



APPENDIX A

Needs Assessment



Needs Assessment

Melbourne Regional Landfill

Prepared for
Landfill Operations Pty Ltd

Prepared by
Tonkin & Taylor Pty Ltd

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1 Introduction

1.1 Background

Landfill Operations Pty Ltd [Landfill Ops] (a wholly owned subsidiary of Cleanaway Waste Management Pty Ltd (Cleanaway)) owns and operates the Melbourne Regional Landfill (MRL) located at 1154-1198 Christies Road, Ravenhall. The MRL was previously owned and operated by Boral Waste Solutions (BWS) and was purchased by Landfill Ops in early 2015.

Tonkin & Taylor Pty Ltd (T+T) has been engaged by Landfill Ops under the instruction of Norton Rose Fulbright (NRF) to assess the need to develop additional landfill airspace¹ at the MRL. This airspace is necessary for MRL to be able to continue its operations and service the future waste needs of the metropolitan Melbourne area.

The MRL is a putrescible waste² (Type 2³) landfill which started accepting waste in 1999, filling void space created by quarrying activities which commenced in 1968, and which are ongoing. The quarry operation is still owned and operated by Boral Quarries. Currently the landfill accepts a significant portion of metropolitan Melbourne's domestic and commercial wastes, collected mainly from the western and central municipal areas.

The MRL has some 7-10 years of capacity left under its current Licence and Landfill Ops is applying for a new planning permit for the future use and extension of the MRL. Landfill Ops also proposes to apply under the Environment Protection Act 1970 (the Act) to the Victoria Environment Protection Authority (EPA) for Works Approval.

A planning application to expand the landfill was made by BWS in July 2013 to Melton City Council. However, the application was rejected. One of the grounds for refusal was:

"There is no demonstrable need at this time, or within a relevant planning horizon, to amend the existing permit to expand the landfill operations across the whole site."

As described in this report, the provision of future landfill capacity to meet the needs of metropolitan Melbourne underpins an essential public service, which in the future is demonstrably reliant to a significant extent on the availability of landfill capacity at the MRL. The 7-10 years of remaining licenced capacity at MRL is a relatively brief time-span in landfill terms, with such facilities often planned and developed for periods of 30 to 50 years or more, in order to underpin their commercial viability and provide reasonable whole of life economics.

Applying now, approximately 10 years before the MRL would otherwise need to close, is appropriate in the context of the governing waste planning hierarchy for metropolitan Melbourne as it allows adequate time to for:

- The Licensing process;
- Detailed planning, design and construction of the expansion;
- Integration of plans for the facility [which is of state-wide significance] within other land use development planning for the area; and
- Pre-planning of quarry void development by the quarry operator.

¹ Landfill airspace is a term that identifies the gross landfill void (or volume) that will ultimately be filled with waste and a proportion of daily, intermediate and final cover materials

² Putrescible waste is waste containing degradable organic material. It typically can be Municipal Solid Waste from commercial and household collections, or commercial and industrial waste from industrial and commercial premises, or a mix of both

³ Type 2 landfill as defined in the EPA Publication 788.3, Siting, design, operation and rehabilitation of landfills, August 2015 (Landfill BPEM)

An application now also provides an increased degree of certainty to the authorities responsible for ensuring future landfill airspace is available to service metropolitan Melbourne's future landfill needs. Hence this represents prudent forward planning of an essential service for which the MRL facility is identified in all relevant plans as being pivotal to the state-wide waste management strategy over the next 30 or more years.

1.2 Purpose and scope

The purpose of this report is to assess the need for future landfill disposal capacity in metropolitan Melbourne and role that the MRL will play in meeting this future demand, in support of the planning permit and works approval applications. This report:

- Reviews the statutory and operational planning framework governing the development of landfills in and around metropolitan Melbourne;
- Summarises the current landfill facilities servicing metropolitan Melbourne;
- Outlines the role of the MRL facility in relation to the residual waste disposal needs of metropolitan Melbourne, over a 30 to 40 year time horizon, in line with the time horizons addressed by applicable state and metropolitan Melbourne waste plans;
- Identifies the likely impact of future waste disposal demand from surrounding regions on the MRL facility, given its location and regional significance: this informs the need to continue development of the MRL over the next 30 to 40 year period (and likely beyond);
- Reviews the adopted forecast of long term residual waste requiring landfill disposal in metropolitan Melbourne, identifies areas of uncertainty in those forecasts, and shows why there is the need for a conservative approach to ensuring future landfill airspace is available (i.e., why it is better to have more landfill airspace available than the minimum forecast amount);
- Assesses the basis for the airspace demand forecast adopted for planning the extension of the MRL and why that is appropriate;
- Reviews the constraints which apply to developing large new regional landfill sites and why large sites relatively close to the metropolitan Melbourne waste source are difficult to find and hence strategically important;
- Identifies the implications of ceasing filling at the MRL and the potential impacts this would have on the metropolitan Melbourne community over the long term; and
- Draws conclusions about the role the MRL will play in servicing the future disposal needs of the metropolitan Melbourne area, and potentially other areas of rural Victoria.

1.3 Report structure

The report has been structured as follows:

Section 2	Statutory and Planning Framework
Section 3	Metropolitan Melbourne Landfill System
Section 4	Modelled Residual Waste Generation Trends
Section 5	Strategic Role of the MRL
Section 6	Conclusions

1.4 Relevant documentation

The following documents have been relied upon for developing this assessment:

- Metropolitan Waste and Resource Recovery Strategic Plan, Victorian Government Department of Sustainability and Environment (DSE), March 2009 (Metropolitan Plan 2009) [the 2009 MWRRSP]
- Getting Full Value, The Victorian Waste and Resource Recovery Policy, DEPI, April 2013 [the VWRRP]
- Statewide Waste and Resource Recovery Infrastructure Plan Victoria 2015–44, Sustainability Victoria, 2015 (SWRRIP 2015) [the SWRRIP]
- Draft Metropolitan Waste & Resource Recovery Implementation Plan, Metropolitan Waste and Resource Recovery Group, [released November 2015] – the 2015 MWRRIP [this supersedes an earlier consultation document dated October 2013, titled 2013 Consultation Draft Metropolitan Waste & Resource Recovery Strategic Plan (2013 MWRRSP)].

2 Statutory and Planning Framework

The hierarchy of waste legislation and strategy driving down from state level, to being specific to metropolitan Melbourne, is summarised here. Higher level national strategies have not been considered in detail as these have been taken into account in developing the detail of Victoria's waste policy and the waste planning process that derives from it.

2.1 The Environment Protection Act 1970

The Environment Protection Act 1970 (the EP Act) is the primary piece of legislation that governs waste management in Victoria. The EP Act, *inter alia*, provides the framework for all aspects of waste management in the state of Victoria and provides the structure for establishing waste management policies.

Pt 9, Div2AA of the EP Act establishes the framework for governance in the waste sector. Section 49C establishes a series of Waste and Resource Recovery Groups (WRRGs) that are tasked with coordinating waste management throughout Victoria. This includes the Metropolitan Waste and Resource Recovery Group (MWRRG), whose designated area includes all of what is now considered the metropolitan Melbourne area, as shown on Figure 1.

Section 50B of the EP Act requires each WRRG in Victoria to develop a Regional Waste and Resource Recovery Implementation Plan (RWRRIP) for its waste and resource recovery region which sets out how the waste and resource recovery infrastructure needs of a region will be met over at least a 10 year period.

Section 50B(3) requires that the MWRRG submit a draft RWRRIP within three months of the SWRRIP. In November 2015, the MWRRG released the 2015 MWRRIP. Section 50BB prescribes certain content for the Regional Waste and resource recovery Implementation Plans, including a schedule of existing and required waste and recovery infrastructure.

The landfill section of the infrastructure schedule is aimed at ensuring there is clarity around where Melbourne's future landfill capacity will come from, and at removing commercial or other distortion of the process related to the development of long term waste disposal infrastructure to service Melbourne. Such distortion was anticipated as a potential risk resulting from, for example, a possible proliferation of commercially-driven landfill proposals which might not be supportive of the wider waste management strategy as required by the EP Act. So the aim of the infrastructure schedule is on the one hand to ensure sufficient landfill space is available, and on the other to ensure that there is not an oversupply or the development of inappropriate landfill airspace which could work to negate the key policy aim of reducing waste volumes (both in total and as a proportion of the waste being generated) that require landfilling.

Under the EP Act, the EPA may refuse to consider an application for a works approval in relation to a waste management facility if the operations of the facility would be inconsistent with the SWRRIP or a relevant RWRRIP.

2.2 Waste Policy direction

The Department of Environment, Land, Water and Planning (DELWP) (formerly DSE and subsequently DEPI), is responsible for reviewing the strategic, legislative, institutional, and investment environments that influence the nature and performance of the waste management system in Victoria. In April 2013, following the earlier release of a consultation draft, a key policy document entitled Getting Full Value the Victorian Waste and Resource Recovery Policy (the VWRRP) was released by the then DEPI. The VWRRP proposed a number of relevant actions which in relation to future landfill requirements, can be summarised as:

- Foster investment in a diversified portfolio of infrastructure that can manage the projected mix and volumes of waste materials
- Waste management facilities need secure, long-term sites to remain commercially viable
- Sites for waste facilities need to be close to existing freight corridors, close to either the waste sources (or collection points) and away from incompatible and sensitive land uses
- Waste facilities are important economic infrastructure that support the growth of Melbourne.
- Land use and transport planning needs to accommodate existing and future infrastructure so that the projected mix and volumes of waste materials can be properly managed, to protect and enhance the liveability of our cities, towns and rural areas.

The document also confirms that there has been a historic lack of long term, strategic planning for waste infrastructure, including landfills and sets a clear policy direction based on:

- Including provision for critical waste infrastructure and maintaining the separation distances needed to protect adjacent land uses around that infrastructure from the encroachment of unsuitable uses, such as residential development
- Ensuring precinct plans developed by planning authorities, including the Growth Areas Authority and local government, provide for sufficient waste and resource recovery infrastructure.

In explaining the proposed policy direction and actions, the VWRRP (*inter alia*) states that over time waste infrastructure has moved from small, local landfills serving single municipalities to a mix of landfill and resource recovery facilities that serve local and regional communities, and commercial entities and that this trend for consolidation to larger (regional) facilities is likely to continue. It is clear from the VWRRP that policy direction is based on the trend that, over time, there will be consolidation to fewer, larger waste resource recovery and landfill facilities located on the city fringe, as inner city sites close. Furthermore, these larger facilities, as well as former sites which have value for use as transfer facilities, need to be protected due to their value to the community. This requires an integrated approach otherwise, longer term, the increasing waste load that is generated due to population growth may mean that the ability of the system to meet community needs could become unsustainable.

