

REPORT

Proposed Peak Power Generation Facility - Harts Farm Way, Havant

Noise Impact Assessment

Client: Green Frog Power II Ltd

Reference: I&BPB5588-111-100R001F02

Revision: 02/Final

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1 Introduction

1.1 Background

This noise impact assessment was prepared on behalf of Green Frog Power II Ltd (GFP) for a generator compound off Harts Farm Way, Havant. The proposal is for the installation of 14 gas-fuelled generators with a combined electrical output capacity of no greater than 20MW_e. The proposed generators will supply short term power to the national grid, under the Capacity Mechanism, during periods when peak demand on the network exceeds supply.

This report provides a review of the existing noise climate in the area and considers the potential for noise impacts at identified human receptors. The assessment used SoundPLAN noise modelling software to predict the impacts of noise at sensitive receptors within the vicinity of the application site. This package directly implements the calculation methods outlined in ISO 9613-2¹ and other nationally and internationally recognised acoustic standards.

It was confirmed² that during a 15 month period other, similar, peak power generating sites have not operated between 2300 and 0700hrs. It is considered that the likelihood of the scheme operating during the night time hours at any time during a calendar year is 1% or less as the demand for electricity drops dramatically after 2300hrs. If the back-up power generators were to operate during the night then it would be due to a national emergency. As a result the night time assessment has been screened out of this report.

The proposed development is not categorised as a Part A activity under the Environmental Permitting Regulations³, as it will have a generating capacity of less than 50 megawatt thermal input (MW_{th}). However with an aggregated net thermal input greater than 20MW_{th} the facility will require a permit to operate from the local authority.

1.2 Site Description and Surrounding Area

The proposed development consists of a peak power generator compound at land off Harts Farm Way, Havant. The site is currently unused in the middle of a commercial and industrial area. The proposed development is located between the A27 Havant Bypass to the north, Harts Farm Way road to the south and commercial / industrial buildings to the east and west.

The closest residential receptors are properties located on Brockhampton Road, approximately 450m to the North East and the second closest residential receptor is located on Mill Lane, approximately 380m to the North West. The proposed development lies within the Havant Borough Council (HBC) administrative area.

The site is clear of any existing structures or buildings that would need to be removed prior to development.

The site location is detailed in **Appendix A, Figure A1**.

¹ International Standard (1996) ISO 9613-2:1996 Acoustics – Attenuation of sound during propagations outdoors – Part 2: General method of calculation. ISO, Switzerland.

² To: Royal HaskoningDHV From: Green Frog Power II Ltd. Date: 09/02/2017

³ Statutory Instrument 2016 - No.1154. The Environmental Permitting (England and Wales) Regulations 2016

2 Legislative Framework and Planning Policy

2.1 National Legislation

2.1.1 Environmental Protection Act 1990⁴

Section 79 of the Act defines statutory nuisance with regard to noise and determines that local planning authorities have a duty to detect such nuisances in their area.

The Act also defines the concept of “Best Practicable Means” (BPM):

- *‘practicable’ means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;*
- *the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;*
- *the test is to apply only so far as compatible with any duty imposed by law; and*
- *the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.*

Section 80 of the Act provides local planning authorities with powers to serve an abatement notice requiring the abatement of a nuisance or requiring works to be executed to prevent their occurrence.

2.1.2 The Control of Pollution Act 1974⁵

Section 60 of the Act provides powers to Local Authority Officers to serve an abatement notice in respect of noise nuisance from construction works.

Section 61 provides a method by which a contractor can apply for ‘prior consent’ for construction activities before commencement of works. The ‘prior consent’ is agreed between the Local Authority and the contractor and may contain a range of agreed working conditions, noise limits and control measures designed to minimise or prevent the occurrence of noise nuisance from construction activities. Application for a ‘prior consent’ is a commonly used control measure in respect of potential noise impacts from major construction works.

2.2 National Policy Guidance

2.2.1 National Planning Policy Framework⁶

The National Planning Policy Framework (NPPF) was introduced in March 2012 replacing the former Planning Policy Guidance 24: Planning and Noise. Paragraph 123 of the National Planning Policy Framework states that planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*

⁴ Her Majesty’s Stationery Office (1990) *Environmental Protection Act*. HMSO, London.

⁵ Her Majesty’s Stationery Office (1974) *Control of Pollution Act*. HMSO, London.

⁶ Department for Communities and Local Government (2012) *National Planning Policy Framework*. DCLG, London.

- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

The NPPF also refers to the Noise Policy Statement for England (NPSE) (Defra, 2010).

2.2.2 Noise Policy Statement for England⁷

The NPSE document was published by Defra in 2010 and paragraph 1.7 states three policy aims:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

The first two points require that significant adverse impact should not occur and that, where a noise level falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect:

“...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.” (Paragraph 2.24, NPSE, March 2010).

Section 2.20 of the NPSE introduces key phrases including “Significant adverse” and “adverse” and two established concepts from toxicology that are being applied to noise impacts:

“NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected”.

Paragraph 2.21 of the NPSE extends the concepts described above and leads to a Significant Observed Adverse Effect Level – SOAEL, which is defined as the level above which significant effects on health and quality of life occur. The NPSE states:

“it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations”. (Paragraph 2.22, NPSE, March 2010).

