Moss Vale Plastics Recycling and Reprocessing Facility

Technical Report 9 – Greenhouse Gas

Plasrefine Recycling Pty Ltd

27 January 2022

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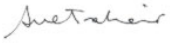
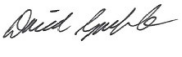
S4	0	H. Dumesich, P. Golveque	S Trahair		D Gamble		02/11/21
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Executive summary

The proposal

Plasrefine Recycling Pty Ltd (Plasrefine) ('the proponent') is seeking approval to construct and operate a plastics recycling and reprocessing facility in Moss Vale, NSW ('the proposal').

The proposal would sort the plastics into different types and convert the various plastics to plastic flakes and pellets (in the first stage) and produce more advanced products (in the second stage). The combined outputs of both stages of the proposal would help fill the gap in local processing capacity for mixed plastics.

The proposal is State significant development and is subject to approval by the NSW Minister for Planning and Public Spaces under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report

This greenhouse gas (GHG) assessment report has been prepared on behalf of Plasrefine Recycling Pty Ltd for the proposal to support the environmental impact assessment (EIS) for the proposal and responds to the Secretary's Environmental Assessment Requirements (SEARs) for greenhouse gas.

This report provides an assessment of GHG in accordance with the general principles of ISO 14064-2 and the National Greenhouse and Energy Reporting (NGER) (Measurement) Determination 2008.

Recommended mitigation and management measures were identified in response to the impact assessment findings.

Impacts from the proposal during construction

Scope 1 and 2 emissions from construction of the proposal are estimated as approximately 2,600 tCO_2-e, over the whole construction period. Construction emissions are considered negligible compared to annual emissions in NSW and Australia.

Impacts from the proposal during operation

Annual Scope 1 and 2 emissions during operations are estimated as approximately 91,033 tCO_2-e, which is approximately 0.07% of NSW's annual emissions and 0.02% of Australia's annual emissions. Operational emissions are also considered minor compared to annual emissions in NSW and Australia.

Recommended mitigation measures

The following measures should be put in place to reduce and mitigate emissions:

- Construction:
  - Sustainable procurement practices adopted where feasible
  - Construction materials sourced locally where possible
  - Investigate the use of biodiesel for trucks and equipment, where suitable
  - Investigate the use of electric light vehicles, where feasible
  - Investigate the use of low carbon concrete
  - All plant and equipment used during the construction works be regularly maintained to reduce emissions and comply with the relevant exhaust emission guidelines
  - Plant and equipment be switched off when not in constant use and not left idling, as long as safe
  - Plant and equipment be brought onsite regularly serviced and energy efficient vehicles or equipment will be selected where available
- Operations:
  - Investigate other more energy efficient equipment and lighting

- Consider installing solar panels on the roof areas
- Purchase of Greenpower for grid electricity.
- Annual monitoring and reporting of GHG emissions under the NGER scheme

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Abbreviations

Term	Definition
AS	Australian Standard
BAU	Business as usual
CER	Clean Energy Regulator
CH_4	Methane
C&I	Commercial and Industrial
CO_2	Carbon dioxide
commercial and industrial waste (C&I)	waste produced by a broad range of businesses and industries such as manufacturing, retail, accommodation and food service, office/administration, healthcare and education facilities
construction footprint	defined as the area that would be directly affected by construction of the proposal. It includes: – the location of proposal infrastructure – the area that would be directly disturbed by the movement of construction plant and machinery, and the location of the temporary construction workforce accommodation facility, construction compounds and laydown areas that would be used during construction the overhead powerline corridor
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPIE	Department of Planning, Industry and Environment
EIS	environmental impact statement
EF	Emissions factor
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
energy from waste	a facility that thermally treats a waste or waste derived material, which is not an eligible fuel and which has as one of its primary purposes to create energy, typically as heat or electricity
GHG	Greenhouse Gas
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardisation
kL	kilolitre
kWh	Kilowatt-hour
LGA	local government area
$MtCO_2$-e	Mega tonnes carbon dioxide equivalent
MWh	Megawatt-hour
MSW	Municipal Solid Waste
municipal solid waste	waste produced primarily by households and council operations
MVEC	Moss Vale Enterprise Corridor
N_2O	Nitrous Oxide
NGA	National Greenhouse Accounts
NGER	National Greenhouse and Energy
NSW	New South Wales
ppm	parts per million
proponent	Plasrefine Recycling Pty Ltd

