



Bioelektra Australia Pty Ltd

West Nowra Resource Recovery Park - Stage 2 Greenhouse gas assessment

May 2021

Table of contents

1.	Introduction	1
1.1	Purpose of this report.....	1
1.2	Staged project approval.....	1
1.3	Project description	2
1.4	Location of the project	3
1.1	Secretary's Environmental Assessment Requirements and agency requirements	6
1.2	Scope and structure of the report	6
2.	GHG inventory	7
2.1	Methodology	7
2.2	Greenhouse gases and global warming potentials.....	7
2.3	Assessment boundary	7
3.	Impact assessment	10
3.1	Construction.....	10
3.1	Operations	10
3.1	Impact of emissions	10
3.2	Conclusions	11
4.	References	12

Table index

Table 1.1	Secretary's Environmental Assessment Requirements and agency requirements	6
Table 2.1	Greenhouse gases and 100-year global warming potentials.....	7
Table 2.2	Greenhouse gas assessment assumptions by source – construction.....	8
Table 2.3	GHG assessment assumptions by source – operations phase	9
Table 3.1	Summary of emissions – construction phase	10
Table 3.2	Summary of annual emissions – operations phase	10
Table 3.3	National and NSW emissions.....	10

Figure index

Figure 1.1	Site layout plan.....	4
Figure 1.2	Proposed site location	5

1. Introduction

1.1 Purpose of this report

Bioelektra Australia Pty Ltd (Bioelektra) proposes to construct and operate an integrated resource recovery facility at West Nowra (referred to in this report as ‘the project’). This report has been prepared by GHD Pty Ltd (GHD) to provide an assessment of greenhouse gas (GHG) emissions associated with Stage 2 of the project as an input to the environmental impact statement (EIS). Bioelektra is the proponent of the project and the EIS is being prepared by GHD in accordance with the requirements of Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (the EP&A Act).

The report addresses the requirements of the Secretary of the NSW Department of Planning and Environment (the Secretary’s Environmental Assessment Requirements (SSD 9887)) dated February 2021.

1.2 Staged project approval

In 2016 Shoalhaven City Council (Council) sought approval for a Concept Proposal for a resource recovery park with a combined capacity of 130,000 tonnes per year (the West Nowra Resource Recovery Park) as well as Project Approval for the first stage of the development.

The Concept Proposal included:

- Stage 1 – clearing of land and provision of basic infrastructure on the nominated site, which would be undertaken by Council or contractors appointed by Council as part of early construction works.
- Stage 2 – construction and operation of a resource recovery park which would be undertaken by an alternative waste technology provider/facility operator, selected through a tendering process to provide the specialised resource recovery facilities.
- Council sought Project Approval for stage 1 as part of the same application.

A staged approach was adopted to enable construction of Stage 1 of the proposal to commence (subject to planning approval) while a contractor was appointed and while the details of Stage 2 were determined via the tendering and design process.

Council received Concept Approval and Stage 1 Project Approval for the West Nowra Resource Recovery Park on 25 August 2016 (SSD 7015). The approved Stage 1 works included:

- Demolition of the existing animal shelter
- Site preparation and clearing of the site
- Construction of perimeter, entry/exit and service roads and line marking
- Installation of perimeter/boundary fencing
- Weighbridge and weighbridge office
- Staff and visitor car parking, including line marking
- Detention and sedimentation dams/basins
- Identification of asset protection zones

Council subsequently awarded Bioelektra with the contract to construct and operate Stage 2 of the works.

1.3 Project description

The project would comprise a range of waste and resource processing activities aimed at maximising resource recovery and minimising the amount of waste destined for landfill disposal.

