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## Corporate Carbon Inventory Boundary & Zero Net Emissions Pathway Report

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## Table of Contents

<b>1. Carbon Inventory Boundary</b>	<b>3</b>
1.1. Purpose	9
1.2. Reporting Methodology	9
1.3. Emissions Factors	9
1.4. Organisational Boundary	9
1.5. Corporate Emissions Boundary	10
1.6. Corporate Emissions Reporting and Co Benefits	11
<b>2. Emissions Profile &amp; Reduction Targets</b>	<b>3</b>
2.1. Corporate Emissions Profile	3
2.2. Corporate Emissions Reduction Targets	4
2.3. Corporate Emissions Reduction Pathways	4
2.4. Net Zero Emissions	5
2.5. Carbon Offsetting Options	8
<b>3. Disclaimers</b>	<b>11</b>

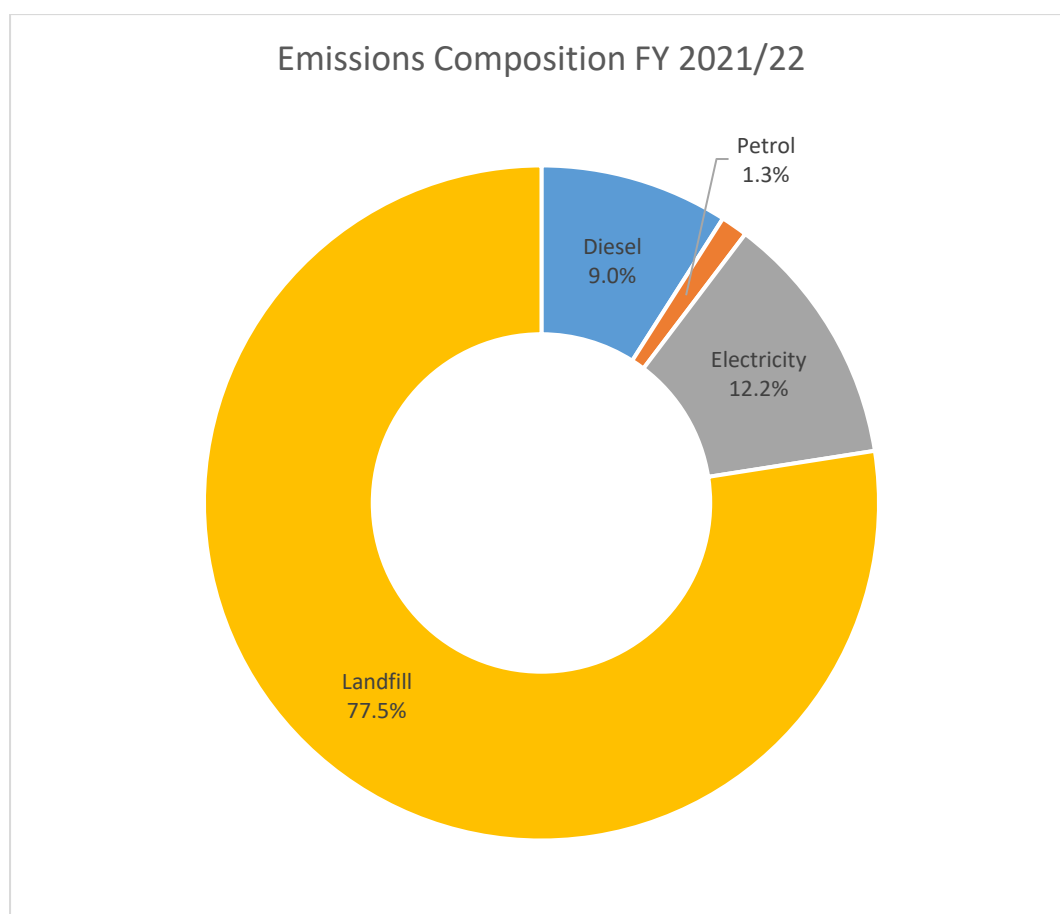
## 1. Emissions Profile & Reduction Targets

### 1.1. Corporate Emissions Profile

Murrindindi Shire Council's landfill accounts for almost 80% of Council's corporate emissions. Electricity has historically been Council's second largest emission source, followed by fuel use. Note that as of July 2022, Council is now purchasing 100% renewable electricity, reducing this portion of emissions to zero. This will be reflected in the 2021/22 profile. Water, paper bottled gas have a smaller emissions footprint so have been omitted from the below chart.

