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Coca-Cola Amatil Eastern Creek

Proposed Injection Moulding Plant

Air Quality and Greenhouse Gas Assessment

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Lvl 10 60 Castereagh Street
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Air Quality and Greenhouse Gas Assessment

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TABLE OF CONTENTS

TABLES

TABLE OF CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

Heggies Pty Ltd (Heggies) has been commissioned by Goodman Property Services Australia Pty Ltd to conduct an Air Quality Assessment (AQA) an Greenhouse Gas Assessment for the operation of the proposed Coca-Cola Amatil (CCA) Preform Injection Moulding Plant (hereafter, “the Project”). The Project site will be located at the existing Coca-Cola Distribution Centre within the M7 Business Hub in Eastern Creek, NSW.

1.1 Description of Proposal and Site

Coca-Cola Amatil (CCA) operates in Australia, New Zealand, Papa New Guinea, Fiji and Indonesia and currently employees more than 1,850 people in NSW. CCA propose to build a PET Preform and Closure manufacturing plant to provide preforms and closures to its in-house Blowfill Bottling Operations in Australia, New Zealand, Papa New Guinea and Fiji.

The facility will require approximately 7,500m^2 of space (expanding up to 10,000m^2) to house technical rooms, the production lines and associated storage and staging of the finished product. The building is anticipated to have multiple heights to accommodate the production line layout requirements.

The facility is proposed to be located within the site of the existing CCA Distribution Centre at Roussell Road, Eastern Creek, NSW as shown in **Figure 2** and **Figure 3**.

Current CCA distribution facility operates 24 hours per day 7 days per week and the proposed preform moulding plant will also operate 24 hours per day 7 days per week.

1.2 Nearest Sensitive Receptors

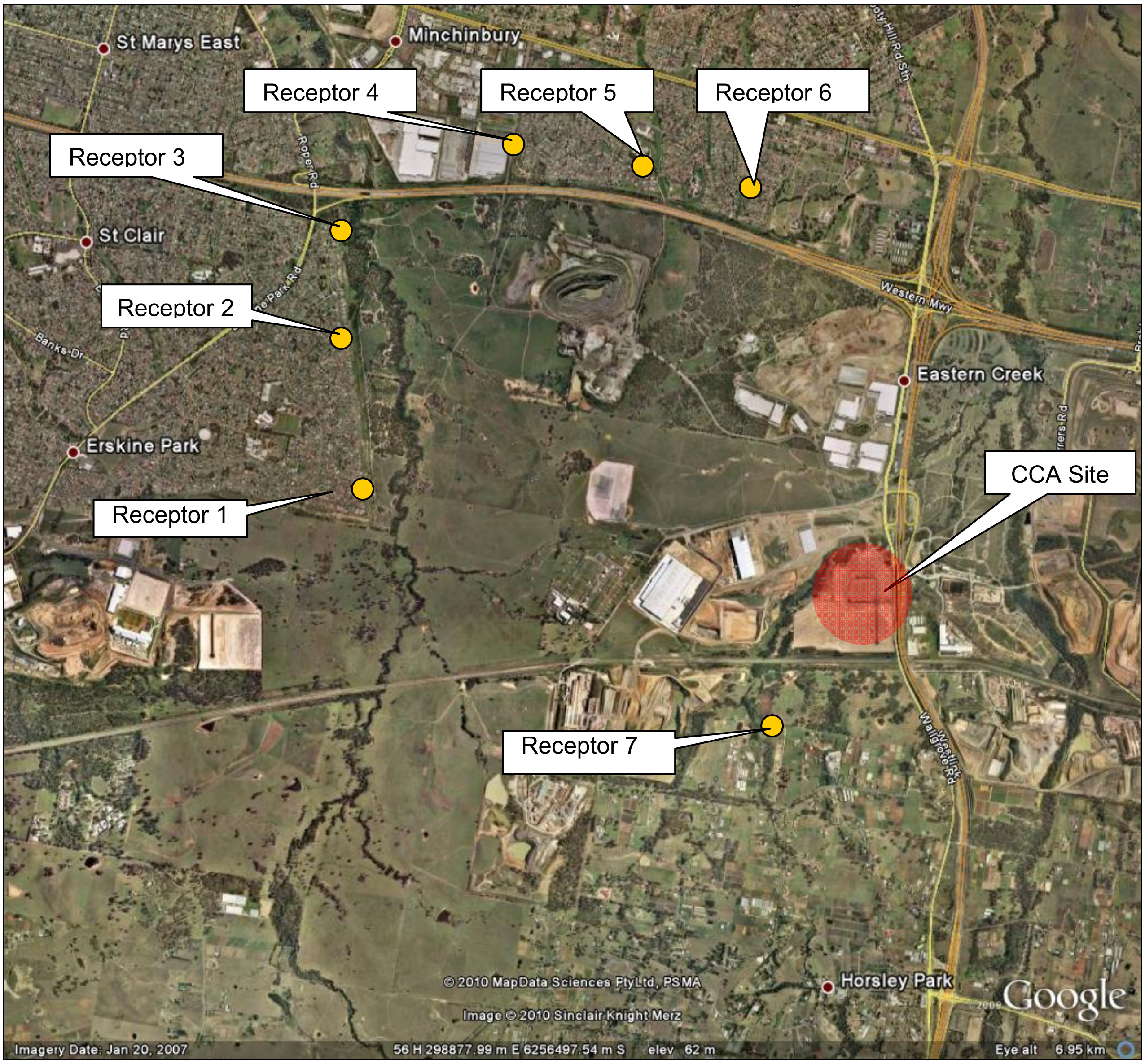
The proposed Coca-Cola preform injection moulding plant is contained within Zone 6 of the M7 Business Hub.

