Application to Discharge Condition Relating to Landscaped Earth Bund

Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY

soundsolution CONSULTANTS

Noise Impact Assessment for Uttlesford District Council, planning ref: UTT/20/0561/FUL

TECHNICAL REPORT

36833-R1

Application to Discharge Condition Relating to Landscaped Earth Bund

Noise Impact Assessment for Uttlesford District Council, planning ref: UTT/20/0561/FUL

Prepared for: Robin Stretton Anthony, Jane Alexandra House, 36a Church Street, Great Baddow, Chelmsford, CM2 7HY

Site location: Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY

Table of Contents

Cornwall Suite, Dencora Business Centre, Whitehouse Road, Ipswich IP1 5LT
Tel: 01473 464 727 | info@sscmail.co.uk | www.soundsolutionconsultants.co.uk
VAT No. 844 9267 90 | Registration No. 5651834
Registered Address: 2 Lemons Hill, Tattingstone, Ipswich, Suffolk IP9 2NH

PROJECT NUMBER:	36833	DOCUMENT REFERENCE:	36833-R1
ORIGINATED		CHECKED	
D. Attwell BEng. (Hons) AMIOA Acoustic Consultant		J. Blakeley BSc. (Hons) MIOA Senior Acoustic Consultant	
RELEASE	DATE	CHANGE DESCRIPTION	
1	30/07/2021	Original release.	

1 BACKGROUND AND INTRODUCTION

1.1 A development has been proposed at Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY (hereinafter, "The Site"). A plan highlighting the boundary of The Site has been provided in Appendix B with development proposal drawings in Appendix C.

1.2 The existing industrial site has been noted within a mixed-use commercial/residential area in a rural location, surrounded by agricultural fields.

1.3 A development comprising the demolition of an existing chicken shed, erection of a new storage barn; temporary removal of frame and cladding of an existing storage barn; construction of a new access road and associated earth bunding, planting and a timber screen fence at Poplars Farm was granted permission by Uttlesford District Council within UTT/20/0561/FUL.

1.4 Condition 11 of the decision notice has been stated below:

"A scheme of site restoration works, to include the provision of a new landscaped earth bund, the precise positioning, height and planting specification to be agreed, and also seeking the removal of the unauthorised access roadway laid down the eastern side of the site shall be submitted to the local planning authority for written approval within 3 months of the date of this decision notice. Subsequently, the site restoration scheme as approved shall be fully implemented within 6 months of the date of this decision notice.

REASON: To protect the visual and residential amenities of the area in accordance with ULP Policies S7 and GEN4 of the Uttlesford Local Plan (adopted 2005).

1.5 Following grant of Section 73A permission, it has been understood that the business proceeded to demolish the existing chicken shed at the north of the site and, in the process of doing so, provisionally removed a section of earth bunding (spoil heap) from around the perimeter of the storage buildings within The Site, as described in Figure C1 in Appendix C.

1.6 Although the planning condition refers specifically to visual impact, it has been understood that concern has been raised to the potential changes in noise level due to the removal of existing earth bunding; therefore, within application UTT/21/1438/DOC, to discharge Condition 11 of UTT/20/0561/FUL, it has been proposed that the bunding be re-built and redesigned in a new location to more readily attenuate sound levels from site activity to nearby sensitive receptors, specifically Little Poplars residential dwelling.

1.7 This document has been prepared to support the application and partially discharge Condition 11, by informing on industrial/commercial noise sources relating to the development and advise on mitigation measures accordingly.

1.8 The three closest noise sensitive receptors to the development proposals have been noted as Poplars Barn, Poplars and Little Poplars, all located to the north of commercial site.

1.9 A Glossary of Acoustic Terms has been provided in Appendix A that may assist with the terminology used within this report.

2 STUDY OF SITE PROCESSES AND SOUND LEVEL PREDICTIONS

2.1 To identify the ideal location and design of potential noise bunding, it has been necessary to establish the processes which take place at the industrial site and the corresponding noise emissions.

2.2 Operations have been noted to include paint manufacturing items (functioning within a central warehouse), forklifts manoeuvring (both internally and externally) moving products between warehouses and storage units, as well as loading/unloading delivery lorries, and static plant items, primarily located within a single plant room.

2.3 During site surveys conducted over 22nd and 24th July 2021, sound measurements were taken over a wide range of conditions, to establish realistic worst-case scenarios with machinery operating at full capacity, as well as investigating the difference in noise emission when re-locating certain sources and testing factory doors in open and closed states.

2.4 A summary of measured activities has been provided in octave bands in Table D1 within Appendix D. All measurements were made using a Class 1 sound level meter at 1.5 m above ground level in free field locations.

2.5 To understand a specific sound level for the purposes of assessment, it has been necessary to make some level of assumption to the proposed usage times in a realistic worst-case hour (determined as the correct reference time interval for daytime assessment).

2.6 In this worst-case, all internal activities could operate continuously and simultaneously within the warehouse buildings (both existing and proposed). To inform a worst-case, it has been assumed that the manufacturing building shutter door could remain open for the entire time-period.

2.6.1 All fixed plant has also been assumed to operate continuously with the plant door open in a realistic worst-case hour.

2.6.2 Forklifts have been modelled to operate for 15 minutes of the hour with an additional 30 minutes of use for unloading/loading of a heavy goods delivery vehicle (HGV).

2.7 A summary of the industrial activities at The Site and the assumed on-times of warehouse processes, yard activity, and fixed plant operations have been shown in Table 1 below.

Description	Assumed on-time of activity in worst-case hour (%)
Manufacturing Room - Maximum Operations	100
Plant room - Maximum Operations	100
Filling and labelling	100
Special Order/Tinting Room)	100
Hissing Pipe external to Plant Room	5
Forklift operations around site	25
Unloading / loading of HGV using forklift in southern yard	50
Diesel pump	100
Crusher	100

Table 1 – Assumed on-time of commercial activities in realistic worst-case hour.

2.8 Due to the complexity of multiple site-phases; sound sources and receptors at The Site, sound pressure level predictions have been undertaken using IMMI V2020-3a using the specific noise levels defined in Appendix D for input data. Calculations for emission have been made in accordance with ISO 9613, describing an industry standard method for environmental noise prediction as applicable to commercial operations.

2.9 It has been noted that the success of any noise model would be dependent on the software user to generate both valid and representative results, accounting for proposed topography and form. Equated values have been verified by manual calculation methods as to ensure that the modelled results have been considered accurate for the scope of this report, to absolve the likelihood of modelling error.

2.10 The following, general modelling assumptions have been made when reviewing the sound level emission from existing and proposed noise generating units at the nearest noise sensitive receptors (NNSRs):

- Site geometry and proposed development layout has been taken from architectural scheme drawings presented in Appendix C, extracted in AutoCAD (.DXF) vector format.
- Simplified building structures have been modelled on the site.
- Surface attenuation factors have been assumed as a worst-case, hard ground. The attenuation factor has been taken as G = 0.0 for Gs, Gm and Gr (the ground types in the source region, middle region and receiver region as defined by ISO 9613-2).
- Receiver locations have been taken 1.5 m above relative ground level at the façades of the nearby dwellings.

2.11 Sound pressure levels over the various phases of the development have been calculated within the noise model for key points about The Site, as presented in the Table below and illustrated within model results of Appendix E.

Noise Propagation model - Predicted Noise Levels at NNSRs Under Different Site Phases					
Situation No.	Scenario Modelled	Details	Little Poplars	Poplars	Poplars Barn
			Predicted Sound Pressure Level dB $L_{Aeq,T}$ re. 20 µPa		
1	Historic Situations	With bund and dilapidated building (Figure C1 in Appendix C)	31	34	40
2		No bund but with dilapidated building still standing	34	34	40
3		With bund but dilapidated building removed	40	34	40
4		No bund or dilapidated building	41	34	40
5	Current Situation	No bund or dilapidated building, but with 1.8 m boundary screening (existing measures)	36	34	40

Table 2 – Summary of results from noise model over the various phases of development.

2.12 The results in Table 2 above have shown that the two dwellings situated to the north/northwest of the business (Poplars Barn and Poplars) would not have experienced a change in sound levels due to the demolition of the dilapidated chicken shed or the removal of earth bunding. For this reason, the following assessment has only considered the relative effects of noise mitigation at Little Poplars residential dwelling.

2.13 It has been demonstrated in Table 2 that the removal of both the building and earth bunding has resulted in a 10 dB rise in sound levels at Little Poplars, arising from activities at the industrial site, due to a removal of natural screening between site sources and the receptor.