2.3 Environment Protection and Sustainability Victoria Amendment Act, 2014

In 2014, the EP Act was amended to establish the Victorian Waste and Resource Recovery Infrastructure Planning Framework. The main purposes of this amendment to the EP Act, *inter alia*, were to establish:

- A new framework for state-wide waste and resource recovery planning; and
- New WRRGs to perform waste and resource recovery functions (i.e., the boundaries were re-drawn to reflect current and expected future needs, as noted above and expanded on later in this report).

2.4 Statewide Waste and Resource Recovery Infrastructure Plan

On 11 June 2015, the Statewide Waste and Resource Recovery Infrastructure Plan Victoria 2015-2044 (SWRRIP) was published by Sustainability Victoria following a period of consultation on the draft. The requirement for and scope of the SWRRIP are both prescribed by the amended EP Act. The SWRRIP provides Victoria with a "30 year" roadmap (to 2044) to guide future investment in infrastructure to achieve an integrated waste and resource recovery system. The strategic directions set out in the SWRRIP (which are based on the VWRRP), guide infrastructure planning with the aim of balancing the need to provide economically viable and sustainable management services

(including landfills for residual waste disposal), with the need to protect communities and environment.

The SWRRIP has developed four goals:

Goal 1: Landfills will only be for receiving and treating waste streams from which all materials that can be viably recovered have been extracted.

Goal 2: Materials are made available to the resource recovery market through aggregation and consolidation of tonnes to create viability in recovering valuable resources from waste.

Goal 3: Waste and resource recovery facilities including landfills are established and managed over their lifetime to provide best economic, community, environment and public health outcomes for local communities and the state and ensure their impacts are not disproportionately felt across communities.

Goal 4: Targeted information provides the evidence base to inform waste and resource recovery infrastructure planning and investment at the state, regional and local levels by local governments, the waste and resource recovery industry and other government agencies.

The SWRRIP provides both state-level and metropolitan Melbourne waste generation and diversion data, as well as context and direction for long term actions to address the increasing volumes of waste being generated in the state. It has a particular focus on materials recovery and diversion, with the aim of minimising the amount of waste requiring landfilling. The SWRRIP's projections are based on the same Sustainability Victoria, Waste and Resource Recovery Projection Model as adopted by the MWMG (now MWRRG) in developing the 2013 MWRRSP. It provides base demographic, waste generation and diversion trend data that inform both policy initiatives and practical drivers for resource recovery. The SWRRIP will be subject to review and amendment as longer terms trends emerge.

Base data presented in the SWRRIP indicate that residual waste volumes will continue to increase over time and this supports the need for the continued development of the MRL facility in a regional context. The SWRRIP identifies the MRL as an existing hub of waste-related activity of state-level importance and, *inter alia*, states in Section 2.2.1 in relation to the Deer Park Precinct TPI Landfill and Boral Quarry:

- *This site is the largest MSW⁴ landfill in the state and reprocesses significant tonnes of C&D materials and organics;*
- *It is well located close to the metropolitan Melbourne area and major transport routes; and*
- *There is potential to expand all activities onsite, including organics reprocessing, using existing buffers subject to meeting planning requirements and EPA approval.*

The SWRRIP also notes potential constraints on achieving this expansion potential, but describes the MRL site in "collective" terms, including with the existing landfill the Boral quarry and its inferred potential to provide future landfill airspace.

2.5 Draft Melbourne Metropolitan Waste and Resource Recovery Implementation Plan

In Victoria, implementing the requirements of the EP Act is managed using Waste and Resource Recovery Groups. The 2014 amendment to the EP Act included some reorganisation of the WRRGs in and around Melbourne, with a larger metropolitan Melbourne group being formed to provide an integrated approach to addressing waste future issues for the growing Melbourne urban area.

⁴ MSW – Municipal Solid Waste - a mix of residual waste including household kerbside collection wastes and other community wastes that are putrescible

The MWRRG is now the statutory body responsible for coordinating and facilitating the delivery of waste management and resource recovery across metropolitan Melbourne, and succeeds the former MWMG.

The MWRRG is required to work with local Councils in the metropolitan Melbourne area (some 31 in all) to:

- Plan for waste management and resource recovery facilities and services across metropolitan Melbourne;
- Facilitate joint procurement of facilities and services to provide better economic, environmental and waste management outcomes for councils; and
- Help build the capacity and knowledge of councils and their communities of world best practice waste minimisation and the opportunities and options available for improved services and infrastructure.

The MWRRG is responsible for the development and implementation of a Plan that articulates both the short and long term framework for waste management infrastructure in metropolitan Melbourne.

The first version of the metropolitan waste Plan was released in 2009 (by the then MWMG) and set out key priorities, including the development of a procurement model for waste facilities, and a Landfill Schedule that addresses landfill airspace availability for the various residual waste types.

A revised Plan was developed over the period 2013 to 2015. The first Plan that was produced was the 2013 Consultation Draft of the Metropolitan Waste and Resource Recovery Strategic Plan (the 2013 MWRRSP). This Plan included significant detail in relation to waste generation rates, waste diversion and materials recovery data, and residual waste being disposed of to landfill. The Plan also contained a number of forecasts, including a forecast of future waste requiring landfilling. The Plan also contained an update of the Landfill Schedule, with projected closure dates for all the landfills servicing metropolitan Melbourne. Some aspects of this Plan are referred to in this report, but weight is given to the subsequent 2015 Plan, as set out below.

Based on feedback from submissions gathered during the consultation process, the MWRRG developed an updated Plan which was released in Draft in November 2015 and is titled the (draft) Metropolitan Waste and Resource Recovery Implementation Plan (MWRRIP). The Plan is still referred to in the text as a “consultation draft” and is stated as being subject to approval by the Minister for Environment, Climate Change and Water (this is required to occur by March 2016). The process for making further amendment prior to final ministerial approval is unclear. However, it is evident from the Plan wording that it is intended to be the “operative” Plan, regardless of its current draft status.

Throughout this document this Plan will be referred to as the 2015 MWRRIP.

The 2015 MWRRIP aligns with the state-wide waste and resource recovery initiatives and associated timeframes identified in the SWRRP. The Plan has the stated objective of setting out how the waste and resource recovery infrastructure needs of metropolitan Melbourne will be met over at least a 10 year period, and broadly the next 30 years, aligning with the planning horizon adopted in the SWRRIP. In particular, Section 5.6 of the Plan adopts the 30 year timeframe in its discussion of landfill infrastructure.

From this it is inferred that the 2015 MWRRIP has been developed to align broadly with the 30 year time horizon in the SWRRIP, but with a 10 year “implementation” horizon adopted in a number of areas where there is uncertainty. This has also led to the projected life of known landfill facilities being aligned in the Plan to the year 2026, with the relevant summaries referring only to some

landfills having "*Potential to operate beyond 2026*", rather than forecasting any longer term closure date.

The ability to deal with change and uncertainty in the ability to accurately forecast long term waste trends is a key point that is addressed later in this report.

The aim of the 2015 MWRRIP reflects the goals and objectives set out in the SWRRIP. The aim of the 2015 MWRRIP is to ensure the metropolitan region has the infrastructure it needs to manage waste and recover resources and specifically to:

- Reduce (their) reliance on landfills
- Achieve best practice standards so that communities and the environment are protected
- Make well informed evidence based decisions.

Given that the 2015 MWRRIP is the "operational" version of the waste plan for metropolitan Melbourne, it is a key consideration in this assessment of need as it:

- Includes a summary of long term trends for waste generation, management and reduction (drawing on state-wide data included in the SWRRIP);
- Identifies approximate forecast future waste volumes and processing needs, and a projection of long term residual waste tonnes requiring landfilling;
- Includes a strategic analysis of existing infrastructure and services for waste management and resource recovery of materials and energy (including landfills);
- Identifies waste management and resource recovery options and provides an economic assessment of these options; and
- Identifies programs for developing infrastructure and services.

As Melbourne's population and hence the amount of waste to be managed is projected to increase significantly over time, the 2015 MWRRIP is aimed at measures to reduce the volume of waste going to landfill by recovering more resources from the C&D and C&I waste streams in particular.

Achieving the targets in the plan will require a significant increase in the direct reuse of diverted waste materials, as well as increased recycling, with the parallel aim of avoiding environmental and social harm from waste treatment and disposal activities.

The 2015 MWRRIP includes at Table 20 an updated list of metropolitan landfill sites (this was formerly known as the Metropolitan Landfill Schedule), and at Table 21, the Metropolitan landfill sequence of fill, which shows existing sites, their project status and their likely closure dates, where known. Of the 9 landfills identified in Table 21 as being Type 2 (putrescible) landfill sites, only 5 are identified as having the "potential" to operate beyond 2026. A copy of Table 21, which is now essentially the replacement for the earlier Landfill Schedule, is attached as Figure 2.

It is noteworthy that the Metropolitan landfill site map for the Melbourne Regional landfill at Ravenhall (provided in Appendix B of the 2015 MWRRIP), includes the entire quarry site and is not just limited to the current landfilling space.

3 The Metropolitan Melbourne Landfill System

This section reviews the current landfill facilities in and around Melbourne and their future airspace availability.

For the past several decades at least, Melbourne's landfill market has operated effectively as two separate catchments: northwest and southeast. This is shown on Figure 3, which also shows the locations of all main landfills as listed in the Landfill Schedule. This arrangement is likely to change as available airspace in the south east is gradually exhausted over the next 20 years or so.

There are a number of reasons for this "geographic split" in relation to landfill siting:

- The historic availability and low cost of landfill sites in the southeast as a result of the availability of disused sand mining or quarry voids which has tended to determine landfill siting over the past few decades, particularly in the Clayton/Cranbourne area;
- Haul route development over time [dominated by the progressive development of the primary highway system];
- Location of industry and related population growth centres; and
- The progressive closure of old style inner-city Council "tips".

3.1 Southeast waste catchment

There are currently four operating landfills in the south eastern catchment that accept MSW and other putrescible waste (Type 2 & 3 landfills according to the Landfill BPEM⁵ classification), noting that the Deals Road site has now closed. These landfills, together with their projected closure dates based on Table 21 in the 2015 MWRRIP, are listed below:

- TPI - Fraser Road Landfill (2017)
- Clayton Regional Landfill (2016)
- SUEZ - Hallam Road Landfill (potential to operate beyond 2026)
- SUEZ - Lyndhurst Landfill (potential to operate beyond 2026).

The closure date of the Clayton Regional and potentially the Lyndhurst site, are both sooner than was forecast in the 2009 Landfill Schedule. As can be seen from the listing above, only two landfills in the south east are identified as having *potential* to operate beyond 2026. At the present time these facilities collectively handle around 1.2 million tonnes of residual waste annually and based on the content of the 2015 MWRRIP no south eastern landfill capacity currently is confirmed beyond the year 2025.