The project is defined as the construction and operation of a resource recovery facility with pre-treatment for mixed municipal waste of up to 130,000 tonnes per year, comprising:

- Shredder operations
- Sterilisation of waste through autoclaving
- Sorting and processing operations
- Other areas for processing and storing and receiving processed material
- Transformer area
- Boiler room
- Wastewater treatment plant
- Offices and amenities (2 levels)

The project also includes ancillary infrastructure including:

- Weighbridges and weighbridge offices
- Covered holding bays
- Circulation roadways and road reserves
- Staff and visitor car parking, including line marking
- Two new sediment / detention basins
- Substation
- Liquid Petroleum Gas (LPG) station
- Fencing around the perimeter of the site
- Asset protection zones (APZs)
- Pump house and firefighting tanks

A schematic of the project is shown in Figure 1.1.

The Concept Approval included construction and demolition (C&D) waste processing and an alternative waste treatment (AWT)/materials recovery facility (MRF).

C&D processing is no longer proposed part of the project and the waste processing technology proposed by Bioelektra includes sterilisation of waste through autoclaving and materials recovery through various sorting operations.

Other ancillary infrastructure not included as part of the Concept Approval but proposed for this project include the transfer station, covered holding bays, boiler room, substation, transformer hall, LPG station and pumping station and firefighting tank.

Construction activities relating to this project would include:

- Bulk earthworks for shaping of the site including access roads, parking area and construction hardstand
- Construction of surface water detention ponds, surface water drains and utilities connections
- Construction of concrete floor slab for the building

- Construction of structures and connection to utilities
- Pavement construction for access roads and parking area
- Fit out and installation of processing equipment and office furnishings