Term	Definition
proposal	The proposal would have an ultimate capacity to receive up to 120,000 tonnes per year of waste plastics and wastes containing plastics, from which approximately 100,000 tonnes per year of mixed plastics would be extracted and processed
Plasrefine Recycling	Plasrefine Recycling Pty Ltd
SEARS	Secretary's Environmental Assessment Requirements
SF_6	Sulphur hexafluoride
t CO_2-e	Tonnes carbon dioxide equivalent
TJ	Terajoules

1. Introduction

1.1 Overview

1.1.1 Plasrefine Recycling and the proposal

For many years, recyclable plastics have been recovered from kerbside collections and it has been profitable to export mixed plastics to China and other countries. With the advent of the China National Sword policy (a policy in China which banned the importation of certain types of waste and set strict contamination limits on recyclable materials), as well as issues with contaminated loads of recyclables being sent to China and other countries, opportunities to send mixed plastics overseas for processing have diminished. Recently, the Council of Australian Governments (COAG) decided to ban exports of recyclable waste from Australia from July 2021.

Despite these difficulties, export markets still exist for clean, separated, pelletised plastics and resins. However, there is very little local capacity in NSW and within Australia to sort recovered plastics into different types and convert them into valuable products.

To help address this issue, Plasrefine Recycling Pty Ltd (Plasrefine Recycling) ('the proponent') proposes to construct and operate a plastics recycling and reprocessing facility in Moss Vale ('the proposal').

The proposal would sort the plastics into different types, and convert the various plastics to plastic flakes and pellets (in the first stage) and produce more advanced products (in the second stage). The combined outputs of both stages of the proposal would help fill the gap in local processing capacity for mixed plastics.

The proposal would have an ultimate capacity to receive up to 120,000 tonnes per year of mixed waste plastics.

1.1.2 Approval and assessment requirements

The proposal is State significant development and is subject to approval by the NSW Minister for Planning and Public Spaces under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This report has been prepared by GHD Pty Ltd (GHD) as part of the environmental impact statement (EIS) for the proposal. The EIS has been prepared to support the application for approval of the proposal and address the environmental assessment requirements of the Secretary of the NSW Department of Planning, Industry and Environment (SSD-9409987) dated 15 October 2020 (the SEARs).

1.2 The proposal

1.2.1 Location

The proposal would be located about 140 kilometres south west of the Sydney central business district and approximately 2.8 kilometres north west of the Moss Vale town centre within the Wingecarribee local government area.

The proposed plastics recycling and reprocessing facility and ancillary infrastructure would be located on the northern parcel of land in Lot 11 DP 1084421, with a current street address of 74-76 Beaconsfield Road, Moss Vale. This parcel of land is referred to as 'the plastics recycling and reprocessing facility site' for the purpose of the EIS. It has a total site area of about 7.7 hectares. The proposal would occupy a portion of the plastics recycling and reprocessing facility site.

The new access road which would extend from the plastics recycling and reprocessing facility to Lackey Road via:

– the currently unformed Braddon Road
– Lot 1 DP 26490 and Lot 10 DP 1084421 (the 'Braddon Road east extension').

The area that would be occupied by the proposal's permanent operational infrastructure, and/or directly disturbed during construction, is referred to as 'the proposal site' for the purposes of the EIS. The proposal site therefore comprises:

– The plastics recycling and reprocessing facility site (7.7 hectares)
– The new access road corridor (about 1.8 hectares)

It is noted that the areas that would be disturbed for construction of buildings, roads and water management would comprise about six hectares of the total 7.7 hectare plastics recycling and reprocessing facility site. Disturbance of the remaining 1.7 hectares would be limited to plantings as part of riparian vegetation management and landscaping.

The proposal would be located within the Moss Vale Enterprise Corridor (MVEC) catchment. The MVEC is a significant area of land between Moss Vale and New Berrima set aside for employment generating development under the Wingecarribee Shire Local Environmental Plan 2010.

The location of the proposal site is shown in Figure 1.1.

