the landfill cover systems must meet the requirements specified in section 5 of Appendix D. • The CQA plan for geomembranes must address the issues raised in section 6 of Appendix D and should follow the suggestions unless an alternative provides an equivalent or better outcome. • Geosynthetic clay liners to be used in landfill cover systems must meet the requirements specified in section 4 of Appendix E. • Installation of geosynthetic clay liners to be used in landfill cover systems must meet the requirements specified in section 5 of Appendix E. • The CQA plan for geosynthetic clay liners must address the issues raised in Section 6 of Appendix E and should follow the suggestions unless an alternative provides an equivalent or better outcome. • The minimum thickness of a phytocap soil layer must be 1.5 m. 	Covered in the Works Approval supporting documentation.

	<ul style="list-style-type: none"> • A phytocap design must include a monitoring and maintenance program to ensure integrity of the cap and for the survival of plants. • Design of phytocaps for a Type 2 landfill requires the use of lysimeter field trials or other approved trial. • The site occupier must ensure that the landfill aftercare management plan is implemented until an Environmental Audit demonstrates that the site no longer poses a risk to the environment or for at least 30 years after the site stopped receiving waste. 	
C8.2	Aftercare Management	
	<p>Relevant BPEM objective <i>To manage the site after closure so that environmental protection and monitoring systems are maintained until the landfill has stabilised.</i></p> <p>Required outcome of the BPEM</p> <ul style="list-style-type: none"> • Preparation of a landfill aftercare management plan. • No building or structures on the site of the landfill cells without an assessment of potential risks and appropriate risk mitigation measures incorporated into the design and construction of those buildings and structures. • Provide buffers in accordance with Table 8.2, where these are unavailable demonstrate that risks are mitigated to the same standard. 	Covered in the Works Approval supporting documentation.