2.14 The Table has also shown that the largest change in sound levels would have resulted from the removal of the dilapidated building, as per planning proposals within UTT/20/0561/FUL, as:

- Removing the bund has been shown to increase the sound levels at the Little Poplars in the order of up to 3 dB.
- Whereas the removal of the dilapidated building has been shown to increase sound levels at the same receptor by 9 dB.

2.15 Item 5 in Table 2 has shown the predicted sound pressure levels under the current conditions at The Site. These “existing measures” comprise the erection of a 1.8 m solid wooden fence along the boundary of Little Poplars, erected by the applicant. This screening has notably reduced sound levels at the NNSR by nominally 5 dB.

2.16 In summary, modelling results have shown that the removal of the dilapidated building has increased incident noise levels at the closest receptor, Little Poplars, and the acoustic benefit of the original bund has been predicted to be marginal once the building has been removed. It has been established from the predictions that, with the inclusion of the boundary screening, the overall sound level from site activities at Little Poplars may have increased by approximately 5 dB (to 36 dB, $L_{Aeq,\,T}$) in comparison to the original site conditions.

3 FUTURE DEVELOPMENT AND POTENTIAL MITIGATION MEASURES

3.1 The proposed development, granted within (UTT/20/0561/FUL), has been noted to include expansions to the rear forecourt, whereby additional operations might take place in a typical worst-case hour, and comprises the erection of a new storage building at the southern end of the development site. These development changes have been incorporated within the noise model.

3.1.1 Due to possible increases in site activity and the inclusion of new reflecting surfaces at the southern end of The Site, it has been predicted that the overall sound level at the NNSR could marginally increase by approximately 1 - 2 dB as a result of these external changes.

EARTH BUNDING DESIGN OPTIONS

3.2 An iterative design approach has been undertaken to establish the ideal location and design of earth bunding in relation to noise control.

3.3 The single-figure results of the bunding noise models have been provided in the below Table, with noise contour plots shown in Appendix E. Each of the below situations has included the consented development proposed within the southern section of The Site.

Noise Propagation model - Predicted Noise Levels at NNSRs with Different Mitigation Schemes			
Situation No.	Scenario Modelled	Details	Little Poplars Predicted Sound Pressure Level dB $L_{Aeq,T}$ re. 20 µPa
6	Future Development	Existing Measures (1.8 m boundary screen)	38
7		1.8 m boundary screen plus original bund reinstated	36
8		1.8 m boundary screen plus original bund reinstated with 1.8 m screen atop bund	36
9		Proposed bunding along northern boundary, with 1.8 m boundary screening remaining	37
10		Proposed bunding along northern boundary, with 1.8 m boundary screening moved atop bund (Figure C2 in Appendix C)	34
11		Bunding along northern boundary in an 'L' shape, with 1.8 m boundary screening moved atop bund (illustrated in Figure E11 in Appendix E)	34

Table 3 – Summary of results from noise model using different mitigation schemes, incorporating the future development to the south of the existing site.

3.4 **The model results shown above have demonstrated that the re-instatement of the earth bunding in its original form would not effectively reduce sound levels at the NNSR (even with an additional 1.8 m solid screen along the apex of the knoll).**

3.5 **The results in Table 3 have illustrated that the most effective noise mitigation would be achieved by re-locating the earth bund along the northern site boundary with a 1.8 m solid screen running along the top (Situations 10 and 11). This design could readily incorporate planting/foliage to satisfy any requirements for visual impact, as described in Figure C3 in Appendix C.**

3.6 It has been demonstrated in Situation 11 that this earth bunding could also extend around the corner of the northern boundary in an 'L' shape, as illustrated in Figure E11 (Situation 11). This design would not reduce sound levels at Little Poplars dwelling any more than Situation 10 but would slightly broaden the mitigating effect within the surrounding residential land/garden area.

3.7 With either Situation 10 or 11 employed, sound levels at Little Poplars would be within 3 dB of the previously existing levels prior to the removal of bunding and dilapidated chicken shed, and prior to the approved development at The Site.

ADDITIONAL MITIGATION MEASURES

3.8 To minimise the effects of industrial noise at the closest receptor, further mitigation measures have been considered, including alterations to existing plant items and industrial building make-up.

3.9 While attending site, observations were made at the boundary to Little Poplars during a typical hour of site operations. During times of low residual noise, it was noted that sound from the industrial plant room was occasionally prevalent, emitting from the open plant room door and from a hissing pipe located eternally, adjacent the northeast corner of the plant room.

3.10 It has been understood that remedial works have been put in place to minimise these noise contributions.

3.10.1 The intermittent hissing pipe has been relocated to a position on the west façade of the plant room, significantly screening the source from the receptor.

3.10.2 Similarly, the plant room has been re-vented out to west, whereby the plant room door can now remain fixed closed during plant operating hours.

3.11 These constraints/amendments to site operations have been reflected in the noise model to predict the combined mitigating effects at the receptor. The results of these revised predictive models have been provided in the Table below.

Situation No.	Scenario Modelled	Details	Little Poplars
			Predicted Sound Pressure Level dB $L_{Aeq,T}$ re. 20 µPa
12	Additional Mitigation Options	Plant Room door kept closed	37
13		Hissing pipe moved to rear of Plant Room	36

Situation No.	Scenario Modelled	Details	Little Poplars
			Predicted Sound Pressure Level dB $L_{Aeq,T}$ re. 20 µPa
14	Recommended Combined Measures	Combined Measures (proposed bund and screen/pipe moved/plant room closed)	32
15		Combined Measures plus erection of new building in place of dilapidated unit	31

Table 4 – Summary of results from noise model using different mitigation schemes, incorporating the future development to the south of the existing site.

3.11.1 In addition to the above measures, the proposed bunding has been incorporated into the scheme, to provide the resultant sound level of 32 dB $L_{Aeq,T}$ at the NNSR (Situation 14), as described in the below Figure along with resultant noise contours around The Site.