Furthermore paragraph 2.22 of the NPSE acknowledges that:

⁷ Department for Environment, Food and Rural Affairs (2010) Noise Policy Statement for England. DEFRA, London.

“further research is required to increase understanding of what may constitute a significant adverse effect on health and quality of life from noise”.

2.2.3 National Planning Practice Guidance for Noise⁸

The National Planning Practice Guidance for Noise (NPPG Noise, December 2014), issued under the NPPF, states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

2.3 Guidance

The following guidance has been used for the purpose of the noise and vibration assessment:

British Standard (BS) 4142:2014 – Method for rating and assessing industrial and commercial sound⁹

BS 4142:2014 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

British Standard (BS) 5228:2009+A1:2014 Parts 1 and 2 Code of practice for noise and vibration control on construction and open sites¹⁰¹¹

This document provides recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels. The legislative background to noise and vibration control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. This British Standard provides guidance on methods of predicting and measuring noise and assessing its impact on those exposed to it.

British Standard (BS) 7445:2003 Parts 1 and 2 - Description and measurement of environmental noise¹²¹³

This Standard provides details of the instrumentation and measurement techniques to be used when assessing environmental noise, and defines the basic noise quantity as the continuous A-weighted sound pressure level (L_{Aeq}). Part 2 of BS 7445 replicates ISO standard 1996-2.

British Standard (BS) 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings¹⁴

Provides a methodology to calculate the noise levels entering a building through facades and façade elements and provides details of appropriate measures for sound insulation between dwellings. It includes recommended internal noise levels which are provided for a variety of situations.

⁸ Department for Communities and Local Government (2014) National Planning Practice Guidance Noise. DCLG, London.

⁹ British Standards Institute (2014) BS 4142:2014 Methods for rating and assessing industrial and commercial sound. BSI, London.

¹⁰ British Standards Institute (2014) BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1: Noise. BSI, London.

¹¹ British Standards Institute (2014) BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration. BSI, London.

¹² British Standards Institute (2003) BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures. BSI, London.

¹³ British Standards Institute (2003) BS 7445-2:2003 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use. BSI, London.

¹⁴ British Standards Institute (2014) BS 8233:2014 Sound Insulation and Noise Reduction for Buildings. BSI, London.

World Health Organisation (WHO) (1999) Guidelines for community noise¹⁵

These guidelines present health-based noise limits intended to protect the population from exposure to excess noise. They present guideline limit values at which the likelihood of particular effects, such as sleep disturbance or annoyance, may increase. The guideline values are 50 or 55dB L_{Aeq} during the day, related to annoyance, and 45 dB L_{Aeq} or 60dB L_{Amax} at night, related to sleep disturbance.

2.4 Local Planning Policy Guidance

With reference to Havant Borough Council's Adopted Core Strategy for Local Development Framework March 2011, Policy CS16 High Quality Design section E states that:

"The development does not cause unacceptable harm to the amenity of neighbours through smell, the loss of privacy, outlook, noise and overlooking."

¹⁵ Berglund et al (1999) Guideline for Community Noise. WHO, Geneva.

3 Baseline Environmental Noise Survey

3.1 Methodology and Procedure

A baseline sound survey was conducted on the 4th and 5th of July 2017 during the daytime and night time in accordance with the procedure described in BS 7445 parts 1 and 2 and BS 4142:2014.

The baseline noise survey was undertaken at locations representative of the existing noise sensitive receptors (NSRs) at and around the proposed location of the generators.

The measurement locations are illustrated in **Appendix A, Figure A1** and detailed in **Table 3.1**.

Table 3.1: Baseline noise survey and receptor locations

Receptor	Description	Location		Corresponding Representative Baseline Monitoring Location
		X	Y	
NSR1	Residential properties on Brockhampton Road	470966.99	106112.17	MP1
NSR2	Residential properties on Mill Lane	470250.15	105986.97	MP2

The noise measurements were taken using the instrumentation detailed in **Table 3.2**.

Table 3.2: Noise survey instrumentation

Instrument	Type	Serial Number	Calibration due date at time of survey
Sound Level Meter	B&K 2250	2600458	16 th June 2018
Preamp	B&K ZC 0032	11447	16 th June 2018
Microphone	B&K 4189	2643174	14 th June 2018
Calibrator	B&K Type 4231	2525097	27 th January 2018

The sound level meter was fully calibrated, traceable to UKAS standards and satisfied the requirements of BS EN 61672-1:2013¹⁶ for a 'Class 1' Sound Level Meter (SLM).

The SLM was set to record L_{eq} , L_{90} , L_{10} and L_{max} data with a 'fast' time constant and A-weighting. **Appendix B** presents descriptions of these terms.

The noise measurements were conducted with the SLM mounted on a tripod at heights between 1.2m and 1.5m above ground level and 3.5m away from any reflecting surface other than the ground, i.e. in free-field

¹⁶ British Standards Institution (2013). BS EN 61672-1:2013 Electroacoustics. Sound level meters. Specifications. BSI, London

conditions. The instrument was calibrated before and after the survey using a portable calibrator. No significant deviation in the calibration level was observed.

