

Proposed Residential Development

Hulbert Road, Havant

Noise Assessment

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1.0 Introduction

This Noise Assessment has been prepared by WYG on behalf of The GHM Jackson 1972 Children's Settlement Trust to inform a planning application for a proposed residential development at Hulbert Road, Havant.

A description of the existing noise environment in and around the site is provided. A noise survey has been undertaken and the results used to verify predictions of the effects of noise from sources in the vicinity of the development site. The noise levels across the site have been predicted at proposed receptors using CADNA noise modelling software, which incorporates ISO 9613 and CRTN methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and a set of location plans and noise contour plots are presented in Appendix B. Report Conditions are presented in Appendix C.

1.1 Legislative Context (England)

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published February 2019. With regard to noise and planning, NPPF contains the following statement at paragraph 170:

"170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans*

A further 2 short statements are presented at paragraph 180, which state:

"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) "mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*

- b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational an amenity value for this reason."*

Furthermore, paragraphs 182 and 183 state:

"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England, is to, *'identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'*

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the NPPG and repeated as follows:

Table 1.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No Specific Measures Required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOEL)	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, eg turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Perception	Examples of Outcomes	Increasing Effect Level	Action
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, eg avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, eg regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, eg auditory and non-auditory	Unacceptable Observed Adverse Effect	Prevent

The NPPF, NSPE and NPPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents, including the 'BS 8233 – Guidance on sound Insulation and Noise Reduction for Buildings (2014)', Section 2.0 presents the noise level criteria used as a basis of this assessment.

The NPPG also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.*

2.0 Assessment Criteria

2.1 LOAEL and SOAEL Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified.

Table 2.1 Noise Level Criteria and Actions

Effect Level	Assessment	Noise Level Criteria	Action / Justification
Lowest Observed Adverse Effect Level (LOAEL)	Proposed Residents	Internal noise levels achieve (with windows open): <i>Bedrooms (night-time) – 30 dBL_{Aeq,8hours} / 45 dBL_{Amax}</i> <i>Living Rooms (daytime) – 35 dBL_{Aeq,16hours}</i> Private external Amenity Space (daytime) – 50 dBL _{Aeq,16hours}	None Within BS8233
Significant Observed Adverse Effect Level (SOAEL)	Proposed Residents	Internal noise levels exceed (with windows closed): <i>Bedrooms (night-time)– 30 dBL_{Aeq,8hours} / 45 dBL_{Amax} (More than 15 times per night)</i> <i>Living Rooms (daytime)– 35 dBL_{Aeq,16hours}</i> Depending on context, external noise levels exceed: Private external Amenity Space (daytime) – 55 dBL _{Aeq,16hours}	Mitigate to achieve (with windows closed): Bedrooms – 30 dB L _{Aeq,8hours} / 45 dB L _{Amax} Living Rooms – 35 dBL _{Aeq,16hours} Depending on context, external amenity space Mitigate and reduce to a minimum*

*With regard to noise in private external amenity areas, Section 7.7.3.2 within BS 8233 specifies that it “*is desirable that the external noise level does not exceed 50 dB L_{Aeq,T} with an upper guideline value of 55 dB L_{Aeq,16hours} which would be acceptable in noisier environments*”. However, BS8233 recognises that these guidelines values “*are not achievable in all circumstances where development may be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*”. This approach has been applied within this assessment with the SOAEL for private external amenity spaces set at 60 dB L_{Aeq,16hours}.

2.2 ProPG Planning and Noise

Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was published in May 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants

(ANC) and the Institute of Acoustics (IOA). The guidance has been published to provide practitioners with guidance on the management of noise within the planning system in England.

The guidance is specifically for '*new residential development*' that would be exposed predominantly to noise from existing transport sources and reflects the Government's overarching Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF), and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance.

The guidance provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, it aims to:

- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Promote appropriate noise exposure standards; and
- Assist the delivery of sustainable development (ADS).

There are two stages of the overall approach outlined in the ProPG:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of 4 key elements which is underpinned by an Acoustic Design Statement.

With regard to Stage 1, the ProPG provides guidance for producing an initial site risk assessment, pre-mitigation, with regards to noise based on the prevailing daytime and night time noise levels across the site, from which the site (or areas thereof) can be allocated a Noise Risk as shown in Figure 2.1, overleaf. This shows the various Noise Risks Categories (NRC) together with their corresponding sound levels as referred to in the ProPG. It should be noted that the categories are not distinct which allows context to be included within the assessment with the purpose of the Stage 1 assessment to determine the likely acoustic challenges on the site.

Figure 2.1 ProPG Stage 1, Noise Risk Assessment

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
Indicative Daytime Noise Levels $L_{Aeq,15hr}$ Indicative Night-Time Noise Levels $L_{Aeq,8hr}$ 70 dB 65 dB 60 dB 55 dB 50 dB 60 dB 55 dB 50 dB 45 dB 40 dB High Medium Low Negligible	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. The risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigate and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective <u>provided that</u> a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

At Stage 2, which is not required to be progressed if the Stage 1 assessment determines a negligible risk, there are 4 elements which should be undertaken in parallel. These are:

- Good Acoustic Design Process
- Internal Noise Level Guidelines
- External Amenity Area Noise Assessment
- Assessment of Other Relevant Issues

There is then the requirement to present an ADS to provide sufficient evidence that the ProPG Stage 1 and Stage 2 Elements 1 to 4 have been followed. As the masterplan is predominantly outline in nature, a detailed site layout is not available and, therefore, an ADS is not required. However, noise design measures will be established on how the site could be brought forward in adherence of the requirements of the ProPG.

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict L_{Aeq} and L_{Amax} noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used which is based on the Department of Transport Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken.

The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in Table 3.1 below have been used.

