REPORT

RELOCATION OF PERMENANT LANDFILL GAS FLARE – EASTERN CREEK RECYCLING ECOLOCGY PARK

1 KANGAROO AVE, EASTERN CREEK NSW

NOISE IMPACT ASSESSMENT
RWDI # 2200609
16 August 2022

SUBMITTED TO

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NOTE

WILKINSON MURRAY

In October 2020, Wilkinson Murray Pty Ltd merged with RWDI Group, a leading international consulting firm. Wilkinson Murrays core practice areas of noise, acoustics, vibration and air quality consulting built since 1962 servicing Australia and Asia-Pacific region will complement RWDI practice areas. Combined, RWDI+Wilkinson Murray is one of the largest teams globally specialising in the area of noise, acoustics, vibration and air quality.

RWDI

RWDI is a team of highly specialised consulting engineers and scientists working to improve the built environment through three core areas of practice: building performance, climate engineering and environmental engineering. More information is available at www.rwdi.com.

AAAC

This firm is a member firm of the Association of Australasian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

QUALITY ASSURANCE

RWDI Australia Pty Ltd operates a Quality Management System which complies with the requirements of AS/NZS ISO 9001:2015. This management system has been externally certified by SAI Global and Licence No. QEC 13457 has been issued for the following scope: The provision of consultancy services in acoustic engineering and air quality; and the sale, service, support and installation of acoustic monitoring and related systems and technologies.

GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

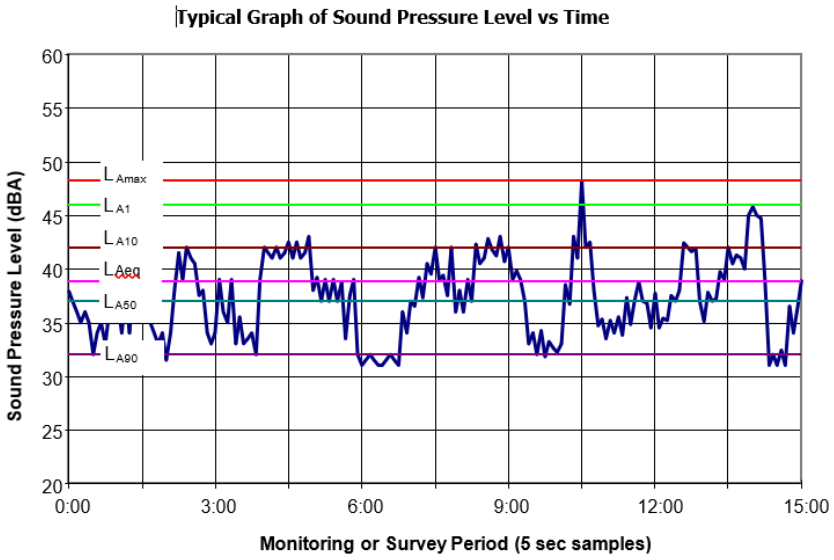


TABLE OF CONTENTS

GLOSSARY OF ACOUSTIC TERMS

1 INTRODUCTION 5

2 SITE LOCATION 7

3 OPERATIONAL HOURS 8

4 APPROVALS AND NOISE LIMITS 9

5 PROJECT DESCRIPTION 10

5.1 Flare design 11

5.2 Construction Works 13

5.2.1 Construction hours 13

5.3 Noise sensitive receivers 13

6 REVIEW OF EXISTING NOISE LEVELS 15

6.1 Noise Monitoring & Compliance Reporting 15

7 NOISE ASSESSMENT 19

7.1 Operational Noise Assessment 19

7.2 Construction Noise Assessment 23

8 NOISE MANAGEMENT 27

9 CONCLUSION 28

10 REFERENCES 30

1 INTRODUCTION

Jackson Environment and Planning Pty Ltd (JEP) has engaged RWDI Australia Pty Limited (RWDI) on behalf of Dial-A-Dump (EC) Pty Ltd (DADEC) to conduct a noise impact assessment (NIA) for a proposed landfill gas (LFG) collection network including flares (the Proposed Development Modification), at the Eastern Creek Recycling Ecology Park (the Premises or REP), located at Kangaroo Avenue, Eastern Creek, NSW in accordance with the informal lodgement requirements issued for the Proposal.

Activities at the Premises were originally approved (MP 06_0139) under Part 3A (now repealed) of the Environmental Planning and Assessment Act 1979 (EP&A Act) in 2009 and commenced operations in 2012. Following the repeal of Part 3A of the EP&A Act on 1 October 2011, those activities were subject to the transitional arrangements provided by the Environmental Planning and Assessment Regulations 2000 (EP&A Regs). The transitional arrangements provided by EP&A Regs have now ceased, and the Premises was transitioned to a State Significant Development (SSD) on 2 October 2020. Consequently, MP 06_0139 is now considered to be SSD.

On 11 March 2022, NSW Department of Planning and Environment (DPE) approved modification 10 (MOD 10) to MP 06_0139 which was associated with:

- the installation and operation of two permanent enclosed LFG flares at a location approximately 50 metres (m) northeast of MPC1;
- the installation of supporting infrastructure for the flares; and
- decommissioning of four temporary LFG flares located in the landfill void.

MOD 10 was supported by a NIA.

Since the granting of approval for MOD 10, the location of the flares has been subject to review by DADEC. The location of the flares is proposed to be changed to improve design, operational and environmental outcomes and facilitate easier connection to the electricity grid should the gas collection and flare system be upgraded in the future. The new proposed location is adjacent to the leachate treatment plant on the eastern side of the site.