When excluding landfill from our profile, Council has reduced emissions from other sources by 11.5% since 2016/17 FY. This translates as a drop from 1,995 tonnes CO<sub>2</sub>-e to 1,766 tonnes of CO<sub>2</sub>-3. This has been achieved through:

- Increased staff awareness in turning off appliances when not in use.
- Investment in energy efficiency on-site through lighting, heating and cooling upgrades.
- Installation of solar PV on a number of Council roof spaces.



## **1.2. Corporate Emissions Reduction Targets**

In 2021, Council engaged 2XE to assist the organisation conduct a Corporate Emissions Reductions Review and Analysis to identify potential actions required to achieve net zero emissions by 2035 and determine short term and medium targets for Council's emissions reduction pathway.

Based on this information, Council has set the following emissions reduction targets:

Short term: 20% reduction on 2016/17 levels by 2025

Medium term: 75% reduction on 2016/17 levels by 2030

Long term: Net zero emissions by 2035

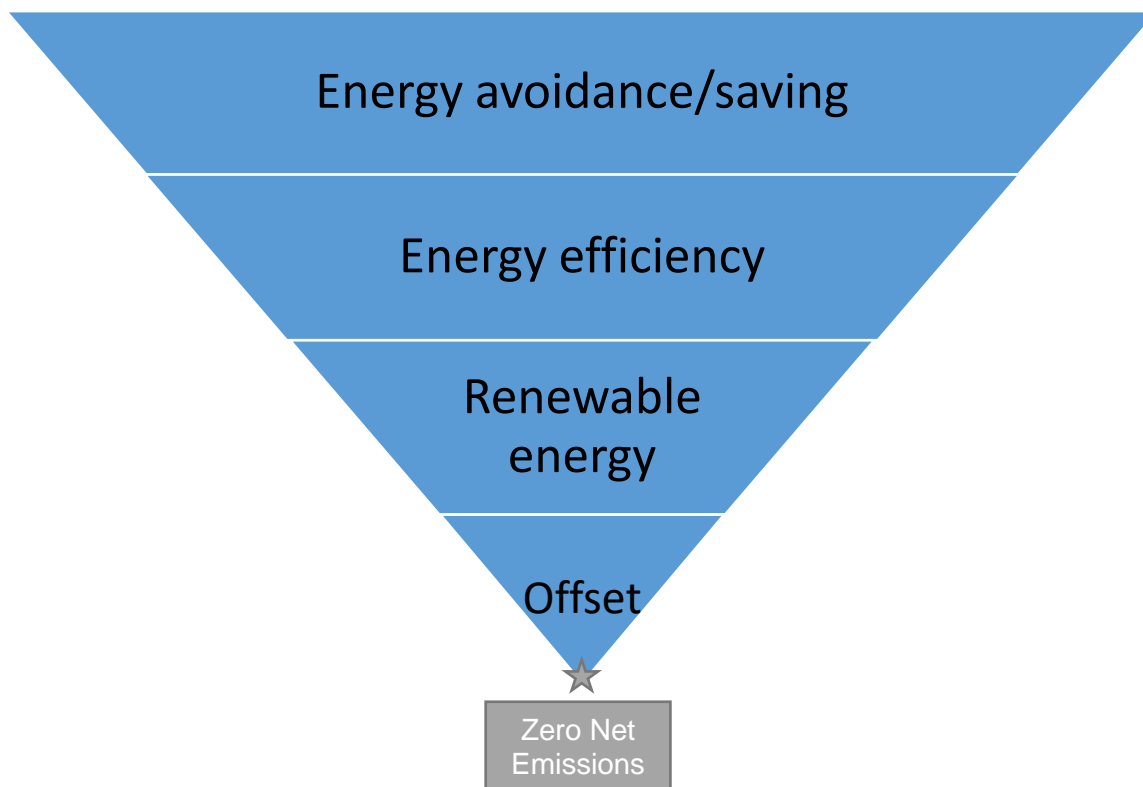
Council owns and manages its own landfill, and landfill emissions comprise ~75% of all Council emissions. Natural fluctuations in landfill emissions (as a result of historic and current waste disposal rates) may undermine any emissions reductions efforts relating to other council assets. To reflect this, Council reporting on progress towards emissions reduction targets will include a breakdown of landfill emissions and non-landfill emissions.

