HERRING STORER ACOUSTICS

INFINITE GREEN ENERGY

PROPOSED HYDROGEN PLANT

LOT 7 131 NORTHAM-YORK ROAD, MULUCKINE

BACKGROUND NOISE MONITORING AND PRELIMINARY NOISE IMPACT ASSESSMENT

FEBRUARY 2023

OUR REFERENCE: 30312-3-22316

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FOR

INFINITE GREEN ENERGY

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REVISION HISTORY

Revision	Description	Date	Author	Checked
1	Addition of preliminary noise impact assessment	1/12/2022	GW	PLD
2	Revision following pre development application review	13/3/2023	GW	PLD

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1	3	Infinite Green Energy Attn: Amelia Badri Email: abadri@igeh2.com		✓

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APPENDICIES

1.0 INTRODUCTION

Infinite Green Energy commissioned Herring Storer Acoustics to assist with obtaining development approval for the design and development of a proposed hydrogen plant at Lot 7 located to the east of the Northam townsite.

The area, and indicative site layout, is shown below in Figure 1.1.

FIGURE 1.1 – AERIAL VIEW OF SITE AND INDICATIVE SITE LAYOUT

2.0 MONITORED AMBIENT NOISE

As per the "Draft Guidelines on Environmental Noise for Prescribed Premises" (released in May 2016), continuous noise monitoring has been conducted to establish the ambient noise levels.

The monitoring locations utilized is shown below in Figure 2.1, with monitoring undertake between 6th October 2022 and 19th October 2022. Monitoring at the west of the proposed development location halted on the 13th October 2022 (battery issue).

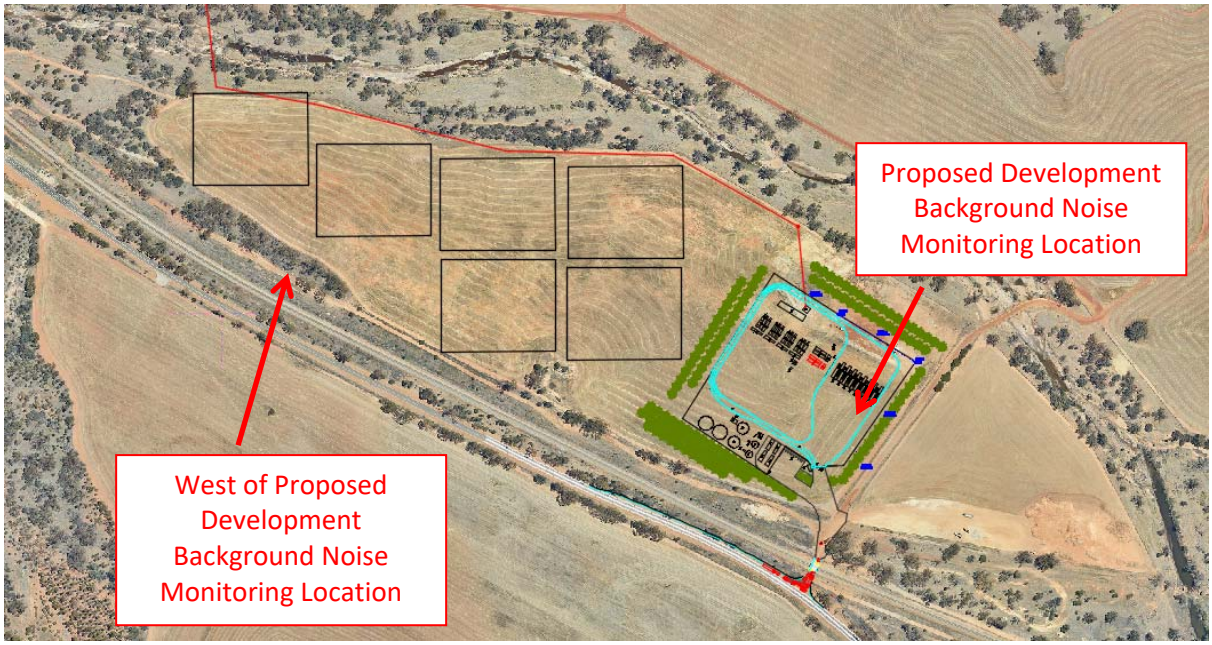


FIGURE 2.1 – MONITORING LOCATIONS

Noise monitoring results are summarised graphically below in Figure 2.2 and 2.3, with the full results contained in Appendix A.

Noise monitoring was undertaken utilising two NGARA Automatic Noise Data Loggers. NATA calibration certificates for the equipment utilised can be provided upon request.