The residential suburb of Erskine Park is located west of the site. The M4 and M7 Motorway are to the north and east of the site respectively with the residential suburb of Minchinbury to the immediate north of the M4.

Sydney West Substation, further industrial areas and scattered residential properties are located to the south of the site. The nearest residence is approximately 500 metres to the south of the site.

The nearest potentially affected receptors are residents located in Erskine Park to the west, Minchinbury to the north and residences off Burley Road, Horsley Park to the south. See Location Map in **Figure 1** for details.

Figure 1 Location of Nearest Sensitive Receptors



Source: Google Earth

Figure 2 Estate Masterplan

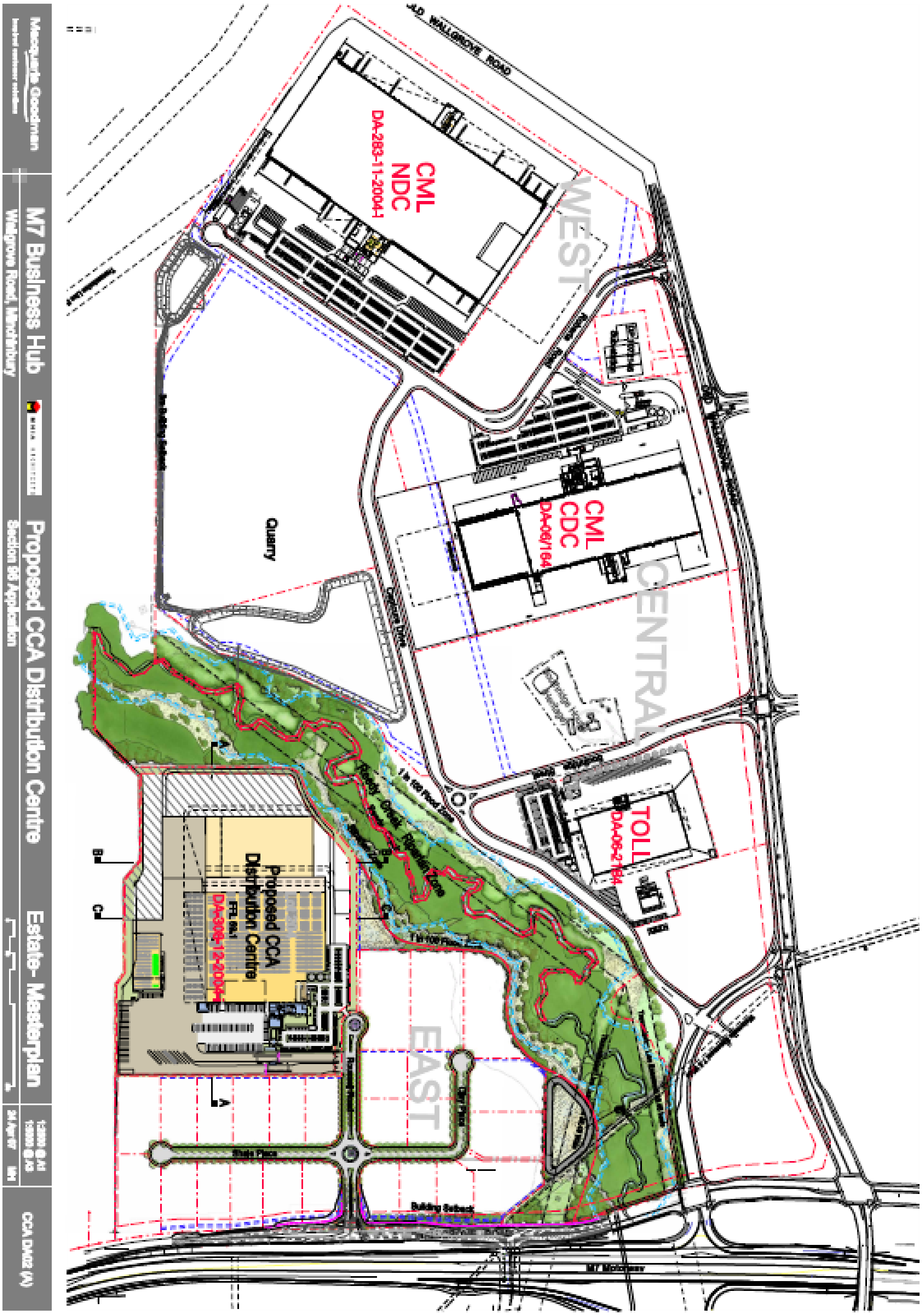
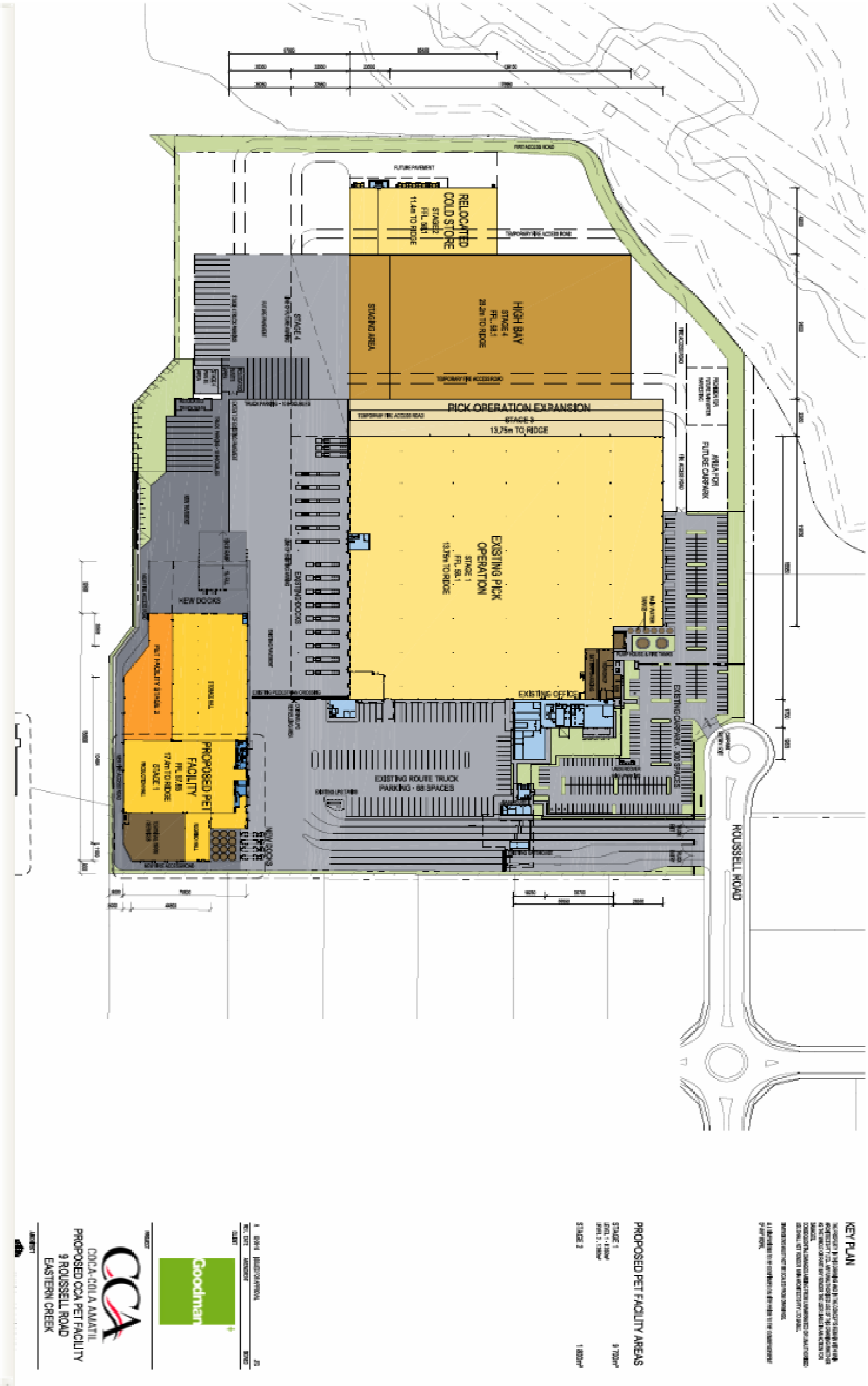