## **1.3. Corporate Emissions Reduction Pathways**

For electricity and transport emissions, Council's emissions reduction pathway draws on the carbon reduction hierarchy, which outlines broad categories for mitigation strategies that are favourable than others. This will ensure the best return on investment for Council and will ensure offsets to achieve net zero emissions are secured in the most cost effective way.

1. Our first choice solutions are projects that avoid the need to use energy, such as a staff work-from-home policy or behavioural change programs. These are low cost or cost saving endeavours for Council.
2. The second choice focuses on energy efficiency projects which often have high return on investment due the operational cost savings achieved by replacing inefficient lighting, appliances, and vehicles with higher efficiency alternatives.
3. The third choice involves investing in renewable energy solutions on-site and remotely through mechanisms such as power purchase agreements or Micro grid technologies, and transitioning vehicles to renewable electricity or hydrogen fuels.
4. Where emissions cannot be reduced otherwise, they can be offset as a last resort.

The carbon reduction hierarchy below provides a visual illustration of this approach.



*Figure 1: Carbon management hierarchy*

Landfill emissions pose a challenge of a different nature. Landfill emissions derive from food and organic waste breaking down into methane, and depend on the volume of organic waste being deposited by the community, as well as previous organic waste deposition. Reducing landfill emissions is therefore a joint effort from both Council and the community.

#### **1.4. Net Zero Emissions Pathway**

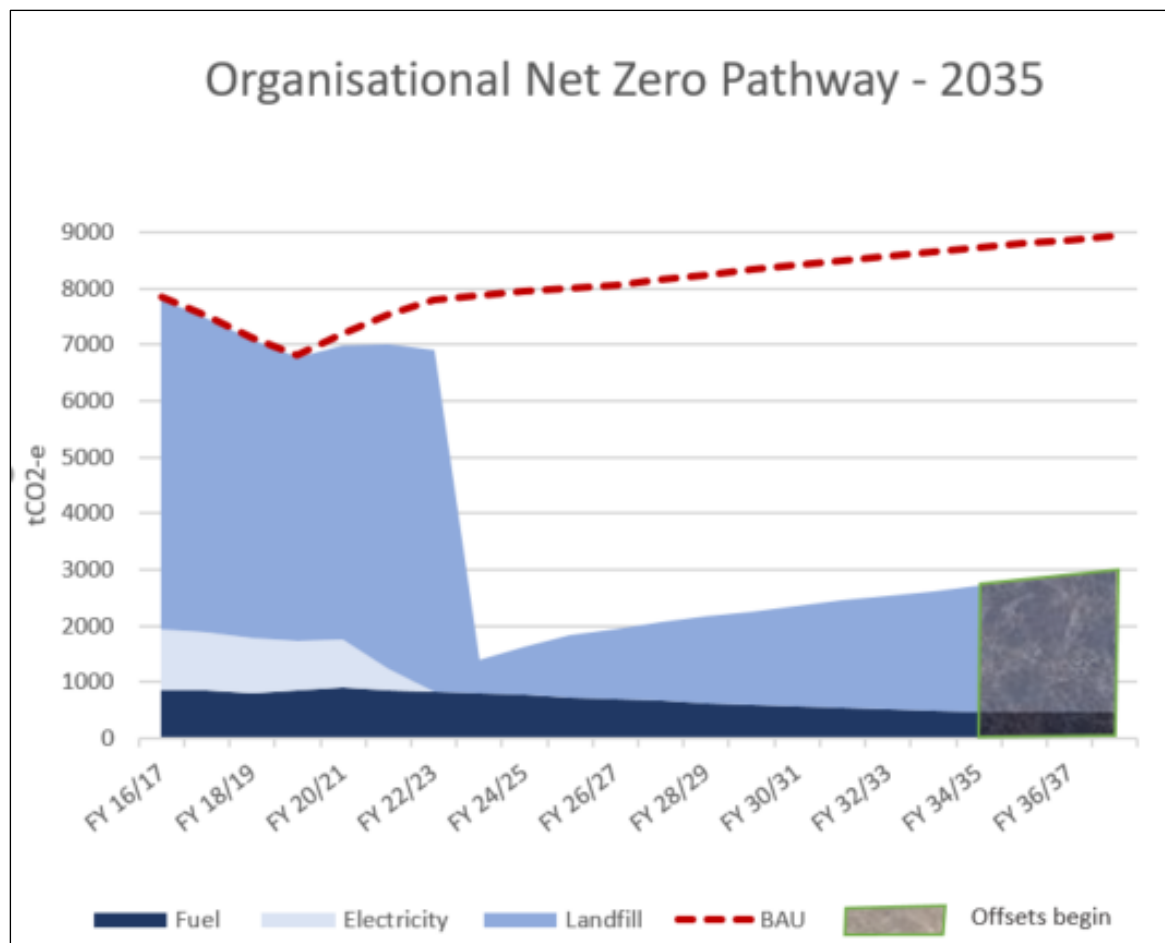
Net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions 'offset' through projects that re-absorb greenhouse gases from the atmosphere into waterways, plants or soils.