A revised NIA is therefore required to assess the potential impacts of the proposed change. This current application has been prepared pursuant to Section 4.55 (1A) of the EP&A Act. This revised NIA form part of the Statement of Environment Effects (SEE) prepared to accompany the modification application for the most recent Proposed Development Modification.

The NIA is based on the following NSW noise policies and guidelines:

- NSW Noise Policy for Industry (NPfI) (Environment Protection Authority [EPA], 2017).
- Interim Construction Noise Guideline (ICNG) (Department of Environment and Climate Change, 2009)

The ICNG was considered, however, construction associated with the new flares was conservatively assessed cumulatively with operational noise in this noise assessment.

DPE provided informal lodgement requirements for the submission of the documentation to support the original modification application (MOD 10). Reference to those informal requirements has been maintained as part of the current Proposed Development Modification.

In addition, DADEC held a meeting with DPE and NSW Environment Protection Authority (EPA) in July 2022, where it was requested that a comparison of noise impacts between approved MOD 10 and the Proposed Development Modification was presented in any updated reporting. This comparison is provided in Chapter 9 of this updated report.

In relation to noise, the informal lodgement requirements are presented in Table 1-1, including a reference to the section of this report where they have been addressed.

This NIA presents the results of the proposed change in landfill gas flare location. The report is largely consistent with the report subject to review by EPA and DPE in late 2021 and early 2022. Updates are largely limited to:

- The locations and height of the flares are outlined in Chapter 5;
- The noise predictions presented in Chapter 7; and
- A comparison of the predicted noise impacts between the approved (MOD 10) and proposed flare location as presented in Table 9-1.

Table 1-1 : DPIE Informal Noise Lodgement Requirements

DPIE Informal Noise Lodgement Requirement	Where addressed
Noise and vibration	
• A quantitative assessment of potential construction and operational noise and vibration impacts in accordance with relevant Environment Protection Authority guidelines and including details of the proposed on-going monitoring regime to be implemented.	Section 7 Section 8

2 SITE LOCATION

The Eastern Creek REP key operational area comprises two parcels of land totalling around 54 hectares (ha) at 1 Kangaroo Avenue, Eastern Creek (Lot 1 DP1145808 and Lot 2 DP1247691), shown in Figure 2-1. The Proposal Site is located within the Eastern Creek industrial precinct / M7 business hub and is surrounded by a large range of industrial developments, primarily to the east. These industrial developments include Techtronic Industries, H&M distribution warehouse, Kuehne + Nagel (Australia) Pty Ltd warehouse, Kmart distribution centre, Bunnings distribution centre and DB Schenker warehouse. To the west of the Eastern Creek REP is the Fulton Hogan asphalt batching plant and a vacant area of undeveloped land.

The Eastern Creek REP is bounded by the Western Motorway (M4) to the north, Kangaroo Avenue to the east and Honeycomb Drive to the south. The Eastern Creek REP is enclosed by commercial and industrial buildings to the immediate north, east and south. The closest residential receivers are located across the M4 Motorway approximately 400 m to the north in the suburb of Minchinbury and approximately 1.2 km west in the suburb of Erskine Park. Nearby sensitive receivers are shown on Figure 2-1.

Existing access to the Eastern Creek REP is from Kangaroo Avenue which connects to Honeycomb Drive to the south and provides access to the broader arterial road network including the M4 and M7 motorways.

Figure 2-1 : The Eastern Creek Recycling Ecology Park located at 1 Kangaroo Avenue Eastern Creek (Lot 1 DP 1145808 and Lot 2 DP 1247691).

3 OPERATIONAL HOURS

The operational hours for the Eastern Creek REP are presented in Table 3-1. No changes are proposed to operational hours as a result of the Proposal.

Table 3-1: Operating hours

Description	Day	Time
Construction	Monday – Friday	7:00am to 6:00pm
	Saturday	8:00am to 4:00pm
	Sunday and Public Holidays	Nil
MPC[1] – operation, waste receival, chute use and maintenance	Monday – Friday	24 hours
	Saturday	
	Sunday and Public Holidays	
SMA[2] – crushing and screening	Monday – Friday	6:00am to 6:00pm
	Saturday	8:00am to 4:00pm
	Sunday and Public Holidays	
SMA – receipt of segregated materials	Monday – Friday	24 hours
	Saturday	8:00am to 4:00pm
	Sunday and Public Holidays	
Landfill – truck deliveries	Monday – Friday	5:00am to 9:00pm
	Saturday	
	Sunday and Public Holidays	

[1] MPC, Material Processing Centres; [2] SMA, Segregated Materials Area.

4 APPROVALS AND NOISE LIMITS

Following the subsequent modifications up to and including Modification 10, the noise limits for the site are presented in Table 4-1.

Table 4-1 : Noise Limits.

Location	Noise Limits dBA						
	Day	Evening	Night			Morning Shoulder	
	$L_{Aeq,}$ (15minutes)	$L_{Aeq,}$ (15minutes)	$L_{Aeq,}$ (15minutes)	$L_{Aeq,}$ (period)	$L_{A1,}$ (1minutes)	$L_{Aeq,}$ (15minutes)	$L_{A1,}$ (1minutes)
1-6 Eber Place, Minchinbury	48	47	44	41	53	47	53
2-44 Warbler Street, Erskine Park	42	42	39	N/A	44	39	44