There is no large replacement Type 2 (putrescible) landfill site identified in the 2015 MWRRIP in the southeast to provide landfill capacity there once the Lyndhurst and Hallam Road sites are full. It is difficult to envisage where a new site of sufficient size to be regionally significant could be located between the existing south-eastern landfill sites and the Latrobe Valley. It is possible that a new Type 2 site could be developed further to the east, or more likely the south east, but any such site would likely be constrained to some extent in terms of size, access or haul distance in comparison with the MRL site which is located close to the central and west metropolitan Melbourne areas. A site in the southeast could be of long term benefit in terms of waste disposal for the Mornington Peninsula and south-eastern shires, assuming a site of sufficient size and with appropriate access is able to be located and licensed.

⁵ EPA Publication 788, *Best Practice Environmental Management: Siting, Design, Operation and Rehabilitation of Landfills* (the Landfill BPEM)

In this waste catchment there are also 4 operating solid inert sites:

- Devilbend
- Heatherton Sands
- Clarinda
- Victory Road.

All of these are due to close by 2020. A new site is listed for potential development in Cranbourne (the SBI site), but this has a relatively limited life and is shown as closing by 2025. Also, this site has yet to obtain approval for filling. So overall, the availability of solid inert waste airspace in the southeast is now also constrained, with a limited future life.

In summary, the availability of landfill airspace in the southeast will decline markedly over the next 10-20 years and based on Tables 20 and 21 in the 2015 MWRRIP there is no certainty of any Type 2 or Type 3 landfill capacity remaining in the southeast beyond 2025. This trend is shown on Figure 4, reproduced from Figure 16 of the 2015 MWRRIP.

3.2 Northwest waste catchment

In the northwest waste catchment, the relevant plan documents identify four currently operating Type 2/3 landfills, all of which are noted as having significant potential capacity. They are:

- TPI – Ravenhall [Melbourne Regional Landfill] (2022, but with potential to operate beyond 2026)
- Werribee Landfill (2018, but with potential to operate beyond 2026)
- Hanson Wollert Landfill (2025, but with potential to operate beyond 2026, but tonnage limited)
- Riddell Road Landfill (2025, but with potential to operate beyond 2026).

In this waste catchment there are also 5 operating solid inert sites:

- Altona North
- BTQ Sunbury
- Western Land Reclamation
- Barro Kealba
- Hi Quality Bulla.

Three of these sites have projected closing dates before 2025, with only Barro Kealba and Hi Quality Bulla potentially extending beyond that date.

For a number of these sites, the availability of airspace is in part determined by the ability to access and backfill what is progressively developing quarry void. Assessed with a long term view (related to ongoing quarrying and the demand for quarried materials), the availability of Type 2 landfill airspace in the northwest is significant.

Ongoing development of void at the Boral Deer Park Quarry, that can be backfilled with waste after lining the excavation, has the potential to generate significant landfill airspace (both Type 2 and Type 3), over a long time period, provided that further landfill extensions are able to be approved. This is what is assumed in the 2015 MWRRIP which essentially assumes that collectively the north-western sites will be able to provide sufficient future landfill airspace to meet whatever demand there might be. The Plan envisages a decreasing future demand for Type 3 landfill airspace, and simply assumes

the future demand can be met. Type 3 landfill airspace in the northwest has a potentially much longer time horizon than in the southeast, but will become also more constrained within the next 10 years without expansion of the MRL.

Figure 4 shows the forecast landfill capacity in the northwest catchment. However, this forecast is based on the key assumption that the northwest sites, including MRL, are able to develop and realise the potential airspace that is assessed as being available. In the case of the MRL, this is based on utilisation of projected quarry void that has yet to be developed and this availability is relied upon in the 2015 MWRRIP, as well as being recognised in the SWRRIP.

3.3 The changing waste disposal context

The 2015 MWRRIP, *inter alia*, identifies a number of key trends and drivers in relation to waste disposal to landfill in Melbourne:

- [Section 5.6] Landfills play a central role in safely and effectively managing waste materials. While the government aims to maximise resource recovery, which would see the current recovery rate of 73% increase, landfills will continue to play a necessary role in the metropolitan infrastructure network for at least the short to medium term. Looking to the long term, there will still be a need for some landfill capacity to safely dispose of treated, residual material.
- [Section 5.6.3] It is government's intention that the use of landfills will decrease over time and eventually only will be used for receiving treated waste from which all viably recovered materials have been extracted.
- [Section 5.6.3] modelling assumes current recovery trends are continued with no additional recovery from the residual waste stream
- [Section 5.6.3] (the modelling) includes all potential void space at existing sites
- [Section 5.6.3] (the modelling assumes) all tonnages from the south east catchment reduces (sic) north west catchment capacity/airspace when south east sites reach capacity and close
- [Section 5.6.5] Beyond ten years, planning decisions must consider whether it is optimal for all of Melbourne's landfilling needs to occur in the northwest. MWRRG modelling indicates that adequate transport capacity for hauling additional waste to northwest is available within the principal freight network.
- [Section 5.6.5] If the northwest catchment managed all metropolitan disposal needs, some landfills would be required to operate at a significantly higher capacity. How this might affect communities, businesses and the environment will need to be further assessed in considering whether landfilling in the northwest may be an optimal long term solution.

In relation to the MRL, the implications of the 2015 MWRRIP, which now appears to be much more of a policy position document than an infrastructure plan, are:

- The importance of the role of the MRL is recognised in the context of the forecast decrease in available airspace in the southeast and the expectation that this will be hard to replace locally or even sub-regionally, within a reasonable timeframe
- That the looming shortfall in landfill capacity will put pressure on the existing northwest landfills with capacity to accept additional waste, including MRL: this will have the effect of increasing the rate at which available (developed) airspace will be consumed, as well as increasing the demand for construction of new cells.
- The recognition that if and when a new site is located somewhere in the southeast or east, that it is unlikely to be close to the existing landfills and given that separation, will need to be looked at on its merits

- The MRL “void” is relied upon and is central to the MWRRIP’s success, yet the Plan provides no direct support for the development of that void beyond stating that the impact and implications of relying on the large landfills in the northwest needs to be further considered.

In the Foreword, the 2015 MWRRIP makes the statement *that “...while some landfill is required in Melbourne’s waste management system....Landfills also have social and environmental consequences and are increasingly becoming more unacceptable to the Victorian community”*.

It is self-evident that almost all community-based infrastructure that is developed has social and environmental consequences and as discussed in this report, it is essential for the forward planning of Melbourne that adequate landfill capacity is provided in line with the evidence based decision making referred to elsewhere in the Plan. The Plan refers to the long term government aspiration of limiting landfilling only to *“treated waste from which all viably recovered materials have been extracted”*.

How long it will take to reach that position, how it will be reached technically and financially (noting that the Plan is based on no increase in current recovery trends), what sorts of residual tonnages that may actually mean for planning medium term (10-20 year) landfill airspace requirements and whether the existing largely private sector landfill system will actually be able to respond and cope with demand, are not addressed at all in the Plan. In short the 2015 MWRRIP has resulted in increased uncertainty over long term landfill airspace planning. Based on the 2015 MWRRIP the ability of the existing waste system to meet the vital public infrastructure need of providing available long term Type 2 landfill airspace now has a high degree of uncertainty attached to it.

It is clear in the 2015 MWRRIP that the MRL is envisaged as having a key future role, not only for metropolitan Melbourne, but also the wider regional Victorian waste system. Depending on whether or not a further site is able to be developed in the south east, the waste catchment for the MRL (and also for Wollert and Werribee), ultimately could become quite large.

The historic trend for a geographic split in waste catchments is reflected in a number of pre-cursor documents. However, the 2015 MWRRIP now recognises that this historic trend is changing and that waste system infrastructure now needs to respond and gear up to transport waste to viable long term landfill disposal facilities, wherever they might be.

It needs to be recognised that modern waste transport logistics are such that in many cities around the world, haul distance, primary haul route availability [motorway], buffer availability, minimising community impacts and the efficiencies associated with larger regional landfill facilities are now the key drivers for new landfill siting. Increasingly there is a worldwide trend to fewer, larger landfill sites operating on a regional or-sub-regional basis, with ever larger waste catchments.

There are many international examples of metropolitan waste disposal systems changing quite radically to adapt to changing commercial and social circumstances. Often this involves the use of centralised waste consolidation and resource recovery facilities, with transfer and long haul (road, rail or marine) to large, remote and well-engineered landfills. Sometimes this is the only solution available to large urban areas and we are now seeing examples of this in Australia (Sydney with the Woodlawn Landfill), and this trend is already very evident in the USA, Asia and Europe.

While all factors do need to be considered, it is simplistic to consider that Melbourne should simply continue to operate as two separate waste catchments. Key factors that warrant increased consideration include:

- Modern developments in waste consolidation and transport technology;
- The social impact of increased daytime traffic congestion;
- The impact of local waste disposal on communities;
- The overall carbon footprint associated with waste processing and transport;

- The ultimate “balanced scorecard” cost of waste disposal; and
- The best overall outcome for communities.

It may well be the case that for a period of time, and likely a significant period of time, the best available disposal facilities for metropolitan Melbourne are located in the north and west, fed by a series of transfer facilities both within the metropolitan Melbourne and, as necessary, elsewhere in the state. This approach also provides a potential benefit of being able to haul waste in off-peak hours and on primary haul routes, reducing impacts on the highway system and on local communities.

It is likely that the two historic waste catchments which have developed in Melbourne (northwest and southeast), may naturally cease to function that way following the closure of the remaining southeast landfills in Clayton. What will likely happen both leading up to and from that point, will be that residual waste from across Melbourne increasingly will be transported to the north west landfills which, assuming their void potential can be realised, have enough capacity for metropolitan Melbourne’s waste for the next 30 to 50 years, and potentially longer. This will be facilitated by the development of transfer facilities in the south east, load consolidation and the use of efficient waste transport logistics.

This change is clearly forecast in Figure 3.8 of the 2013 MWRRSP.

If a viable new landfill site is identified to the south east of Melbourne and ultimately is approved (likely outside the metropolitan Melbourne area), then two things are likely:

- Firstly the lead time required to establish this site will be significant; and
- Secondly, such a site will simply reduce the increasing demand for airspace that will otherwise fall to the north-western sites, but it will not eliminate it.

As stated in the 2013 MWRRSP, a shortage of landfill airspace in one catchment or region does not necessarily require the scheduling of a new landfill. The efficiency benefit of any proposed new landfill would need to be assessed in the context of regional waste management infrastructure that existed at the time. For example, the establishment of improved waste transfer facilities in the southeast in the interim may mean that the development of a further site in the southeast might not be of immediate benefit in relation to the objectives of the 2015 MWRRIP, and therefore could be a longer term priority.