Figure 3 Site Map



1.3 Director General Requirements

The Director General requirements applicable to this assessment are described in **Table 1**.

Table 1 Director General Requirements

Key Issue	Description
Air quality and odour	A quantitative assessment of the potential air quality and odour impacts of the project.
Greenhouse Gas	A quantitative assessment of the scope 1 and 2 greenhouse gas emissions of the project. A qualitative assessment of the potential impacts of these emissions on the environment. An assessment of all reasonable and feasible measures that could be implemented to minimise the generation of greenhouse gas emissions associated with the project.

2 PROJECT PROCESS INFORMATION

The manufacturing process entails converting polyethylene terephthalate (PET) and high density polyethylene (HDPE) resin pellets into preforms and closures respectively. The steps of this process are explained below.

2.1 Resin Delivery & Storage

PET and HDPE resin pellets arrive on site in 20’ shipping containers lined with a large plastic bag. Each delivery of resin pellets has a weight of up to 25 tonnes. The Resin Pellets are loaded into a rotary valve located next to silos and an air blower transfers the Resin Pellets from the rotary valve up to top of the resin silos where the resin is stored ready for use. The unloading process for one container of resin is approximately 1 hour. In some cases the rotary valve and blower onsite will not be used to load the resin pellets into the silos as some of the delivery trucks are fitted with their own air blower which can be connected to the silo pipework directly. All PET and HDPE resin pellets are stored in large silos approximately 4,400mm in diameter by 13m in height.