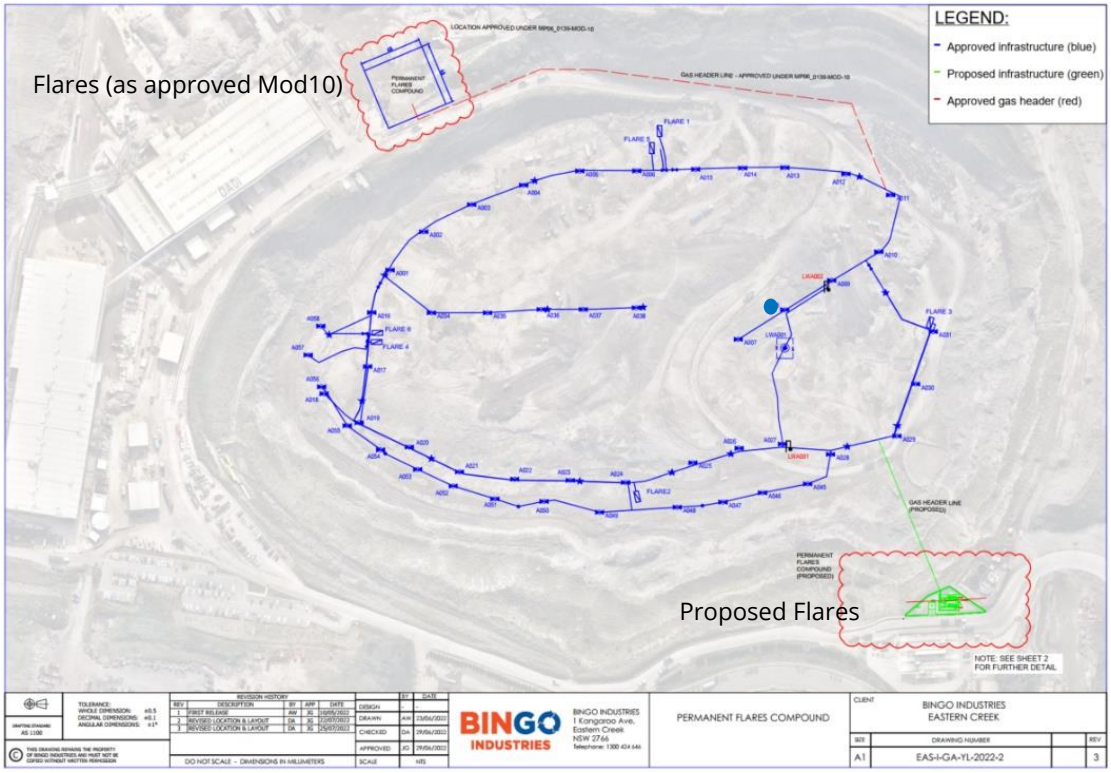
The noise limits in the Approval are reflected in the sites Environment Protection Licence (EPL) (#13426) and (#20121).

The Approval and EPL do not consider industrial premises. The *Noise Policy for Industry* (NPfI) (EPA, 2017) provides a framework for assessing environmental noise impacts from industrial premises and industrial development proposals in New South Wales (NSW). The NPfI recommends the development of project noise trigger levels, which for industrial premises is 68dBA $L_{Aeq,15min}$. This project noise trigger level is considered when assessing the proposal at the closest industrial premises.

5 PROJECT DESCRIPTION

The Proposed Development Modification seeks approval to install and operate two permanent enclosed LFG flares at the Premises to allow the ongoing extraction and treatment by combustion of LFG. The temporary flares are located within the landfill void and would be required to be sequentially relocated as the landfill surface is raised through the placement of waste materials. The Proposed Development Modification would provide a more sustainable long-term solution as it would locate larger LFG flares in a permanent position, outside of the landfill void. The proposed location of these flares is presented in Figure 5-1.

Figure 5-1 : Proposed flare compound locations.



The proposed development involves the installation of two (2) 1500 m^3/hr high temperature, fully enclosed ground flares (model OEF-300) at the site.

An example of the flare is provided in Figure 5-2. The flares will be approximately 9.9m high and located approximately 20m north of the weighbridge (refer to Figure 5-1). Figure 5-3 and Figure 5-4 provides a general arrangement drawing. The elevation at the proposed location of the flares is approximately 70 m AHD. The RL of the top of the stack is 93.7m.

Figure 5-2: Example of the model OEF-300 flare installed in Western Australia.

5.1 Flare design

The flares are designed to incinerate biogas with a methane composition between 10-60%. Ignition is established using an interrupted LPG gas pilot. The flares will be connected to an existing three phase power source.

The flares will be connected to the existing gas collection system via a 450 mm main header line. Biogas enters the flares via a stainless-steel knock-out pot and is drawn into the biogas blower. Electric motors, with direct-drive arrangement to a gas booster, will be capable of delivering 1,500 m^3/hr to each flare.

The stainless-steel condensate knockout pot will be located prior to the entry of the gas booster to ensure that no airborne liquids can pass into the gas booster.

The flares will be automatically and remotely controlled using the Horner flare Programmable Logic Controller (PLC) and will have automatic shutdown and restart with remote dial in telemetry. The flare unit provides industry best practice control over combustion air to facilitate elevated temperatures, whilst ensuring complete combustion. All flaring equipment on site will be compliant

with the relevant Australian and international standards, including AS3814/AG 501-Industrial and Commercial Gas-fired Appliances.