3.2 Measured Baseline Noise Data

Measured baseline sound levels at the monitoring locations MP1 and MP2 are presented in **Table 3.3** and **Table 3.4**, respectively. A subjective assessment of the noise climate at each of the receptors is presented in **Table 3.5** and **Table 3.6**.

Table 3.3: Baseline noise level summary – MP1

Period	Date	Time	Duration (minutes)	L _{Aeq}	dB L _{Amax}	dB L _{A10}	dB L _{A90}
Day	4 th July	18:00:15	60	66.5	94.7	69.8	57.1
Night	4 th July	23:37:07	15	48.4	74.7	48.5	42.0

Table 3.4: Baseline noise level summary – MP2

Period	Date	Time	Duration (minutes)	L _{Aeq}	dB L _{Amax}	dB L _{A10}	dB L _{A90}
Day	4 th July	19:15:58	60	59.3	78.5	61.0	56.8
Night	5 th July	00:00:43	15	45.6	55.6	47.9	42.3

Table 3.5 – Subjective assessment summary - MP1

Period	Ambient noise component	Character
Day	Brockhampton Road Traffic	Continuous
	Distant Road Traffic (A27)	Continuous
	Noise from Passers-by / People in Gardens	Intermittent
	Noise from Industrial Estate	Intermittent
	Leaf Rustle and Birds	Intermittent
Night	Brockhampton Road Traffic	Intermittent
	Distant Road Traffic (A27)	Continuous
	Sound of running water from other side of Brockhampton Road	Continuous
	Overhead Aircraft	Intermittent
	Leaf Rustle and Birds	Intermittent

Table 3.6 – Subjective assessment summary – MP2

Period	Ambient noise component	Character
Day	Distant Road Traffic (A27)	Continuous
	Passing Cyclists and runners	Intermittent
	Overhead Aircraft	Intermittent
	Leaf Rustle and Birds	Intermittent
Night	Distant Road Traffic (A27)	Continuous
	Leaf Rustle and Birds	Intermittent

4 Noise Impact Methodology and Assessment Criteria

4.1 Consultation

The proposed development lies within the administrative area of HBC. Consultation was undertaken with the Environmental Health Officer via telephone and email¹⁷ to agree on the methods of the assessment.

4.2 Assessment Methodology

The following sections describe the impact methodology and assessment criteria used to determine the significance of noise impact from the simultaneous operation of the generators.

The study area for the noise impact assessment comprised the area immediately adjacent to the proposed development site and the receptors in closest proximity to the site likely to be affected.

4.2.1 Construction Noise

The noise generated by the construction activities associated with the development has the potential to temporarily increase noise levels at nearby residential properties. Due to the temporary nature of construction activities the potential for receptors to be affected will depend on where within the application site the noisy activity takes place, the nature of the activity and controls and meteorological conditions.

Noise generated by the construction of the development is inevitable, therefore to minimise the potential for noise impacts generic mitigation measures are provided within Section 7. These include Best Practicable Means (BPM) as defined in The Control of Pollution Act 1974.

4.2.2 Industrial and Commercial Sound Assessment

BS4142:2014

Noise from fixed plant is typically assessed in the context of BS 4142:2014, which involves a comparison of the rating level and the measured background (L_{A90}) noise level at potential receptor locations.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident and combines procedures for assessing the impact in relation to the development of new industrial and/or commercial sources affecting existing receptors.

The standard applies to industrial/commercial and background noise levels outside residential buildings and for assessing whether existing and new industrial/commercial sound sources are likely to give rise to significant adverse impacts on the occupants living in the vicinity.

The assessment is undertaken by subtracting the measured background noise level from the derived rating level; the greater this difference, the greater the magnitude of the impact.

BS 4142 refers to the following;

¹⁷ Telephone call between Royal HaskoningDHV and HBC Environmental Health Department, 3rd July 2017, follow up email titled "Noise Survey in Havant" sent 6th July 2017

"A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level relative to the measured background sound level the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context".

Taking the above guidance into account, the impact magnitude criteria presented in **Table 4.1** were applied to this assessment.

Table 4.1: Operational noise impact magnitude criteria for industrial/commercial sound sources

Rating level dB $L_{A,r,Tr}$	Impact criteria
$\leq$ Measured L_{A90}	No impact
= Measured L_{A90} dB to +3 dB	Negligible
Measured L_{A90} + 3 dB to 5 dB	Minor
Measured L_{A90} + 5 dB to 9.9 dB	Moderate
$\geq$ Measured L_{A90} + 10 dB	Major

Modelling Details

A detailed SoundPLAN noise model was created using noise data provided by GFP to assess noise levels as a result of the proposed generators. Ground absorption was incorporated into the SoundPLAN model using a coefficient of 0.6 to represent the mixed ground conditions between the sound sources and receiver. A 4.0m high close board timber fence was modelled surrounding the compound.

No garden fences at receptor locations have been incorporated within the model. Although BS5228:2009+A1:2014 states that, "as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10dB when the noise screen completely hides the sources from the receiver".

On-time was assumed to be 100% during the daytime reference period.

Intermittency

For assessment purposes the generators are considered as being operational for 100% of the reference assessment period; therefore a +3dB penalty was not added to the calculated noise contribution for intermittency during the daytime period.