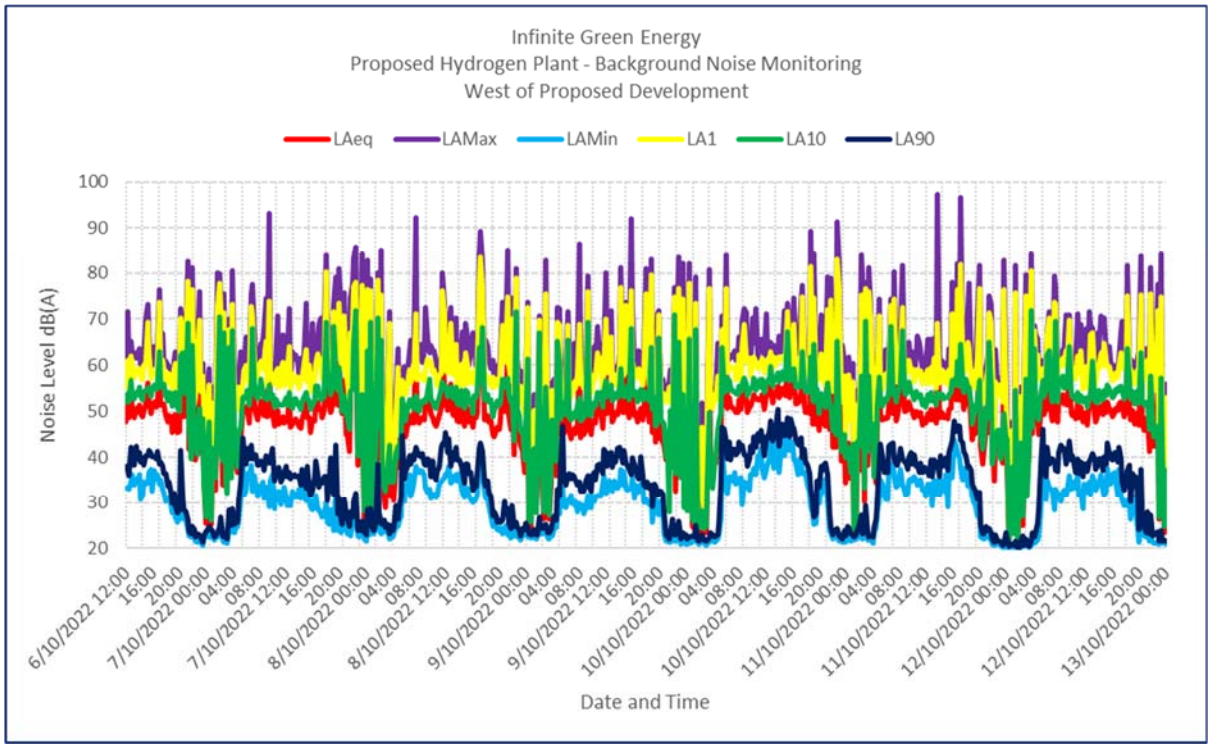


FIGURE 2.2 – MONITORED BACKGROUND NOISE LEVELS – WEST OF PROPOSED DEVELOPMENT

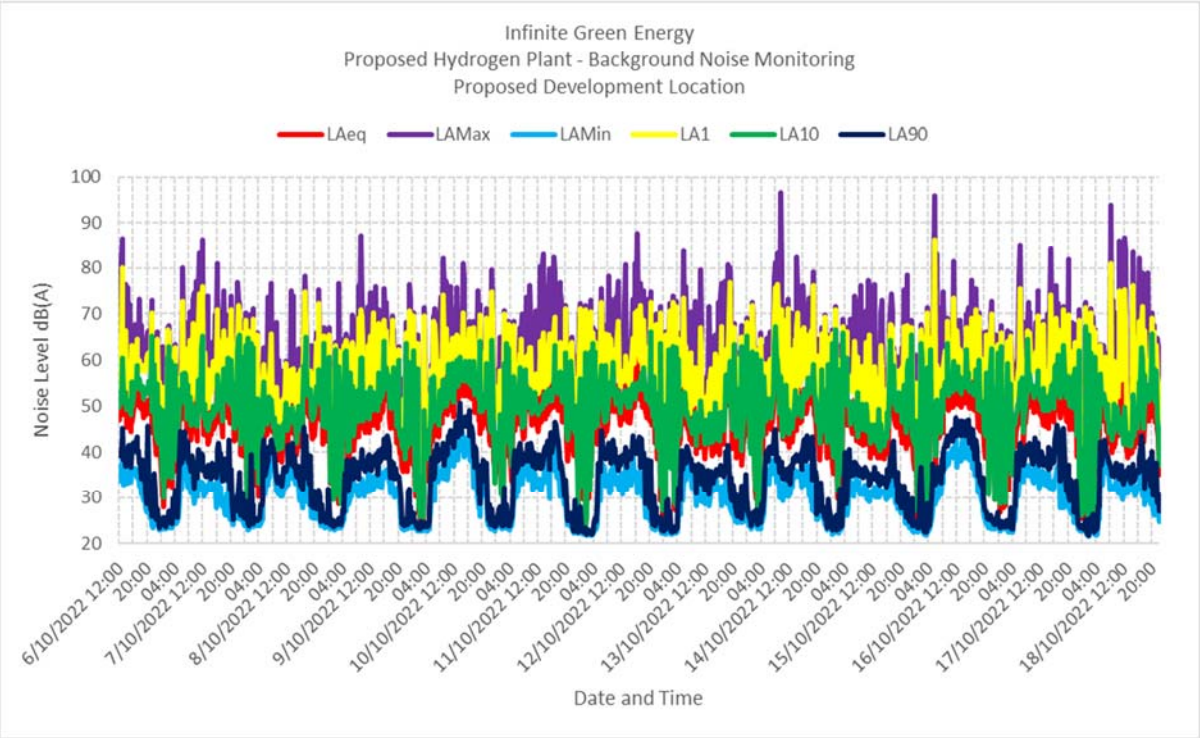


FIGURE 2.3 – MONITORED BACKGROUND NOISE LEVELS – AT PROPOSED DEVELOPMENT

For informational purposes, a summary of the average noise level for each daily regulatory time period is shown in Table 2.1 and 2.2.