Figure 5-3: Flare compound layout

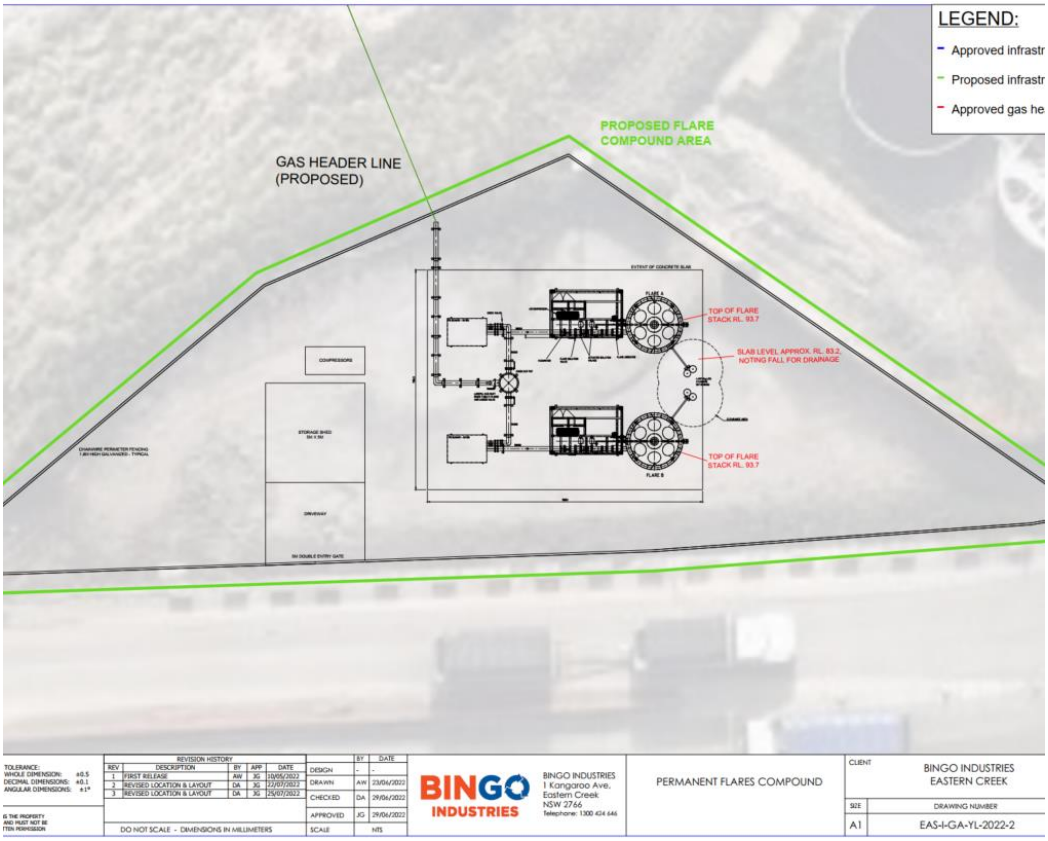
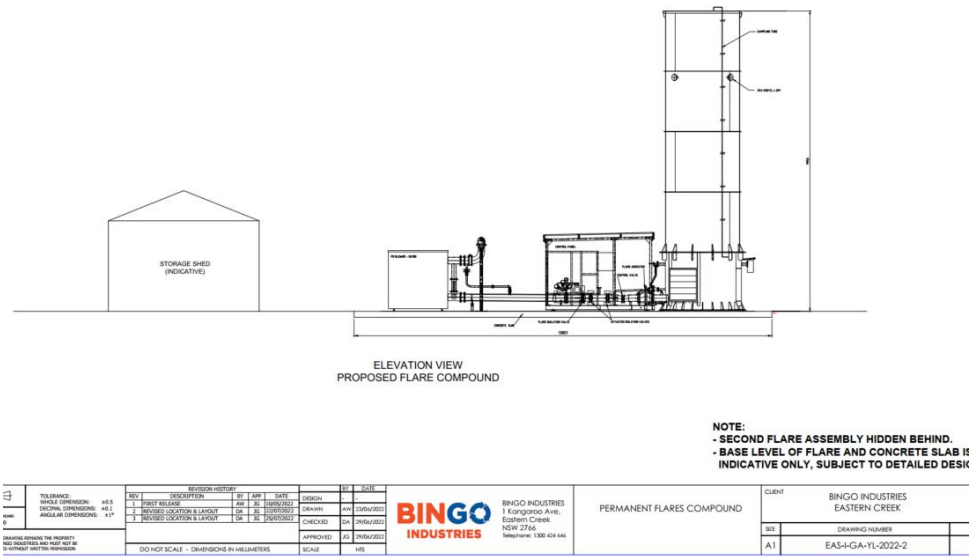


Figure 5-4: Flare general arrangement



5.2 Construction Works

Key elements of the construction of the Proposal would include:

- Earthworks and civil works to establish the hardstand for the permanent flare location;
- Erection of the permanent flare structure (incorporating flare stack, blowers and acoustic enclosure);
- Connection pipework and headworks; and
- Installation of gas collection wells and associated collection infrastructure within the landfill.

Subject to final staging and any weather delays, it is anticipated that installation works will be completed over a period of approximately 6 months.

The proposed installation works will utilise Kangaroo Avenue via Honeycomb Drive for access to and egress from the Project area.

As part of the development, the four existing temporary LFG flares will be decommissioned.

In addition to the existing 31 wells currently installed on site, twelve (12) additional gas collection wells will be installed in the waste mass under the existing approval. The installation of the additional wells is not included in the Scope of Works for the proposed development modification or covered by the SEE as these works are approved under MP06_0139.

5.2.1 Construction hours

Construction will be carried out within the approved construction hours as shown in Table 3-1.

Construction works outside the standard construction hours may be undertaken in the following unlikely circumstances:

- for the delivery of materials required outside the standard construction hours for safety reasons; or
- where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

5.3 Noise sensitive receivers

The nearest representative residential noise sensitive locations to the site as identified in the Approval are identified in Table 5-1 hereafter referred to in this report as assessment locations. The assessment locations are shown in Figure 5-5.