Tonality

Details of the equipment to be installed are provided in **Table 4.2**. Third octave band data was unavailable; however the octave band data in **Table 4.3** indicates that the presence of tones is likely within the higher frequencies. Therefore, a +6dB penalty for tonality has been applied. A standard close board wooden fence was modelled using properties presented in **Table 4.4**.

Table 4.2: Generators and equipment

Manufacturer	Genset	Engine	Number
Cummins	C1283N5D	GQSK 60-G10	14

Table 4.3: Frequency spectrum 1/1 Octave – Generators*

Frequency (Hz)	63	125	250	500	1000	2000	4000	8000
Sound Pressure Level @ 1m (dB)	71.38	67.64	67.71	66.48	62.09	59.25	50.38	74.66

* - Sound power calculated from sound pressure as a box shaped machine radiating in a half sphere (on the ground).

Table 4.4: Modelling Parameters of Standard Close Board Wooden Fence

Reflection Loss (dB)	Absorption Coefficient	Reflection Coefficient
1	0.206	0.794

Using the information supplied by GFP (detailed within **Appendix C**), noise calculations were undertaken for the 14 generators operating simultaneously at full capacity. The calculated noise levels were predicted at the two locations considered representative of sensitive receptors, to assess the rating sound levels with the measured background.

A plan showing the proposed site boundary and position of each generator was provided by GFP and used for the distance calculation is included in **Appendix D**.

Predicted sound levels were calculated for a receptor height of 1.5m and 4.0m, representing ground floor (GF) and first floor (FF) respectively.

5 Impact Assessment

5.1 Construction Noise

Noise and vibration associated with the construction phase of the proposed development may have the potential to impact upon residential receptors adjacent to the development site, due to the close proximity of nearby receptors.

Although the construction works will be carried out during the day time, some equipment, such as power generation plant for security or lighting, may be required to run at night. Old or ill-maintained equipment is likely to generate higher noise levels; however 'silenced' plant is available, which would reduce noise impacts at nearby residences.

Mitigation measures using BPM for construction noise and vibration are presented in Section 7 of this report.

5.2 BS4142 Assessment - Fixed Plant Noise

The baseline measurement locations were selected to represent the existing residential receptors or groups of sensitive receptors, closest to the application site. The receptors are listed in **Table 3.1** and shown on **Appendix A, Figure A1**.

The results of the SoundPLAN modelling are detailed in **Table 5.1** representing the daytime reference period. **Appendix A, Figure A2** presents a corresponding noise isopleth.

Table 5.1: Predicted noise impact of proposed fixed plant daytime (free-field)

Receptor	Floor	Calculated fixed plant rating level, free field, dB $L_{Aeq,1hr}$	Background noise level at receptor dB L_{A90}	BS 4142 Assessment
NSR1	GF (Ground Floor)	40.8	57.1	No Impact
	FF (First Floor)	43.7		No Impact
NSR2	GF	44.8	56.8	No Impact
	FF	45.5		No Impact

The BS 4142 assessment detailed in **Table 5.1** determined that simultaneous operation of all the generators would have a **No Impact** at identified receptor locations during the daytime reference period.

6 Mitigation Measures

6.1 Construction Noise Mitigation

It is inevitable that there would be some increases in noise levels local to works from the required construction activity; however these changes in noise level would be short term and temporary.

Mitigation measures include good practice construction management to reduce impacts from the noise generated by the construction phase of the proposed development, as described below.

6.1.1 Noise Management Plan

The Control of Pollution Act and BS 5228 define a set of Best Practice working methods and mitigation measures, referred to as BPM. Examples of these measures include:

- Where possible, locating temporary plant so that it is screened from receptors by on-site structures, such as site cabins;
- Using modern, quiet equipment and ensuring such equipment is properly maintained and operated by trained staff;
- Applying enclosures to particularly noisy equipment where possible;
- Ensuring that mobile plant is well maintained such that loose body fittings or exhausts do not rattle or vibrate;
- Ensuring plant machinery is turned off when not in use;
- Providing local residents with 24-hour contact details for a site representative in the event that disturbance due to noise from the construction works is perceived;
- Informing local residents about the construction works, including the timing and duration of any particularly noisy elements, and providing a contact telephone number to them; and
- Keeping noisy deliveries, such as skips and concrete, to the middle of the day where possible.

Although the effect of adopting such methods cannot be precisely quantified, it is possible that these methods would reduce noise levels by between 5 - 10dBA.

6.1.2 Training

The site induction programme and site rules should include good working practice instructions for site staff, managers, visitors and contractors to help minimise noise whilst working on the site.

Good working practice guidelines/instructions could include, but not be limited to, the following points:

- Avoiding unnecessary revving of engines;
- Plant used intermittently should be shut-down between operational periods, where possible;
- Avoiding reversing wherever possible;
- Reporting any defective equipment/plant as soon as possible so that corrective maintenance can be undertaken; and
- Handling material in a manner that minimises noise.

6.1.3 Maintenance

Maintenance of temporary plant should be carried out routinely and in accordance with the manufacturers' guidance.

A regular inspection of all plant and equipment could be undertaken to ensure that:

- all plant is in a good state of repair and fully functional;
- any plant found to be requiring interim maintenance has been identified and taken out of use;
- acoustic enclosures fitted to plant are in a good state of repair;
- doors and covers to such enclosures remain closed during operation; and
- any repairs are being undertaken by a fully qualified maintenance engineer.