Table 3.1 Modelling Parameters Sources and Assumptions

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Traffic data surrounding roads	WYGE	WYGE observations and validated noise levels.
Building heights – around site	WYGE Observations	12 m for 3 storey apartment blocks, 8 m height for two storey residential properties
Barrier heights	WYGE	A 1.8m high barrier atop a 3m high bund have been included within the models along with additional 1.8m barriers as shown on SK07
Receptor positions	WYGE	Height of 1.5 m for ground floor, 4 m for first floor receptors. Garden receptors, 1.5m above ground level. 1.5 m and 4 m height for model grids and monitoring locations for validation.
Absorbent Ground	CADNA	Frequency dependant ground absorption has been applied based on values specified in VDI 2714/16 clause 6.3.
Site Layout	WYG Urban & Landscape Design	Concept Masterplan 01 A096474 CMP-01 C

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst case.

3.2 Model Input Data

Road traffic noise from the A3(M) and Hulbert Road is considered to be the dominant noise source in the area. The results of the survey have been used to inform the noise modelling input methodology.

3.2.1 Road Traffic Noise Verification

The models have been validated against the long-term monitoring data collected from the noise survey. The comparison between the monitoring and modelling results are shown in the tables below.

Table 3.2 Daytime Modelled vs. Monitored Results $L_{Aeq,T}$

Monitoring Position	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between modelled and measured noise level (dB)
LT1	76.3	76.3	0.0
LT2	63.5	63.5	0.0

All values are sound pressure levels in dB re: 2×10^{-5} Pa

Table 3.3 Night-time Modelled vs. Monitored Results $L_{Aeq,T}$

Monitoring Position	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between modelled and measured noise level (dB)
LT1	70.8	70.8	0.0
LT2	56.6	56.6	0.0

All values are sound pressure levels in dB re: 2×10^{-5} Pa

Table 3.4 Night-time Modelled vs. Monitored Results L_{Amax}

Monitoring Position	Monitored L_{Amax}^*	Modelled L_{Amax}	Difference between modelled and measured noise level (dB)
LT1	82.0	82.0	0.0
LT2	69.7	69.7	0.0

All values are sound pressure levels in dB re: 2×10^{-5} Pa

*Night-time L_{Amax} values have been validated against the 90th Percentile of all L_{Amax} samples in order to derive a typical maximum noise level and remove any influence from non-typical extraneous events.

The verification points show no divergence between monitored and modelled results, therefore, the models are suitably verified.

3.3 Tranquillity Rating

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zone 1-2.

4.0 Noise Survey

4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser (WYG13)	s/n	1221575
Rion NL-52	Environmental Noise Analyser (WYG17)	s/n	1043466
Rion NL-52+X	Environmental Noise Analyser (WYG5)	s/n	342866
Rion NC-74	Sound Calibrator	s/n	35046823

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at eight locations (as specified in the following table and shown in SK01 of Appendix B) from Thursday 2nd February 2017 to Tuesday 7th February 2017. Attended short term measurements were undertaken at five locations during the day, evening and night-time periods with two additional locations being measured unattended over a 117-hour period. The raw data collected from the long-term monitoring is available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being dry with scattered showers. Anemometer readings confirmed that wind speeds were less than 5 ms⁻¹ at all times during the survey with a predominant westerly wind direction.

Table 4.1 Noise Monitoring Locations

Ref	Description
LT1	Northwest boundary of site adjacent to A3 (M)
LT2	Southeast corner of site
MT1	Near Northeast boundary of B&Q service yard
ST1	Adjacent site entrance B2150 Hulbert Road
ST2	Close to junction between Woodsedge and Sage Close
ST3	Customer entrance road to B&Q adjacent to service yard
ST4	Purbrook way Bridge over A3 (M)
ST5	Chestnut Avenue

4.2 Noise Survey Results

Existing ambient noise levels around the site are dominated by road traffic noise from the A3 (M) with the exception of monitoring location ST1 which is dominated by road traffic noise from B2150 Hulbert Road.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period).

Table 4.2 Meteorological Conditions during the Survey

Survey Location/	Date & Time	Temperature	Wind Speed	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Day ST1	07/02/17 11:30	7.5 °C	0-1 m/s	West	0	A3 (M) and B2150 road traffic noise
Day ST2	07/02/17 10:45	7.5 °C	0-1 m/s	West	0	A3 (M) road traffic noise
Day ST3	07/02/17 10:00	7.5 °C	0-1 m/s	West	0	A3 (M) and B&Q entrance road traffic noise
Day ST4	07/02/17 10:18	7.5 °C	1-2 m/s	West	0	A3 (M) and Purbrook Way Bridge road traffic noise
Day ST5	07/02/17 11:09	7.5 °C	0-1 m/s	West	0	A3 (M) road traffic noise
Eve ST1	06/02/17 22:24	5.0 °C	1-2 m/s	West	8	A3 (M) road traffic noise
Eve ST2	06/02/17 22:04	5.0 °C	2-3 m/s	West	8	A3 (M) road traffic noise
Eve ST3	06/02/17 21:17	5.0 °C	1-2 m/s	West	8	A3 (M) road traffic noise
Eve ST4	06/02/17 21:37	5.0 °C	3-4 m/s	West	8	A3 (M) and Purbrook Way Bridge road traffic noise
Eve ST5	06/02/17 22:45	5.0 °C	1-2 m/s	West	8	A3 (M) road traffic noise
Night ST1	07/02/17 00:03	6.5 °C	0-1 m/s	West	8	A3 (M) road traffic noise
Night ST2	06/02/17 23:42	7.5 °C	0-1 m/s	West	8	A3 (M) road traffic noise
Night ST3	06/02/17 23:19	6.5 °C	2-3 m/s	West	8	A3 (M) road traffic noise
Night ST4	07/02/17 00:27	6.5 °C	2-3 m/s	West	8	A3 (M) and Purbrook Way Bridge road traffic noise
Night ST5	07/02/17 00:49	6.5 °C	0-1 m/s	West	8	A3 (M) road traffic noise

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2×10^{-5} Pa). For the LT locations, the presented $L_{Aeq,T}$ and $L_{A10,T}$ are average noise levels whilst the L_{A90} is the modal noise level of each 5 minute measurement over the stated survey period.