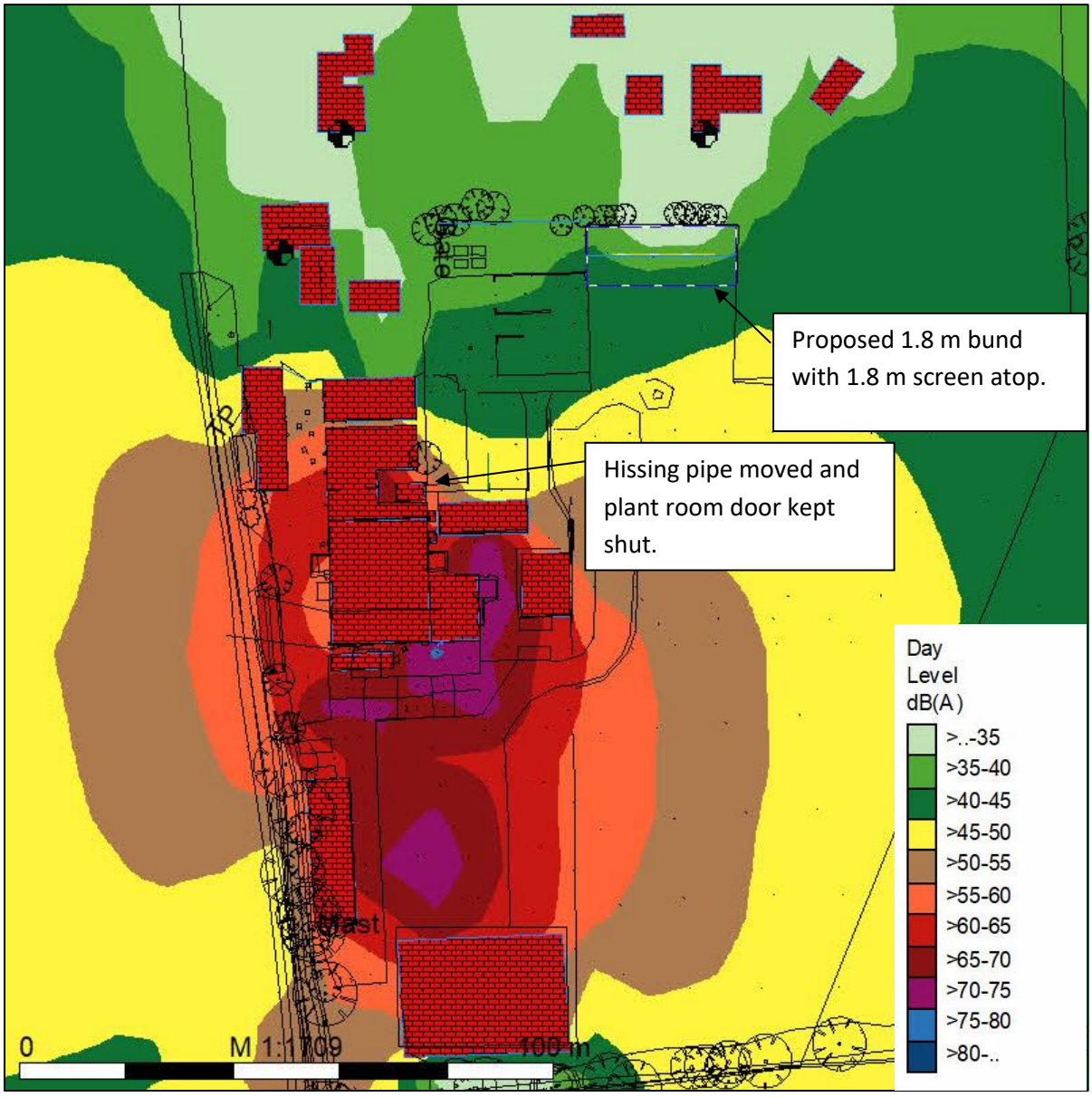

Figure 1 – Situation No. 14 – Recommended Combined Mitigation Measures (Predicted Sound Pressure Levels, dB $L_{Aeq,T}$).

3.11.2 Situation 15 in the above Table has shown that further reductions in sound level could be achieved by re-instating a 4 – 6 m tall building within the same footprint as the demolished chicken shed, subject to planning.

3.12 A combination of the earth bunding as described in Table 3, Situations 10 or 11, and on-site amendments, as described in Situations 12 and 13 in Table 4 have been shown to result in sound levels at Little Poplars within 1 dB of previously existing conditions prior to any development work at The Site.

4 CONCLUSIONS

4.1 An assessment of sound levels has been carried out at Poplars Farm, Broad Bridge Road, Aythorpe Roding, Dunmow CM6 1RY. Sound levels have been taken from a site survey at the northern boundary (representative of nearby residential receptors) in conjunction with close-to-source measurements of industrial activities at The Site.

4.2 Extensive modelling of industrial processes at The Site (historical, current, and proposed) has been provided to assess the noise emissions in the surrounding area under various phases of development. Results of noise the modelling have established that the removal of the dilapidated building has resulted in increased sound levels at the residential receptor (Little Poplars) where removal of earth bunding itself has only a marginal effect.

4.3 Various bunding designs have been assessed and it has been demonstrated that bunding along the northern boundary of the site (with a 1.8 m solid screen along the apex) would be most effective at controlling noise emitting from the industrial site.

4.4 A recommended mitigation scheme has been outlined which incorporates a new sound bund location and design, devised to minimise incident sound from site activities to the nearest noise sensitive receptor. With this scheme in place, the predicted resultant sound levels at the receptor would be within 3 dB of those predicted in the historical situation with earth bunding and dilapidated building still in-situ.

4.5 Further on-site mitigation measures have been reviewed and the combined mitigation scheme (with earth bunding) has been predicted to attenuate industrial emissions such that the level at the receptor would be comparable to previously existing levels.

Appendix A: Glossary of Acoustic Terms

'A' weighting dB(A): Correction applied to the frequency range of a noise in order to approximate the response of the human ear. Noise measurements are often A-weighted using an electronic filter in the sound level meter.

Attenuation: Sound reduction, measured in decibels (dB).

Ambient Sound: The totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far. Note: The ambient sound comprises the residual sound and the specific sound when present.

Background sound level: A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Calibration: A check of the function of a sound level meter by comparing the meter reading with a known sound pressure level.

Decibel (dB): The unit of sound level and noise exposure measurement. The range of audible sound pressures is approximately 0 dB to 140 dB.

Frequency (Hz): The pitch of the sound, measured in Hertz.

LAeq,T: The A-weighted equivalent continuous sound pressure level during a period. It is the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period, T.

Octave-bands: A division of the frequency range into recognised bands.

Rating level, LAr,Tr: The specific sound level plus any adjustment for the character of the sound.

Residual sound: Ambient sound remaining in the absence of the specific sound or that it is supressed as not to contribute to the ambient sound level.

Residual sound level, Lr or Leq,T: The equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given reference time interval, T.

Sound pressure level (SPL): The basic measure of sound, expressed in decibels, usually measured with an appropriate frequency weighting (e.g. the A-weighted SPL in dB(A)).

Sound power level (Lw): The sound energy radiated per unit time by a sound source measured in watts (W). Sound power can be weighted (e.g. A-weighted) and is not influenced by environmental or physical factors such as weather or distance.

Specific sound: Sound source being assessed.

Specific sound level, Ls or Leq,T: The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval, T.

Appendix B: Annotated Location Plan

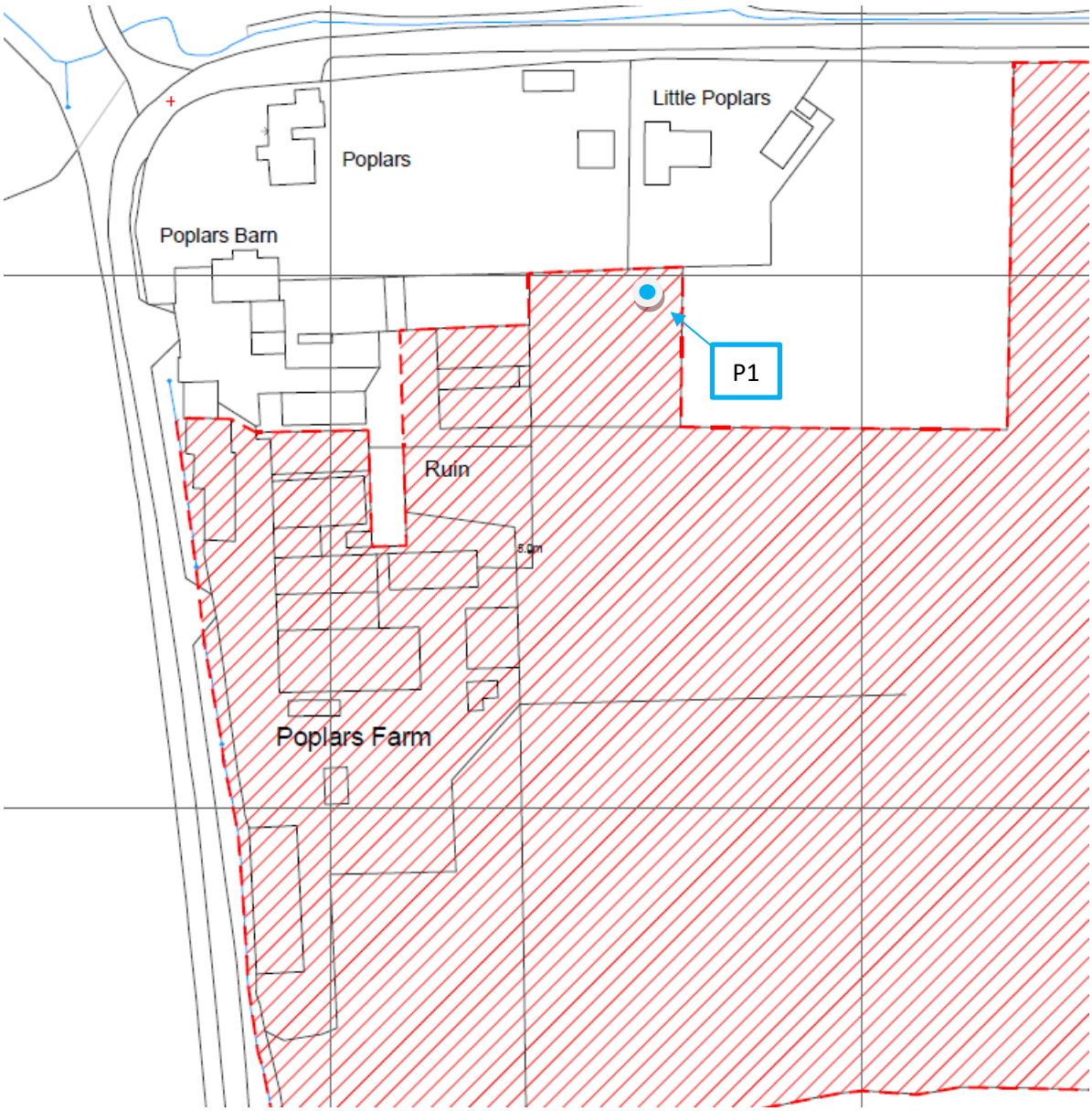

Figure B1 – Location plan, with measurement position annotated.