Weather data for the monitoring period was sourced via the Bureau of Meteorology web site for Northam Where appropriate, noise level data was excluded due to the influence of heavy rain.

TABLE 2.1 – SUMMARY NOISE LEVELS – WEST LOCATION
LA90 AMBIENT NOISE LEVELS

Day / Date	Time Period			Comment
	Day 0700 to 1900	Evening 1900 to 2200	Night 2200 to 0700	
Thursday, 6 October 2022	39	29	23	
Friday, 7 October 2022	37	29	29	
Saturday, 8 October 2022	38	27	29	
Sunday, 9 October 2022	37	29	27	
Monday, 10 October 2022	43	32	27	
Tuesday, 11 October 2022	40	27	28	
Wednesday, 12 October 2022	39	28	26	
Thursday, 13 October 2022	-	-	23	
Average	**39**	**29**	**27**	

TABLE 2.2 – SUMMARY NOISE LEVELS – PROPOSED DEVELOPMENT LOCATION
LA90 AMBIENT NOISE LEVELS

Day / Date	Time Period			Comment
	Day 0700 to 1900	Evening 1900 to 2200	Night 2200 to 0700	
Thursday, 6 October 2022	40	31	26	
Friday, 7 October 2022	37	31	30	
Saturday, 8 October 2022	37	29	30	
Sunday, 9 October 2022	38	30	28	
Monday, 10 October 2022	43	33	27	
Tuesday, 11 October 2022	40	28	29	
Wednesday, 12 October 2022	39	30	27	
Thursday, 13 October 2022	36	29	29	
Friday, 14 October 2022	39	30	29	
Saturday, 15 October 2022	35	29	29	
Sunday, 16 October 2022	42	28	28	
Monday, 17 October 2022	40	31	28	
Tuesday, 18 October 2022	36	33	29	
Average	**39**	**30**	**28**	

3.0 ACOUSTIC CRITERIA

The criteria used is in accordance with the *Environmental Protection (Noise) Regulations 1997.* These regulations stipulate maximum allowable external noise levels. For residential or noise sensitive premises, this is determined by the calculation of an influencing factor. The influencing factor is calculated for the usage of land within the two circles, having radii of 100m and 450m from the premises of concern. For commercial and industrial premises, the assigned noise levels are fixed for all hours, as listed in Table 3.1.

TABLE 3.1 –ASSIGNED OUTDOOR NOISE LEVELS

Type of premises receiving noise	Time of day	Assigned level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises: highly sensitive area (i.e within 15m of a dwelling)	0700 to 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + IF	45 + IF	55 + IF
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} noise level is the maximum noise level recorded.
IF = Influencing Factor

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined as per Regulation 9.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

TABLE 3.2 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS WHEN MUSIC IS NOT PRESENT

Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

The influencing factor at the nearest noise sensitive premises has been conservatively determined as being zero for the nearest receptors.

The most critical assessment parameter is the L_{A10} noise level 'assigned level' at the nearest noise sensitive premises. If the noise emissions are tonal then after adjustment for tonal characteristic the applicable the noise level to ensure compliance is an L_{A10} of 30 dB(A) or lower at night and 40 dB(A) during weekdays.

The locations of the nearest noise sensitive premises considered in this preliminary assessment are shown below in Figure 3.1.