Council's pathway to a net zero emissions by 2035 is presented in Figure 1, and identified emissions reductions projects are presented in Table 1. Council has already taken steps to reduce organisational emissions, with actions including waste education to divert organic waste from landfill, energy efficiency upgrades, installation of solar photovoltaic systems, and renewable energy purchasing. Many of these actions will continue, as well as additional projects in the areas of landfill and fleet/plant management.

Council estimates that implementation of the emission reduction projects identified in Table 1 will reduce emissions from 2016/17 by around 65%, leaving just over 2,500 tonnes of CO<sub>2</sub>-e remaining to reduce through carbon offsetting by 2035. Note that the final amount of carbon to offset will be subject to a number of unknown factors, including but not limited to:

- The amount of emission reduction projects Council was able to finance and deliver by 2035.
- The reduction and/or expansion of Council's asset base and service levels.
- The reduction and/or growth of Council workforce.

- The reduction and/or growth of the municipality's rate base (and therefore waste generation) and the level of community uptake of Council's food and organic waste service, which will divert FOGO service.



**Figure 1: Net Zero Pathway by 2035**

Note at 2035 a reduction of 65% is projected by 2035. The contributions to this reduction are around 47% landfill/waste, 13% electricity, 5% fuel.

**Table 1: Emission Reduction Projects**

Emission Source	Emission Reduction Project	Timeframe	Climate Action Plan Ref.
Landfill	Phyto-capping and rehabilitation of landfill to achieve a 90% drop in emissions on of the cell.	2023/24	MIRE1
	Introduce food and organics collections service to divert organic waste from landfill (a 50% reduction in organic matter combined with capping will keep emissions below the 50% target over the next 20 years).	2024/25	MIRE2
	Continue to deliver waste education programs across Council and community using a range of educational messages and approaches.	Ongoing	MIRE3

	Continue to investigate opportunities for reducing landfill emissions (e.g. waste to energy; heat capture; flaring)	Ongoing	MIRE4
Petrol/Diesel Use	Purchase highest efficiency vehicles and plant when renewing assets, and explore use of low emissions fuels	2022/23 ongoing every year through Transition Plan	MICC3
	Consider application of hydrogen fuel cell technology in Council's heavy and light truck fleet.	2022/23 ongoing every year through Transition Plan	MICC3
	100% of Council's petrol fleet transitions to electric vehicles by 2030	Transition Plan developed by 2022, and 2022/23 ongoing every year through Transition Plan	MICC3
LPG Bottle Gas Use	LPG use for Council is less than 0.5% of all emissions, so no projects have been identified to mitigate LPG use.		
Electricity	Implement energy conservation policies (energy efficiency standards in renovations/capital improvements, IT, appliance use, automatic temperature settings, equipment run times etc.) Conduct energy audits on Council facilities and implement energy efficiency upgrades (e.g. solar and batteries, high efficiency lighting, hot water systems, HVAC retrofits including replacement of old inefficient systems, integration of intelligent systems, insulation.	2023/24 onward	MICA1
	Develop an Environmentally Sustainable Design policy/strategy and guidelines for new projects and developments, and the maintenance and upgrade of Council buildings	2023/24 onward	FAM2
	Purchasing 100% renewable electricity for Council facilities through a power purchase agreement.	Completed.	MICC3
	Replace all public street lights with high energy efficiency LED lights by 2030.	2022/23 onward	MICC4
	Install an additional 200 kW of solar panels plus battery storage to reduce electricity use by 60% and power Council's electric vehicles	2023/24 onward	MICA1
All	Reduce organisational resource use through behavioural measures such as avoiding unnecessary staff business travel, carpooling when required, cycling/walking to work, reducing paper use, switching off PCs, lights and aircon at the end of the work day.	Ongoing	MICC1