Appendix C: Scheme Designs

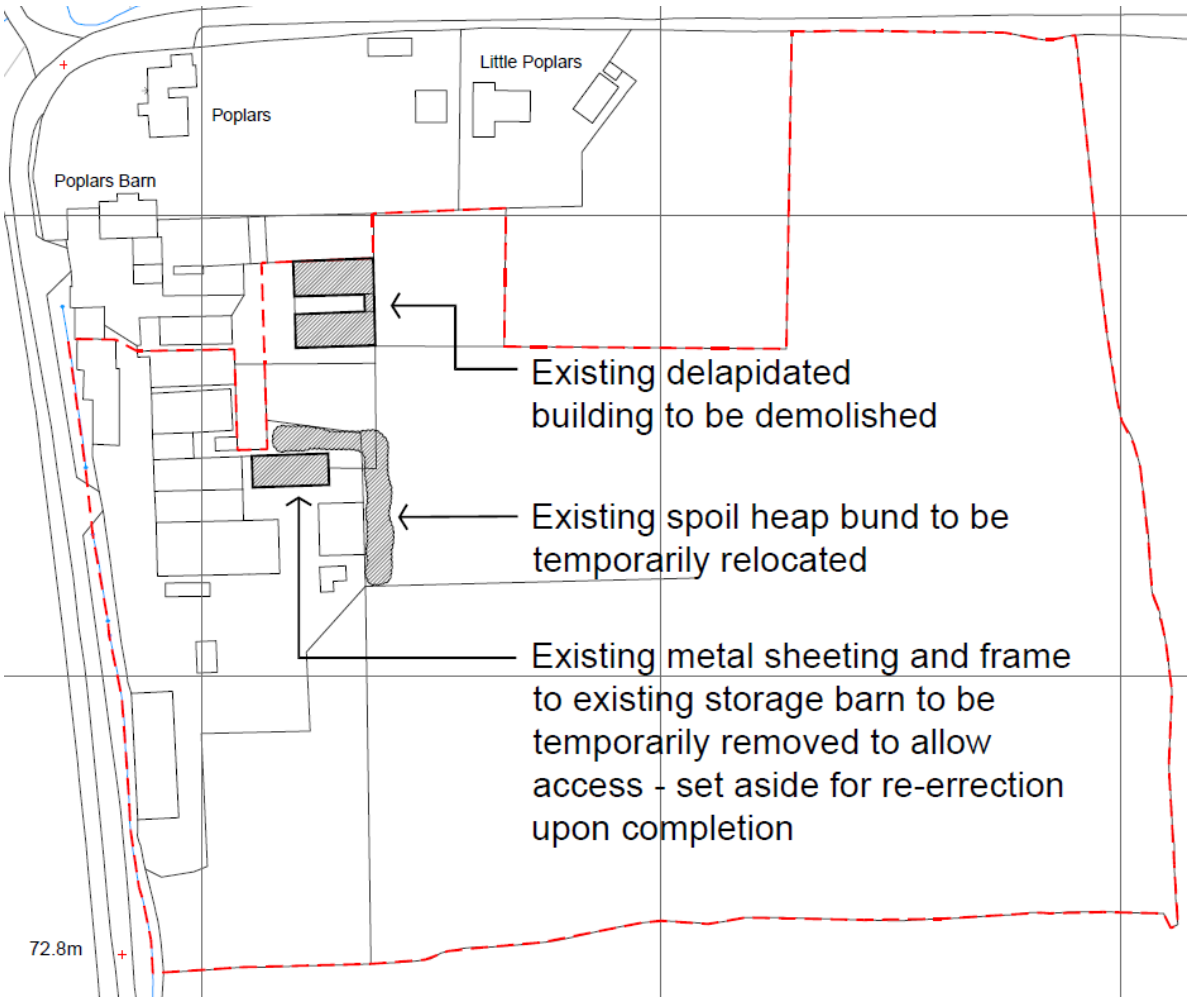

Figure C1 – Historic site plan, historic scheme with removed building and bund.

Figure C2 – Location plan with granted development to south.

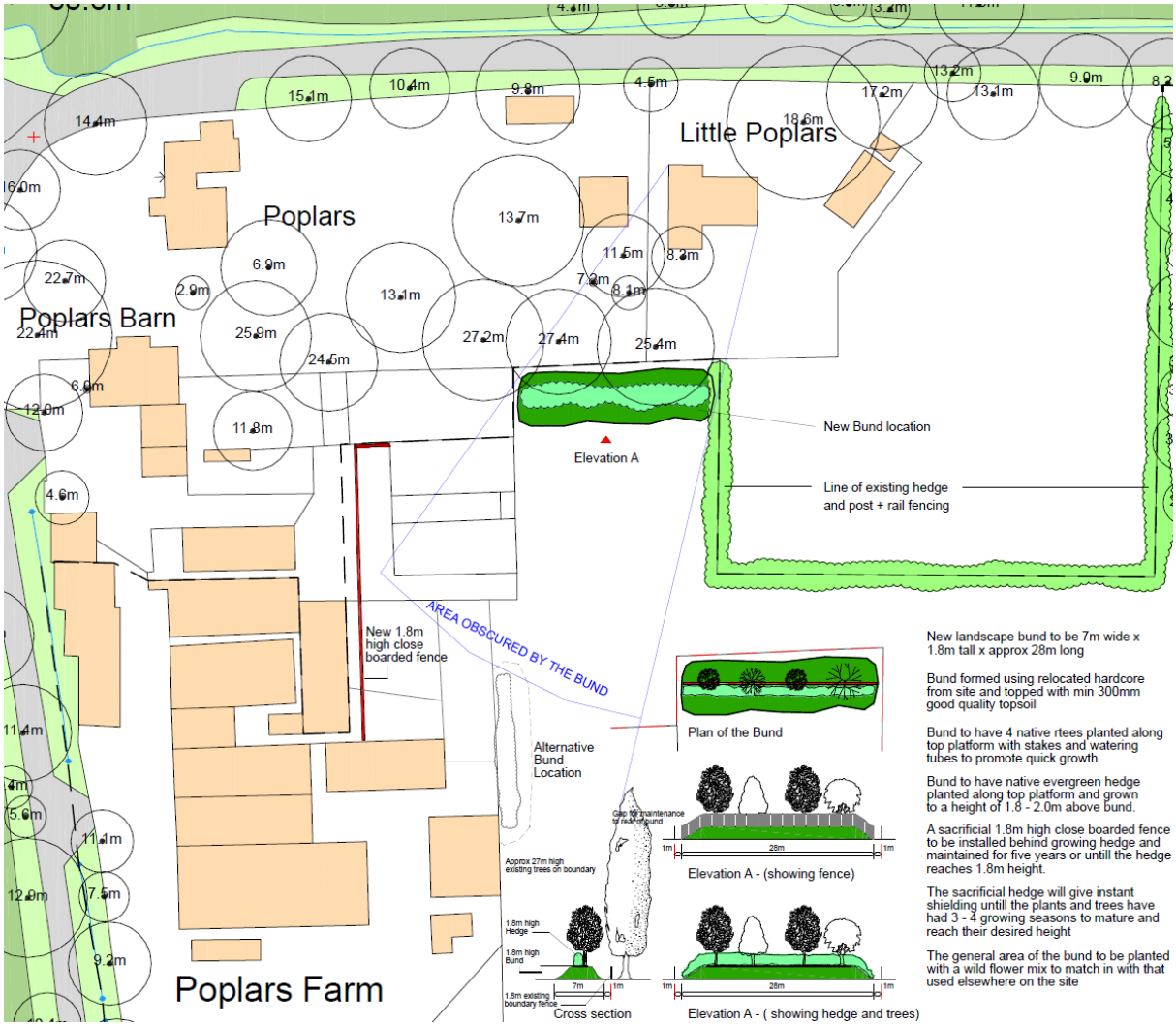

Figure C3 – Location plan with proposed bund location and design.

Appendix D: Environmental Survey Summary

The equipment used conforms to BS EN 61672-1:2003 (Class 1) for sound level meters and BS EN 60942 (Class 1) for sound calibrators; with at least traceable calibration history valid; no greater than two years for sound level meters and one year for sound calibrators, relevant to the times of the site assessment.

Manufacturer	Model No.	Description	Serial No.
Larson Davis	LxT (ST)	3rd octave band sound level meter	4170
Larson Davis	PRMLxT1L	Microphone preamplifier (low range)	36076
Larson Davis	337B02	½" electret microphone	151485
Larson Davis	CAL200	Sound level calibrator	11165

Table D1 – Sound monitoring equipment.