2.2 Resin Blending

PET resin pellets are transferred via vacuum pipework from the bottom of the silos into the Blending Room where the resin is loaded into Blender. The resin from the silo (Virgin PET) is blended with small amounts of recycled resin (Regrind) produced from the small amount of plastic waste produced during the start-up of the process. Once the PET Resin Pellets have been blended, vacuum pipework is then used to transfer the PET Resin Pellets to the Resin Dryers in the Dryer Room. HDPE Resin pellets are also transferred via vacuum pipework from the bottom of the silos; however the resin is transferred directly to the loading hopper on top of the Closure Injection Machine.

2.3 Resin Drying

PET resin is loaded into the resin dryers located in the dryer room. Each of the resin dryers holds approximately 6 tonnes of blended PET resin pellets. Inside the dryer the resin is heated up to 170°C for a period of 4 to 6 hours. During this process the air in the dryer is circulated, the moisture in the air is removed by passing the air through a desiccant bed. The drying process is a continuous process as the resin loaded in the top of the dryer takes approximately 4 to 6 hours to reach the bottom of the dryer. At the bottom of the dryer the hot PET Resin Pellets are fed into the preform iInjection machine.

2.4 Injection Moulding

PET resin pellets are fed from the bottom of the resin dryer into the preform injection moulding machine where the pellets are melted with heat and pressure into molten PET. The PET Resin is then injected into a steel mould to produce PET preforms. The preforms are then transferred from the preform injection moulding machine where they are packed into bins. Once the bins have been filled, Automatic Guided Vehicles (AGV) take the filled bins to the warehouse conveyor. The AGV also bring empty bins to the preform injection machine for filling. HDPE resin pellets are fed from the loading hopper located above the closure injection machine where the pellets are melted with heat and pressure into molten HDPE. The HDPE resin is then injected into a steel mould to produce HDPE closures.

The closures are then transferred from the closure injection moulding machine where they are packed into bins and AGV take the filled bins to the warehouse conveyor. Closures requiring printing are not packed into bins but are transferred directly from the closure injection machine via conveyors to the closure printing mjachines. Closures are loaded into the closure printing machines where logos are printed onto the surface of the closures. The printed closures are dried and then packed into bins. Once the bins have been filled the AGV take the filled bins to the warehouse conveyor. The AGV also bring empty bins to the closure injection machine and closure printing machines for filling.

2.5 Warehousing

Preforms and closures are loaded onto the warehouse conveyor via AGV where the bins are labelled and transferred from the injection moulding room into the warehouse. The bins are then moved via forklifts into the warehouse where the bins are stacked up to 5 bins high in the warehouse.

3 SUMMARY OF AIR QUALITY EMISSIONS

It is noted that all major plant and equipment that operates on-site uses mains electricity. There is no gas consumed on-site.

Table 2 lists of the plant and equipment and the associated air emissions.

Table 2 Summary of emission sources

Process Item	Plant and equipment	Significant Emissions to air
Resin Delivery and Storage	Air Blowers	Nil
Resin Blending	Vacuum pumps	Nil
	Blenders	Nil
Resin Drying	Resin Dryers	Hot air only.
Injection Moulding	Closure injection machine x11	Nil
	Printers x 3	Fugitive volatile organic compounds
	Printer dryers x 4	Fugitive volatile organic compounds
	Mould dehumidifier	Hot air only
Warehousing	-	Nil

As described in **Table 2**, there are no major emissions to air. It is understood that there are also no stack sources that emit anything other than hot air. The only source that is understood to be of significance for consideration within this assessment are the fugitive emissions of Volatile Organic Compounds (VOCs) from the printing process.