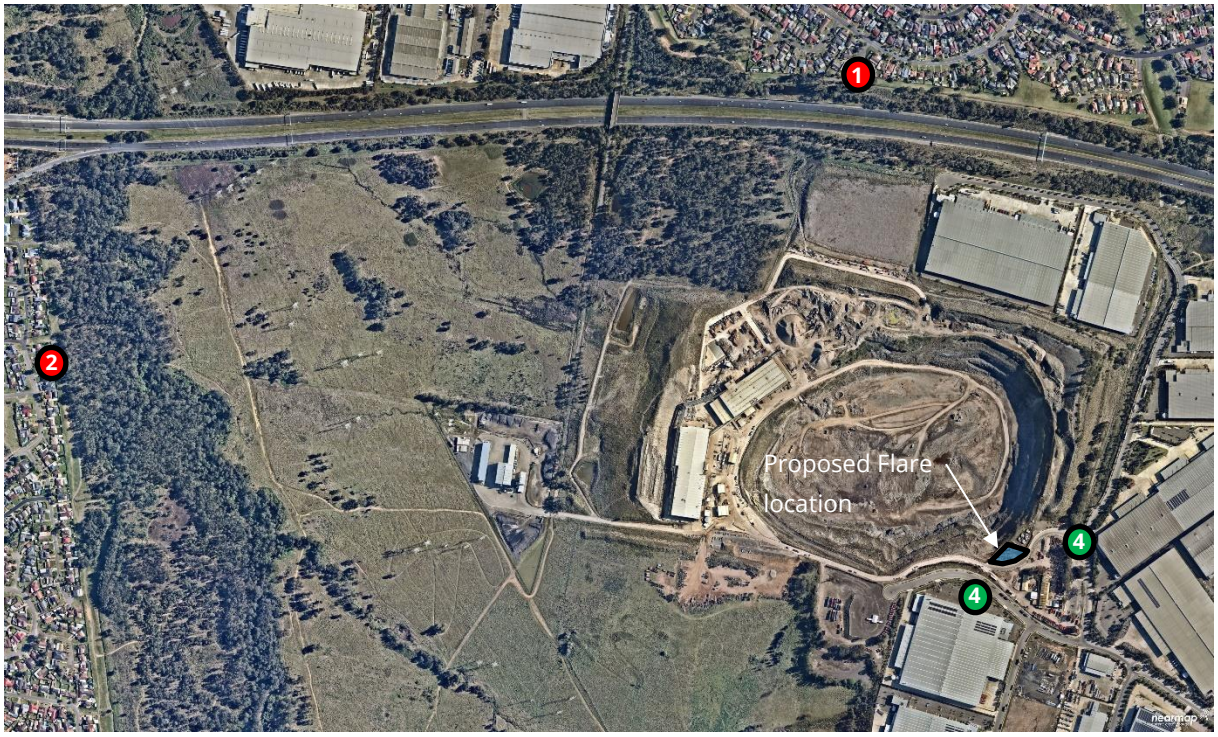
These locations were identified through the previous Approval process as representing the most impacted residential receivers in Minchinbury and Erskine Park. As such, they have been used in this assessment to investigate the potential impact of the proposed flare in Minchinbury and Erskine Park.

Table 5-1: Sensitive Receivers - Residential

ID	Type	Description
1	Residential	1-6 Eber Place, Minchinbury
2	Residential	2-44 Warbler Street, Erskine Park

The Proposal Site is located within an established industrial and commercial precinct. The nearest representative industrial receivers to the Proposal Site have been identified and are shown in Figure 5-5.

Figure 5-5: Residential Receivers - Assessment Locations



The nearest representative industrial locations to the Proposal Site are identified in Table 5-2.

Table 5-2: Industrial Receivers - Assessment Locations

ID	Type	Description
3	Industrial	2 Hanson Place, Eastern Creek
4	Industrial	4 Kangaroo Avenue, Eastern Creek

6 REVIEW OF EXISTING NOISE LEVELS

6.1 Noise Monitoring & Compliance Reporting

Noise monitoring was carried out to validate the noise predictions of the noise impact assessment submitted to support the modification MP06 0139. This verification assessment was conducted consistent with Condition 38 of the Approval and submitted to the Planning Secretary. The noise monitoring was conducted by RWDI.

Table 6-3**: Measured L_{Aeq} Noise Levels** summarises the resultant noise levels measured at the representative receiver locations and any relevant observations. Noise from the site was inaudible during the entire monitoring period at all identified residential receivers.

The Project is subject to an additional maximum noise level for the morning shoulder and night-time periods. The results of the attended measurements addressing the $L_{A1,(1min)}$ noise criteria for the morning shoulder and night period is shown below in Table 6-1.

Table 6-1: Measured $L_{A1,(1min)}$ Noise Levels

Time of Measurement / Period	Location	Estimated $L_{A1,(1min)}$ (dBA) Noise Contribution at Receiver	Noise Limit(s) $L_{A1,(1min)}$ (dBA)	Complies with Noise Limit? Yes/No
13/10/2020 22:03 (Night)	2-44 Warbler Street, Erskine Park	<42	44	Yes
13/10/2020 22:35 (Night)	1-6 Eber Place, Minchinbury	<44	53	Yes
15/10/2020 04:39 (Night)	1-6 Eber Place, Minchinbury	<47	53	Yes
15/10/2020 05:10 (Morning Shoulder)	2-44 Warbler Street, Erskine Park	<44	44	Yes

The measured noise contribution at all receivers complied with the identified noise limits during all time periods for the noise monitoring carried out to validate the noise predictions of the noise impact assessment.