1.2.2 Key features

The proposal is defined as the construction and operation of a plastics recycling and reprocessing facility with capacity to receive up to 120,000 tonnes per year of mixed plastics, comprising:

– Two main buildings for waste receival, recycling and reprocessing and finished product storage
– Wastewater treatment plant
– Ancillary infrastructure including an office building, workshop, truck parking, staff and visitor parking, internal roadways, weighbridges, water management, fire management, landscaping, fencing, signage and utility connection
– A new access road from the plastics recycling and reprocessing facility to Lackey Road via part of Braddon Road (currently unformed) and Lot 1 DP 26490 and Lot 10 DP 1084421 (the Braddon Road east extension).

The proposal would sort the plastics into different types and convert the various plastics to flakes and pellets (in the first stage) and produce more advanced products (in the second stage). The combined outputs of both stages of the proposal would help fill the gap in local processing capacity for mixed plastics.

Further information on the proposal is provided in the EIS.

The proposed site layout is shown in Figure 1.2

1.2.3 Construction overview

An indicative construction strategy has been developed, based on the current design, to be used as a basis for the environmental assessment process. Detailed construction planning, including programming, work methodologies and work sequencing would be undertaken once construction contractor(s) have been engaged and during detailed design.

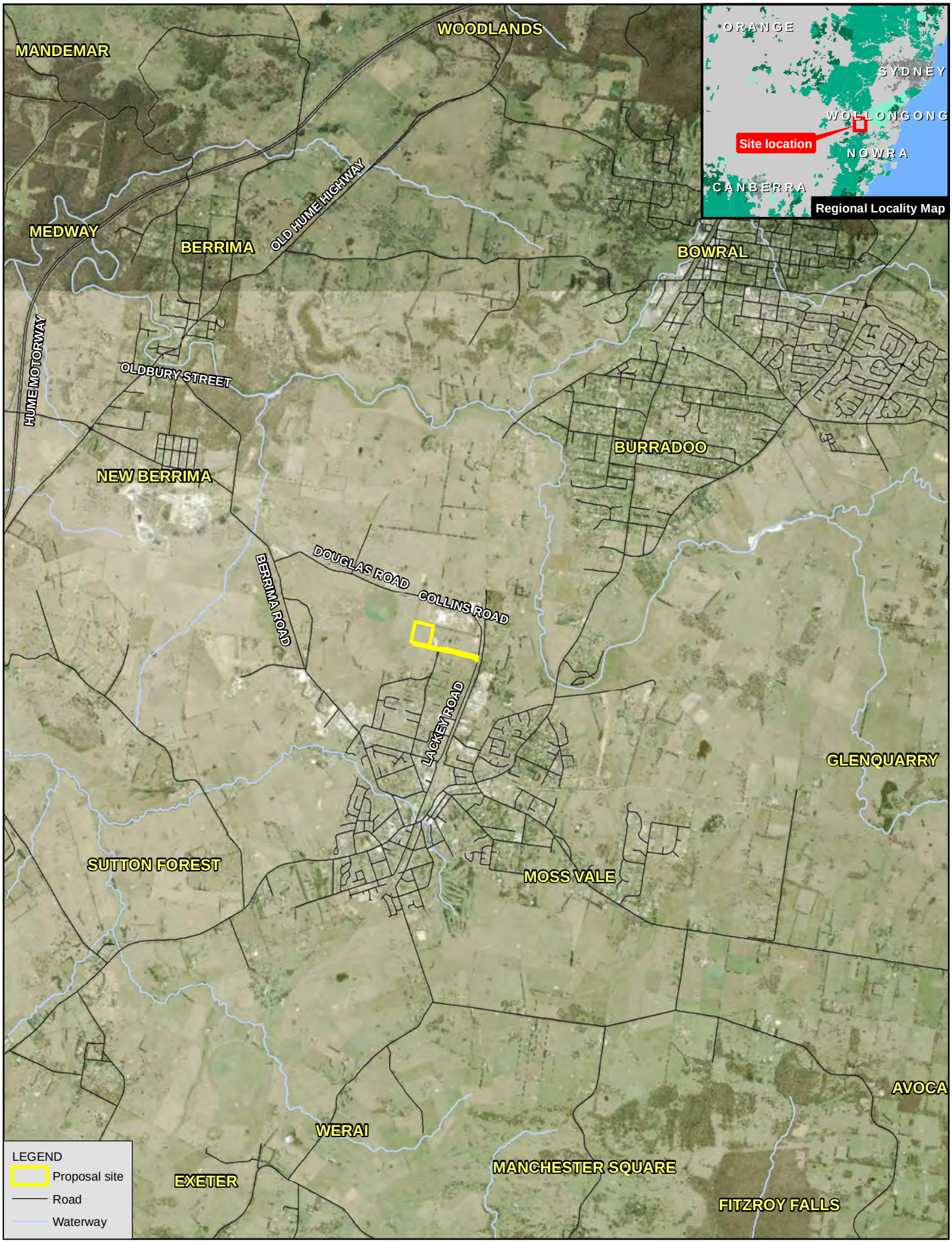
It is estimated that the proposal would take about 15 months to construct and commission and consist of three key stages:

– Early works and site establishment (1 month):
  - Construction of site access road
  - Utilities connection
  - Establishment of construction compound including construction staff amenities
  - Installation of temporary fencing
– Main site works (11 months):
  - Clearance of vegetation within the construction footprint, stripping and stockpiling of topsoil for reuse
  - Bulk earthworks for site shaping and surface water drainage and the bioretention pond
  - Pouring concrete foundation slab, footings, hardstand and slabs for the buildings
  - Construction of pavement areas for the truck and car park, internal roads and the site entrance/egress points
  - Installation of steel truss framework for structures

- Erection of pre-cast concrete panels for external and internal partition walls and metal roof sheets for site buildings
- Installation of processing equipment
- Building finishing works including fit out
- Installation of firewater and other tanks
- Installation of weighbridges
- Installation of permanent fencing and signage
- Restoration works including removal of temporary construction compound, general site clean up and landscaping following construction

– Testing and commissioning (3 months)

Further information on how the proposal would be constructed is provided in the EIS.



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

Plasrefine Recycling Pty Ltd
Moss Vale Plastics Recycling and Reprocessing Facility

Project No. 12524108
Revision No. A
Date 22 Dec 2021

Proposal site location

FIGURE 1.1

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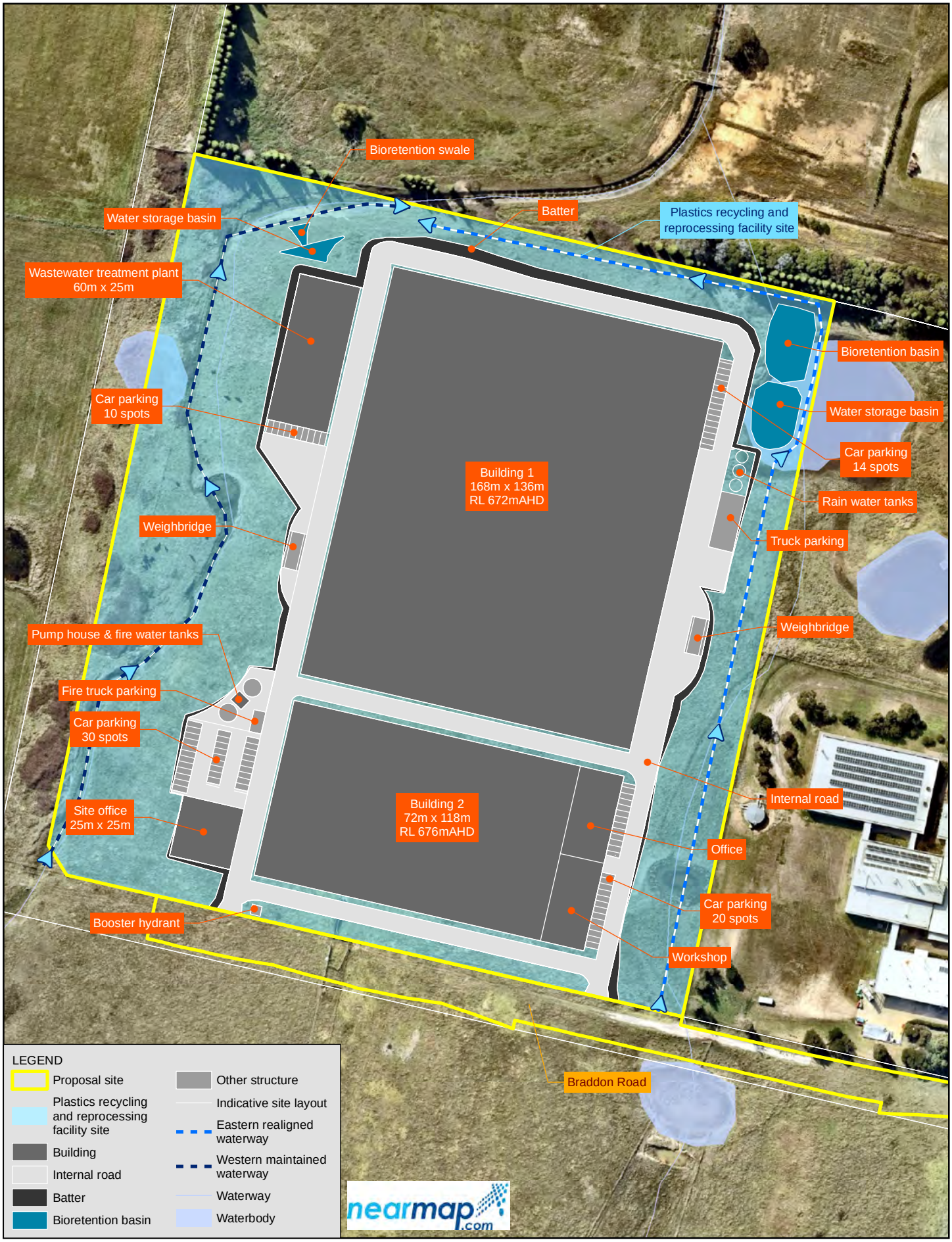