Validation checks at the end of the survey demonstrated acceptable drift across all parts of the study, across the sound level measurement equipment used, of ≤ 0.20 dB. Interval data was recorded at the measurement location at 1-minute and 15-minute periods, time synchronised to BST.

Weather conditions at the times of site attendance were deemed acceptable for surveying.

Weather conditions	Start	Finish	Additional comments
Wind velocity	< 4 m/s Average	< 2 m/s Average	None
Wind direction	N	N	
Cloud cover/rain	100 %, no rain	0 %, no rain	
Temperature	13 °C	14 °C	

Table D2 – Recorded weather conditions.

A brief description of the sound field at the residential boundary has been provided below:

Incident sound was observed predominantly from natural sounds such as birdsong and wind in trees. Intermittent aircraft activity dominates sound field during flyovers from Stanstead airport (The Site notably resides beneath flight path).

A constant whine from industrial Plant Room can be heard when natural sound levels drop.

Intermittent sudden hissing sound occurs every few minutes (approximately 1 - 3 mins of every hour) – emitted from pipe associated with Plant Room.

Forklift reverse sirens occasionally just audible from industrial site, in addition to quiet clatters.

Description	Measurement Distance From Source (m)	Sound Pressure Levels, Leq dB re. 20µPa												
		1/1 Octave, Frequency (Hz)												$L_{Aeq, T}$
		8	16	32	63	125	250	500	1k	2k	4k	8k	16k	
IANL Manufacturing Room - Maximum Operations	N/A	58	59	59	65	74	75	83	81	76	72	63	55	**85**
IANL Plant room - Maximum Operations	N/A	58	59	59	70	74	69	72	69	67	64	57	46	**74**
IANL filling and labelling	N/A	60	59	57	58	60	63	63	63	62	61	55	47	**69**
IANL Special Order/Tinting Room)	N/A	61	56	57	53	57	59	55	55	55	52	48	38	**61**
External to Plant Room (open door)	2	55	53	56	63	64	60	64	61	59	53	45	34	**66**
External to Plant Room (closed door)	2	55	52	54	57	61	52	56	48	46	44	40	32	**56**
Hissing Pipe external to Plant Room	3	68	55	51	55	57	53	55	62	70	75	73	68	**78**
Forklift entering Manufacturing Room (horn blasts twice)	2	58	52	60	57	60	64	67	63	69	71	51	43	**75**
Forklift moving pallets and maneuvering around yard	8	69	65	75	74	65	60	60	61	61	56	49	37	**66**
Unloading / loading of HGV using forklift	5	69	68	78	77	66	64	66	69	65	63	58	46	**73**
Diesel pump	2	57	60	62	60	58	67	68	63	53	47	39	31	**68**
Crusher	2	62	65	63	66	60	60	72	79	67	66	59	51	**80**
External to Manufacturing Room - Open aperture	5	65	55	58	58	58	56	65	63	57	51	40	28	**67**
External to Manufacturing Room - Closed rolling doors	5	52	58	58	56	56	53	57	55	48	40	31	22	**58**

Table D1 – Summary of measured sound pressure level results of industrial processes.

Appendix E: Model Outputs

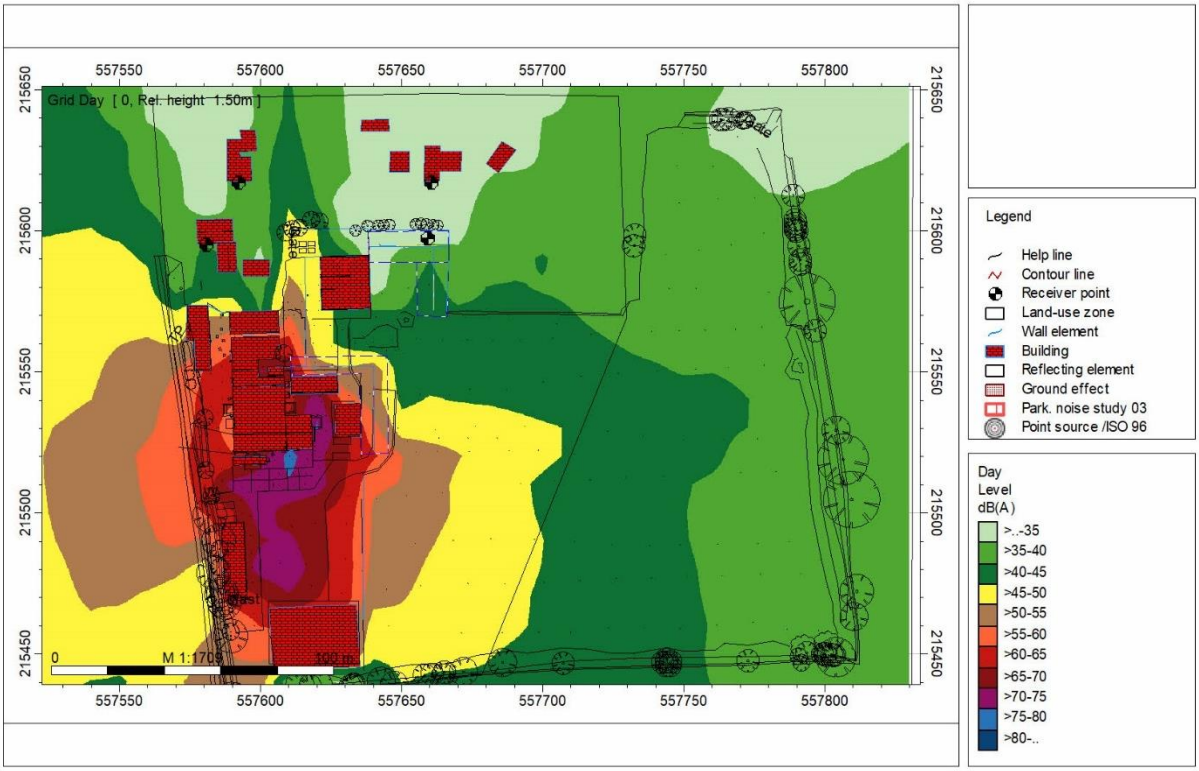

Figure E1 – Noise Contour Plot: Historic Situation (Situation 1).

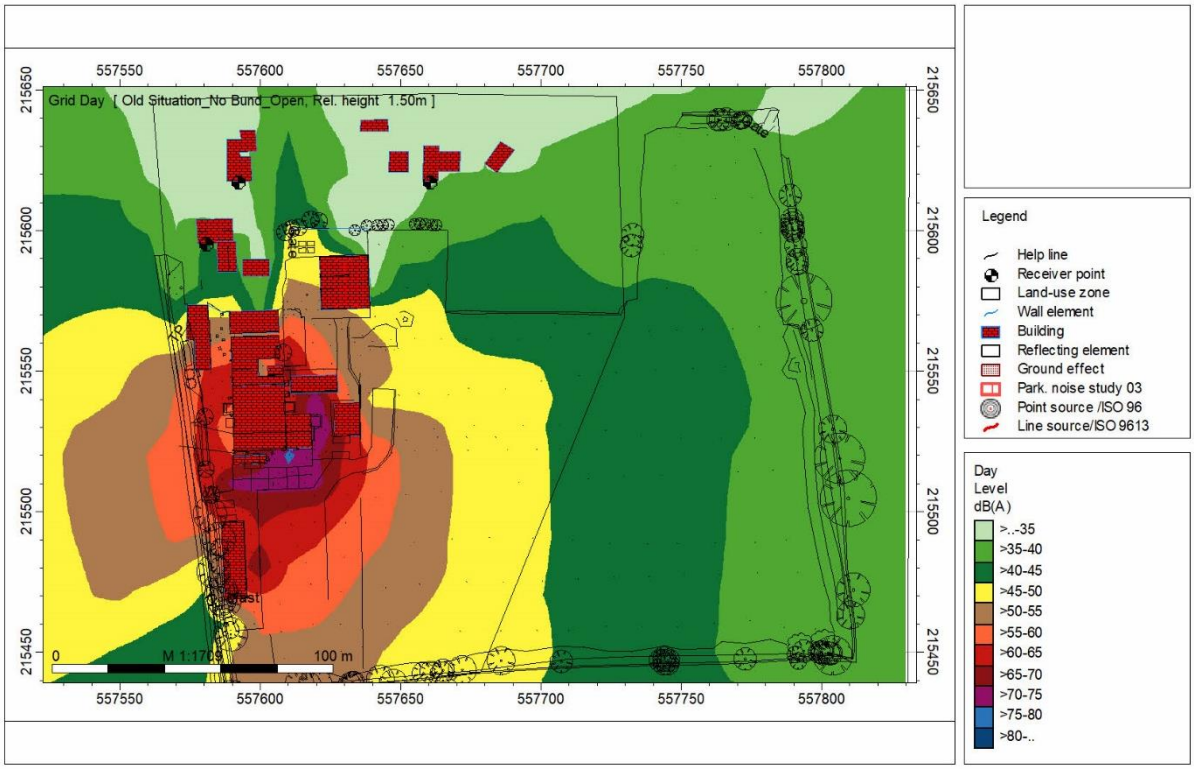

Figure E2 – Noise Contour Plot: Historic Situation – bund removed (Situation 2).