Additionally, compliance noise monitoring has been conducted consistent with the Eastern Creek REP Environmental Management Strategy on a six-monthly basis by Consulting Earth Scientists since 2016. A review of the compliance noise monitoring by RWDI indicates that noise from the site is continually inaudible at the two nearest residential receiver locations at Minchinbury and Erskine Park. As such, the compliance noise monitoring is consistent with the noise monitoring carried out to validate the noise predictions of the noise impact assessment.

Attended noise monitoring was conducted at the boundary of 4 Kangaroo Avenue on 28June 2022 between 7:00pm and 7:15pm and 11:00pm and 11:15pm to gauge the noise contributions from the site. The results of the noise monitoring are presented in Table 6-2.

Table 6-2: Measured Noise Levels on Kangaroo Avenue

Time of Measurement / Period	Location	Measured Ambient L_{Aeq}	Measured Ambient L_{A90}	Measured Ambient L_{Amin}	*Observation* Is the noise from the site audible?	Noise Contribution at Receiver $L_{Aeq,15min}$ (dBA)
28/6/2022 7:00pm and 7:15pm (Evening)	4 Kangaroo Avenue Eastern Creek	58.3	53.2	50.1	Vehicles entering and leaving the site, occasional site noise. Noise environment made up of traffic and industrial noise	<48
28/6/2022 11:00pm and 11:15pm (Night)	4 Kangaroo Avenue Eastern Creek	54.1	49.2	48.7	Vehicles entering and leaving the site, occasional site noise. Noise environment made up of traffic and industrial noise	<48

Table 6-3: Measured L_{Aeq} Noise Levels

Time of Measurement / Period	Location	Measured Ambient L_{Aeq}	Measured Ambient L_{A90}	Measured Ambient L_{Amin}	*Observation* Is the noise from the site audible?	Noise Contribution at Receiver $L_{Aeq,15min}$ (dBA)	Noise limit(s) (dBA)	Complies with Noise Limit? Yes/No
13/10/2020 13:06 (Day)	1-6 Eber Place, Minchinbury	54.4	49.8	44.1	Inaudible in a 50 dBA background noise environment made up of traffic and industrial noise	<40	48	Yes
13/10/2020 14:32 (Day)	2-44 Warbler Street, Erskine Park	45.9	42.7	40.3	Inaudible in a 43 dBA background noise environment made up of traffic and industrial noise	<33	42	Yes
13/10/2020 22:03 (Night)	2-44 Warbler Street, Erskine Park	46.7	44.4	42.5	Inaudible in a 44 dBA background noise environment made up of traffic and industrial noise	<34	39	Yes
13/10/2020 22:35 (Night)	1-6 Eber Place, Minchinbury	47.6	44.7	42.9	Inaudible in a 45 dBA background noise environment made up of traffic and industrial noise	<35	44	Yes
14/10/2020 17:25 (Day)	1-6 Eber Place, Minchinbury	57	53.9	51.4	Inaudible in a 54 dBA background noise environment made up of traffic and industrial noise	<44	48	Yes
14/10/2020 18:00 (Eve)	2-44 Warbler Street, Erskine Park	51.5	48.7	46.9	Inaudible in a 49 dBA background noise environment made up of traffic and industrial noise	<42	42	Yes

Time of Measurement / Period	Location	Measured Ambient L_{Aeq}	Measured Ambient L_{A90}	Measured Ambient L_{Amin}	*Observation* Is the noise from the site audible?	Noise Contribution at Receiver $L_{Aeq,15min}$ (dBA)	Noise limit(s) (dBA)	Complies with Noise Limit? Yes/No
14/10/2020 18:49 (Eve)	1-6 Eber Place, Minchinbury	54.6	51.2	48.7	Inaudible in a 51 dBA background noise environment made up of traffic and industrial noise	<41	47	Yes
15/10/2020 05:39 (Night)	1-6 Eber Place, Minchinbury	51.3	46.4	43.7	Inaudible in a 46 dBA background noise environment made up of traffic and industrial noise	<36	44	Yes
15/10/2020 05:10 (Morning Shoulder)	2-44 Warbler Street, Erskine Park	50.7	49.1	47.7	Inaudible in a 49 dBA background noise environment made up of traffic and industrial noise	<39	39	Yes
21/10/2020 14:23 (Day)	2-44 Warbler Street, Erskine Park	56.4	50.5	48.5	Inaudible in a 51 dBA background noise environment made up of traffic and industrial noise	<41	42	Yes
21/10/2020 21:08 (Eve)	2-44 Warbler Street, Erskine Park	53.3	49.4	44.3	Inaudible in a 49 dBA background noise environment made up of traffic and industrial noise	<39	42	Yes
21/10/2020 21:38 (Eve)	1-6 Eber Place, Minchinbury	51.3	49	46.8	Inaudible in a 49 dBA background noise environment made up of traffic and industrial noise	<39	47	Yes

7 NOISE ASSESSMENT

Noise impacts associated with the Modification include both an operational noise and construction noise assessment. Methodologies for the assessment of both operational noise and construction noise are outlined below.

7.1 Operational Noise Assessment

The assessment requires the estimation of the total noise at each assessment location resulting from the flare operation and the existing facility. To account for this the operational noise levels as a result of the new flares at both nearby residential and industrial locations have been calculated using the CadnaA, a proprietary computer program using the CONCAWE noise algorithms. This modelling software has previously been accepted by the EPA for use in environmental noise assessments.