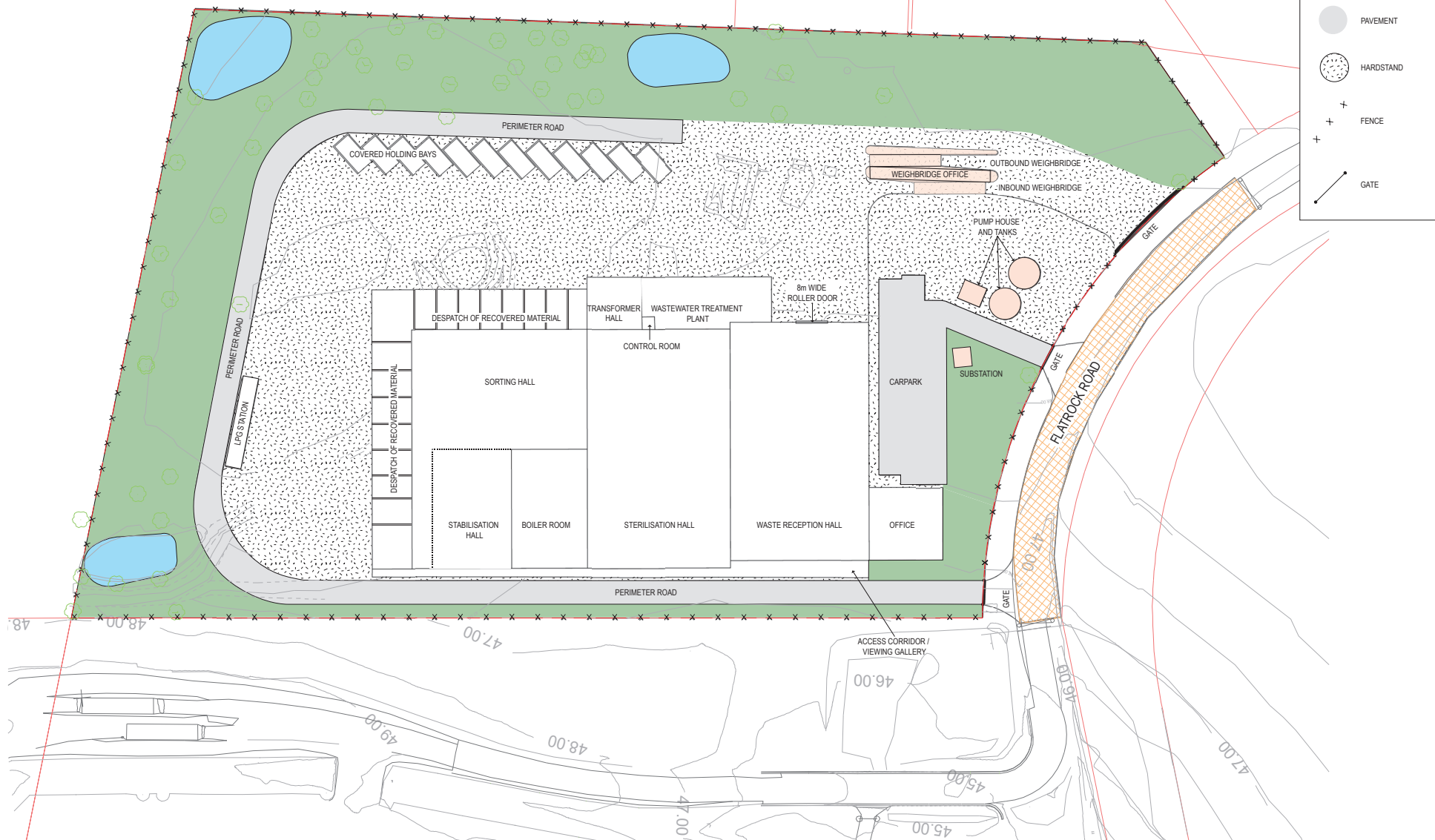
1.4 Location of the project

The project site is approximately five kilometres to the west of the Nowra Central Business District and is accessed from Flatrock Road, off Yalwal Road in West Nowra (refer to Figure 1.2).

The site is adjacent to the existing landfill and is located on an approximate 3.6 ha parcel of land (Lot 342 DP 257515).



BASED ON PROPOSED SITE PLAN
PREPARED BY BECA, DATED MARCH
2019 (REF: 2440823-ar-0501-a)
AND AMENDED BY GHD TO RELOCATE
LPG STATION, ADJUST COVERED
HOLDING BAYS AND INTERNAL ROAD
ALIGNMENTS AND REMOVE
TRANSFER STATION.



Bioelektra Australia Pty Ltd
West Nowra Resource Recovery Park Stage 2

Site Plan

Job Number 12536311
Revision A
Date December 2020

Figure 1-1

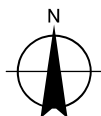
Level 15, 133 Castlereagh Street, Sydney NSW 2000 Australia T 61 2 9239 7100 F 61 2 9239 7199 E sydmall@ghd.com W www.ghd.com



Paper Size ISO A4
1:20,000

0 200 400
Metres

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



Bioelektra Australia Pty Ltd
West Nowra Resource Recovery Park Stage 2

Site Location

Project No. 12536311
Revision No. -
Date 28 Sep 2020

FIGURE 1-2

1.1 Secretary's Environmental Assessment Requirements and agency requirements

The specific SEARs and agency requirements addressed in this report are summarised in Table 1.1. The SEARs did not mandate a specific standard, protocol, or methodology for the greenhouse gas assessment.

Table 1.1 Secretary's Environmental Assessment Requirements and agency requirements

Assessment requirements	Where addressed in report
Air Quality and Odour "a greenhouse gas assessment"	This entire report
Agency requirements	
Nil – no specific requirements with respect to GHG emissions	NA

1.2 Scope and structure of the report

1.2.1 Scope of report

A quantitative greenhouse gas assessment to consider emissions from the construction and operation stages.

The following scopes of emissions were considered, namely:

- Scope 1: Emissions from direct energy use, and
- Scope 2: Indirect energy use from imports and exports of electricity, heat or steam

1.2.2 Limitations

The assessment does not include any Scope 3 emissions from construction or operational stages.

1.2.3 Abbreviations

Term	Definition
CER	Clean Energy Regulator
CO ₂	Carbon dioxide
CH ₄	Methane
EF	Emission factor
EPA	Environmental Protection Authority
GHG	Greenhouse gas
GWP	Global warming potential
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardisation
Mtpa	Million tonnes per annum
MW	Megawatt
MWh	Megawatt-hour
NGA	National Greenhouse Accounts
NGER / NGERs	National Greenhouse and Energy Reporting / Scheme
t CO ₂ -e	Tonnes of carbon dioxide equivalent
tpa	Tonnes per annum

2. GHG inventory

2.1 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:

- NGER (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 Project.