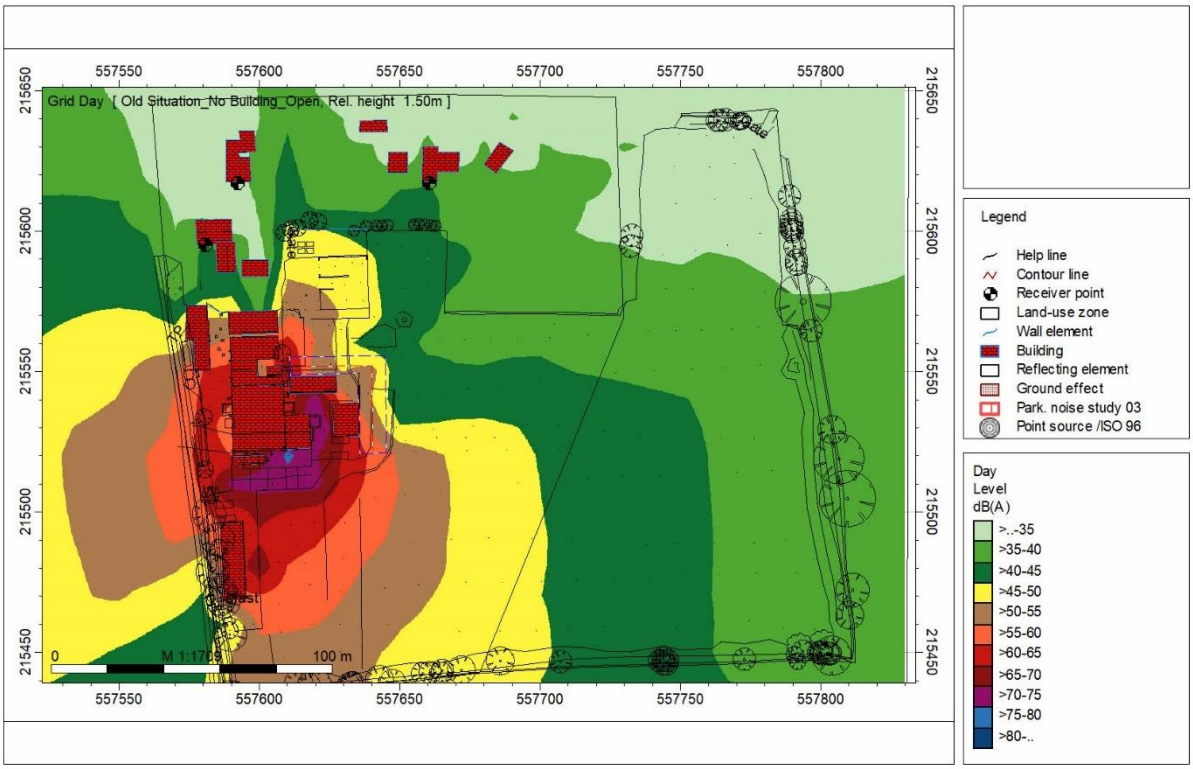

Figure E3 – Noise Contour Plot: Historic Situation – dilapidated building removed (Situation 3).

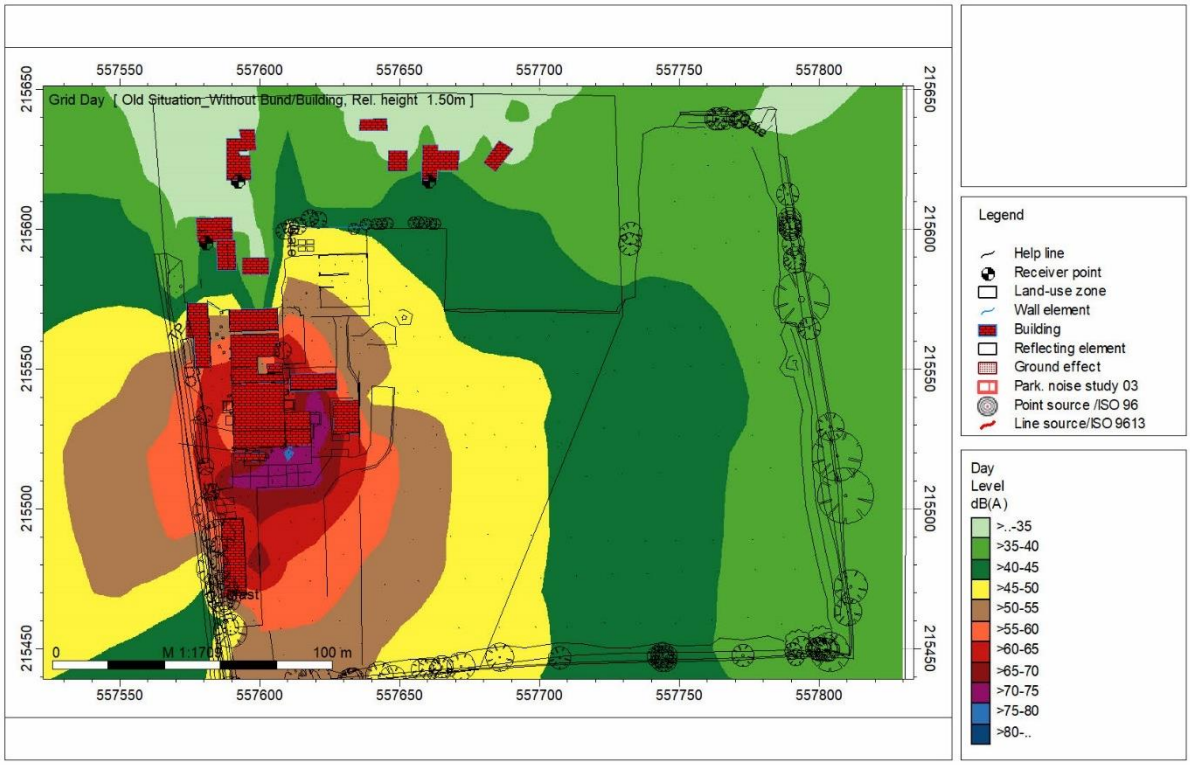

Figure E4 – Noise Contour Plot: Historic Situation – dilapidated building and bunding removed (Situation 4).