7 Conclusions

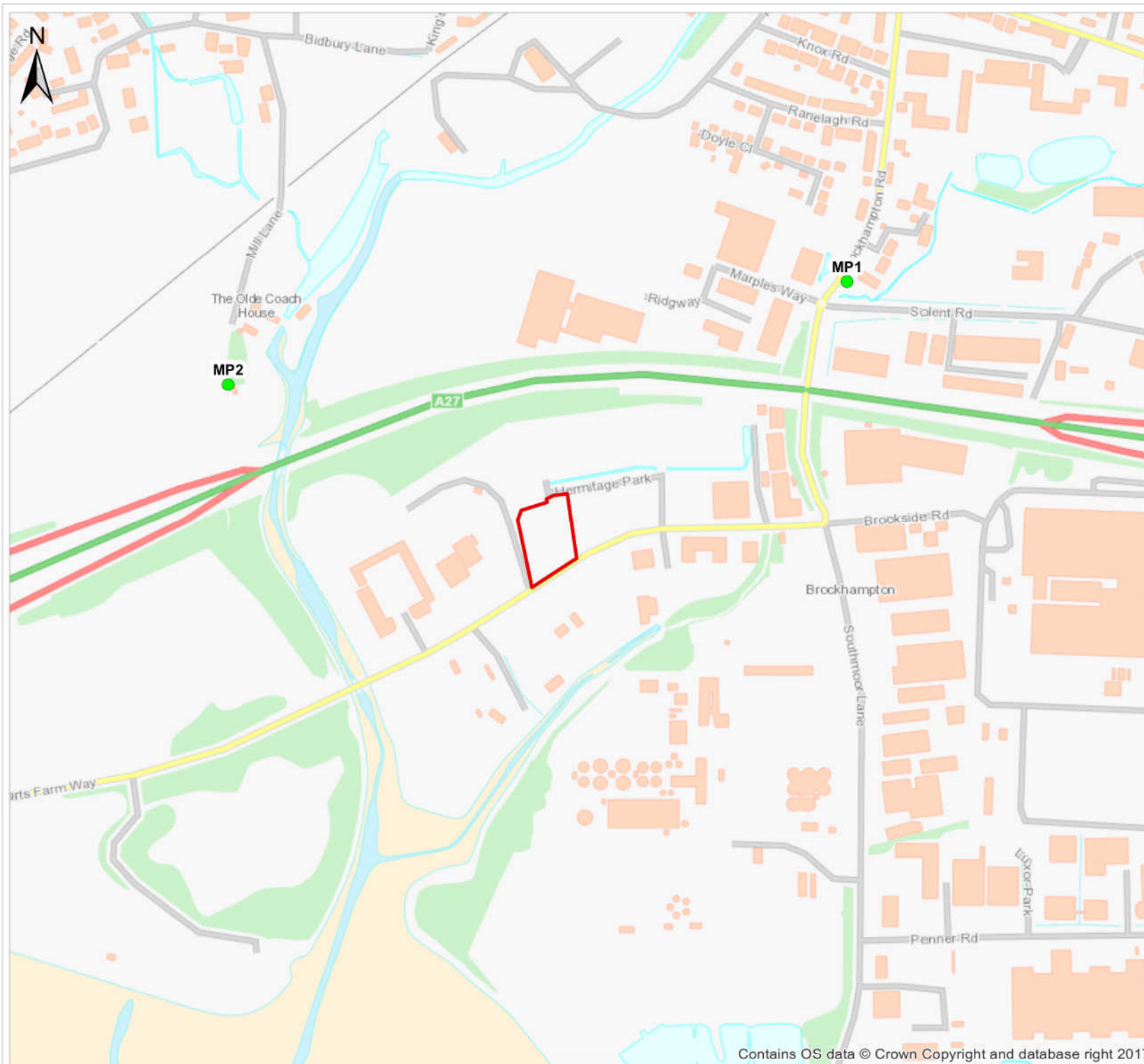
This assessment considered the potential impact from the installation and operation of 14 generators at existing NSR locations.

A BS 4142 assessment determined that the simultaneous operation of the 14 generators would have **No Impact** at identified receptor locations during the daytime reference period.

Based on the results of the noise modelling there is no requirement for any additional noise mitigation measures.

Appendix A

Figures



Legend:

- Indicative Site Boundary
- Baseline Monitoring Position

Title
Baseline Monitoring Locations

Project
PB5588 green Frog Havant

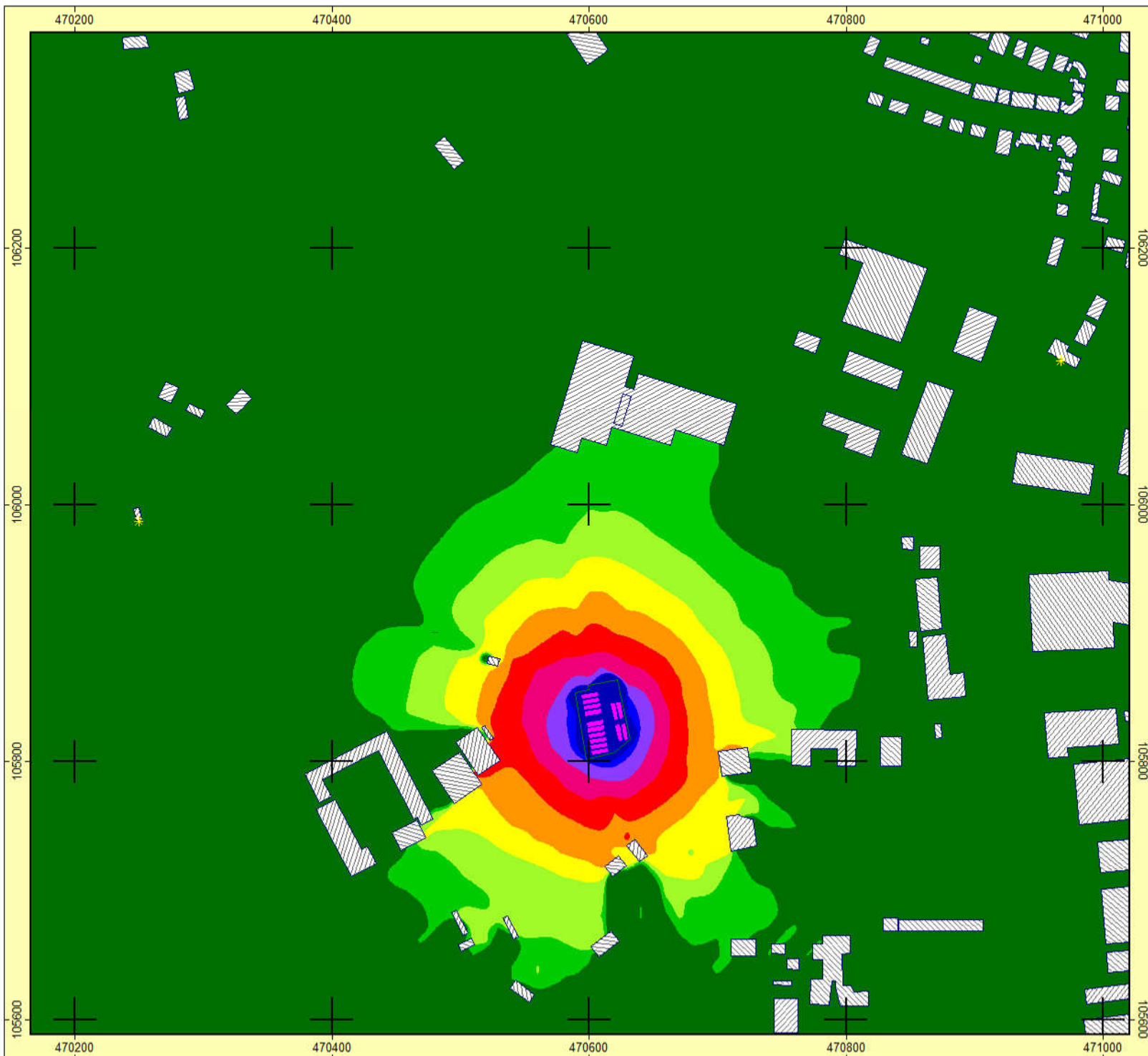
Client
Green Frog Power Ltd

<i>Date</i> 18/07/2017	<i>Scale</i> 1:6000
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Figure
Figure A1

<i>Drawn by</i> JP	<i>Checked by</i> NF
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Customer: Green Frog Power II Ltd

Project: Green Frog Havant

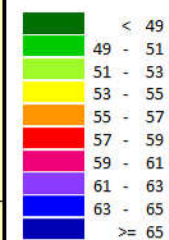
Project-No. PB5588

Figure
A2

Calculation in 1.5 m above ground

Project engineer: Nicholas Fry

Levels LrD
in dB(A)



Signs and symbols

- Road axis
- Wall
- Railway axis
- ▨ Main building
- ★ Point receiver
- source



Length scale 1:4211



Appendix B

Acoustic Terminology and Uncertainty

Uncertainty

The locations used for taking measurements were chosen to maintain low uncertainty where possible. The background sound levels were measured on public land at the closest position to the nearest proposed noise sensitive properties. All sound level measurements were taken with a calibrated type 1 sound level meter, which represents the most accurate type of SLM available. Sound levels were measured to the nearest 0.1 dB, time periods were measured and recorded to the nearest second. No rounding was done in any calculations, the only rounding being done on final results, in compliance with BS 4142:2014. The sound level meter was calibrated before and after each survey period and no drift was apparent.

Environmental conditions were favourable for the outdoor measurement of sound in accordance with the requirements of BS 4142: 2014. Background measurements were taken at positions representative of the nearest receptors and in the absence of noise from the sound source under investigation. Background measurements were undertaken at least 3.5m from any sound reflecting surfaces. No sources were identified as being unusual or not typical for the area.

Source Sound Power Levels (SWLs) were taken from design criteria set by GFP; uncertainty regarding the SWs is considered to be low.