The 2015 MWRRIP supports an integrated approach to solutions for waste disposal and management in Melbourne, with a preference for fewer, well-located and well-managed landfills to service future residual disposal needs. The landfills in the north west collectively have the potential to provide a long term supply of landfill airspace that could accommodate all of Melbourne’s waste out to 2044 and beyond (i.e., beyond the SWIRRP planning horizon). Transporting waste to those sites with improved efficiency on good haul routes is a natural development of a modern, evolving waste system for the metropolitan Melbourne area.

In the future, it is quite likely that waste consolidation and haulage to fewer, larger strategic landfill facilities such as MRL will become a dominant trend in Victoria. An example of this is evident in the southeast where waste from Baw Baw Shire is now being hauled to the Taylors Road landfill due to the closure of a smaller traditional country landfill which has reached capacity and the changing economics of landfill development which mean that developing new small, low tonnage sites is simply no longer economically viable.

Historically there has been a degree of inaction regarding developing potential future landfill sites. The 2015 MWRRIP tends to support this position, with the Plan providing no certainty that the landfill airspace that is assumed beyond 2025, can actually be provided. Significant delays in commencing the required planning, works approvals and licence applications have resulted in some

sites not being available for filling when they were sequenced in the prior Landfill Schedule. In some instances over 10 years have passed between the initial scheduling, the scheduled commencement date and the commencement of approval processes.

This is inevitable when a planning overlay is imposed over what are essentially private sector projects for the most part. In practice this creates difficulties because environmental, buffer and planning controls change over time. Development of landfill sites in the outer parts of the metropolitan area can mean that while in their early life they may be relatively isolated, ultimately they become encroached upon due to residential development or industrial growth over time due to urban spread. This is the classic “reverse sensitivity” issue and the value of long term landfill assets is such that this needs to be protected through appropriate planning.

3.4 Meeting future landfill airspace demand

The SWRRIP at Section 2.2.1 identifies a number of waste and resource recovery “hubs” of state-wide significance. A number of these contain landfills of strategic importance to the waste system:

- Werribee Landfill, Wyndham
- Deer Park Precinct TPI Landfill (MRL) and Boral Quarry
- Wollert Hanson Quarry and Landfill
- Kingston/Clayton/Dingley Precinct
- Hallam Road, Hampton Park
- Lyndhurst Landfill, Taylors Road, Lyndhurst.

The SWRRIP list above includes several locations where landfills are either closed, or due to close within short to medium timeframes (Kingston, Hallam Road and Lyndhurst). Importantly, the SWRRIP does not include any reference to new or prospective landfill facilities of state-wide significance in the south east.

The SWRRIP states the anticipated closure date of the MRL as being 2090, with Werribee being 2066 and Wollert 2080. There are no other sites identified in the SWRRIP with closure dates beyond 2040. Hence it is clear that while the SWRRIP has a formal planning horizon extending to 2044, it is nevertheless projecting somewhat further in terms of landfill airspace availability. The potential available airspace at MRL and the other north-western sites is central to this “bank” of available long term landfill airspace that is assumed to be available.

Tables 20 and 21 included in the 2015 MWRRIP do not list prospective landfills if need has not been demonstrated and this issue will be particularly relevant for any new site proposed in the south east.

Based on Table 21 of the 2015 MWRRIP, by 2041⁶ there are likely to be at most three Type 2 landfill sites still operative in the greater Melbourne region (MRL, Wollert and Werribee). There is the possibility of a new and as yet un-recognised site in the south east in the future, but this is by no means certain.

The MRL (formerly known as the Boral Deer Park Landfill) was listed in the previous Landfill Schedule, as having a projected life of 30+ years after 2041. The same applies to the Werribee and Wollert sites. In the 2015 MWRRIP, which primarily focusses on the next 10 years, each is simply listed (Table 21) as having the potential to operate beyond 2026. So it is clear from the collective planning documentation that both the SWRRIP and the 2015 MWRRIP envisage these three sites as being key planks in the residual waste disposal system for metropolitan Melbourne, for a very long time. The future of the two Suez sites is less clear in the Plan, with Table 20 indicating that the Hallam Road site has a works approval and a planning permit to operate until 2040. The ultimate

⁶ This depends on the actual closure date of the Hallam Road landfill.

capacity and final projected life of this facility are not provided. The Lyndhurst site is indicated as having a remaining life of 10-15 years, i.e., to approximately 2030.

All of the assessments of remaining landfill airspace in Table 20 of the 2015 MWRRIP are based on "potential" landfill capacity. In practice, this is very different from actual licensed or developed airspace, which at this point is only a fraction of what the Plan is reliant on to meet forecast long term needs. As the 2015 MWRRIP is focussed mainly on the next 10 year period, the risk of potentially overlooking longer term considerations in relation to landfill planning needs to be considered.

4 Modelled Residual Waste Generation Trends

4.1 Sources of data

The main sources of data that have been relied on are the Victorian state-wide data developed and included in the SWRRIP, and the data provided in the 2015 MWRRIP and the earlier 2013 MWRRSP. This data is used for planning purposes at both the state and metropolitan levels and is relied upon to inform future landfill demand assessment.

Sustainability Victoria has developed its long term waste model for Victoria based on the knowledge that in a developed country such as Australia, waste generation is driven by two key factors:

- Population demographics, and in particular, population growth; and
- Economic activity (commercial, social and industrial).

Metropolitan Melbourne, with its relatively affluent population and associated manufacturing and commercial base produces significant volumes of waste. The 2015 MWRRIP identifies the composition of the waste stream, together with projected waste recovery rates. It also derives forecasts of residual waste streams that will require landfill disposal, which are discussed later in this report.

4.2 The impact of population growth

To a significant extent, waste generation is driven by population, so long term population trends are a key factor in assessing likely trends in long term waste disposal needs at a community (macro) level.

Victoria's population increased from 4.8 to 5.8 million (+20.8%) between 2000 and 2012, which represents approximately 1.6% average growth year on year. Between June 2013 and June 2014 this growth rate increased to 1.9% per year and in metropolitan Melbourne it was even higher at 2.2%, reflecting the ongoing trend for Melbourne-centric growth in the state.

Metropolitan Melbourne's population is projected to reach some 7.8 million by 2051 and this figure has been adopted in the 2015 MWRRIP for long term waste planning. Melbourne attracts the bulk of migrants to Victoria and its population is growing at a rate greater than that of the state overall. Because it accommodates a large proportion of Victoria's population, and because of its high loading of industry and commercial activity compared to rural areas, metropolitan Melbourne also accounts for the bulk of the waste generated in the state. These trends are forecast to continue and Melbourne is projected to experience more than 80% of the state's population and waste generation growth between now and 2050.

The SWRRIP forecasts, based on a business as usual scenario, the total waste generation in Victoria to rise from its current level of some 12.176 million tonnes in 2011-12, to more than 20 million tonnes by 2043-44, as a result of this forecast population increase. Hence the modelled growth of waste originating from metropolitan Melbourne is significant, with approximately 2% average year on year growth forecast.

The current system and related forecasts of landfill airspace required, rely on very high diversion and recycling rates in the C&D and C&I sectors in particular, to greatly reduce the residual waste volumes needing to be landfilled. Therefore, unless the high recovery rates adopted in the model are able to be met over the long term (meaning that the increase in uses and markets for the ever increasing volume of diverted materials keep pace with waste generation), then it is inevitable that both the total amount of and proportion of residual waste that will need to be landfilled will rise. Thus there is an inherent system risk that the modelled forecast for residual waste could be exceeded due to

population growth outstripping the ability to divert materials from the waste stream in a sustainable way.

The counter-argument can also be put. That is, that in the future waste diversion rates will actually increase and counter the overall growth in waste tonnage that occurs due to population increase. While this is possible, it has yet to occur so the adopted waste forecasting model assumes that such an increase in diversion rates will not occur. This is a prudent approach, but there is nevertheless the allied assumption that the market for diverted and recycled materials will still be able to keep pace at that assumed future constant rate of diversion as material volumes increase, and that assumption is by no means a certainty.

4.3 Economic activity and per capita waste generation

There is an important link between economic activity and average per capita waste generation rates. Waste generation per capita in Victoria has steadily increased from around 1.2 tonnes per capita in 1997, to some 2.2 tonnes per capita in 2002⁷. This trend for a gradual per capita waste generation rate increase is likely to continue unless there is economic or other intervention to reverse the trend, albeit the rate of increase is likely to slow due to other commercial, social and industry factors.

Some of the commercial and social factors that will tend to counteract the trend for an ongoing increase in per capita waste generation are supported by specific initiatives to drive down residual waste volumes over time. These factors include:

- Taxes or levies imposed on those producing or disposing of waste;
- Restrictions or bans on materials or products that produce certain types of waste [particularly intractable or hazardous wastes];
- Changes in economic conditions that occur over time;
- Policy-driven initiatives to reduce or re-use waste [sometimes associated with fees or levies];
- Wider environmental factors such as personal or corporate environmental awareness; and
- Education programmes that result in reductions in personal or community waste generation.

Modern society is also experiencing rapid technological advance. This is resulting in products such as computers and mobile phones entering the waste stream faster than ever before, and in ever increasing volumes. E-waste was identified 10 years ago as being the fastest growing type of waste (ABS, 2006), and the waste industry and associated policies and control measures have had to respond very rapidly to that trend. Products such as home appliances today generally have a shorter life span in comparison to those made in the past, and today often are not repaired, but instead are replaced. As a result they are also entering the waste stream at a greater rate than ever before.

On the other side of the equation, we are seeing improvements in product stewardship, packaging covenants and rapidly evolving waste materials recovery technologies, all of which have the potential to significantly mitigate the trend for increasing per capita waste generation rates.

Selecting an appropriate long term per capita waste generation rate for waste forecasting is difficult, because intervention may be required to counter the trend for increasing per capita waste generation over time. The extent to which this may be possible needs to be considered when forecasting long term waste quantities and the adopted model sensibly assumes there are constraints to achieving further reductions over the long term.

⁷ Hyder 2009, Blue Environment, 2014

4.4 Barriers to resource recovery

Historically the availability of ample landfill (dump) capacity in close proximity to Melbourne resulted in a competitive market and relatively cheap landfill gate rates (when compared to the cost of recovery). Consequently a limited range of resource recovery technologies had been implemented up until the time when the landfill levy was introduced to drive change.

Green waste diversion and composting was introduced and became a driver in reducing waste to landfill. However, fickle markets for compost products combined with odour issues have resulted in the closure of some facilities and the restriction of capacity at other sites. They have also created difficulties in locating new resource recovery facilities.

4.5 Constraints to developing new landfills

As Melbourne grows, securing land for new landfills with forecast operating lives of 30 years or more is an increasing challenge. As population increases, a city tends to spread, waste generation increases and as communities strive for world's best practice environmental standards, finding and securing land for waste management facilities reasonably close to the waste source becomes increasingly difficult. In siting landfills, particularly large or regional Type 2 landfill facilities, there is inevitably a conflict between achieving proximity to the waste source and providing sufficient buffer/suitable land zoning and the worldwide trend is for the development of fewer, larger "regional" sites, often located some distance from the waste source. Establishing such large sites, with ample buffer, essentially is aimed at future-proofing the system from reverse sensitivity issues.