Paper Size ISO A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Plasrefine Recycling Pty Ltd
Moss Vale Plastics Recycling and Reprocessing Facility

Project No. 12524108
Revision No. A
Date 06 Oct 2021

Proposed site layout

FIGURE 1.2

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Data source: Aerial imagery - nearmap 2021 (image date 24/04/2021, image extracted 30/06/2021); General topo - NSW LPI DTDB 2020, 2015. Created by: jrprice

1.3 Secretary's Environmental Assessment Requirements

The specific SEARs addressed in this report are summarised in Table 1.1.

Table 1.1 SEARs and agency requirements relevant to this assessment

Requirement	Where addressed in this report
Air Quality and Odour – including:	
– a greenhouse gas assessment and	Section 3-4
– details of proposed mitigation, management and monitoring measures	Section 5

1.4 Purpose and scope of the report

The purpose of this report is to assess the potential greenhouse gas (GHG) emissions from constructing and operating the proposal. The report:

– Addresses the SEARs and agency requirements listed in Table 1.1.
– Assesses the impacts of constructing and operating the proposal
– Recommends measures to mitigate and manage the impacts identified

The specific SEARs and agency requirements addressed in this report are summarised in Table 1.1

1.5 Structure of this report

The structure of the report is outlined below.

– Chapter 1 – provides an introduction to the report
– Chapter 2 – provides a description of the proposal during the operational phase
– Chapter 3 – details the methodology, assumptions for the GHG assessment (operational, construction).
– Chapter 4 –summarises the outcomes of the assessment and a discussion of the potential impacts
– Chapter 5 – provides the mitigation measures recommended to reduce the potential GHG emissions
– Chapter 6 – gives the overall conclusion
– Chapter 7 – lists the references used in this report

2. Proposal description

2.1 Operation of the proposal

2.1.1 Operational process

The proposal includes the construction and operation of a waste plastics sorting and plastics recycling facility with operations across two buildings. In the first building (building 1), the facility would receive mixed plastics such as containers and bottles from recycling collections and mixed plastics from other sources such as recycling centres. The facility would have the potential to reprocess the following plastic types:

– Polyethylene terephthalate (PET) bottles
– High-density polyethylene (HDPE) bottles
– Polypropylene (PP) bottles
– Acrylonitrile butadiene styrene (ABS)
– Low-density polyethylene (LDPE) recycled films
– Unplasticized polyvinyl chloride (UPVC) recycled pipes

The raw incoming material would be unloaded and transferred to one of the two automatic sorting lines. Unwanted materials such as glass pieces, metal wire, aluminium, copper, caps and other recyclables would then be removed by screening, optical sorters and magnetic separators. Oversized materials would be picked out manually via manual sorting platforms. The recyclable materials not suitable for further processing on site would be sent offsite to recycling facilities. The remaining non-recyclable materials would be disposed to EPA licenced facilities.