2.2 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 2.1. 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 2.1 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 ₂ O)	265

2.3 Assessment boundary

The following GHG emissions have been considered:

2.3.1 Construction phase emission sources

The following emission sources were included in the assessment boundary for the construction Phases 2, 3, and 4 stages:

- Fuel consumption (including related infrastructure, civil works)

Exclusions

- Phase 1 of construction and associated activities: e.g. Land clearing, fuel consumption of delivery trucks.
- Scope 2 emissions – all electricity used during construction will be from the on-site generator, and no electricity will be sourced from the grid

- Scope 3 emissions - Other indirect energy use or greenhouse gas emissions, such as emissions from transport and waste disposal.

Assumptions

Assumptions used in estimating GHG emissions for the construction phase of the project are listed in Table 2.2. The emissions factors (EF) used are from the NGER (Measurement) Determination, unless otherwise specified.

Table 2.2 Greenhouse gas assessment assumptions by source – construction

Parameter	Assumptions
Construction Phase – Scope 1 emissions	
Phase 2 diesel consumption	Phase 2 includes ground works and excavation, estimated to take 3 months. Construction hours are estimated as 8 hours/day and 24 days/month. Phase 2 diesel consumption is estimated to be 57 kL, based on hourly diesel consumption rates of proposed equipment (excavators, bulldozer and backhoe loader).
Phase 3 diesel consumption	Phase 3 includes construction of the structures, estimated to take 6 months. Construction hours are estimated as 8 hours/day and 24 days/month. Phase 3 diesel consumption is estimated to be 104 kL based on hourly diesel consumption rates of proposed equipment (mobile crane and concrete pump).
Phase 4 diesel consumption	Phase 4 includes landscaping, estimated to take 3 months. Construction hours are estimated as 8 hours/day and 24 days/month. Phase 4 diesel consumption is estimated to be 33 kL based on hourly diesel consumption rates of proposed equipment (mobile crane and backhoe loader).
General diesel consumption	Use of generator and telehandlers is estimated at 4.3 weeks/month over 7 months. This is estimated to be 22kL based on weekly diesel consumption of the generator (55 hours/week at 5 L/hour) and telehandler (2 x 230L tanks refuelled once/week).

2.3.2 Operations phase emission sources

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

- LPG consumption of the boiler
- Diesel consumption of the front end loader
- Electricity consumption (from grid electricity and on-site solar)

Exclusions

- Scope 3 emissions (from indirect energy use)
- Avoided emissions from diverting waste from landfill
- Emissions from the agricultural application of the product

Assumptions

Assumptions used in estimating GHG emissions for the operations phase of the project are listed in Table 2.3.

Table 2.3 GHG assessment assumptions by source – operations phase

Parameter	Assumptions
Operation Phase – Scope 1 emissions	
LPG consumption	The boiler is estimated to require 334 kg/hr of LPG fuel. Total operating hours are assumed to be 7,300 hours/year (20 hours/day for 365 days/year). The lower heating value is assumed to be 46,000 kJ/kg and the density of the fuel calculated as 0.57 t/kL. Annual LPG consumption is estimated to be 4,364 kL/year.
Diesel consumption	The front end loader diesel consumption is estimated to be 350 L/week or, assuming 52 weeks operation in a year, 18 kL/year. The front end loader is the only mobile equipment in use at the project.
Operation Phase – Scope 2 emissions	
Solar generation	Solar generation is estimated at 1,429 MWh/year. No GHG emissions are associated with solar generation.
Electricity consumption	The electricity requirement is 9,091 MWh/year. The electricity required to be supplied from the grid is 7,662 MWh. The grid emission factor used is 0.81 tCO ₂ -e/MWh for NSW.