	Continue to monitor carbon offset policies, markets and schemes and investigate feasibility of local carbon offsetting opportunities in Council or privately owned land for corporate and community emissions.	2024/25 onward	MOCC4
	Develop a carbon offsetting policy or guidelines that define the principles and framework for how Council will offset.	After 2025	N/A – not in 3 year priority plan
	Offset our residual emissions by purchasing accredited carbon offsets (or credits)	2035	N/A – not in 3 year priority plan

Further background information to our net zero emissions pathway analysis can be found in TRIM 21/55256 (Logic, Methodology & Limitations) 21/55255 (Model) and 21/55254 (Power Point Presentation).

### 1.5. Carbon Offsetting Options

Unless there are significant improvements in landfill processing/gas management and significant advances in heavy machinery technologies, Council will need to secure carbon offsets to meet our net zero target. This will require investment in projects that reduce, remove or capture emissions from the atmosphere, such as reforestation, renewable energy or energy efficiency. One carbon credit is issued for each tonne of emissions avoided, removed or captured from the atmosphere.

As well as climate change mitigation, offsets can bring significant additional benefits such as biodiversity and habitat protection, waterway health, increased amenity, additional farm income, job creation, and support for First Nations people to live and work on country.

Organisations can choose to offset emissions without certification, or can secure the benefit of participating in a nationally consistent program or scheme which helps organisations improve the robustness of their carbon neutrality claims. Examples of schemes and programs include the NCOS Carbon Neutral Program, GreenFleet, and ClimateActive.

Note that carbon neutral certifications (such as Climate Active Certification) generally require Scope 3 emissions to be included (see below for information about Scope 3 emissions). These are not currently included in Council's emissions profile, but, based on calculations by comparable councils, they are estimated to comprise roughly 80% of the profile. Significant investment would therefore be required to work with staff and suppliers to reduce these emissions and source offsets for remaining emissions outside of Council's scope of influence.

Before investing in any offsetting solutions, it is prudent to take a 'wait and see' approach in the carbon market to assess what carbon offset policy approach will deliver the best co-benefits for our community, and what the corresponding implications on Council's resources and reputation will be. Council has identified a short to medium term action to develop a carbon offsetting policy or guidelines, to consider carbon offset projects in Murrindindi Shire that deliver a favourable cost benefit outcome to our Council and community.



## 2. Carbon Inventory Boundary

### 2.1. Purpose

The purpose of a carbon inventory is to monitor and report on the emissions produced by an organisation, within their defined reporting boundary.

### 2.2. Reporting Methodology

Council has used the standards of the Greenhouse Gas Protocol<sup>1</sup> to guide our organisational decisions in regard to the accounting, monitoring, management and reporting of our net zero emissions by 2035 target.

### 2.3. Emissions Factors

The emission factors used for consumption of electricity, bottled gas, and transport fuels have been sourced from the *National Greenhouse Account Factors August 2020* and the *Clean Energy Regulator Solid Waste Calculator*.

### 2.4. Organisational Boundary

Council has set its emissions reporting boundary at assets that it has full or partial control over – as identified in the Greenhouse Gas Protocol Standard.

**Table 2.1 Council's organisational boundaries:**

Control approach	Description of how it applies	Included/ excluded
<b>Full operational and financial control</b>	Assets owned by the Council and where Council has 100% operational or financial control (both in operating and renewal/maintenance costs). Examples include Council's fleet and plant, administration offices, libraries, customer service centres, depots, public conveniences; council owned public lighting, swimming pools and some community halls.	Included
<b>Financial control</b>	Assets owned by the Council and where Council has around 50% or more financial control (e.g. costs, and/or asset renewal/maintenance). Examples include community centres or halls that are under joint use agreements or where Council has appointed a community operated committee of management.	Included
<b>No operational and financial control.</b>	Assets where Council has no control operationally or financially (unless approvals are arranged between the Council and the asset owner). Examples include buildings that are owned by the Crown or Council, but operated under a Committee of Management, or vehicles that are used in Council's road and waste contracting services.)	Excluded

<sup>1</sup> See <https://ghgprotocol.org/standards>

## 2.5. Corporate Emissions Boundary

Council set operational boundaries across direct and indirect emissions for all three scopes, as defined in the Standard:

### Scope 1: Direct GHG emissions

Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled vehicles.