The PET, PP and PE bottles would be sorted by plastic type and colour using optical, smart arm methods and cleaned using steam comprising a heated alkaline water solution at 193 degrees Celsius. The condensed steam would be recirculated following treatment at the wastewater treatment plant. The PET, PE, and PP bottles and PE film would be crushed and mixed in batches and sterilised and deodorised using the patented disinfectant solution. The sorted material would be pelletised or shredded into flakes suitable for sale at this point or transferred to building 2 for further processing. Waste plastic sorting and cleaning as well as crushing and cleaning lines will be housed in Building 1 while granulation and extraction will occur within Building 2.

The processed material would be used to produce more advanced plastic products such as PET sheets, PET packing belts, wood plastic composites, plastic logistic pallets, furniture or turnover boxes. The plastic flakes, pellets or plastic derived products would be sold to domestic or international markets. Filter residue from extrusion and granulation would be transferred off site and disposed at an EPA licenced facility.

Material testing associated with manufacturing and processing would also be undertaken at the laboratories located in building 2.

2.1.2 Operational workforce

The proposal would require up to 140 full time equivalent staff during full scale operation. This would comprise approximately 40 staff per shift (three shifts) within the receival and processing buildings and up to 20 staff for maintenance, administration, management, engineering and technical support.

2.1.3 Hours of operation

The proposal would operate year round, 24 hours per day, seven days per week, for 300 days per year, allowing two months for equipment maintenance. However, waste acceptance would only occur Monday to Friday between 7 am and 6 pm.

2.1.4 Traffic and access

The indicative traffic generation associated with the proposal during operation are summarised as:

– Up to 200 truck movements between 7 am and 6 pm, with a maximum of 10 trucks in a peak hour period
– Staff 140 full time equivalents with up to 50 staff arriving and leaving at a change-over period.

3. GHG inventory

3.1 Methodology

This assessment has been undertaken in accordance with the principles of ISO 14064-2 and the general principles for estimating emissions in the National Greenhouse and Energy Reporting (NGER) (Measurement) Determination 2008. Relevant sections of the following documents were used for the purposes of defining appropriate methods for quantification of emissions from individual sources:

– *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (as amended) and NGER Act 2007, Commonwealth Department of Industry, Science, Energy and Resources; and
– National Greenhouse Accounts (NGA) Factors, Commonwealth Department of Industry, Science, Energy and Resources, 2020.

These guidelines are considered representative of good practice GHG accounting in Australia and are applicable to the proposal.

3.2 Greenhouse gases and global warming potentials

The greenhouse gases considered in this assessment and the corresponding global warming potential (GWP) for each GHG are listed in Table 3.1. GWP is a metric used to quantify and communicate the relative contributions of different substances to climate change over a given time horizon. GWP accounts for the radiative efficiencies of various gases and their lifetimes in the atmosphere, allowing for the impacts of individual gases on global climate change to be compared relative to those for the reference gas carbon dioxide.

The GWPs from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment report and section 2.02 of the National Greenhouse and Energy Reporting (NGER) Regulations 2008, updated July 2020, were used in this assessment.

Table 3.1 Greenhouse gases and 100-year global warming potentials

Greenhouse gas	Global warming potential
Carbon dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous oxide (N_2O)	265

3.3 Assessment boundary

The following GHG emissions have been considered:

3.3.1 Construction phase emission sources

The following emission sources were included in the assessment boundary for the construction stage:

– Fuel consumption for Stage 1 and 2 buildings (including related infrastructure, administration building, internal road, and road for site access)

3.3.2 Operations phase emission sources

The following emission sources were included in the assessment boundary for the operations stage:

– Stage 1 sorting and shredding fuel and electricity use
– Stage 2 reprocessing fuel and electricity use
– Employee commuting
– Transport of plastics to site

– Transport of product

Exclusions

The following were excluded from the GHG assessment:

– During operations: Other Scope 3 emissions, other than those mentioned above, were not considered including transport and disposal of wastes, or downstream processing of the plastic pellets/flakes or other products
– During construction: No Scope 3 emissions were considered including: transport of construction materials and equipment to site; transport and disposal of construction of waste; construction worker commuting; embodied emissions in materials used; or emissions associated with connection of utilities to the site (water, sewer, stormwater, electricity).
– This study does not include a comparison of emissions saved from manufacturing plastics from raw materials compared with recycled materials
– Vegetation has been removed from the site, so emissions associated with vegetation clearing are negligible.