Table 4.3 Results of Baseline Noise Monitoring Survey

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Weekday Day 07:00 – 23:00	44 hours	02/02/2017 – 07/02/2017 07:00 – 23:00	LT1	76.3	96.3	47.8	70.9	72

Period	Duration (T)	Monitoring Date and Times	Location	L _{Aeq,T} (dB)	L _{Amax,T} (dB)	L _{Amin,T} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
Weekday Night 23:00 – 07:00	24 hours	02/07/2017 – 07/02/2017 23:00 – 07:00		70.8	97.2	25.2	52.4	45
Weekend Day 07:00 – 23:00	32 hours	02/02/2017 – 07/02/2017 07:00 – 23:00		75.6	95.8	43.0	68.8	72
Weekend Night 23:00 – 07:00	16 hours	02/07/2017 – 07/02/2017 23:00 – 07:00		69.0	94.9	31.5	51.2	55
Weekday Day 07:00 – 23:00	45 hours	02/02/2017 – 07/02/2017 07:00 – 23:00	LT2	63.5	92.6	42.2	66.1	59
Weekday Night 23:00 – 07:00	24 hours	02/07/2017 – 07/02/2017 23:00 – 07:00		56.6	75.6	25.6	56.3	39
Weekend Day 07:00 – 23:00	32 hours	02/02/2017 – 07/02/2017 07:00 – 23:00		62.7	88.2	40.3	65.4	57
Weekend Night 23:00 – 07:00	16 hours	02/07/2017 – 07/02/2017 23:00 – 07:00		54.8	85.0	30.0	56.7	47
Weekday Day 07:00 – 23:00	12 hours	06/02/2017 – 07/02/2017 07:00 – 23:00	MT1	63.9	84.2	42.3	66.7	58
Weekday Night 23:00 – 07:00	8 hours	06/02/2017 – 07/02/2017 23:00 – 07:00		57.2	75.9	30.9	62.2	38
Day 07:00 – 19:00	15 Mins	07/02/2017 11:30	ST1	74.6	87.9	53.0	79.2	58.3
Day 07:00 – 19:00	15 Mins	07/02/2017 10:45	ST2	63.5	73.5	55.5	64.8	60.9
Day 07:00 – 19:00	15 Mins	07/02/2017 10:00	ST3	65.8	74.1	59.9	68.1	62.8
Day 07:00 – 19:00	15 Mins	07/02/2017 10:18	ST4	81.5	106.7	70.0	82.8	76.4
Day 07:00 – 19:00	15 Mins	07/02/2017 11:09	ST5	51.4	68.6	44.9	52.8	46.7
Evening 19:00 – 23:00	15 Mins	06/02/2017 22:24	ST1	69.3	85.0	48.4	73.2	50.6
Evening 19:00 – 23:00	15 Mins	06/02/2017 22:04	ST2	63.2	71.7	54.2	65.3	60.0
Evening 19:00 – 23:00	15 Mins	06/02/2017 21:17	ST3	61.2	73.0	55.0	63.2	58.1
Evening 19:00 – 23:00	15 Mins	06/02/2017 21:37	ST4	76.9	85.4	58.8	80.5	67.8
Evening 19:00 – 23:00	15 Mins	06/02/2017 22:45	ST5	39.5	54.6	35.4	41.0	37.7
Night 23:00 – 07:00	15 Mins	06/02/2017 00:03	ST1	63.5	86.0	40.1	58.1	44.0
Night 23:00 – 07:00	15 Mins	06/02/2017 23:42	ST2	57.8	72.2	44.0	61.2	49.9
Night 23:00 – 07:00	15 Mins	06/02/2017 23:19	ST3	56.7	66.7	48.7	59.2	52.8
Night 23:00 – 07:00	15 Mins	07/02/2017 00:27	ST4	69.3	83.4	57.3	74.4	59.5
Night 23:00 – 07:00	15 Mins	07/02/2017 00:49	ST5	33.0	57.9	27.1	34.4	29.5

All values are sound pressure levels in dB re: 2x 10⁻⁵ Pa

5.0 Assessment of Key Effects

5.1 ProPG Stage 1 Risk Assessment

Based on the verified daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise models, SK03 and SK04 in Appendix B present noise contour plots during the day and night-time periods which provides a representation of the range of traffic noise levels across the site.

Table 5.1 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	ProPG Stage 1 Risk Assessment Noise levels
Daytime $L_{Aeq,16hr}$	Medium - High
Night-time $L_{Aeq,8hr}$	High

All values are sound pressure levels in dB re: 2×10^{-5} Pa

The Stage 1 risk assessment shows that whilst the acoustic challenges at the site are generally high, a good acoustic design process will be required to be followed.

With regard to the ProPG Stage 2 requirements, as the masterplan is predominantly outline in nature, a detailed site layout is not available and, therefore, an Acoustic Design Statement (ADS) is not formally included. However, a number of design measures have been presented below which constitute to good acoustic design. These features which should be retained as part of the masterplanning process include:

- Positioning of gardens to the rear of properties to provide mitigation for external amenity areas within the site particularly along the western and eastern boundaries;
- Inclusion of the standoff between the A3(M) and nearest residential units along the Western boundary providing provision for leisure walking and cycling routes;
- Barriers in the form of close boarded fences, or equivalent with a minimum mass of 10kgm^{-2} are recommended along garden boundaries most exposed to traffic noise; and
- A 3m bund with 1.8m fence on top providing substantial screening to the A3(M) representing a good acoustic design measure.

An indicative layout where these design measures are included is shown on SK07. This shows that with the protected dwellings in place private amenity spaces can achieve the 55 dB criteria.

5.2 Assessment of Key Effects – Residential End Use

The following Sections establish predicted noise levels at the proposed receptor locations determined from the concept masterplan, which shows how the site could be brought forward. As the development is outline in nature and no building locations are fixed, the assessment considers predicted noise levels at the proposed

build line of each designated residential area as detailed on the concept masterplan and presented on SK02 in Appendix B.

Internal noise levels at the proposed development, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of standard double glazing (4mm / 16mm / 6mm) with a sound reduction of 28 dB R_w+C_{tr} has been used. The predicted noise levels at the assessed receptors locations, as shown in SK02 are presented in Tables 5.2, 5.3 and 5.4 below.