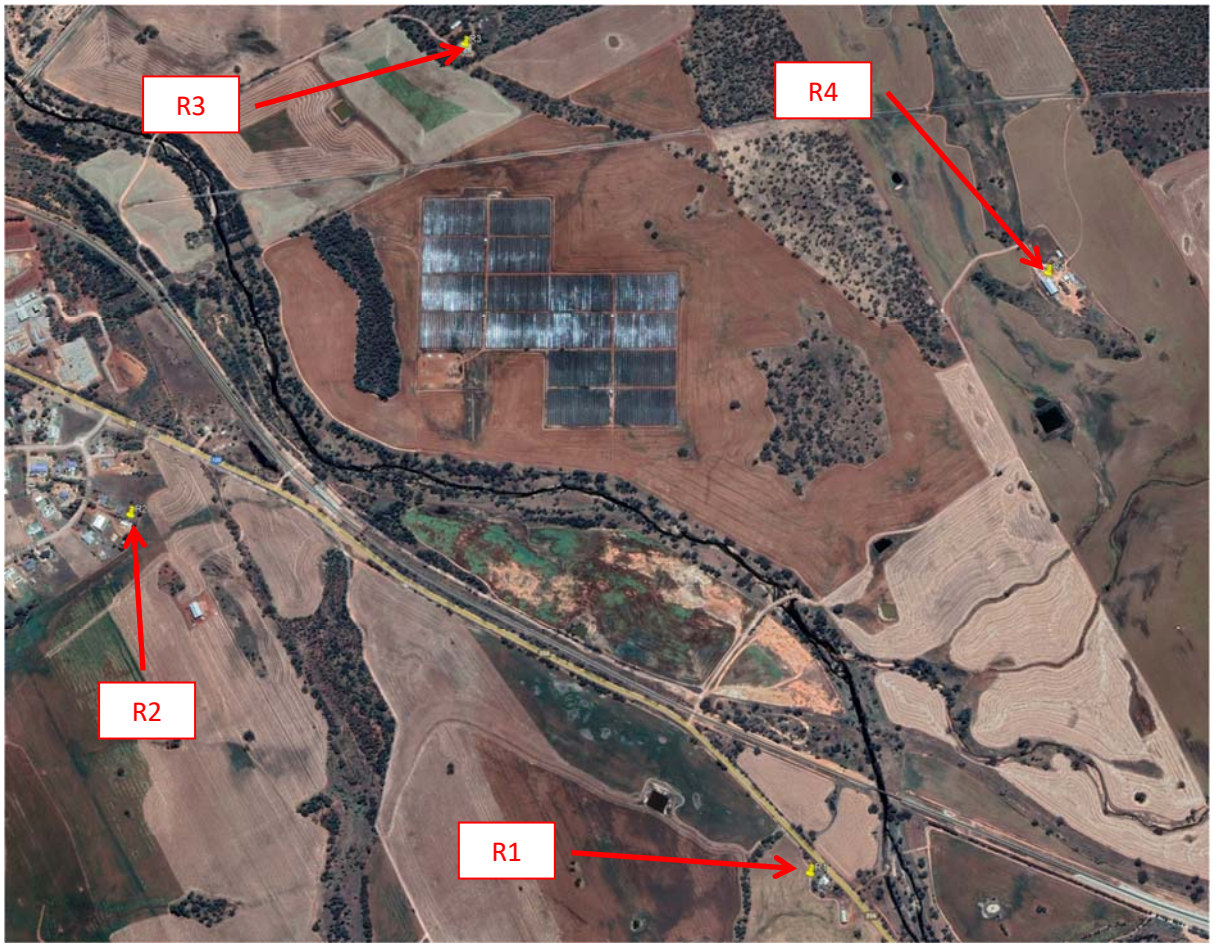


FIGURE 3.1– NEAREST NOISE SENSITIVE PREMISES

4.0 CALCULATED NOISE LEVELS

Noise emmissions[1] at the nearest neighbouring residential premises, due to noise associated with the proposed operations, were modelled with the computer programme SoundPlan. Sound power levels used for the calculations are based on measured sound pressure levels of similar equipment proposed for use on site.

At this preliminary stage, noise levels associated with the proposed equipment on site are not known. As the equipment is "containerised" a noise level of 85 dB(A) at a distance of 1m from the equipment has been set as the assumed noise level. This was determined on the basis of preliminary information provided.

For the initial modelling scenario, the noise sources have been placed at a height of 1.5m above ground level.

The following input data was used in the calculations:

a) Provided drawings.
b) Assumed noise levels of 85 dB(A) at a distance of 1m from equipment.
c) Ground contours of the area attained from Google Earth.

Weather conditions for modelling were as stipulated in the Environmental Protection Authority's "*Draft Guidelines on Environmental Noise for Prescribed Premises"* and for the day period are as listed in Table 4.2.

TABLE 4.2 – WEATHER CONDITIONS

Condition	Day
Temperature	20°C
Relative humidity	50%
Pasquill Stability Class	E
Wind speed	4 m/s*

* From sources, towards receivers.

5.0 RESULTS

Calculated noise levels associated with the noise emissions from the proposed operations are summarised below in Table 5.1. Appendix B contains the overall noise contour plot.

TABLE 5.1 – CALCULATED NOISE LEVEL

Receiver	Calculated Noise Level (L_{A10} dB(A))
R1	30
R2	23
R3	21
R4	24

1 Immissions – noise received at a source
2 Emissions – noise emanating from a source and / or location

6.0 ASSESSMENT

Based on calculated noise levels at the nearest premises, noise levels may be considered to contain tonal characteristics. Hence, to be conservative, a + 5 dB adjustment has been applied to calculated noise levels as shown in Table 6.1.

TABLE 6.1 – APPLICABLE ADJUSTMENTS AND ASSESSABLE LEVEL OF NOISE EMISSIONS, dB(A)

Receiver	Calculated Noise Level, dB(A)	Applicable Adjustments to Measured Noise Levels, dB(A)			Assessable Noise Level, dB(A)
		Where Noise Emission Is Not Music			
		Tonality	Modulation	Impulsiveness	
R1	30	+5	-	-	35
R2	23	+5	-	-	28
R3	21	+5	-	-	26
R4	24	+5	-	-	29

Based on the assessable noise levels above, comparison against the relevant assigned noise level is contained in Table 6.2

TABLE 6.2 – ASSESSMENT OF NOISE LEVELS

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable L_{A10} Assigned Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	35	Day	45	Complies
		Sunday / Public Holiday Day Period	40	Complies
		Evening	40	Complies
		Night	35	Complies
R2	28	Day	45	Complies
		Sunday / Public Holiday Day Period	40	Complies
		Evening	40	Complies
		Night	35	Complies
R3	26	Day	45	Complies
		Sunday / Public Holiday Day Period	40	Complies
		Evening	40	Complies
		Night	35	Complies
R4	29	Day	45	Complies
		Sunday / Public Holiday Day Period	40	Complies
		Evening	40	Complies
		Night	35	Complies