Heggies reviewed of the emissions to air from resin drying and injection moulding process. Following communications with Husky Injection Moulding, the manufacturer of the Plant, they have confirmed that, with exception of VOCs from the printing process, there are no odour or air pollutants emitted from the process. A letter provided by Husky Injection Moulding, confirming this, is provided in **Appendix A**. Heggies have therefore adopted their recommendations.

4 AIR QUALITY DISCUSSION

As described in **Table 2**, there are no major emissions to air. There are also no stack emissions. In accordance with the DGRs described in **Table 2**, there is a requirement to undertake a quantitative assessment of potential air quality and odour impacts. With there being no major emissions to air, a quantitative assessment for the proposed Coca-Cola Amatil (CCA) Preform Injection Moulding Plant has not been undertaken within this assessment.

Heggies understands and confirms the following:

- There is no stack associated with the project used to emit anything other than hot air.
- There are no significant emissions of particulate from the Project.
- There are no significant combustion emissions from the Project.
- Fugitive emissions of VOC are emitted from the printers.

With the nearest sensitive receiver being approximately 500 metres from the Project site, and no major emission sources, air emissions are therefore not anticipated to have a negative impact with regard to air quality.

4.1 Consultation with DECCW

Heggies contacted the Department of Environment, Climate Change and Water (DECCW) on Friday 10 September 2010.

Contact was made with Janelle Pickup from the Air Policy unit and it was confirmed that if there were no stack sources, a quantitative assessment was not necessary (Pers Comm 2010).

DECCW have requested that the fugitive emissions from the printers be appropriately captured and treated with an afterburner.

4.2 Mitigation

CCA propose to install an extraction system to capture the VOCs emitted from the printing process. The extraction system will incorporate an afterburner to mitigate the VOCs within the air stream, in compliance with the consultation advice received from DECCW.

The extraction system will incorporate a local exhaust ventilation (LEV) system, for each of the five (5) printers, all converging into one duct which will be directed through an afterburner.

It is anticipated that the afterburner will eliminate 99% of VOC emissions vented to atmosphere.

The design of the extraction system will consider *AS 1668 The Use of Ventilation and Air Conditioning in Buildings, Part 1 and Part 2*.

5 GREENHOUSE GAS ASSESSMENT

A quantitative greenhouse gas assessment has been undertaken to estimate potential greenhouse gas (GHG) emissions associated with the Project.

5.1 Direct and Indirect Emissions (Emission Scopes)

The NGA Factors (DCC, 2009) defines two types of greenhouse gas emissions:

> ***Direct emissions*** *are produced from sources within the boundary of an organisation and as a result of the organisation's activities.*
>
> *...*
>
> ***Indirect emissions*** *are emission generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation.*

The NGA Factors identifies three 'scopes' of emissions for greenhouse gas accounting and reporting purposes, defined as follows:

- *Direct (or point-source) emission factors give the kilograms of carbon dioxide equivalent (CO2-e) emitted per unit of activity at the point of emission release (i.e. fuel use, energy use, manufacturing process activity, mining activity, on-site waste disposal, etc.). These factors are used to calculate scope 1 emissions.*
- *Indirect emission factors are used to calculate scope 2 emissions from the generation of the electricity purchased and consumed by an organisation as kilograms of CO2-e per unit of electricity consumed. Scope 2 emissions are physically produced by the burning of fuels (coal, natural gas, etc.) at the power station.*
- *Various emission factors can be used to calculate scope 3 emissions. For ease of use, this workbook reports specific 'scope 3' emission factors for organisations that:*
  - *(a) burn fossil fuels: to estimate their indirect emissions attributable to the extraction, production and transport of those fuels; or*
  - *(b) consume purchased electricity: to estimate their indirect emissions from the extraction, production and transport of fuel burned at generation and the indirect emissions attributable to the electricity lost in delivery in the T&D network.*

5.2 Greenhouse Gas Calculation Methodology

Quantification of potential Project emissions has been undertaken in relation to both carbon dioxide (CO_2) and other non-CO_2 greenhouse gas emissions.