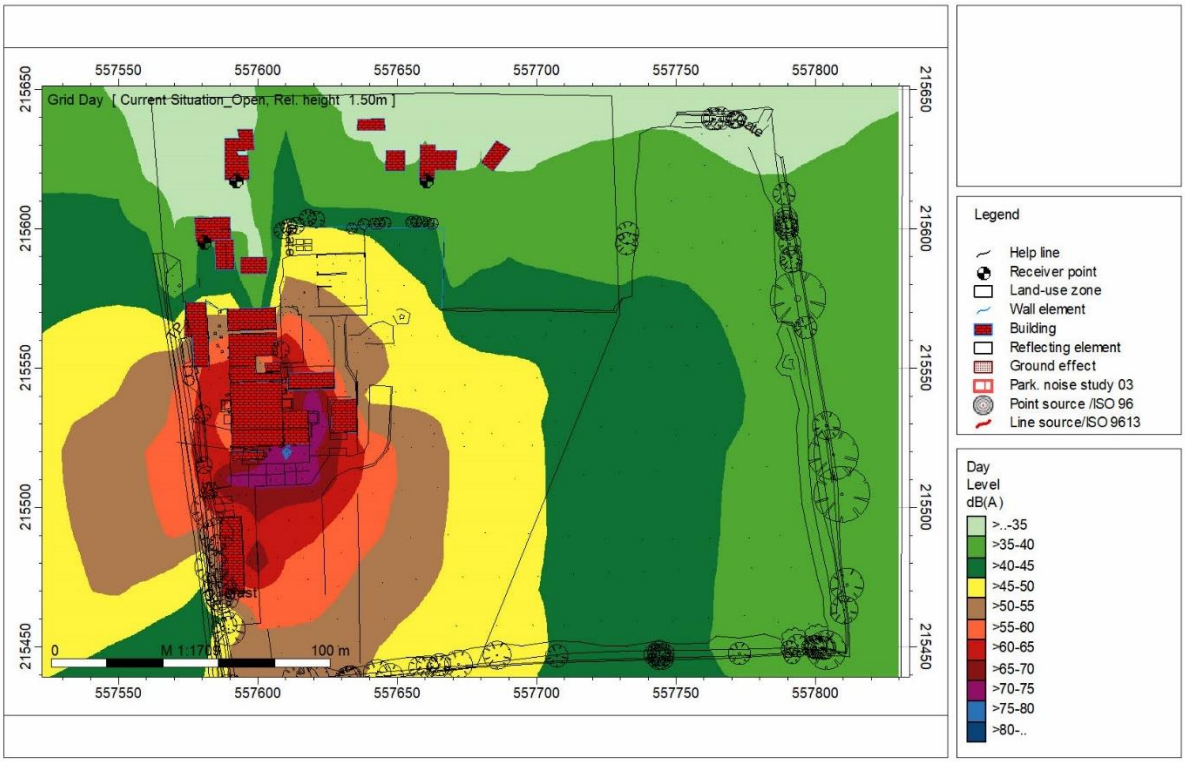

Figure E5 – Noise Contour Plot: Existing Situation – Existing measures of 1.8 m screen along north boundary (Situation 5).

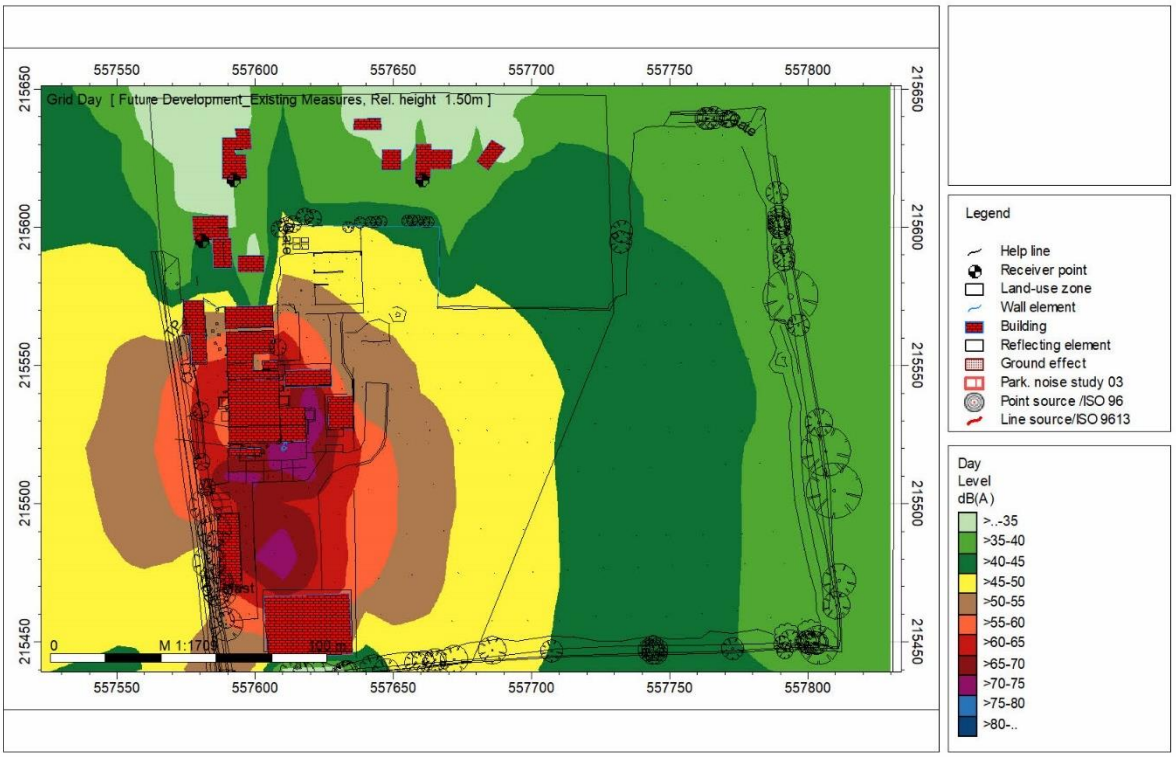

Figure E6 – Noise Contour Plot: Future Development – Existing measures of 1.8 m screen along north boundary (Situation 6).

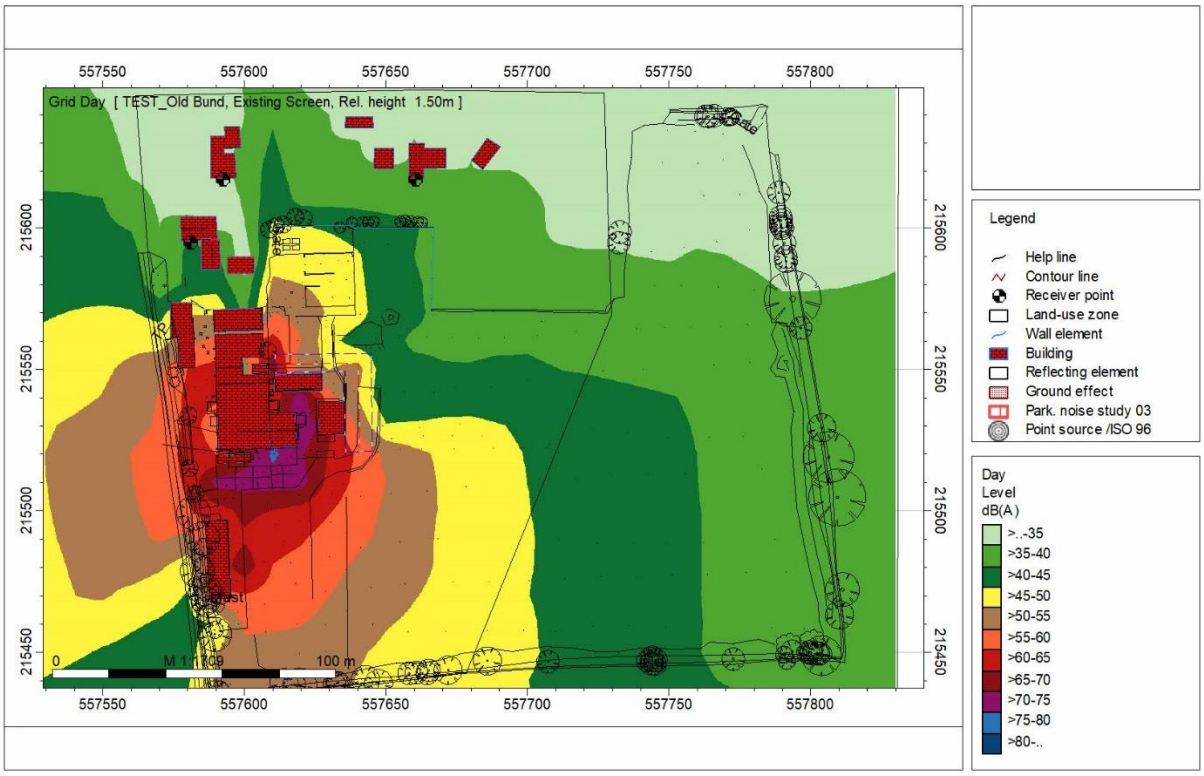

Figure E7 – Noise Contour Plot: Reinstatement of old bund and retention of existing 1.8 m screen around northern boundary (Situation 7).