7.0 CONCLUSION

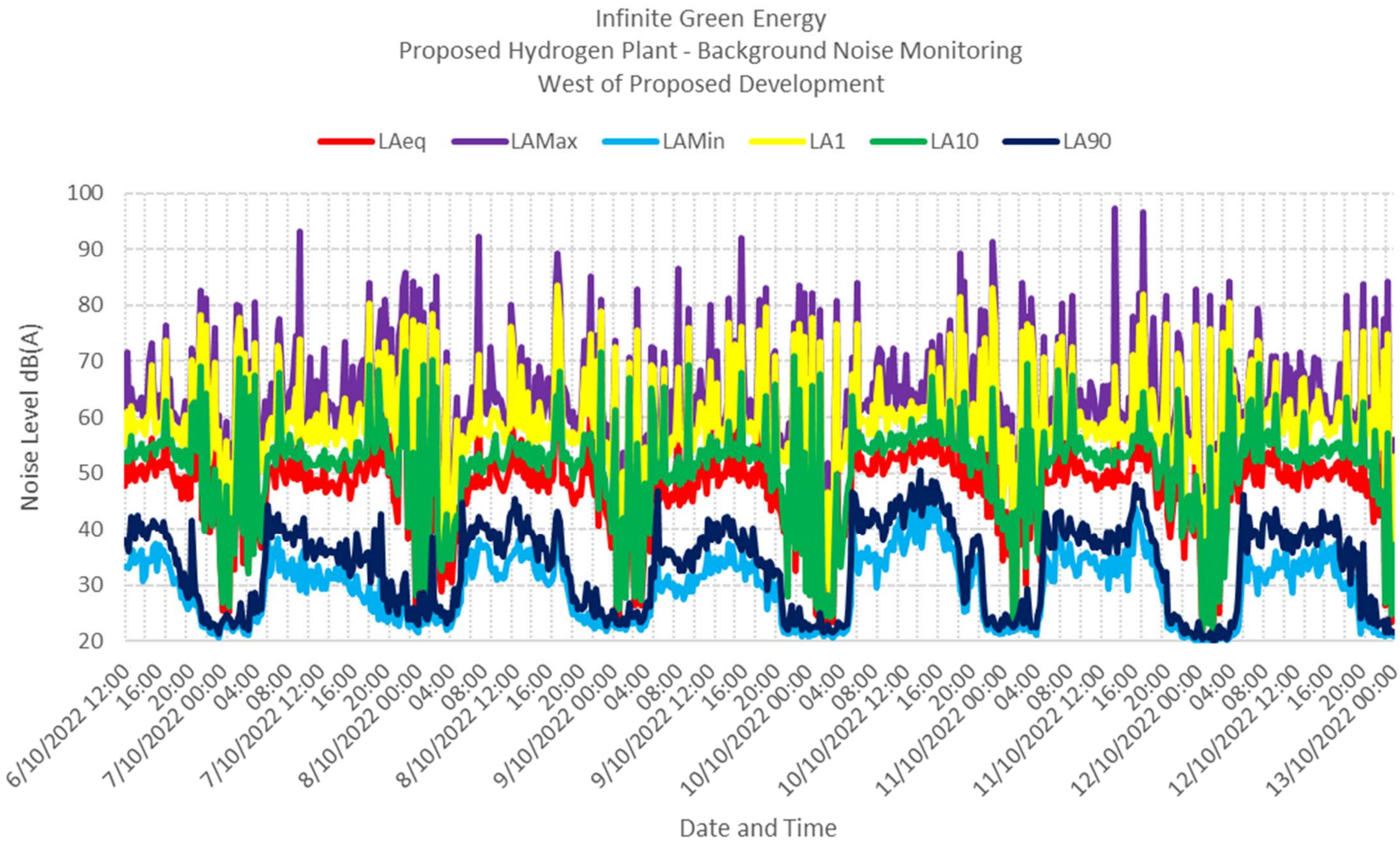
Background noise levels in the vicinity of the proposed development has been undertaken, with the results indicative of rural ambient noise levels.

A preliminary assessment of the noise impact of the proposed development has been undertaken. Noise emissions associated with the equipment have been assumed to be 85 dB(A) at a distance of 1m from each of the containerised pieces of equipment.