A number of operating quarries in and around Melbourne have previously been identified as potential future Type 2 landfill sites. However, to date none are clear contenders for the provision of significant landfill airspace as the majority of such sites are either too small, or are located in close proximity to existing urban development. Preliminary evaluation based on access and primary constraints related to land use and environmental overlays shows that there are unlikely to be many (if any) practicable new sites of substantial size available in the central south east, and located west of the Latrobe Valley.

4.6 Waste diversion rates and modelled waste generation

In Victoria, the percentage of waste recovered varies depending on the waste type.

The 2015 MWRRIP identifies in Section 3.2, that in metropolitan Melbourne approximately 10.3 million tonnes of waste was managed in the 2014-15 financial year. The highest levels of recovery and diversion are occurring in the C&D⁸ sector where in recent years more than 80% of identified waste material has been diverted. In the C&I⁹ sector, diversion rates are around 66% in metropolitan Melbourne. The extent to which recovery rates in these sectors can be further improved upon represents a significant uncertainty in waste forecasting as it is subject to market forces. The adopted forecasting model is based on these recovery rates not increasing over the model period.

In the MSW sector, the increase in the overall diversion rate has slowed since 2005 and is now levelling off at around 45%. Unless there is further significant "impetus" (likely by way of step-change initiatives such as introducing mandatory household-level composting, higher charges, or increased incentives/disincentives related to household level recycling), getting beyond a 50% diversion rate from MSW seems unlikely.

The modelling of future waste generation, recovery/diversion and residual landfilling tonnages in both the SWRRIP and the 2015 MWRRIP is based on recorded trends since 2002 and the general

⁸ C&D – Construction and Demolition

⁹ C&I – Commercial and Industrial

outlook for recycling. The model assumes that from 2015/2016 there will be no change in resource recovery rates. As noted, this is on the one hand conservative in terms of waste recovery trends, but also potentially optimistic in that it assumes the market can continue to absorb the significant forecast increase in diverted materials that will occur due to population growth. The importance of this assumption is clearly demonstrated by Figure 5. As can be seen from this figure the bulk of the waste growth is forecast to be recovered. If this is not possible, then the forecast “flat” growth in terms of residual disposal requirements (i.e., landfilling) may prove significantly in error on the low side.

The total amount of waste generated annually in metropolitan Melbourne is estimated in the 2015 MWRRIP as likely to increase from its current level of around 10.3 million tonnes, to a total of some 16.5 million tonnes by 2041-42: an overall increase of some 63% over current levels at an average annual rate of increase of some 2%.

The 2015 MWRRIP indicates that (even) if 2015 recycling rates continue, then metropolitan Melbourne by 2041-42 will need one million tonnes of new landfill capacity each year, in addition to a large increase in reprocessing capacity – estimated to be in the order of 7 million tonnes per year.

Of the total of some 10.3 million tonnes of waste generated in metropolitan Melbourne in 2014-2015, approximately 3 million tonnes was residual waste that required landfilling. The residual waste forecast for metropolitan Melbourne, was provided in the precursor document to the 2015 MWRRIP [2013 MWRRSP] and the SWRRIP (i.e., the annual amounts requiring landfilling). This data is based on modelling and can be summarised as follows (approximate figures derived from 2013 MWRRSP and SWRRIP data):

- C&D waste: 680,000 tonnes in 2010-11, rising to approximately 900,000 tonnes by 2041-42
- C&I waste: 1,046,000 tonnes in 2010-11, rising to approximately 1,115,000 tonnes by 2041-42
- MSW: 1,388,000 tonnes in 2010-11, rising to approximately 1,400,000 tonnes by 2041 after an initial “dip” through 2016-2017
- PIW¹⁰ and contaminated soil: 110,000 tonnes in 2010-11, declining slightly by 2041-42.

It is noted that the 2015 MWRRIP does not provide an update of these figures.

4.7 Residual waste to landfill

The adopted waste forecasting model outputs predict that residual waste quantity that requires landfilling will stay relatively flat over time. The forecast of the amount of residual waste to landfill relies on a significant increase in the waste diversion rate occurring over time.

Previous forecasts indicate the total landfill tonnes in metropolitan Melbourne requiring disposal are projected to increase gradually from a 2010-11 level of 3.2 million tonnes. The 2015 MWRRIP forecast of waste to be managed by disposal indicates that approximately 4.2 million tonnes may require disposal by 2041-42.

It is important to note that if some of the main waste generation model assumptions prove, over time, to be wrong, particularly in relation to the ability of the market to cope with a significant increase in diverted materials, the current estimate of residual waste requiring landfilling in the future (as made by Sustainability Victoria and adopted by MWRRG), could prove to be significantly in error. Based on historic trends, it is likely that the current forecast of residual waste will prove to be on the low side. Experience over the next 10 or so years will therefore be very important in confirming the validity of the long term model predictions of residual waste requiring landfilling.

¹⁰ PIW – Prescribed Industrial Waste (waste requiring special handling due to its properties)

In general, the forecast growth in waste requiring landfilling is low in relation to long term historic trends, and based on precedent elsewhere. Without significant intervention to promote waste diversion, the assessed growth rate is considered very likely to be a low-side estimate. That is, precedent suggests that actual final waste tonnages to landfill will be higher than forecast over the planning horizon in the SWRRIP and hence landfill airspace demand will also end up being higher than currently forecast.

From previous data included in the 2013 MWRRSP, of the forecast of 4.2 million tonnes of waste requiring landfilling by 2041-42, it can be inferred that some 24.6%, or approximately 1 million tonnes is forecast to be C&D (solid inert) waste, leaving a forecast "nett" Type 2 landfill input of some 3.2 million tonnes per year. This figure is adopted for the long term landfill airspace demand predictions that follow.

The 2015 MWRRIP estimate of the total amount of waste requiring disposal of around 4.2 million tonnes by 2041-42 is based on a number of key assumptions, all of which result in uncertainty in the forecast, specifically that:

- Organic waste diversion is able to keep pace with demand;
- C&D and C&I waste diversion is able to keep pace with demand (i.e., that markets and/or interventions are sustainable);
- The impact of any government levies or other mechanisms that may be introduced to ensure current diversion rates are maintained, prove to be effective; and
- There is no significant increase in PIW or other waste streams.

In terms of loading on the landfills potentially remaining active in 2041-42, the following step-wise assessment can be made:

- If it is (conservatively) assumed that after 2041-42 the bulk of the solid inert waste stream goes to the Barro Kealba, Maddingley or other Type 3 landfill sites, this means that in the absence of another new regional Type 2 facility and assuming that the SUEZ Hallam Road and Lyndhurst sites do not operate beyond 2040, the plan forecasts indicate that the three remaining north-western landfills, Wollert, Werribee and MRL would, between them, need to accept an average of more than 3.2 million tonnes of Type 2 (C&I, MSW and PIW) waste per annum.
- The Hanson Wollert site is limited by its licence to accepting no more than 450,000 tonnes per year (currently it accepts 280,000 tonnes). If it is assumed (again conservatively), that the Wollert site is able to accept its full licenced tonnage and that this is entirely Type 2 landfill waste (C&I, MSW and PIW), then the amount of residual Type 2 waste that would need to be handled by MRL and Werribee would be in the order of 2.75 million tonnes per year. Currently these two sites operate at about half this level of input.
- Noting that the Wollert site is unlikely in practice to operate as assumed above, then the total disposal to Werribee and MRL would increase by at least 1 million tonnes per year, or over 2,500 tonnes per day by 2041-42. This represents both a large forecast increase and a significant uncertainty in terms of the capacity of the system "as scheduled" to meet demand. A further factor in this regard is the ability of the Werribee site to increase its throughput sufficiently: something which is also unknown.
- In all likelihood, the larger proportion of this increased waste load would fall to MRL due to its closer location and likely constraints on the ability of the Werribee site to move from being a site receiving in the order of 1,200 tonnes per day, to one accepting over 3,000 tonnes per day. In landfill development, financial, operations and Licence compliance terms, that would be a very significant change.

4.8 Assessed long term waste generation for design of MRL

The MRL accepted approximately 780,000 tonnes per year of waste from all sources in the 2014-15 year (excluding cover soil). This makes MRL the largest landfill in Victoria by a considerable margin.

Cleanaway has recently obtained a planning permit from the City of Kingston for the development of the South East Melbourne Transfer Station (SEMTS). It is envisaged that waste collection trucks will deliver waste to a transfer station in the south east from waste collections in local council areas. The waste will then be consolidated before being loaded onto B-double (or similar) trucks for transport to MRL using the primary highway system.

Landfill Ops expects that once the transfer station is operational in 2017, it will attract additional waste tonnage and it is likely that waste accepted at MRL will increase from the 2014-15 level of around 780,000 tonnes per year (excluding cover) to over 1.4 million tonnes per year by 2020, an increase of some 62%. Landfill Ops has forecast a step increase in the waste to be accepted at MRL for 2017 as a result of the need to divert waste from its closing Clayton facilities.

This results in a forecast tonnage increase for the MRL site as the transfer station is commissioned and space at other sites in the southeast becomes constrained, waste tonnages are forecast to reach 1.5 million tonnes per year by 2025. Longer term, Landfill Ops expects these waste volumes to gradually increase to around 1.7 million tonnes per year by 2041, which is more than a doubling of current levels.

This forecast appears to be aligned with the long term scenario described above and in practice the forecast growth is likely to prove conservative (lower than actual). This forecast is shown on Figure 6, which also shows how this relates to the total metropolitan Melbourne waste tonnage.

Landfill Ops estimates that the proportion of metropolitan Melbourne's waste that will require disposal at the MRL will increase quite rapidly from the current 24%, to over 36% by 2020. After accounting for growth in its own collections, MRL has settled on adopting a growth rate increase for airspace forecasting purposes of 1% per year in developing its Works Approval forecast. This is lower than MWRRG/SWRRIP forecasts of around 2% year on year growth, and is based solely on Cleanaway's expected increase in its market share, as well as some allowance for the additional waste that the site is expected to start attracting as other sites close.

This assumed growth rate ultimately may prove low if residual waste quantities are greater than forecast by Sustainability Victoria and the MWRRG, or Landfill Ops increases its share of the final disposal market more significantly than assumed. Some of the reasons for this are:

- The MRL is the closest facility to the southeast catchment;
- While the exact timing of the Lyndhurst and Hallam Road sites reaching capacity remains uncertain, it is clear that ultimately a shortage of Type 2 airspace will occur in the south east and that this will gradually increase waste flows to the northwest sites. The timing of this will depend on what operating constraints may apply to the two SUEZ sites in the south east, as well as their achievable capacity, but the looming south east landfill capacity shortfall predicted in the SWRRIP and the 2013 MWRRSP is not amended in the 2015 MWRRIP other than by noting that the south east sites *may* now have capacity beyond 2026;
- Cleanaway is anticipating growth through establishing its own transfer station in the south east; and
- Landfill Ops considers that it has been conservative in anticipating growth in its own regional waste collection contracts.