Term	Definition
Noise sensitive receptors	People, property or designated sites for nature conservation that may be at risk from exposure to noise and vibration that could potentially arise as a result of the proposed development/project
Noise and Vibration study area	The area assessed for noise and vibration impacts during this assessment
Baseline scenario	Scenarios with the proposed development/project not in operation
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μ Pa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
LAeq,T	The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq,T is used to describe many types of noise and can be measured directly with an integrating sound level meter.
LA10,T	The A weighted noise level exceeded for 10% of the specified measurement period (T). LA10 is the index generally adopted to assess traffic noise
LA90, T	The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 2014 it is used to define the 'background' noise level.
LAmix	The maximum A-weighted sound pressure level recorded during a measurement.
Rw	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies.
Sound Reduction Index (SRI)	Laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.



Appendix C

Technical Data

Test Report TR3114

Test Procedure B&K PULSE report

Acoustically Treated Generating Set Noise Test Results (Hemispherical method)

Customer Order No: **CO** -
 Manufacturing Order No: **M** -
 PN Number: **PN** -
 DVPR Number: **DVPR** -

Date of Test: 27th August 2015
 Test Engineer: J.Hogben
 Test Site: Horsa Poland

Wind Speed: **5** mph
 Wind Direction: **SW**
 Radiator points: -

Barometric Pressure: 1008 mBar
 100800 Pa
 Relative Humidity: 30 %
 Ambient Temperature: 28 °C

Genset Model: **C1283N5D** Engine: **SQSK 60-G10**
 Genset Serial No. Serial No.
 Enclosure or container part No./drawing No. -

Alternator: **PE734F2** Radiator mfg Cummins
 Serial No. part number: -

Instrumentation.

Frequency: **50** Hz
 Speed: **1500** rpm
 Standby Rating (110% load): **1411.3** kW
 Prime Rating (100% load): **1283** kW
 75% load: **962.25** kW

Meter Type: Bruel & Kjaer - 3560 --
 Serial No.: 2664786
 Date of last calibration: N/A
 Calibrator Type: Bruel & Kjaer 4231
 Serial No.: 2656735
 Date of last calibration: 10/05/2015

Microphone: Danak 4189-A-021
 Serial No.: C0808883
 Date of last calibration: 18/02/2015
 Microphone: Danak 4189-A-021
 Serial No.: C0808884
 Date of last calibration: 18/02/2015
 Microphone: Danak 4189-A-021
 Serial No.: C0808885
 Date of last calibration: 18/02/2015

Microphone: Danak 4189-A-021
 Serial No.: C0808886
 Date of last calibration: 18/02/2015
 Microphone: Danak 4189-A-021
 Serial No.: C0808887
 Date of last calibration: 18/02/2015
 Microphone: Danak 4189-A-021
 Serial No.: C0808888
 Date of last calibration: 18/02/2015

Design Criteria:

Designed Noise Level - % load = - dB(A) @ 1m
 Required Sound Power Level - LwA N/A dB @ 50Hz Operation at 75% Prime power.

2000/14/EC Stage II

Summary of Noise Test Data

Radius of Hemisphere: 16 m
 @ 50 Hz 75% @ 50 Hz 100% @ 50 Hz 110%
 70.56 70.93 71.40 dB(A) @ 16 m radius, 6 Points.

Calculated Sound Power Level - LwA 103 dB @ 50Hz Operation at 75% Prime power.

Calculated Sound Power Level - LwA + K 105 Value of K established during development testing. Default value = 2
 Result PASS K value calculation number -

Calculated sound pressure at a distance.

		dB(A)	SOUND PRESSURE LEVEL @ 16M FROM GEOMETRIC CENTRE OF EQUIPMENT UNDER	SOUND PRESSURE LEVEL @ 1M FROM TOP CORNER OF EQUIPMENT UNDER TEST.	SOUND PRESSURE LEVEL @ 7 M FROM TOP CORNER OF EQUIPMENT UNDER	SOUND PRESSURE LEVEL @ 15 M FROM TOP CORNER OF EQUIPMENT UNDER TEST.
% of Prime power	75%	70.56	71 dB(A)	77 dB(A)	72 dB(A)	68 dB(A)
	100%	70.93	71 dB(A)	77 dB(A)	72 dB(A)	68 dB(A)
	110%	71.40	71 dB(A)	78 dB(A)	73 dB(A)	69 dB(A)

Noise at a distance is calculated from the calculated LwA data produced from the test, is based on the premise that the noise source is a point noise source and that the distance is 1, 7 or 15 metres from the top corner of the equipment under test on a line from the geometric centre of the floor plan of the equipment under test through the top corner of the equipment under test.

Conclusion:

No sound power level specified at 400 kW Prime and above
 This product does meet the design requirements.

All readings taken for 15 second duration.

Determinations made in accordance with EN ISO 3744:1995 result in Standard Deviations of Reproducibility equal to or less than 1.5dB(A) (clause 1.4).
 With 90% confidence the true noise level lies within ±2.47dB(A) of the measured value
 With 95% confidence the true noise level lies within ±2.94dB(A) of the measured value.

Noise at control panel, measured at 1.6 m above floor level and 1m from face of control panel with door closed.