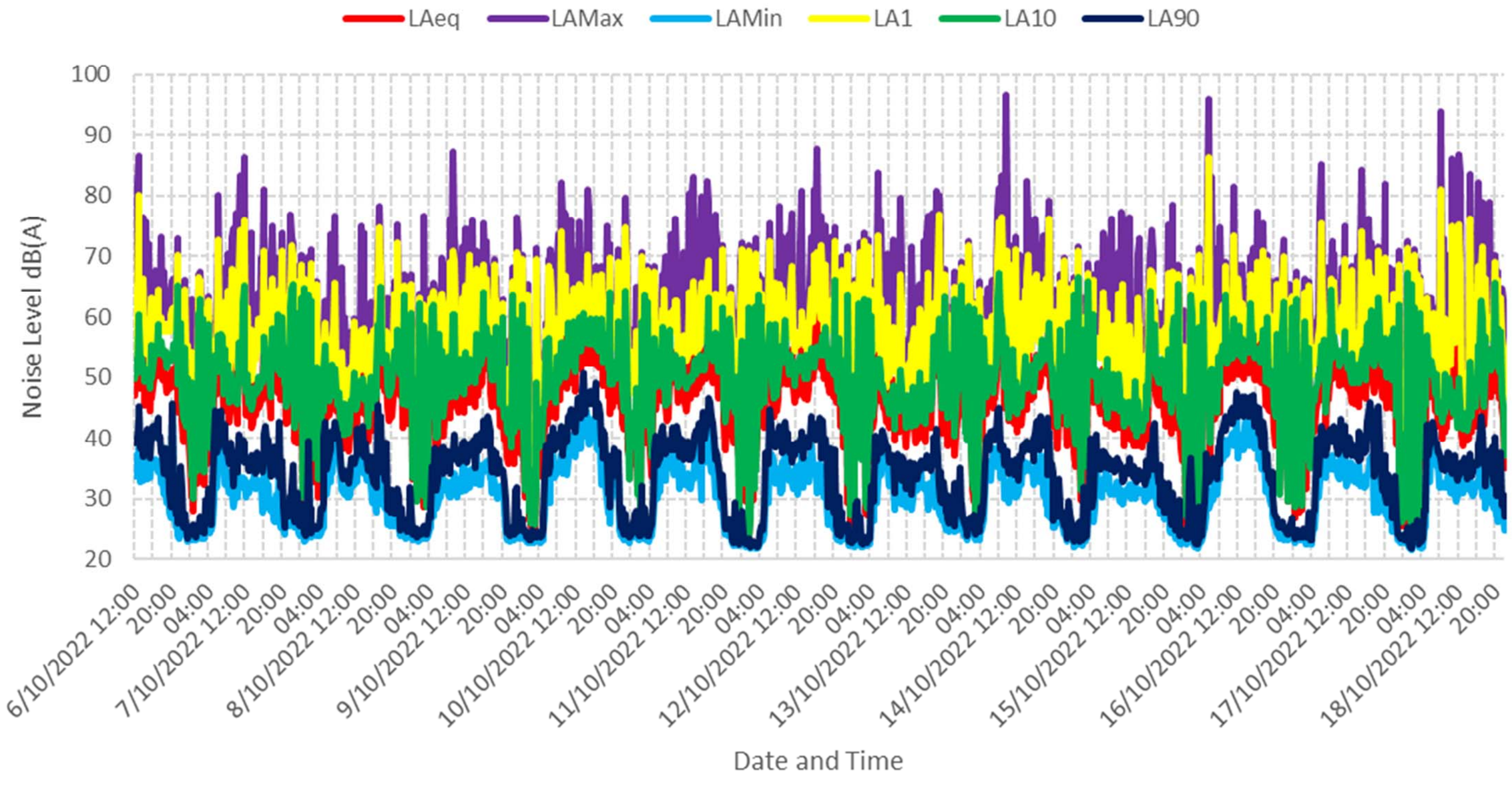
Noise level emissions associated with the proposed development, based on this preliminary assumption of noise levels associated with the equipment, have been found to be compliant with the Assigned Noise Levels stipulated by the *Environmental Protection (Noise) Regulations 1997* at all times.

APPENDIX A
BACKGROUND NOISE MONITORING CHARTS

Infinite Green Energy
Proposed Hydrogen Plant - Background Noise Monitoring
West of Proposed Development