For the reasons set out in this report, it is likely that Landfill Ops' tonnage (and hence airspace demand) forecast will prove to be low-side over the longer term (beyond 2035). Allowance also needs to be made for a degree of "skew" in terms of where waste will be directed due to market

forces. In the medium term this will likely favour MRL as being a more accessible site than Werribee, and longer term a favourable alternative to Wollert, which ultimately may become tonnage-constrained. It is estimated that by 2041-42, Werribee would need to be accepting in the order of 1 million tonnes of waste per year. The site is currently accepting in the order of 300,000 tonnes of waste per year.

Based on current airspace utilisation rates, Landfill Ops has estimated that it has a further 7 to 10 years of capacity within the existing permitted area. In landfilling terms this is a relatively small amount of void as most landfills develop cells progressively to provide 2-4 years of landfill capacity ahead of demand. So the site is actually only 2 cell developments away from running out of airspace. Normally, to ensure commercial viability, new landfills aim to permit 30 or more years of airspace to provide certainty for cost amortisation related to capital development and long term site management infrastructure such as leachate treatment and landfill gas management. Given the relatively short timeframe remaining for completion of the existing permitted area, a further 30 years of landfill life is being sought, which appears prudent in light of the general uncertainty related to provision of airspace for metropolitan Melbourne beyond around the year 2030.

While the SWIRRP is based on a nominal 30 year time horizon (out to 2041-42), it is not unusual for landfill operations to plan for longer time periods than this. There are many landfills in existence that have operated as regional facilities for well in excess of 30 years. In this case, the capacity of the MRL site is known to have the potential to extend well beyond the timeframe considered by the SWIRRP (the SWRRIP states 2090 as an anticipated closure date for MRL), with the Landfill Schedule included in the 2013 MWRRSP clearly envisaging the site continuing to operate beyond the current planning horizon. It can be argued that planning for the availability of landfill capacity beyond a 30 year timeframe (noting that airspace will be developed only as it is required), represents prudent long term planning for a city as large as Melbourne and with the population growth rate it is experiencing.

Given the intensification of development proposed for the area surrounding the Ravenhall site, obtaining a planning permit for potential future landfill airspace is prudent and appropriate. The site is of strategic significance in terms of the future landfill disposal needs of metropolitan Melbourne, whatever they might actually prove to be. Protection of this asset from unmanaged encroachment and impacts resulting from reverse sensitivity is an important long term planning step that needs to be taken now, and not in 20 to 30 years' time.

Given that MRL will be developed to follow an ongoing quarry operation, in all likelihood the demand for airspace at MRL could outstrip the ability of the MRL facility to actually provide it in time. This has the potential to put pressure on other landfills that the schedule relies on. In practice, the ability of the system as a whole to respond to a future shortage of landfill void is largely unknown. Given that the ability to meet metropolitan Melbourne's future residual waste disposal needs is on the one hand reliant on a massive increase in waste diversion and recycling, and on the other on the provision of landfill airspace for which there is no guarantee of availability, providing for a degree of additional (buffer) landfill capacity at MRL simply appears to be a prudent step.

The airspace demand scenario, which has been adopted in developing the proposed 30 year MRL airspace expansion envelope, does not allow for settlement or improvements that may be achieved in waste compaction. In practice this means that the MRL facility will have potentially more tonnage capacity than assessed in developing the proposed footprint. If so, then longer term, this would prove to be a benefit given the forecast increase in waste generation and the potential that exists for the benefit of any such "buffer" to be offset by an under-forecast of actual residual waste tonnages.

The "best estimate" curve for landfill airspace demand for the MRL as shown on Figure 6 is considered appropriate for planning an extension, but ultimately this may prove to under-forecast airspace demand. While projections of landfill airspace needs could be made beyond 2041-42, at this

point these would be subject to significant uncertainty. The better approach is to accept that society will likely continue to generate a baseload of residual waste and to provide flexibility through having available permitted airspace in excess of known demand, and that can be developed as required.

Planning for an excess of landfill airspace, rather than a potential shortfall is always prudent, particularly where there is such reliance on continued high diversion rates (as is the case here) and particularly where that actual ability to provide the airspace is constrained by other factors that there is little ability for waste planners to control.

5 The Strategic Role of the MRL

The 2013 MWRRSP and the 2015 MWRRIP both clearly indicate that the available sites in and around metropolitan Melbourne with the potential to provide significant airspace all have a key role to play in relation to the city's future waste disposal needs.. This is irrespective of the possible development of any new site to the south east, which is as yet very much in the identification phase and not yet included in the 2015 MWRRIP, which is the operative Plan.

Overall, the MRL site has potential capacity estimated to be in the order of 114 million cubic metres (or in excess of 100 million tonnes based on historic airspace utilisation rates). Hence, at an assumed utilisation rate of 1.5 million tonnes per year, the site potentially could service a large proportion of Melbourne's landfill needs for some 50 years or more, and certainly the next 30. The strategic importance of the MRL site is therefore clear and is recognised as such in the 2015 MWRRIP. However, as is the case for the other sites with significant future capacity, the 2015 MWRRIP assumes that future airspace can and will be made available by private industry in the main, as and when it is required. This is a huge assumption, which is based on the further related assumption of assured commercial viability and hence a positive industry response to meet the need. In reality, the MRL is strategically critical, but will be available only if there is sufficient certainty around the commercial model to facilitate its timely development by Landfill Ops in association with the ongoing extractive quarry operation at the site.

Available data indicate that the load on the existing northwest sites (mainly Werribee and MRL, because Wollert ultimately will become tonnage constrained), is going to increase significantly over the next 10-15 years and potentially very markedly beyond 2025/2030. Longer term, these sites become even more regionally significant due to their ability to provide the essential airspace required for the safe disposal of residual waste requiring a Type 2 landfill.

Should capacity not be available at MRL beyond 2025, when existing licensed airspace is forecast to be exhausted, then the amount of waste that would need to be diverted elsewhere will likely exceed 1.2 million tonnes per year by that stage, rising to 1.5 million tonnes per annum, or more, by 2041-42. As a total, the shortfall needing to be met by MRL could exceed 20 million tonnes over the 2025-2041 period.

The desired policy direction of minimising the haulage of waste, while relevant, is now being re-considered in line with the forecast south-eastern landfill closures, evident practicalities and commercial imperatives. What is likely to occur is an increase in waste sorting, recycling and consolidation close to source, with bulk haulage to the remaining large strategic landfills located on the outer fringe of metropolitan Melbourne. This is a trend that is already evident and given its favourable location and potential large capacity, MRL is clearly central to this evolving strategy.

The SWIRRP also promotes the concept of waste and resource recovery hubs. That is, a facility or group of facilities that manage or recover waste or material streams. An ideal hub has appropriate buffer distance established to support the waste and resource activities occurring at that location without impacting on surrounding land uses. An ideal hub has good access to transport networks and is located in close proximity to complementary activities that provide feedstock or markets for the products and services made from the hub activities, or that share and utilise the same buffers.

MRL has been identified in the SWRRIP as a potential waste hub of state-wide significance, along with Werribee, Wollert, Hallam Rd, Taylors Rd and other non-landfill sites that have the potential for waste sorting and processing activity. This concept is reinforced in Table 13 of the 2015 MWRRIP where the role of the Deer Park precinct is outlined.

The main reasons for MRL's significance as stated in the SWIRRP are:

- It is the largest MSW (Type 2) landfill in the state;

- It is well located close to the metropolitan Melbourne area and major transport routes; and
- There is potential to expand reprocessing activities onsite, including organics reprocessing, using existing buffers and subject to meeting planning requirements and EPA approval.

At this point no further resource recovery activity is proposed at the MRL site, but it is quite likely that such activity will occur at the proposed transfer station facility, prior to bulk transport of residual waste to MRL. That approach is consistent with the intent of the SWRRIP. In Table 13 of the 2015 MWRRIP it states:

“If this site does not continue its landfill operations in the medium term (beyond the current 5 -10 years of approved airspace), Melbourne is at risk of having inadequate landfill capacity to manage waste for which there is currently no resource recovery alternative”

and further:

“...if the entire site is not appropriately acknowledged in current precinct structure planning processes, its long term role may be diminished with implications for the metropolitan waste and resource recovery system.”

A review of landfill locations in relation to the centroid of waste generation, both pre and post-the scheduled closure of the Taylors Road Landfill in 2030, shows that that MRL is the best-located of the three major facilities that will remain, as shown on Figure 3. There is no direct haul route to the Wollert landfill, other than through or around the fringe of the Melbourne CBD and it is also tonnage-constrained. Ease of access from primary haul routes (regional highways) and haul distance comparisons have been made and are summarised below.

Table 9.1. Haulage distances to four key landfills from the future South East Transfer Station (Fraser Road).

Landfill Name	Distance (km)	Est. Travel Time (hrs)
Werribee Landfill	62	1 hr 23 min
Melbourne Regional Landfill	49	1 hr 8 min
Wollert Landfill	69	1 hr 17 min

The landfill capacity approved under the existing permit at MRL will be exhausted by approximately 2025. As noted, if a new planning permit and works approval for extension of the landfill is not granted, at least 1.2 million tonnes of waste per annum will need to be directed elsewhere by 2020. In addition, growth in residual waste volumes, together with progressive closure of the larger south-eastern landfill sites will result in at least an additional 20 million tonnes of waste needing to be directed to either the north-western or other landfills over the period 2025 to 2041. Given the forecast metropolitan Melbourne area landfill capacity shortfall by 2025, it is very unlikely that could actually happen without a significant extension of the MRL facility.

6 Conclusions

The MRL has been identified in the SWRRIP, the 2013 MWRRSP, and the 2015 MWRRIP (which is now the operative waste plan although it remains in Draft), as having a key regional role. The facility has a remaining life potentially in excess of 50 years, depending on quarry extraction and the rate of waste acceptance following permitting of landfill extensions. It is also identified as a key location in the hub and spoke model, provided that future use is well planned, and the landfill operation is well managed, such that performance aligns with community expectations.

There is a clear, demonstrable need for the expansion of the MRL due to the forecast closure of the number of landfills currently servicing the south east waste catchment, namely the Fraser Road and Clayton Regional Landfills within the next four years, and the two SUEZ landfills at Hallam Road and Lyndhurst in the next 20-25 years. When the closure of these landfills is considered alongside the known lack of available and suitable locations for new putrescible landfills either in or close to the current south east waste region, there inevitably will be a significant increase in waste volumes needing to be diverted to the northwest Melbourne landfills.