Table 5.2 Daytime Noise Intrusion Levels $L_{Aeq,16hr}$

Ref	External $L_{Aeq,16hr}$ Daytime	Internal $L_{Aeq,16hr}$ Daytime (Windows Open)	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Standard Glazing	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Enhanced Glazing	BS 8233 Internal Target Criteria L_{Aeq}
R01	62.1	47.1	34.1	28.1	35
R02	63.5	48.5	35.5	29.5	35
R03	64.7	49.7	36.7	30.7	35
R04	64.6	49.6	36.6	30.6	35
R05	62.9	47.9	34.9	28.9	35
R06	62.1	47.1	34.1	28.1	35
R07	61.8	46.8	33.8	27.8	35
R08	61.4	46.4	33.4	27.4	35
R09	60.6	45.6	32.6	26.6	35
R10	61.0	46.0	33.0	27.0	35
R11	63.3	48.3	35.3	29.3	35
R12	60.9	45.9	32.9	26.9	35
R13	60.7	45.7	32.7	26.7	35

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.3 Night-time Noise Intrusion Levels $L_{Aeq,8hr}$

Ref	External $L_{Aeq,8hr}$ Night-time	Internal $L_{Aeq,8hr}$ Night-time (Windows Open)	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Standard Glazing	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Enhanced Glazing	BS 8233 Internal Target Criteria L_{Aeq}
R01	58.6	43.6	30.6	24.6	30
R02	59.9	44.9	31.9	25.9	30
R03	60.6	45.6	32.6	26.6	30
R04	60.2	45.2	32.2	26.2	30
R05	59.3	44.3	31.3	25.3	30
R06	58.5	43.5	30.5	24.5	30
R07	58.2	43.2	30.2	24.2	30
R08	58.5	43.5	30.5	24.5	30
R09	57.6	42.6	29.6	23.6	30
R10	57.9	42.9	29.9	23.9	30
R11	60.7	45.7	32.7	26.7	30
R12	57.7	42.7	29.7	23.7	30

Ref	External $L_{Aeq,8hr}$ Night-time	Internal $L_{Aeq,8hr}$ Night-time (Windows Open)	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Standard Glazing	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Enhanced Glazing	BS 8233 Internal Target Criteria L_{Aeq}
R13	57.9	42.9	29.9	23.9	30

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Table 5.4 Night-time Noise Intrusion Levels L_{Amax}

Ref	External $L_{Aeq,8hr}$ Night-time	Internal L_{Amax} Night-time (Windows Open)	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Standard Glazing	Internal $L_{Aeq,8hr}$ Night-time (Windows Closed) Enhanced Glazing	BS 8233 Internal Target Criteria L_{Amax}
R01	63.2	48.2	35.2	29.2	45
R02	72.1	57.1	44.1	38.1	45
R03	76.1	61.1	48.1	42.1	45
R04	78.1	63.1	50.1	44.1	45
R05	73.7	58.7	45.7	39.7	45
R06	69.8	54.8	41.8	35.8	45
R07	63.7	48.7	35.7	29.7	45
R08	61.5	46.5	33.5	27.5	45
R09	63.9	48.9	35.9	29.9	45
R10	64.1	49.1	36.1	30.1	45
R11	65.4	50.4	37.4	31.4	45
R12	61.5	46.5	33.5	27.5	45
R13	61.6	46.6	33.6	27.6	45

All values are sound pressure levels in dB re: 2×10^{-5} Pa.

Glazing

As shown in the tables above, with windows closed, it is expected that standard double glazing (example specification 4mm/16mm/6mm) will not be sufficient to mitigate noise levels to the $L_{Aeq,T}$ internal target noise level criteria in habitable rooms within the majority of the development site.

As a worst-case, an uplift in glazing specification may be required for properties at the extremities of the site most exposed to road traffic noise from the A3(M) and Hulbert Road. The exact specification will be dependent on the type of glazing and ventilation configuration. However, as an example, a glazing specification of 6mm / 16mm argon / 8.8mm provides a noise reduction of $34 \text{ dB } R_w + C_{tr}$ which, based on the assessment presented in Tables 5.2 and 5.3, would result in the internal noise level criteria being met.

Ventilation

With windows open, internal noise levels within habitable rooms are predicted to be greater than the target criteria. Therefore, a scheme of ventilation will be required for such areas to enable acceptable rates of ventilation when windows are closed. This can be provided in several ways from acoustic trickle vents (which

should have a comparable acoustic performance as the glazing), other passive ventilation systems or mechanical ventilations systems.

For the majority of the site, as details are currently outline, locations where such measures are required would be identified as part of a reserved matter application when a detailed site layout is available.

External Amenity

As can be seen in Table 5.2 noise levels are predicted to be up to 68 dB $L_{Aeq,16hr}$ at locations at the extremities of the site, with all exposed locations at the proposed build line exceeding the SOAEL of 60 dB $L_{Aeq,16hr}$. However, it is considered that through the incorporation of the good design measures outlined in Section 5.1, predicted noise levels within external amenity areas can be mitigated to below the upper guideline value of 55 dB $L_{Aeq, 16hr}$ within the majority of external amenity spaces.

Given the proposed developments location, adjacent to the A3(M) and strategic transport network, it is considered that providing the development is designed to achieve the lowest practicable levels external amenity spaces development should not be restricted on the grounds of external amenity.

5.3 Tranquillity Assessment

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zones 1-2. As the proposed development will not disrupt current public rights of way the development is considered to have a negligible effect on local access to areas of greater tranquillity.

6.0 Conclusions

NPPF 170 (e) and 180 (a)

Through the use of appropriate mitigation, it is considered that the proposed development will avoid noise giving rise to significant adverse impacts on health and the quality of life. Recommendations have been provided in Section 5.1 with regard to a good acoustic design process. Where feasible, when taking into account other design considerations, these measures should be considered at detailed design stage.