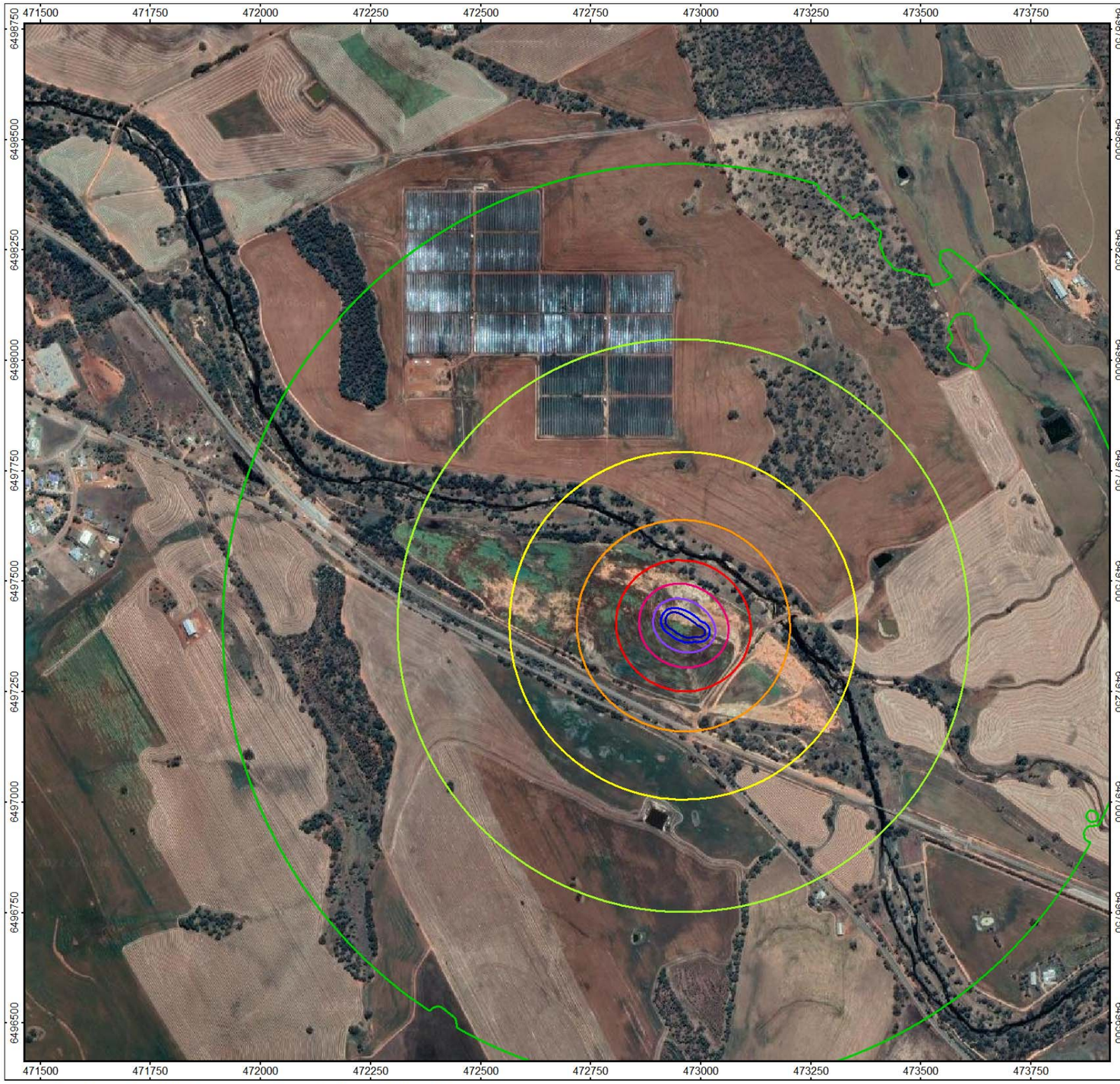


Infinite Green Energy
Proposed Hydrogen Plant - Background Noise Monitoring
Proposed Development Location



APPENDIX B

NOISE CONTOUR PLOT



Customer:
Infinite Green Energy
Project: Infinite Green Energy Hydrogen Plant
Project-No. 22316

Infinite Green Energy
Fuelling The Future

Map
1

GNM - Preliminary NIA
Result number 2
Calculation in 1.5 m above ground

Project engineer: George Watts
Created:
Processed with SoundPLAN 8.2, Update 18/11/2022

Levels
in LA10 dB(A)

- = 25
- = 30
- = 35
- = 40
- = 45
- = 50
- = 55
- = 60
- = 65

N

0 50 100 200 300 400 m

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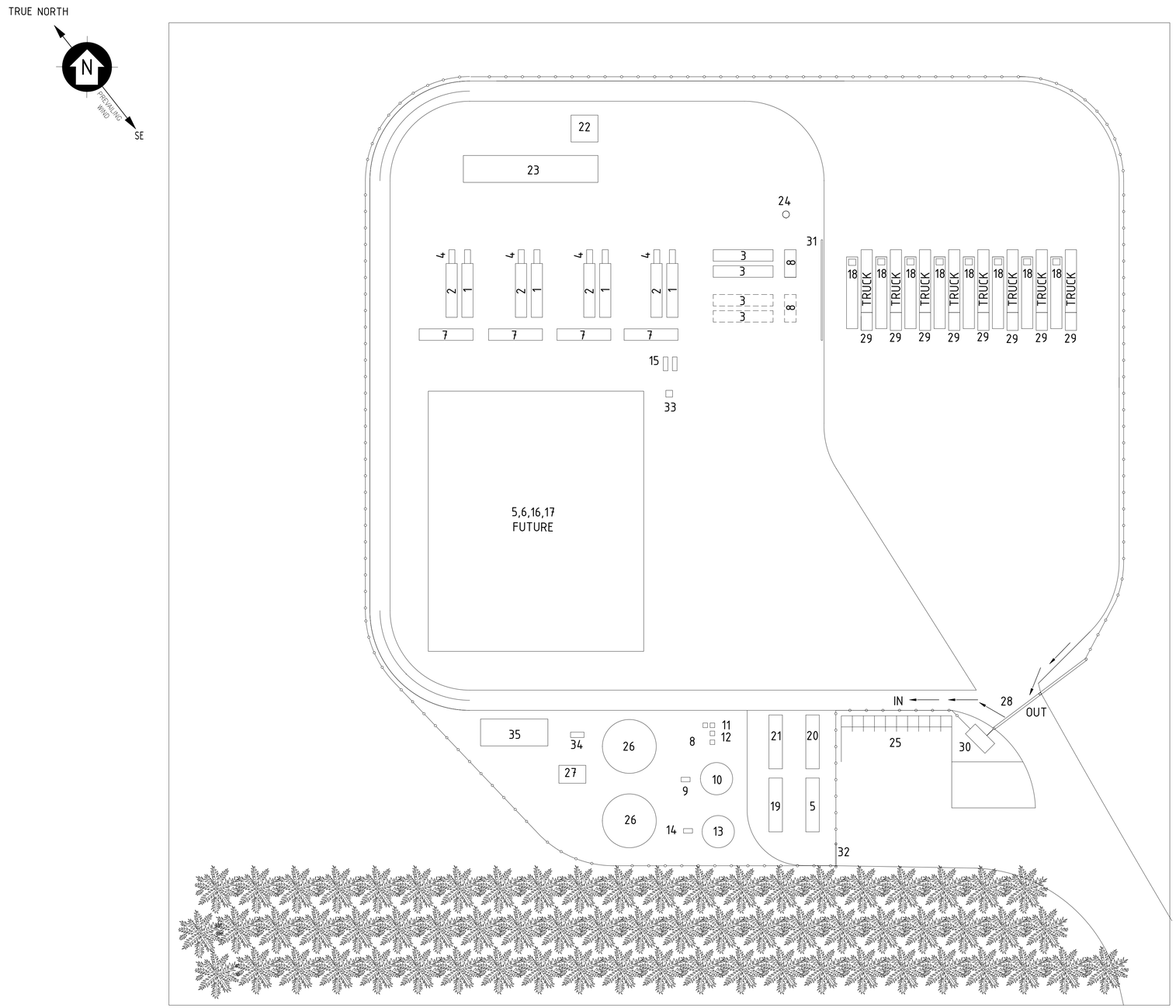
APPENDIX C