3.4 Assumptions

Assumptions used in estimating GHG emissions for the construction phase of the proposal are listed in Table 3.2. The emissions factors (EF) used are from the NGER (Measurement) Determination, unless otherwise specified.

Table 3.2 Greenhouse gas assessment assumptions by source – Construction and operation

Source	Assumptions	Activity Data and Units
Construction phase emissions		
Total diesel consumption	It was assumed that the construction activities would be undertaken in three stages including earthworks and site establishment, road construction, building construction, then equipment installation. The construction period would commence in 2022 with an estimated 13 months and an additional three months for equipment installation and commissioning. Fuel use was estimated based on the equipment to be used, number of units, estimated hours of use and equipment manufacturers' fuel consumption. The emission factor for diesel oil for machinery and equipment is 2.71 t CO_2-e / kL.	953 kL
Electricity consumption (NSW) - Construction	It was assumed that no electricity will be consumed during the construction phase. It is assumed that all electricity requirements will be generated by diesel gensets.	0 kWh
Operations phase emissions		
Electricity consumption (NSW) - Operations	The total power requirement for operations is estimated to be 12,143 kW for sorting and reprocessing. The total operational hours for a year were assumed to be 7,200 hours (plant running 24 hours a day for 300 days a year, 2 months of equipment maintenance). The electricity grid emission factor for NSW is 0.81 t CO_2-e / MWh.	87,430 MWh
Backup diesel generator	A backup diesel generator will be used on site, estimated to be used up to once a month for 6 hours at a time, a total of 72 hours. The emission factor was diesel for stationary equipment of 2.71 t CO_2-e / kL.	6 kL
Employee commuting	It is assumed there will be 140 staff per day. It is assumed that the employees will be commuting, on average, within 60-km from the site (120 km return), 7 working days/week. The emission factor for diesel oil for transport is 2.72 t CO_2-e / kL.	697 kL
Transport of plastics to site	Plastics would be transported to site 5 days per week. It was assumed that 100 vehicles are delivering waste plastics to site per day. The vehicles are assumed to be heavy trucks which are coming from Sydney and Canberra with an estimated total km travelled of 300 km	3,366 kL

Source	Assumptions	Activity Data and Units
	per day per truck. The emission factor for diesel oil for transport is 2.72 t CO_2-e / kL.	
Transport of product	Plastic products would be transported from site 5 days per week, with 100 vehicles delivering products per day. (It has been assumed that the trucks delivering waste plastics to site are not suitable for transporting products from the site). The vehicles are assumed to be heavy trucks which are delivering to Sydney with an estimated total km travelled of 300 km per day per truck. The emission factor for diesel oil for transport is 2.72 t CO_2-e / kL.	3,366 kL

4. Impact assessment

4.1 Estimated GHG emissions

A summary of estimated scope 1 and 2 GHG emissions occurring as a result of construction and operation activities for the proposal is presented in Table 4.1.

Table 4.1 Summary of emissions – construction and operation phase

Activity	Activity data	Units	Emissions (tCO_2-e)*		
			Scope 1	Scope 2	Total emissions
Construction					
Total diesel consumption	953	kL	2,583	0	2,583
Total construction emissions (t CO_2-e/ year)			**2,583**		**2,583**
Operations					
Electricity consumption (NSW) - Operations	87,430	MWh/year	0	70,818	78,818
Backup generator	10	kL	26	0	26
Employee commuting	697	kL	1,894	0	1,894
Transport of plastics to site	3,366	kL	9,147	0	9,147
Transport of product	3,366	kL	9,147	0	9,147
Total annual operational emissions (t CO_2-e/ year)			**20,215**	**70,818**	**91,033**

*Emissions are rounded up to the nearest whole tCO_2-e

It is noted that solar panels would be installed on the roof areas of the buildings. Estimates for how much power would be sourced from solar has not yet been made because the spacing and locations of the panels has not been determined at this stage in the design. This would be confirmed during the next stage of design, but is expected to be considerate given the large roof area available. The emissions estimates in Table 4.1 are therefore considered conservative.