With regard to the means of ventilation to proposed dwellings, noise levels within large parts of the site will not meet the BS 8233 criteria with windows open. Therefore, typical of developments of this nature and location, a scheme of ventilation will be required for such areas to enable acceptable rates of ventilation when windows are closed. This can be provided in several ways from acoustic trickle vents (which should have a comparable acoustic performance as the glazing), other passive ventilation systems or mechanical ventilations systems.

Locations where mitigation measures are required, such as enhanced glazing or acoustic trickle vents, would be identified as part of a reserved matter application when a detailed site layout is available.

An indicative layout where these design measures are included is shown on SK07. This shows that with the protected dwellings in place private amenity spaces can achieve the 55 dB criteria.

NPPF 180 (b), 182 and 183

Based on the assessments undertaken it is not considered that any existing businesses wanting to develop would be restricted by the proposals. An assessment of the existing tranquillity level of the site was undertaken and identified that the site is not highly prized for its tranquillity (falls in Zones 1-2) and recreational value in terms of noise. There will be no disruption to public rights of way and, therefore, the proposed development is considered to have a negligible effect on local access to any areas of tranquillity.

Appendices

Appendix A – Acoustic Terminology and Abbreviations

Acoustic Terminology

- dB** Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.
- dB(A)** Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result, the single dBA value provides a good representation of how loud a sound is.
- L_{Aeq}** Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The L_{Aeq, 07:00 – 23:00} for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower than the L_{Aeq, 07:00 – 23:00}.
- L_{Amin}** The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.
- L_{Amax}** The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.
- L_n** Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the L_{A10, 1 hr} = x dB.
- The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.
- R_w** The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

An explanation of the abbreviations used within this report is provided below.

CADNA – Computer Aided Noise Abatement

HGV – Heavy Goods Vehicle

PPG – Planning Practical Guidance

WYGE – WYG Environment

NPPF – National Planning Policy Framework

NPPG – National Planning Practice Guidance

LOAEL – Lowest Observed Adverse Effect Level

SOAEL – Significant Observed Adverse Effect Level

Appendix B – Sketches

- SK01 Noise Monitoring Location Plan
- SK02 Receptor Location Plan
- SK03 ProPG Stage 1 Proposed Daytime $L_{Aeq,16hr}$ Noise Contour Plot
- SK04 ProPG Stage 1 Proposed Night-time $L_{Aeq,8hr}$ Noise Contour Plot
- SK05 Noise Contour Plot Proposed Daytime $L_{Aeq,16hr}$
- SK06 Noise Contour Plot Proposed Night-time $L_{Aeq,8hr}$
- SK07 Noise Contour Plot Proposed Daytime $L_{Aeq,16hr}$ – Indicative Layout



Client:
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Children's Settlement Trust

Project:
Hulbert Road
Havant

Project Number:
A1

Drawing Title / Scenario:
Noise Monitoring
Location Plan

Drawing Number:
SK01

Key:
Site Boundary: —

Monitoring
Locations: ●

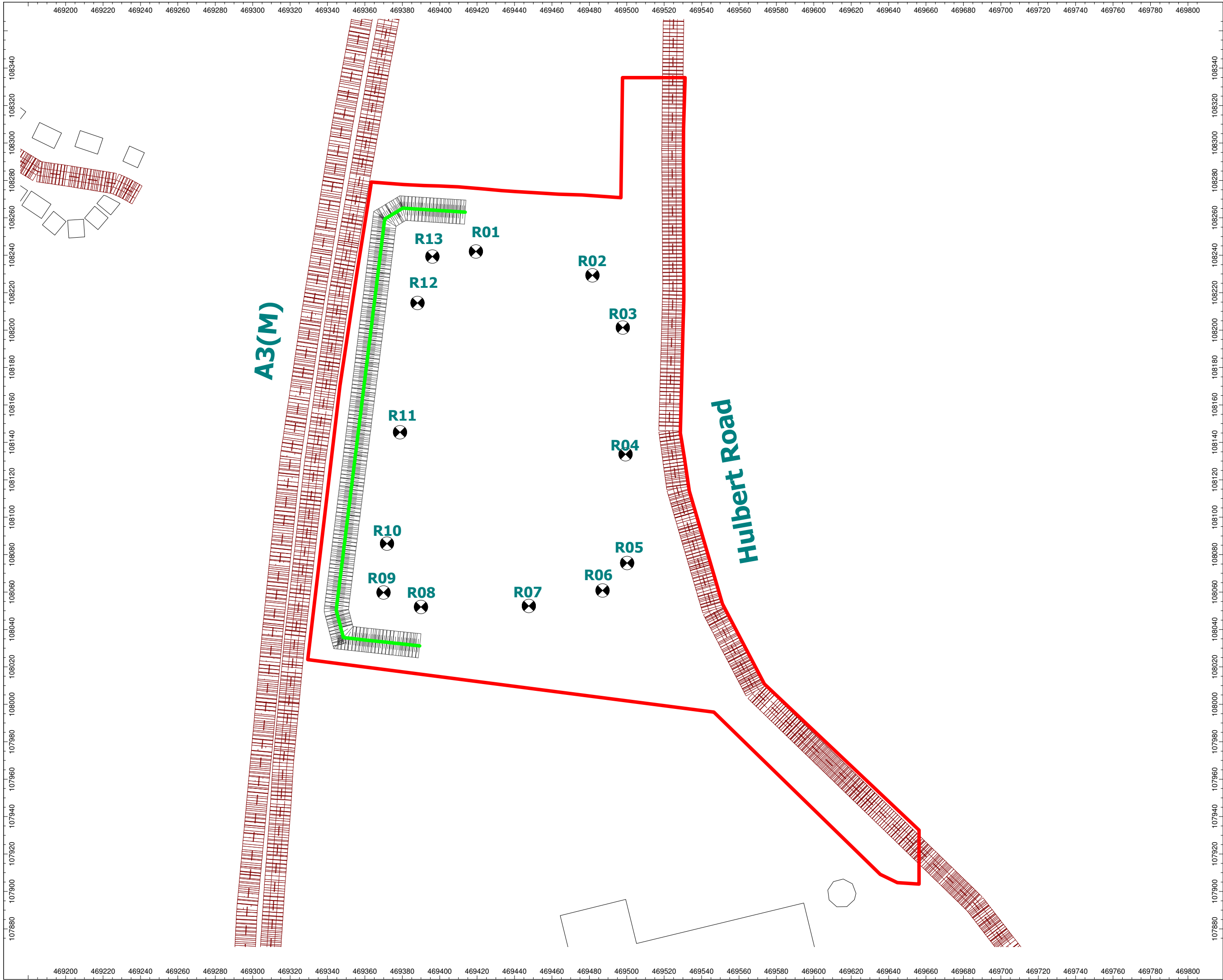
Scale : Not to scale

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Drawing Title / Scenario:
Proposed Receptor
Location Plan