As described in this report, prudent, conservative provision of future landfill capacity to meet the needs of metropolitan Melbourne underpins an essential public service, which in the future is demonstrably reliant to a significant extent on the availability of landfill capacity at the MRL. The 7-10 years of remaining licenced capacity at MRL is a relatively brief time-span in landfill terms, with such facilities often planned and developed for much longer periods in order to underpin their commercial viability and provide reasonable whole of life economics.

The 2015 MWRRIP has a stated operating horizon of 10 years, but also needs to align with the SWRRIP in planning for waste infrastructure over a 30 year horizon. At this point the 2015 MWRRIP is not definitive in terms of how future landfill airspace (particularly Type 2 capacity), will be provided to meet forecast demand. The Plan is quite broad in its approach to assessing how long term landfill capacity needs will be met and is reliant on a number of key assumptions in determining landfill airspace demand. If the waste generation or diversion forecasts included in the SWRRIP and integrated into the 2015 MWRRIP ultimately prove to be low, then the provision of adequate future landfill airspace could quite quickly develop into an acute problem for metropolitan Melbourne.

Applying now for planning and works approval for extension of the MRL, some 10 years before the site would otherwise need to close, is therefore appropriate in the context of the governing waste planning hierarchy for metropolitan Melbourne as it allows adequate time to for:

- The Licensing process;
- Detailed planning, design and construction of the expansion;
- Integration of plans for the facility [which is of state-wide significance] within other land use development planning for the area; and
- Pre-planning of quarry void development by the quarry operator.

Furthermore, confirming the availability of future airspace at MRL through the planning permit process builds in the capacity to account for potential error in current forecasts by providing additional landfill capacity as a buffer. Confirmation of significant future landfill airspace at MRL will provide an increased degree of certainty to the authorities responsible for ensuring future landfill airspace is available to service metropolitan Melbourne's future landfill needs. All relevant waste planning documents are based on the continued development of the MRL, which is a facility identified as pivotal to the state-wide waste management strategy over the next 30 or more years.

The proposed extension of MRL, provided it is well managed and appropriately developed in accordance with usual planning requirements, is consistent with both state-level and metropolitan

strategic waste plans (the SWRRIP and 2015 MWRRIP) that collectively aim to retain existing landfill sites with adequate buffers. Key reasons for this are:

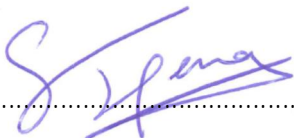
- The inevitability of significant long term demand for landfill airspace close to metropolitan Melbourne;
- The established use of the MRL site for landfill purposes, the developed infrastructure and the recognised status of the site in the relevant planning documents ;
- The favourable location of the MRL in relation to the sources of waste, particularly when assessed against the changing landscape of landfill airspace availability in metropolitan Melbourne;
- The favourable access routes that MRL has, with bulk haulage to the site confined largely to primary regional highways;
- The inherent development flexibility that the MRL offers, with the ability to adjust to changes to Melbourne's future landfill disposal needs over time;
- The significant airspace (volume) potentially available at the site – this represents a disposal resource of state-level significance and provides a high level of future-proofing for residual waste disposal in metropolitan Melbourne; and
- The inherent uncertainty in the long term residual waste projections relied upon in the SWRRIP and the 2015 MWRRIP and hence the associated need to be conservative in relation to providing for the development of sufficient landfill airspace to meet the future needs of metropolitan Melbourne.

7 Applicability

This report has been prepared for the benefit of Landfill Operations Pty Ltd with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

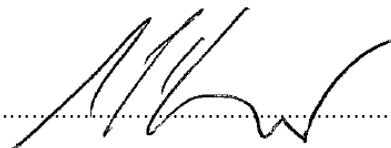
Tonkin & Taylor Pty Ltd

Report prepared by:



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(Environmental Consultants)

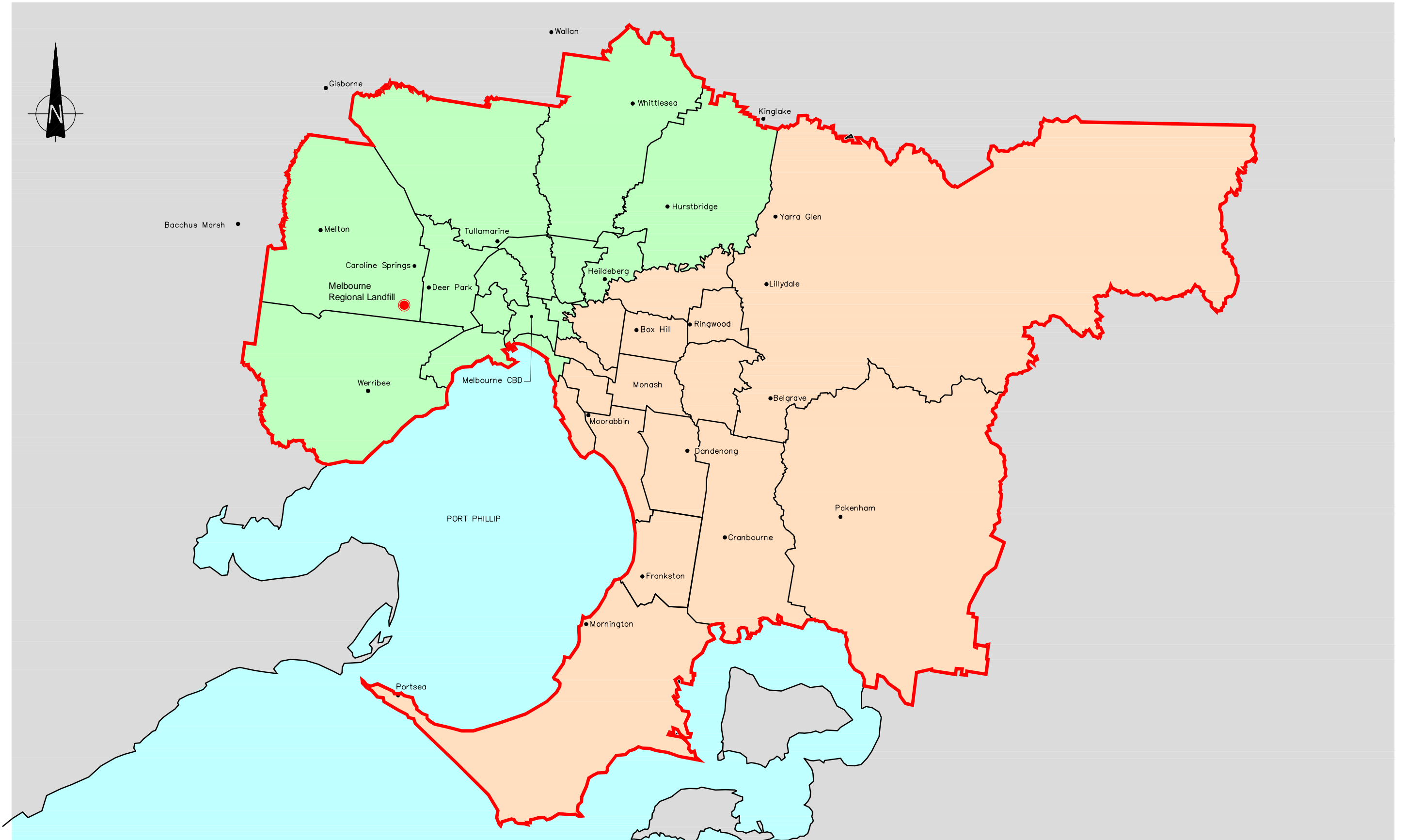
Authorised for Tonkin & Taylor Pty Ltd by:



Tony Kortegast
(Director)

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Appendix A: Figures



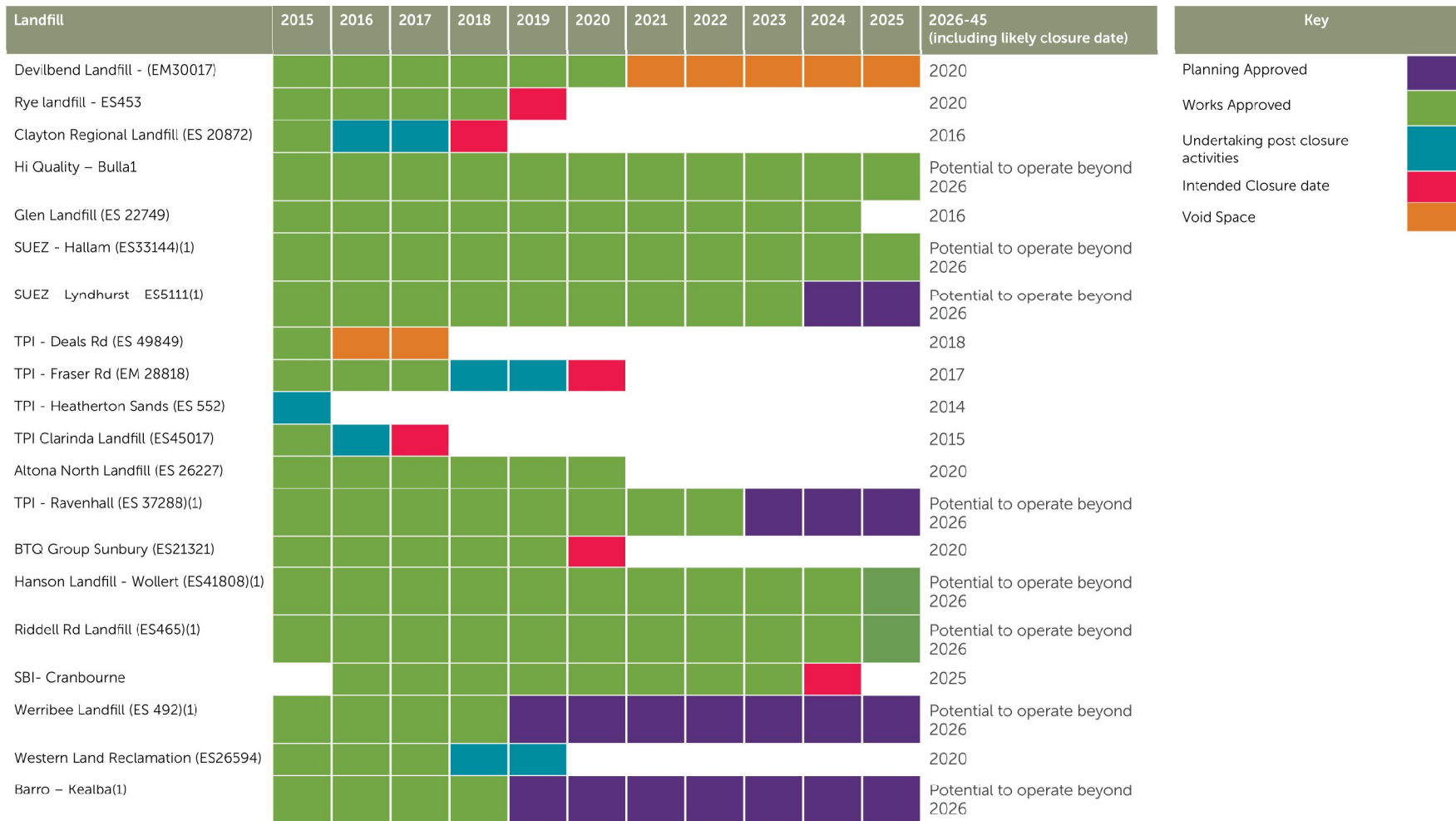
LEGEND

- Metropolitan Melbourne Waste & Resource Recovery Group Geographic Boundary 2015
- Melbourne Metropolitan Northwest Catchment
- Melbourne Metropolitan Southeast Catchment
- Greater Victorian Regions

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 Extent of Metropolitan Melbourne Waste Area




General Footnote

*Sequence of fill is to be read in conjunction with the Hub Assessments (Table 13); Existing resource recovery and reprocessing infrastructure (Table 18); Future Resource Recovery Infrastructure requirements (Table 19); and Existing Landfills (Table 20).