For comparative purposes, non-CO_2 greenhouse gases are awarded a "CO_2-equivalence" (CO_2-e) based on their contribution to the enhancement of the greenhouse effect. The CO_2-e of a gas is calculated using an index called the Global Warming Potential (GWP). The GWPs for a variety of non-CO_2 greenhouse gases are contained within the Intergovernmental Panel on Climate Change (IPCC), (1996) document "*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*".

The GWPs of relevance to this assessment are:

- methane (CH_4): GWP of 21 (21 times more effective as a greenhouse gas than CO_2); and
- nitrous oxide (N_2O): GWP of 310 (310 times more effective as a greenhouse gas than CO_2).

The short-lived gases such as carbon monoxide (CO), nitrogen dioxide (NO_2), and non-methane volatile organic compounds (NMVOCs) vary spatially and it is consequently difficult to quantify their global radiative forcing impacts. For this reason, GWP values are generally not attributed to these gases nor have they been considered further as part of this assessment.

The greenhouse gas emissions associated with the Project have been assessed in terms of direct (Scope 1) emission potential, indirect (Scope 2) emission potential. As detailed within the DGRs (**Table 1**), Scope 3 has not been assessed

A summary of the potential greenhouse gas emission sources is provided in **Table 3**.

Table 3 Summary of Potential Project Greenhouse Gas Emissions

Project Component	Direct Emissions	Indirect Emissions
	Scope 1	Scope 2
Transportation of pre-forms from shipping yard	Emissions from the combustion of diesel by transporting the pre-forms to the CCA Facility	NA
Transportation of post-consumer recycled resin from recycling centre	Emissions from the combustion of diesel by transporting the pre-forms to the CCA Facility	NA
Electricity	NA	Emissions associated with the consumption of generated and purchased electricity at the Project Site.

Scope 1: Direct Emissions through the Transportation of Pre-forms

Scope 1 GHG emissions attributable to diesel relate to the haulage of pre-forms to the site.

Annual Scope 1 emissions of CO_2 and other GHG from diesel combustion have been estimated using emission factors contained in Table 4 of the NGA Factors. The following is assumed

- Annual diesel combustion associated with the transport of imported resin from Port Botany to Eastern Creek and PCR from Visy at Prestons to Eastern Creek calculated as 51,684 L from the following:
  - Truck vehicle consumption rate of 30 L\100km (from VTT, 2005); and
  - Average truck delivery round trip distance from Port Botany of 110 km.
  - Average truck delivery round trip distance from Preston of 32 km.
  - The facility will receive one (1) load of pre-form from Prestons per day.
  - The facility will receive four (4) loads of pre-form from Port Botany per day.

The calculated Scope 1 diesel combustion related emissions for proposed Injection Moulding Plant are presented in **Table 4**.

Table 4 Scope 1 GHG Emissions from the Project

Emissions Source	Activity Rate / annum	Calculated Emissions t CO_2-e /annum
Diesel Combustion	51,684 L	139.5
TOTAL		**139.5**

Scope 2: Indirect Emissions through the Consumption of Purchased Electricity

Electricity consumption at the Project Site has been calculated as (approximately) 36,672 Megawatt-hours (MWh) based on 2017 estimations for the project supplied by Husky Injection Moulding.

The emission factor for Scope 2 (0.89 tonnes of CO_2-equivalents per kilowatt hour [t CO_2-e/kWh]) represents the consumption of purchased electricity in NSW.

Calculated Scope 2 emissions of greenhouse gas resulting from the emissions sources outlined above for the Project are presented in **Table 5**.

Table 5 Scope 2 GHG Emissions from the Project

Emissions Source	Activity Rate / annum	Calculated Emissions t CO_2-e /annum
Electricity	36,672 MWh	32,638
TOTAL		**32,638**

5.3 Greenhouse Gas Calculation Results

The total calculated annual GHG emissions are presented in **Table 6**.