Drawing Number:
SK02

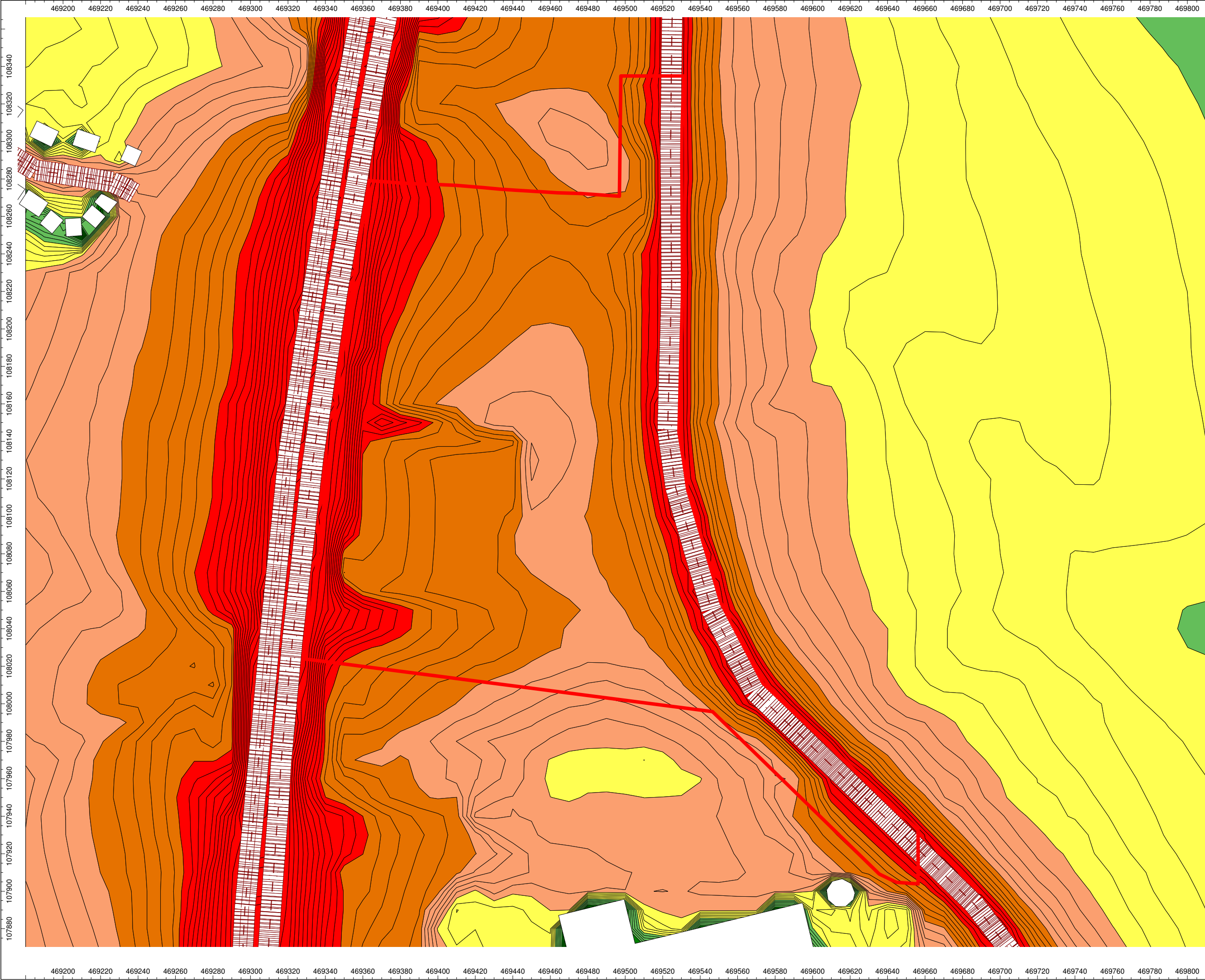
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- Receptor Locations: 
 - Site Boundary: 
 - Proposed Bund/ Barrier Location: 
 - Scale : Not to scale

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Drawing Title / Scenario:
ProPG Risk Assessment
Stage 1: Existing Daytime
LAeq 16hr Noise
Levels