The following information was provided to facilitate noise modelling:

- Topographic information covering the general area and including all relevant noise-sensitive receivers.
- Location of the flares.

The sound power level of the flare plant has been provided by the manufacturer/ supplier (Run Energy Pty Ltd). The main noise source of the flare plant is the blower which is proposed to be installed with silencers on both inlet and outlet and with a noise reduction enclosure. The sound power level of the blower enclosure was provided as being 89dBA. The noise level from the flare burning was taken from site noise measurements conducted by RWDI from the existing temporary flare facility. The sound power level of the of the flare burning is assumed to be 97dBA. The flare operates continuously and therefore there are no expected maximum noise level events expected from the plant. As such maximum noise levels have not been considered any further in this assessment.

It was assumed that the flares would operate on a 24-hour basis. Therefore, operational noise levels associated with the Modification were predicted for the day (7.00am-6.00pm), evening (6.00pm-10.00pm), night (10.00pm-5.00am) and morning shoulder (5.00am-7.00am) assessment periods.

The operational noise levels from the flare facility and the existing noise levels conservatively estimated from measurements (highest levels presented in Table 6-2and Table 6-3) were added to provide the total noise of the facility. The resultant total noise levels were then compared against the relevant noise limits set in the Project Approval 06_0139 to determine whether any potential increase in noise associated with the Modification would occur.

At relatively large distances from a source, the resultant noise levels at receivers can be influenced by meteorological conditions, particularly temperature inversions and gradient winds. Where these factors are a feature of an area, their effect on resultant noise levels should be taken into account.

In accordance with the NPfI, the following default conditions have been modelled to account for potential noise enhancing meteorology:

- Stability category D with 3.0 m/s source-to-receiver winds during the daytime and evening
- Stability category F with 2.0 m/s source-to-receiver winds during the night time.

The CadnaA noise modelling software includes a feature that allows the model to be run with the "worst-case wind direction". This option produces the highest noise level for each receiver due to noise-enhancing winds and has been used in the modelling.

Predicted noise levels associated with both standard meteorological conditions ("calm") and noise enhancing ("NE") meteorological conditions are presented in this assessment.

The predicted site noise emissions for the Eastern Creek REP with the flare operating is presented in Table 7-1.

Table 7-1 shows compliance with the operational approval noise limits for residential receivers and the criterion for industrial receivers from the NPfI at all assessment locations. The flare noise contribution is so low that it does not contribute to the overall noise emissions from the site.

Table 7-1: Predicted site noise emissions for the Eastern Creek REP including the flares - $L_{Aeq,15\ minute}$

Assessment location	Period	Existing Site noise	Flares operating	Total noise from the site	Existing Site noise	Flares operating	Total noise from the site	Approval Noise Limit	Complies
		Calm			NE				(Yes/No)
1	Day	44	<15	44	44	<15	44	48	Yes
	Evening	41	<15	41	41	<15	41	47	Yes
	Night	36	<15	36	36	<15	36	44	Yes
	Morning Shoulder	44	<15	44	44	<15	44	47	Yes
2	Day	41	<15	41	41	<15	41	42	Yes
	Evening	42	<15	42	42	<15	42	42	Yes
	Night	34	<15	34	34	<15	34	39	Yes
	Morning Shoulder	39	<15	39	39	<15	39	39	Yes
3	Day	48	48	52	48	51	53	68	Yes
	Evening	48	48	52	48	51	53	68	Yes
	Night	48	48	52	48	51	53	68	Yes
	Morning Shoulder	48	48	52	48	51	53	68	Yes

Assessment location	Period	Existing Site noise	Flares operating	Total noise from the site	Existing Site noise	Flares operating	Total noise from the site	Approval Noise Limit	Complies
		Calm			NE				(Yes/No)
4	Day	48	22	48	48	25	48	68	Yes
	Evening	48	22	48	48	25	48	68	Yes
	Night	48	22	48	48	25	48	68	Yes
	Morning Shoulder	48	22	48	48	25	48	68	Yes

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7.2 Construction Noise Assessment

Key elements of the construction of the Proposal would include:

- Earthworks and civil works to establish hardstand for the permanent flare location;
- Erection of the permanent flare structure (incorporating flare stack, blowers and acoustic enclosure);
- Connection pipework and headworks; and
- Installation of gas collection wells and associated collection infrastructure within the landfill.

Subject to final staging and any weather delays, it is anticipated that installation works will be completed over a period of approximately 6 months.

Various types of plant and equipment would be required for the various construction activities of the Modification Proposal. A summary of the plant and equipment that are likely to be used during the construction of the Modification Proposal is provided in Table 7-2**Error! Reference source not found.** split up into three noise modelling scenarios. Table 7-2**Error! Reference source not found.** presents the sound power levels for individual items of construction equipment and overall activity sound power levels.

The activity sound power is considered to represent the typical worst-case level in a given 15-minute period. It is important to note that this sound power level is unlikely to be sustained at such a level for the duration of the activity. As a result, construction noise emissions during many 15-minute periods will be at lower levels.