3. Impact assessment

3.1 Construction

A summary of estimated scope 1 and 2 GHG emissions occurring as a result of construction activities for the project is presented in Table 3.1

Table 3.1 Summary of emissions – construction phase

Activity	Activity data	Units	Total emissions (t CO ₂ -e)	
			Scope 1	Scope 2
Phase 2 diesel consumption	57	kL	156	0
Phase 3 diesel consumption	104	kL	282	0
Phase 4 diesel consumption	33	kL	89	0
Diesel consumption (Generator & Telehandler)	22	kL	60	0
Total emissions (t CO₂-e/ year)			586	0

3.1 Operations

A summary of estimated scope 1 and 2 GHG emissions occurring as a result of operations for the project is presented in Table 3.2.

Table 3.2 Summary of annual emissions – operations phase

Activity	Activity data	Units	Annual emissions (t CO ₂ -e)	
			Scope 1	Scope 2
LPG consumption	4,364	kL/year	11,825	0
Total diesel consumption	18	kL	49	0
Solar production	1,429	MWh	0	0
Electricity consumption (NSW)	7,662	MWh	0	6,206
Total			11,875	6,206

3.1 Impact of emissions

The quantity of Scope 1 and 2 emissions estimated to occur during construction and operations are estimated as approximately 586 tCO₂-e and 18,081 tCO₂-e, respectively.

Australia's national GHG emissions, by sector, for the year to March 2020 and year 2018 are presented in Table 3.3 below. Total emissions for the year to March 2020 are 528.7 MtCO₂-e, and 537.4 MtCO₂-e for year 2018.

Table 3.3 National and NSW emissions

Emissions source	Australia Emissions Year to March 2020 (MtCO ₂ -e) ¹	2018 Australia Emissions (MtCO ₂ -e) ²	2018 NSW Emissions (MtCO ₂ -e) ²
Energy – Electricity	172.9	183.2	52.1
Energy – Stationary Energy (excluding electricity)	102.7	97.1	15.3
Energy – Transport	99.7	100.8	28.7
Energy – Fugitive Emissions	55.8	54.4	13

Emissions source	Australia Emissions Year to March 2020 (MtCO ₂ -e) ¹	2018 Australia Emissions (MtCO ₂ -e) ²	2018 NSW Emissions (MtCO ₂ -e) ²
Industrial Processes and Product Use	34.6	34.2	13.7
Agriculture	68	75.6	18
Waste	13.1	12.7	4.3
Land Use, Land Use Change and Forestry	-18.5	-20.6	-13.3
Overall Total	528.7	537.4	131.7

Source:

1. Table 3, Department of the Environment and Energy "Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2020" 30 October 2020

2. Table 4, Department of the Environment and Energy "State and Territory Greenhouse Gas Inventories 2018" May 2020

3.2 Conclusions

Scope 1 and 2 emissions from construction of the proposal are estimated as 586 tCO₂-e, which is approximately 0.0004% of NSW's annual emissions and 0.0001% 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 18,081 tCO₂-e, which is approximately 0.01% of NSW's annual emissions and 0.003% of Australia's annual emissions. Operational emissions are also considered negligible compared to annual emissions in NSW and Australia. Operational emissions are lower than the facility reporting threshold of 25,000 tCO₂-e per annum, under the National Greenhouse and Energy Reporting scheme.

4. References

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

Department of the Environment and Energy "Quarterly Update of Australia's National Greenhouse Gas Inventory: March 2020 Incorporating preliminary estimates of emissions up to June 2020" 2020

Department of the Environment and Energy "State and Territory Greenhouse Gas Inventories 2018" May 2020

GHD

Level 15

133 Castlereagh Street

T: 61 2 9239 7100 F: 61 2 9239 7199 E: sydmail@ghd.com

© GHD 2021

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

12536311-43214-

121/https://projectsportal.ghd.com/sites/pp15_01/bioelektrawestnowrar/ProjectDocs/12536311-REP_Bioelektra West Nowra GHG assessment.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	P Golveque	S Trahair		D Gamble		17/05/21

www.ghd.com