### Scope 2: Electricity indirect emissions

Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is brought into the organisation boundary of the company but physically occur at the facility where electricity is generated.

### Scope 3: Other indirect GHG emissions

Scope 3 is an optional reporting category that allows for the treatment of other indirect emissions that are consequences of Council's activities (i.e. provision of a service) but occur from sources not owned or controlled by the organisation.

Operational boundaries are shown in Table 2.2.

**Table 2.2 Council's operational boundaries**

	Reported Emissions	Non-Reported Emissions
<b>Scope 1</b>	Fuel Consumption – Fleet Fuel Consumption – Private km's Fuel Consumption – Plant LPG - Bottled and Bulk Municipal waste operations (landfill)	AC refrigerants – Fridges Fugitive Emissions
<b>Scope 2</b>	Grid electricity usage (100% operationally and financially controlled sites)	n/a
<b>Scope 3</b>	Street lighting Grid electricity usage (financially but not operationally controlled sites). Office paper Water reticulated use and disposal (water supply) Water extracted and used (groundwater and surface water)	Staff business travel Staff commuting Contractor vehicle/plant use Disposal of Council waste Office paper (*at sites other than main administration office) Emissions from transport of purchased materials/products Embodied emissions of other supplies and services Petroleum based lubricants Off-site and open space annual events Electricity use in public facilities not under operational or financial control of Council.

It is acknowledged that our carbon inventory boundary could better reflect Scope 3 emissions; however, the resources to do this are currently unavailable within Council's existing staff levels and operational budget. Priority emissions to include, as a starting point,

would be staff business travel, staff commuting, disposal of Council generated waste, office paper consumption, and contractor vehicle/plant use. Inclusion of these emissions would give a more accurate reflection of Council's environmental footprint.

## **2.6. Corporate Emissions Reporting and Co Benefits**

Council has invested in emissions management software known as Azility. All of Council's reportable greenhouse gas emissions, as defined in Table 1.1 Organisation Boundaries and Table 1.2 Operational Boundaries will be reported from this system annually through a combination of automated and manual processes of data collation. The system is administrated by Council's Environmental Programs Unit with support from our Assets and Finance Teams.

This system offers additional benefits to the organisation, some of which are underutilised. These include the ability to:

- Improve monthly utility billing, tracking and payment.
- Track utility expenditure and improve management of monthly and quarterly budgets.
- Understand assets energy and water performance.
- Identify and rectify anomalies (unusual bills, water leaks, pump problems etc.)
- Report performance over time.

## **3. Disclaimers**

### **Baseline Data**

The baseline used council data from FY 16/17 to FY 19/20.

### **Business as Usual Forecast**

The BAU forecast assumes that the quantity of resources used during the last year of the baseline (FY19/20) will be consistent for the next 30 years. Realistically, the resource use over the next 30 years will vary considerably. Given the uncertainty of future emissions profiles, these values are assumed to be constant.

The Victorian government has estimated future electricity conversion factors between 2021-2025<sup>2</sup>. These factors have been included in the BAU forecast. The landfill BAU forecast is based on the councils' future plans for closing one landfill site and opening a second landfill site over the next two years.

The BAU forecast for the first landfill site illustrates the emissions profile on an uncapped landfill site. Emissions on this site are expected to decrease slowly over the next 30 years. The BAU forecast for the second landfill site assumes that the quantity and composition of waste entering the second landfill site will be consistent with that of the first landfill site.

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<sup>2</sup>[https://www.vic.gov.au/sites/default/files/2020-02/Final\\_Regulatory\\_Impact\\_Statement\\_2019\\_-\\_Main\\_Text.pdf](https://www.vic.gov.au/sites/default/files/2020-02/Final_Regulatory_Impact_Statement_2019_-_Main_Text.pdf)