Table 7-2: Indicative Construction Activities and Equipment for the Modification Proposal with their Sound Power Level

Activity	Equipment	Qty	Individual SWL (dBA)	Activity SWL (dBA)
Scenario 1				
Earthworks and establishment of levelled hardstand	Excavator	1	113	**119**
	Grader	1	113	
	Dump truck	1	112	
	Compactor	1	110	
	Dozer	1	106	
	Hand tools	As required	105	

Activity	Equipment	Qty	Individual SWL (dBA)	Activity SWL (dBA)
Scenario 2				
Erection of the permanent flare structure (incorporating flare stack, blowers and acoustic enclosure);	Hand tools	As required	105	**111**
	Mobile Crane	1	105	
	Road truck	1	108	
Scenario 3				
Connection pipework and headworks, Installation of gas collection wells and associated collection infrastructure within the landfill	Mobile Crane	1	105	**111**
	Road truck	1	108	
	Hand tools	As required	105	

Typically, construction noise is assessed consistent with the ICNG, however as construction associated with the new flares would not be discernible from normal site operations, construction noise was conservatively assessed cumulatively with operational noise in this noise assessment. Therefore, the assessment requires the estimation of the total noise at each assessment location resulting from the construction activities and the existing facility.

Noise levels associated with the proposed construction works have been predicted using the same modelling approach as used for the operational noise assessment.

Based on the construction activities and plant SWL presented above, the predicted $L_{Aeq,15min}$ construction noise levels at assessment locations from the various construction activities during the standard recommended hours are presented in Table 7-3 for clam meteorological conditions and noise enhancing conditions in Table 7-4.

The predicted construction noise levels associated with the construction of the flares and the existing Eastern Creek REP, presented in Table 7-3 and Table 7-4, shows compliance with the operational approval noise limits for residential receivers and the criterion for industrial receivers from the NPfI at all assessment locations.

Table 7-3:Predicted site noise emissions for the Eastern Creek REP including the flare construction activities (Calm meteorological conditions) - $L_{Aeq,15min}$

Assessment location	Scenario 1			Scenario 2			Scenario 3			Approval Noise Limit	Complies (Yes/No)
	Existing Noise level	Construction Contribution	Total	Existing Noise level	Construction Contribution	Total	Existing Noise level	Construction Contribution	Total		
1	44	18	44	44	<15	44	44	<15	44	48	Yes
2	41	<15	41	41	<15	41	41	<15	41	42	Yes
3	48	54	55	48	46	51	48	46	51	68	Yes
4	48	41	49	48	33	48	48	33	48	68	Yes

Table 7-4: Predicted site noise emissions for the Eastern Creek REP including the flare construction activities (Noise Enhancing conditions) - $L_{Aeq,15min}$

Assessment location	Scenario 1			Scenario 2			Scenario 3			Approval Noise Limit	Complies (Yes/No)
	Existing Noise level	Construction Contribution	Total	Existing Noise level	Construction Contribution	Total	Existing Noise level	Construction Contribution	Total		
1	44	23	44	44	<15	44	44	<15	44	48	Yes
2	41	<15	41	41	<15	41	41	<15	41	42	Yes
3	48	57	57	48	49	52	48	49	52	68	Yes
4	48	45	50	48	37	48	48	37	48	68	Yes

8 NOISE MANAGEMENT

The Eastern Creek REP has an Environmental Management Strategy (February 2021) that stipulates the noise monitoring requirements. The Environmental Management Strategy states:

- Six monthly monitoring will be undertaken;
- Monitoring would be conducted by an appropriately qualified environmental consultant;
- The monitoring would be conducted at residential locations to the north and west of the site, in and around McFarlane Drive, and Barossa Drive in Minchinbury and Swamphen Street and Roper Road in Erskine Park; and
- Noise monitoring would be conducted in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise.

It is proposed to continue with the noise monitoring requirements in the Environmental Management Strategy.

9 CONCLUSION

Noise impacts associated with the construction and operation of the permanent flare have been assessed in accordance with the following NSW Government guidelines and policies:

- *Interim Construction Noise Guideline*
- *Noise Policy for Industry*

A comparison of the noise modelling results for the Approved Development Modification (when flares were in an alternate location as approved under Modification 10) indicates that there are no material changes to predicted noise impacts of the Modification Proposal.

The predicted operational and construction noise predictions associated with the Modification Proposal comply with the site's operational approval noise limits and the criterion for industrial receivers from the NPfI at all assessment locations.

Table 9-1, on the following page, presents the predicted operational noise impacts under calm conditions at the residential assessment locations under the approved MOD 10 noise assessment, and those currently predicted resulting from the proposed change in permanent flare location. It shows that all noise criteria are still predicted to be achieved, and the change in permanent flare location does not have any material impacts on the conclusions of the assessment.

Table 9-1: Comparison of Predicted site noise emissions for the Eastern Creek REP including the flares – Calm Conditions

Assessment location	Period	Existing Site noise	Flares operating	Total noise from the site	Existing Site noise	Flares operating	Total noise from the site	Approval Noise Limit	Complies
		Approved Mod 10			Proposed				(Yes/No)
1	Day	44	<15	44	44	<15	44	48 $L_{Aeq,15\ minute}$	Yes
	Evening	41	<15	41	41	<15	41	47 $L_{Aeq,15\ minute}$	Yes
	Night	36	<15	36	36	<15	36	44 $L_{Aeq,15\ minute}$	Yes
	Morning Shoulder	44	<15	44	44	<15	44	47 $L_{Aeq,15\ minute}$	Yes
2	Day	41	<15	41	41	<15	41	42 $L_{Aeq,15\ minute}$	Yes
	Evening	42	<15	42	42	<15	42	42 $L_{Aeq,15\ minute}$	Yes
	Night	34	<15	34	34	<15	34	39 $L_{Aeq,15\ minute}$	Yes
	Morning Shoulder	39	<15	39	39	<15	39	39 $L_{Aeq,15\ minute}$	Yes

10 REFERENCES

1. DECC (2009) *Interim Construction Noise Guideline*, Department of Environment and Climate Change NSW, July 2009.
2. EPA (2017) *Noise Policy for Industry*, Environment Protection Authority, October 2017.