Table 6 Total Annual GHG Emissions

GHG Emissions (t CO_2-e/year)		Total Emissions (t CO_2-e/year)
Scope 1	**Scope 2**	
139.5	32,638	32,777.5

A comparison of the predicted project emissions against Australia's 2007 net emissions of 597 Mt CO_2-e demonstrates the Project would represent approximately 0.005 % of the total annual Australian emissions (DCC, 2008). A comparison of the predicted Project emissions against NSW emissions in 2007 (162.7 Mt CO_2-e) demonstrates that the Project would represent approximately 0.02% of NSW emissions (DCC, 2007).

5.4 Greenhouse Gas Mitigation Measures

The measures that the Project Site is striving to achieve include:

- Resin Drying – investment in latest technology drying systems will **reduce energy** consumption required to dry PET resin prior to moulding.
- Preform Moulding Machine – latest Technology injection machine will produce preforms faster at with a **lower energy** requirement.
- Transport emissions will be reduced as pallets of bottles will no longer be transported to the Beverage filling Plant – only performs.
- Depalletising & Rinsing of Bottles **-** is no longer required as preforms are automatically feed to the integrated Blowfill machine – **reducing energy consumption.**

6 CONCLUSION

Heggies has been commissioned by Goodman Property Services (Aust) Pty Ltd to conduct an Air Quality Assessment an Greenhouse Gas Assessment for the operation of the proposed Coca-Cola Amatil Preform Injection Moulding Plant.

It air assessment concluded that:

- There is no stack associated with the project used to emit anything other than hot air.
- There are no significant emissions of particulate from the Project.
- There are no significant combustion emissions from the Project.
- Fugitive emissions of VOC are emitted from the printers, which can be effectively mitigated using an extraction system and afterburner.

With the nearest sensitive receiver being approximately 500 metres from the Project site, and no major emission sources, air emissions are therefore not anticipated to have a negative impact with regard to air quality.

A Scope 1 and 2 Greenhouse Gas was undertaken. A comparison of the predicted Project emissions against Australia's 2007 net emissions of 597 Mt CO_2-e demonstrates the Project would represent approximately 0.005 % of the total annual Australian emissions (DCC, 2007). A comparison of the predicted Project emissions against NSW emissions in 2007 (162.7 Mt CO_2-e) demonstrates that the Project would represent approximately 0.02% of NSW emissions (DCC, 2007).

7 REFERENCES

- Commonwealth of Australia Department of Climate Change (2007) "Australia's National Greenhouse Accounts, State and Territory Greenhouse Gas Inventories".
- Commonwealth of Australia Department of Climate Change (2009) "National Greenhouse Accounts (NGA) Factors Workbook".
- Intergovernmental Panel on Climate Change (IPCC) (1996) "Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories".
- Personal Communication (10 September 2010) Discussion with Janelle Pickup from DECCW Air Policy.

8 CLOSURE

This report has been prepared by Heggies Pty Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Goodman Property Services (Aust) Pty Ltd; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Heggies.

Heggies disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Husky Injection Moulding Air Emissions Letter

HUSKY

Keeping our customers in the lead

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Wednesday, September 15, 2010

Coca Cola Amatil

Attn: Ian Twaddle

Re: Regeneration air from PET Resin dryers

Ian
As discussed, below is an extract from an installation guide for the resin dryers. It identifies the composition of typical regeneration air coming from the resin dryers. Obviously the composition varies with resin specification. Plastic Systems are the manufacturer of the Husky dryers.

Plastic Systems declares that the composition of the air regeneration include:

- air;
- water from the humidity in the plastic granules;
- acetaldehyde from the plastic granules ***(very low quantity tending to 0)**;*

Please let me know if there is anything else I can help you with.

Kind regards

Michael Ludemann
PET Business Manager, ANZ.