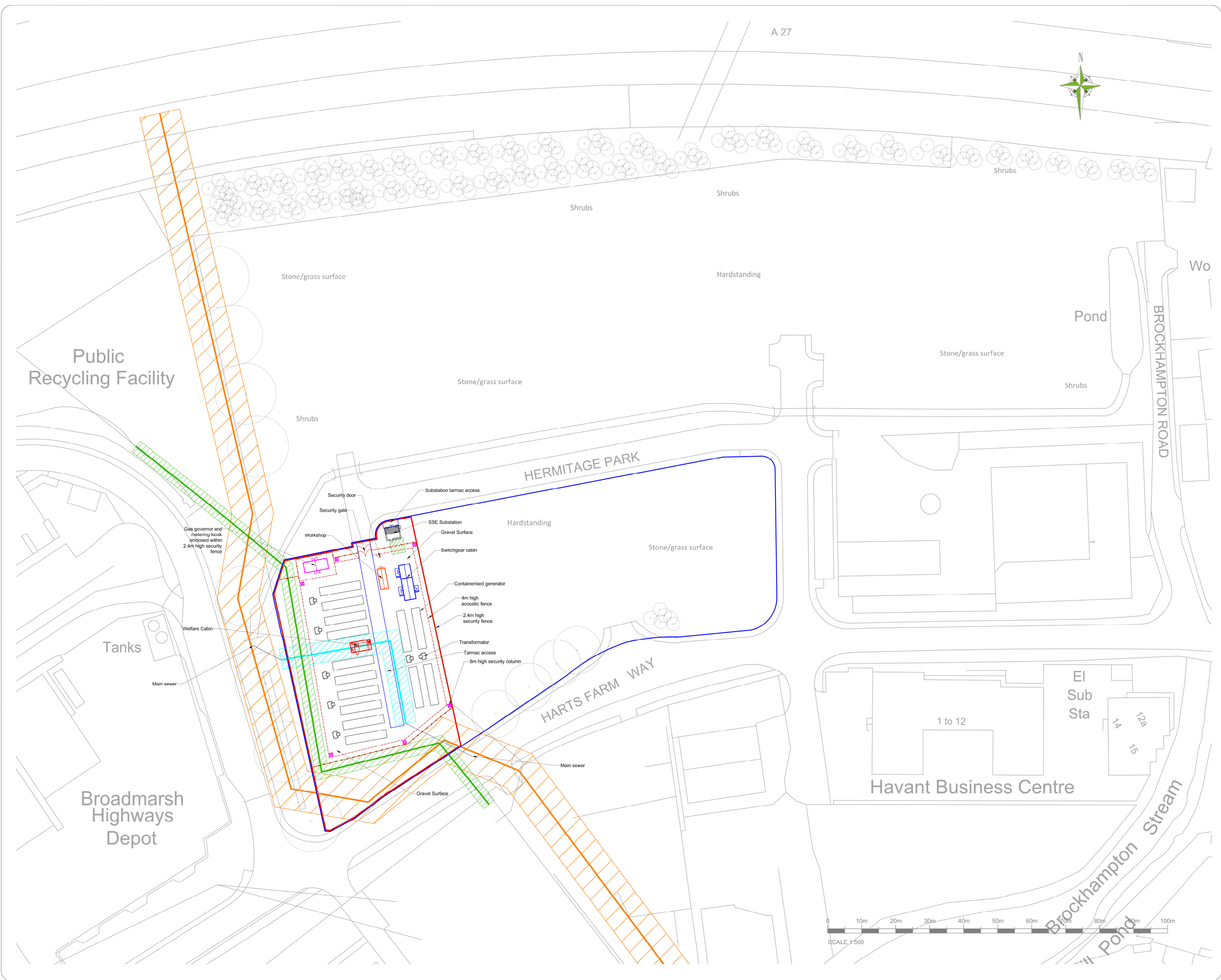
Noise measured at: - 110 % power

Frequency Response dB(A)								Broadband
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
71.38	67.64	67.71	66.48	62.09	59.25	50.38	74.66	77.90



Appendix D

Site Layout



PLANNING PLAN

LEGEND:

SITE INFRASTRUCTURE:

- LANDLORDS PROPERTY
- PROPOSED SITE
- DRIVE ACCESS
- PERIMETER FENCELINE
- INNER FENCELINE
- DNO SUBSTATION
- SECURITY COLUMN
- GAS GOVERNORS
- TRANSFORMER
- SWITCHGEAR
- SECURITY GATE
- WELFARE CABIN
- GENERATOR
- HIGH PRESSURE GAS ROUTE
- DIVERTED ELECTRIC ROUTE
- DIVERTED SEWER ROUTE
- SEWER DIVERSION EASEMENT
- ELECTRIC WAYLEAVE/EASEMENT
- HIGH PRESSURE GAS EASEMENT

rev	revision notes	date
REVISIONS		

Planning

ALL DIMENSIONS TO BE CHECKED ON SITE
WORK TO FIGURED DIMENSIONS ONLY
REPORT DISCREPANCIES TO THE GFP
AT ONCE BEFORE PROCEEDING
COPYRIGHT ACT APPLIES



Project Title:
GENERATION COMPOUND
HARTS FARM WAY
PO9 1HS

Drawing Title:

PROPOSED SITE PLAN

Scale @A1: 1:500
Drawn: TB
Drawing No:
Date: Apr 2017
Checked: DS
Rev:
4000_GF_DR_PP_103 -