PROPOSED PLANT LAYOUT



FACILITY IDENTIFICATION

1 – CONTAINERIZED ELECTROLYZER – 2.5MW
2 – CONTAINERIZED ELECTROLYSER, TRANSFORMER.
3 – HYDROGEN COMPRESSOR PACKAGE.
4 – HVAC UNITS – 1 PER CONTAINER.
5 – OXYGEN GENERATION AND STORAGE (FUTURE).
6 – LIQUEFACTION (FUTURE).
7 – COOLING WATER SYSTEM AND AIR COOLERS.
8 – INSTRUMENT AIR PACKAGE (INCL AIR RECEIVER).
9 – DEMIN WATER PACKAGE
10 – FEED WATER STORAGE TANK.
11 – FEED WATER PUMPS.
12 – POTABLE WATER PUMP.
13 – DEMIN REJECT WATER STORAGE TANK.
14 – DEMIN REJECT WATER DISPOSAL PUMP.
15 – NITROGEN BOTTLE CASCADE
16 – TRUCK LOADING TERMINAL – LIQUID H2 (FUTURE)
17 – TRUCK LOADING TERMINAL – 02 (FUTURE)
18 – TRUCK LOADING TERMINAL – GAS H2
19 – ABLUTION ROOM.
20 – FIRST AID ROOM AND OFFICE
21 – CONTROL ROOM AND INSTRUMENT EQUIPMENT ROOM
22 – TRANSFORMERS
23 – SUBSTATION
24 – VENT
25 – PARKING FOR 10 VEHICLES
26 – FIREWATER TANK – 2x300000L
27 – FIREWATER PUMPS SKID.
28 – CARD ACCESS SECURITY GATE
29 – SEMI TRAILER TRUCK (19.0M LG X 2.5 WIDE)
30 – SECURITY HUT BUILDING
31 – BLAST WALL
32 – SITE ACCESS GATE
33 – OILY WATER SEPARATOR (SITE DRAINAGE)
34 – FIRE WATER TANK SUCTION CONNECTIONS FOR DFES
35 – FIREWATER TRUCK HARDSTAND AREA

1 – CONTAINERIZED TO MINIMIZE SITE WORKS.
2 – SHEDS PUT OVER ELECTROLYZERS,COMPRESSORS, OFFICES AND LOADING BAYS.
3 – SEPARATION BETWEEN UTILITIES AND PROCESS 5.0m.
4 – BLAST WALL AROUND STORAGE ON 3 SIDES ONLY.
5 – SPACING BETWEEN CONTAINER PAIRS 1.0M
6 – MAINTENANCE ALLOWANCE BETWEEN GROUPS OF CONTAINERS 4.0M
7 – TARMAC FOR OUTSIDE CARPARK AND TRUCK LOADING AREAS.
8 – PROCESS VENTS EXTEND UP FROM EACH CONTAINER.
9 – DESIGNED FOR ONE TRUCK ONLY AT LOADOUT BAY AT ONE TIME.
10- TRUCK SEMI-TRAILER PER MAIN ROADS DWG 200431-0194-1
11 – PORTABLE BUILDINGS TO BE CLADDED TO LOOK AGRICULTURAL
12 – DISTANCE BETWEEN PLANT AND FENCES 10.0M

FOR INFORMATION ONLY

0m 10m 20m 30m 40m 50m

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MEG-HP1 PLOT PLAN

NORTHAM H2 PLANT

SCALE:	DRN:	CHK:	T.EN DWG No:	REVISION:
1:500	STC	SKY	213973C-500-DW-0051-4001	C
	DATE: 03.11.22	DATE: 03.11.22	A1 DRAWING No: MEG-DES-LYT-TEN-0001	