Drawing Number:
SK03

Key:
Site Boundary: —

■ Negligible
■ Negligible - Low
■ Low
■ Low - Medium
■ Medium
■ High

Scale : Not to scale

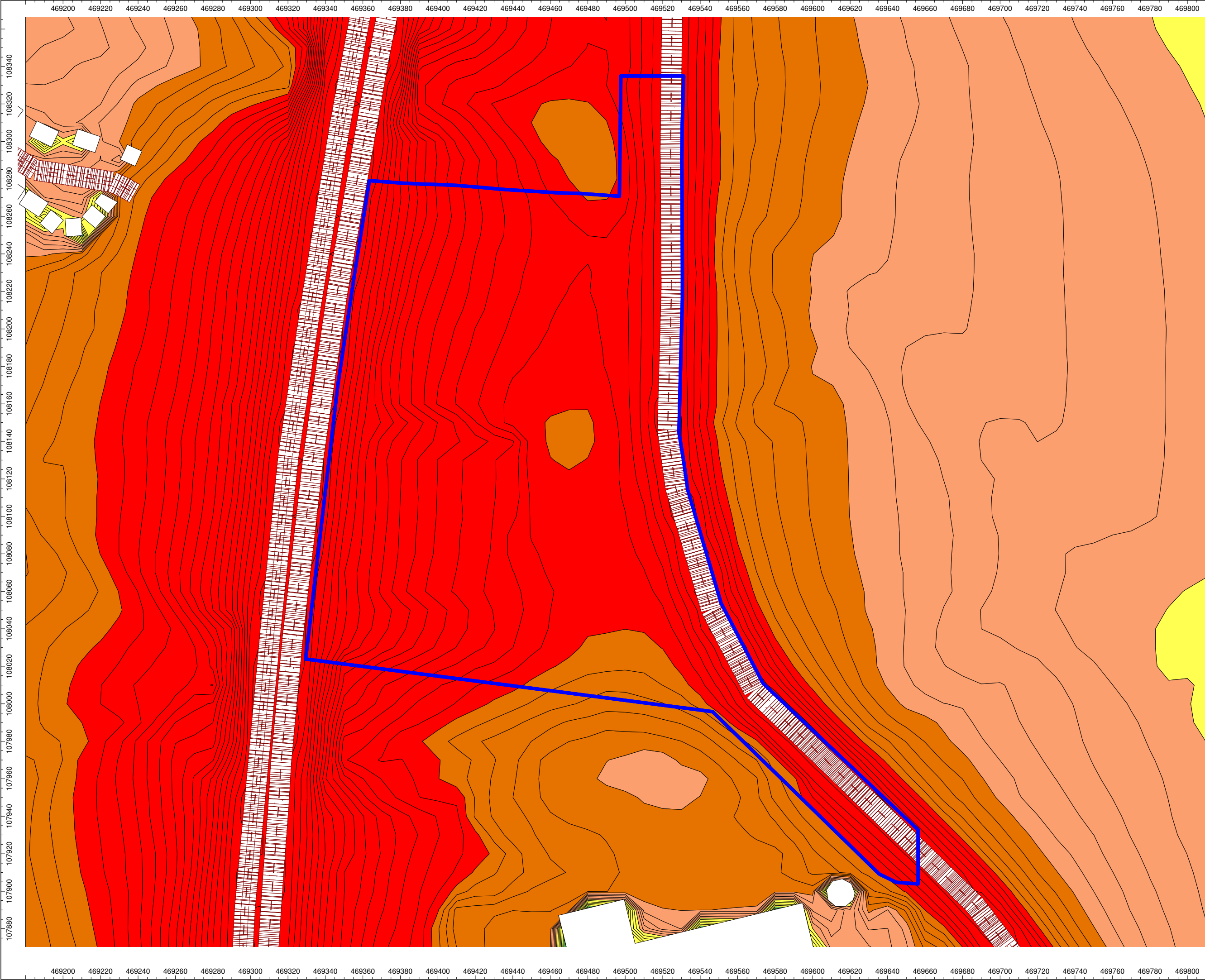
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Project Number:
A1

Drawing Title / Scenario:
ProPG Risk Assessment
Stage 1: Existing Night-time
LAeq 8hr Noise Levels

Drawing Number:
SK04

Key:
Site Boundary: 

-  Negligible
-  Negligible - Low
-  Low
-  Low - Medium
-  Medium
-  High

Scale : Not to scale

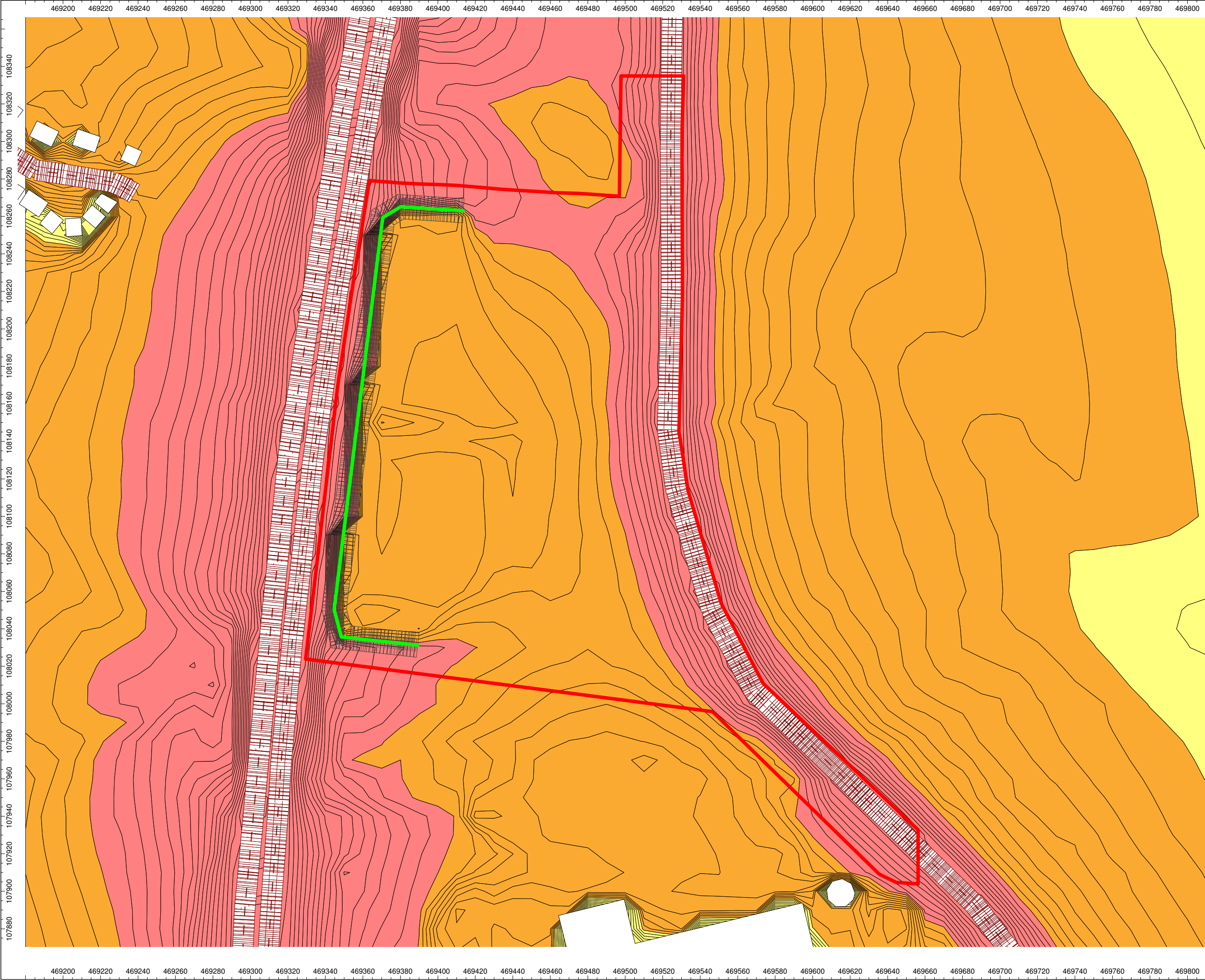
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Project Number:
A1