4.2 Impact of emissions

The quantity of Scope 1 and 2 emissions estimated to occur during construction and operations are estimated as approximately 2,583 tCO_2-e and 91,033 tCO_2-e, respectively.

Australia's national GHG emissions, by sector, for the year to December 2020 and year 2019 are presented in Table 4.2 below. Total emissions for the year to December 2020 are 499 $MtCO_2$-e, and 529.3 $MtCO_2$-e for year 2019.

Table 4.2 National and NSW emissions

	Australia Emissions Year to March 2021 ($MtCO_2$-e) [2]	2019 Australian Emissions ($MtCO_2$-e) [2]	2019 NSW Emissions ($MtCO_2$-e) [3]
Overall Total	494	519	136.6
% Contribution of the proposal operation	0.02%	0.02%	0.07%

Source:
1. "Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2021 Incorporating emissions from the NEM up to June 2021, Australian Government Department of Industry, Science, Energy and Resources" March 2021
2. National Inventory Report 2019 Volume 1, Australian Government Department of Industry, Science, Energy and Resources, April 2021
3. State and territory greenhouse gas inventories: data tables and methodology - Table 3A: Sectoral breakdown of national, state, and territory greenhouse gas inventories and contribution to national emissions, 2019

Scope 1 and 2 emissions from construction of the proposal are estimated as 2,583 tCO_2-e, which is approximately 0.0019% of NSW's annual emissions and 0.0005% of Australia's annual emissions. Construction emissions is considered negligible compared to annual emissions in NSW and Australia.

Annual Scope 1 and 2 emissions during operations are estimated as 91,033 tCO_2-e, which is approximately 0.07% of NSW's annual emissions and 0.02% of Australia's annual emissions. Operational emissions are also considered negligible compared to annual emissions in NSW and Australia.

Operational emissions are higher than the facility reporting threshold of 25,000 tCO_2-e per annum, under the National Greenhouse and Energy Reporting (NGER) scheme. Therefore, the plant would be required to monitor fuel and electricity use and report energy use and emissions annually under the NGER scheme.

5. Recommended mitigation measures

As discussed above, emissions during construction and operations would be very low compared to NSW's and Australia's emissions as a whole. Although low, the following measures should be put in place to reduce and mitigate emissions:

Construction

- Sustainable procurement practices adopted where feasible
- Construction materials sourced locally where possible
- Investigate the use of biodiesel for trucks and equipment, where suitable
- Investigate the use of electric light vehicles, where feasible
- Investigate the use of low carbon concrete
- All plant and equipment used during the construction works would be regularly maintained to reduce emissions and comply with the relevant exhaust emission guidelines
- Plant and equipment be switched off when not in constant use and not left idling, as long as safe
- Plant and equipment be brought onsite regularly serviced and energy efficient vehicles or equipment will be selected where available

Operations

- Investigate other more energy efficient equipment and lighting
- Purchase of Greenpower for grid electricity. Providers are listed in https://www.greenpower.gov.au/
- Annual monitoring and reporting of GHG emissions under the NGER scheme will be required

6. Evaluation and conclusion

Scope 1 and 2 emissions from construction of the proposal are estimated as approximately 2,600 tCO_2-e over the whole construction period. Construction emissions are considered negligible compared to annual emissions in NSW and Australia.

Annual Scope 1 and 2 emissions during operations are estimated as approximately 91,033 tCO_2-e, which is approximately 0.07% of NSW's annual emissions and 0.02% of Australia's annual emissions. Operational emissions are also considered negligible compared to annual emissions in NSW and Australia.

7. References

Commonwealth of Australia "*National Greenhouse and Energy Reporting (Measurement) Determination 2008*", Compilation No. 12, July 2020

Department of Industry, Science, Energy and Resources "Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2021" March 2021

Department of Industry, Science, Energy and Resources "State and Territory Greenhouse Gas Inventories 2019" April 2021

Department of Industry, Science, Energy and Resources, "National Greenhouse Accounts Factors" July 2020

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