Footnote 1:

Landfills have potential to operate beyond 2026. It is acknowledged that due to their size and potential long term capacity, waste and/or resource recovery activities may continue at these sites beyond the current landfill schedule. In addition it is expected that, during this 10 year period and beyond, there will be changes in the need and ability of these sites to undertake resource recovery and disposal activities.

Source: Table 21 from Draft Metropolitan Waste & Resource Recovery Implementation Plan, November 2015.

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 Metropolitan Landfill Sequence of Fill

FIG. No.	Figure 2	REV.	0
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LEGEND

- Metropolitan Melbourne Waste & Resource Recovery Group Geographic Boundary 2015
- Top 5 populous municipalities - Casey, Wyndham, Brimbank, Whittlesea and Monash
- Top 5 growth areas - Wyndham, Casey, Whittlesea, Melton and Melbourne
- Melbourne Metropolitan Southeast Catchment
- Regional Highway System
- Melbourne Metropolitan Northwest Catchment
- Greater Victorian Regions
- Existing Type 2 (solid inert) Landfills
- Existing Type 3 (Putrescible) Landfills

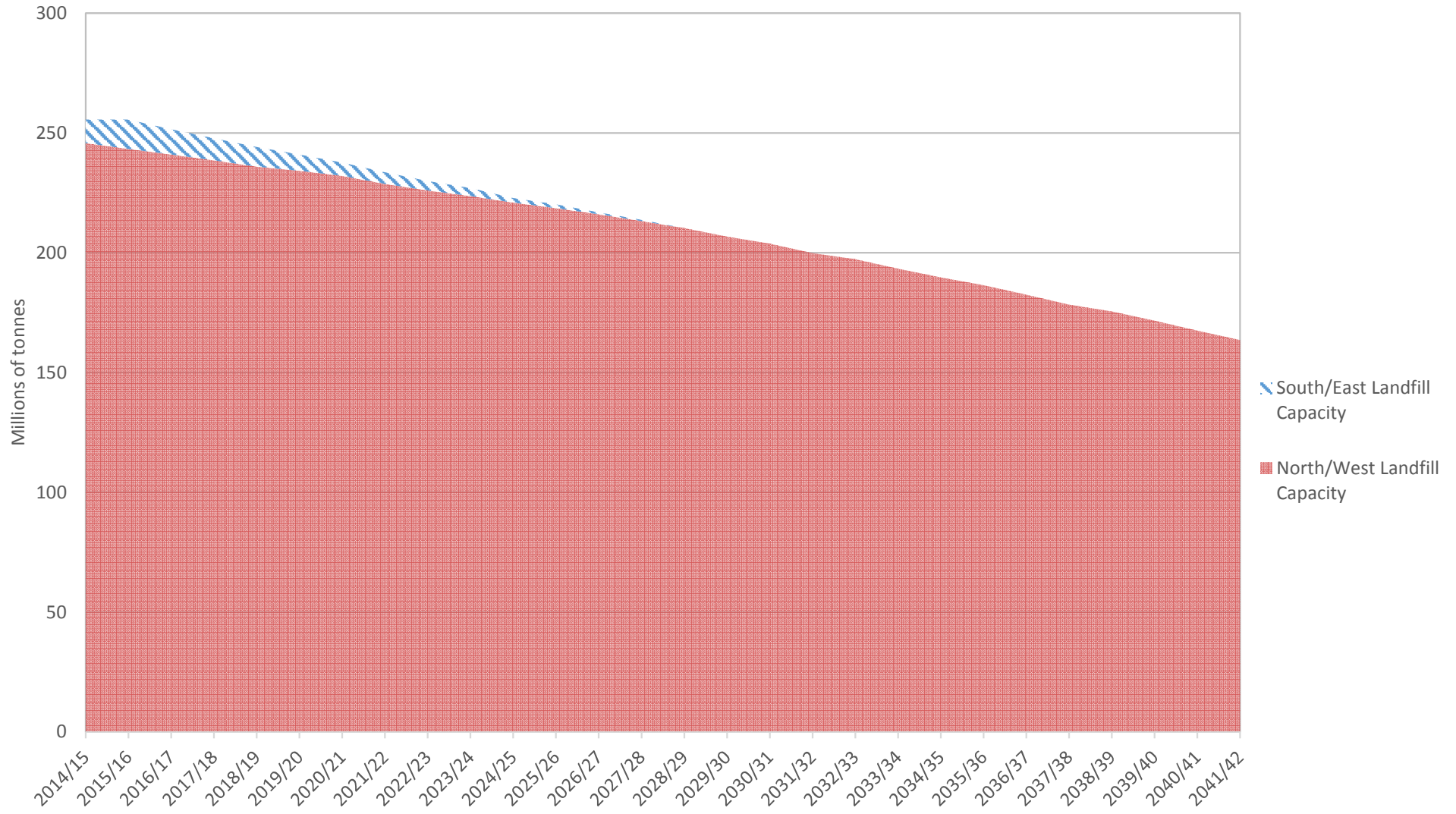
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 Existing Landfill Infrastructure in Metropolitan Melbourne

FIG. No. **Figure 3** REV. **0**

Figure 4
Projected Landfill Capacity, 2014-15 to 2041-42



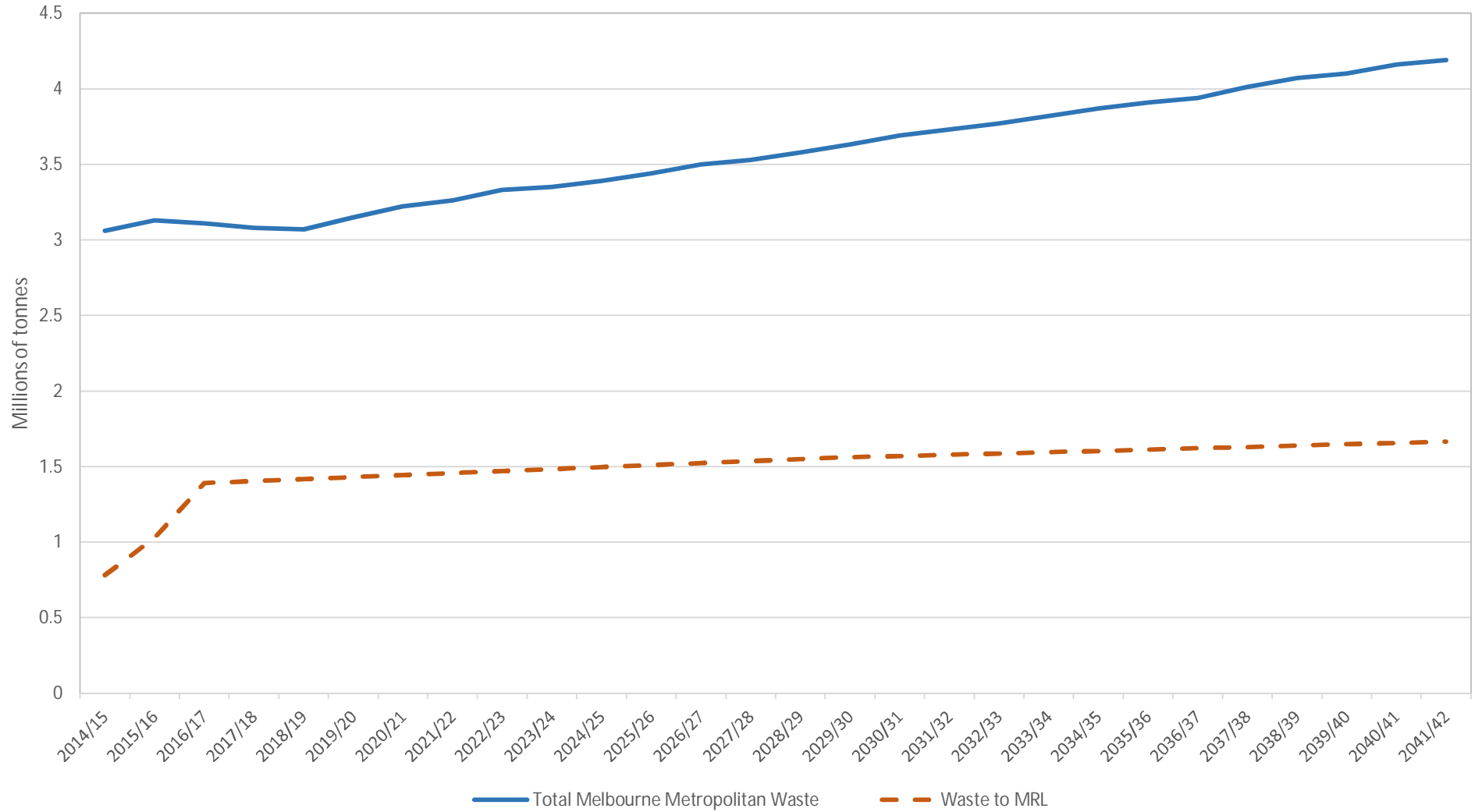
Source: Draft Metropolitan Waste and Resource Recovery Implementation Plan, Figure 16, November 2015

Figure 5
Metropolitan Region Projected Waste to be Managed



Source: Draft Metropolitan Waste and Resource Recovery Implementation Plan, Figure 6, November 2015

Figure 6
Projection of Waste to Melbourne Regional Landfill



Source: Draft Metropolitan Waste and Resource Recovery Implementation Plan, Metropolitan Waste and Resource Recovery Group, November 2015 & TPI Waste Projections