Drawing Title / Scenario:
Daytime Noise Contour Plot
LAeq,16hour

Drawing Number:
SK05

Key:
Site Boundary: —

Proposed Bund/ Barrier
Location: —

0 - 45 dB(A)
 45 - 55 dB(A)
 55 - 65 dB(A)
 >65 dB(A)

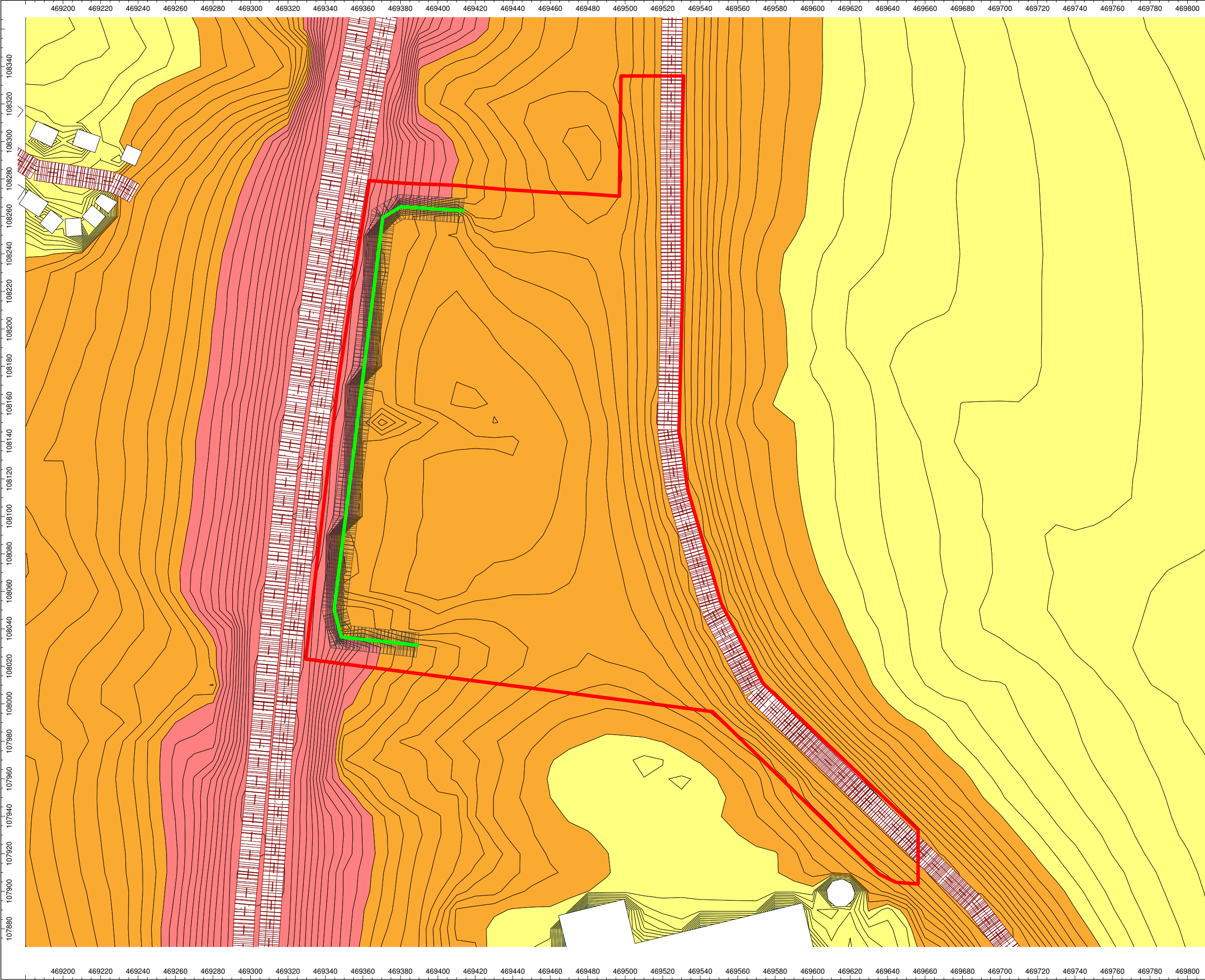
Contour plot for indicative
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Project Number:
A1

Drawing Title / Scenario:
Night-time
Noise Contour Plot
LAeq,8hour

Drawing Number:
SK06

Key:
Site Boundary: —

Proposed Bund/ Barrier
Location: —

0 - 45 dB(A)
45 - 55 dB(A)
55 - 65 dB(A)
>65 dB(A)

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Havant

Project Number:
A1

Drawing Title / Scenario:
Daytime Noise Contour Plot
External Amenity
Indicative Layout
LAeq,16hour

Drawing Number:
SK07

Key:
Site Boundary: —

Proposed Bund/ Barrier
Location: —

0 - 45 dB(A)
45 - 55 dB(A)
55 - 65 dB(A)
>65 dB(A)

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purposes only.

Scale : Not to scale
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Appendix C – Report Conditions

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The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

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