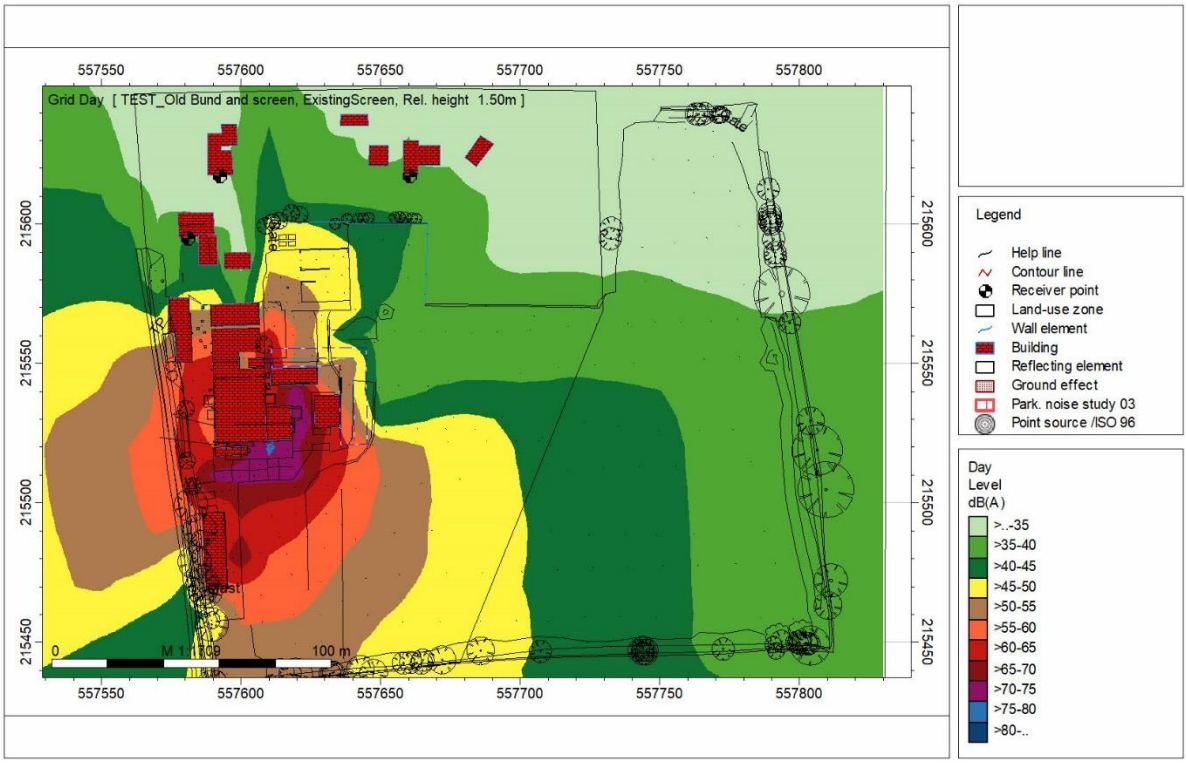

Figure E8 – Noise Contour Plot: Reinstatement of old bund with 1.8 m screen atop bund and retention of existing 1.8 m screen around northern boundary (Situation 8).

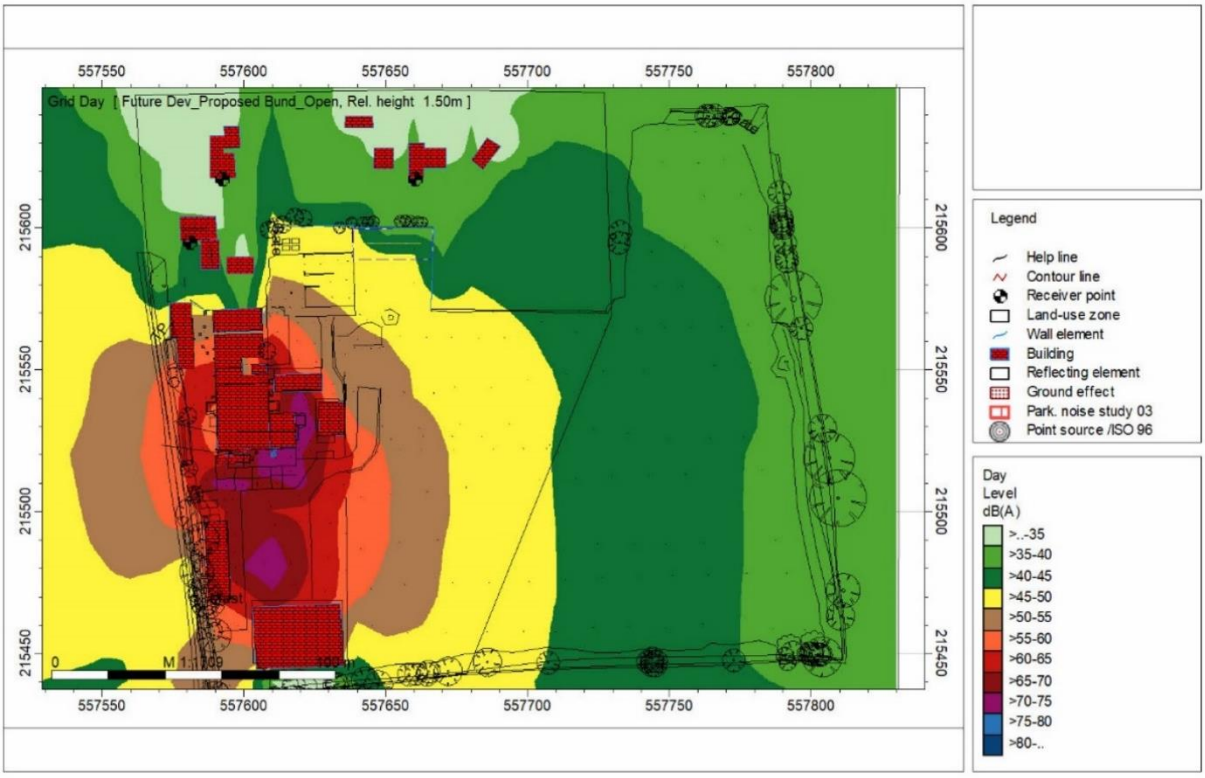

Figure E9 – Noise Contour Plot: Proposed bund with existing 1.8 m screen around northern boundary (Situation 9).

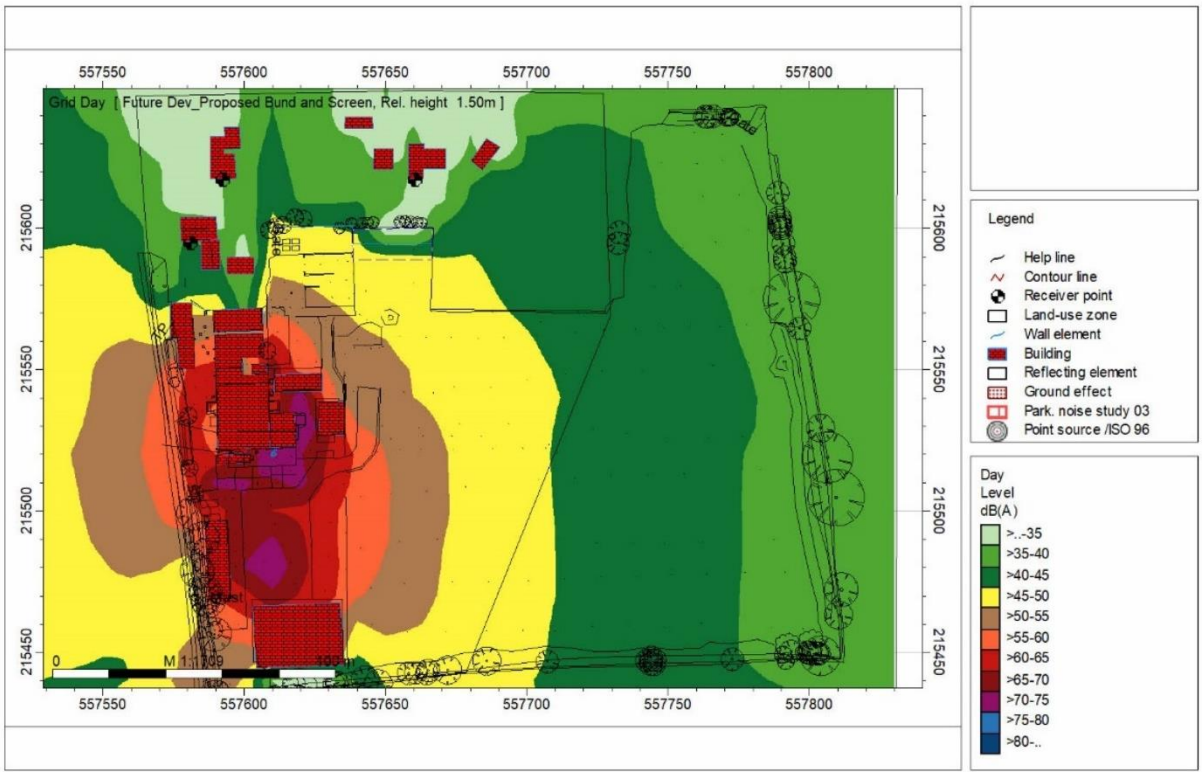

Figure E10 – Noise Contour Plot: Proposed bund with 1.8 m screen atop (Situation 10).

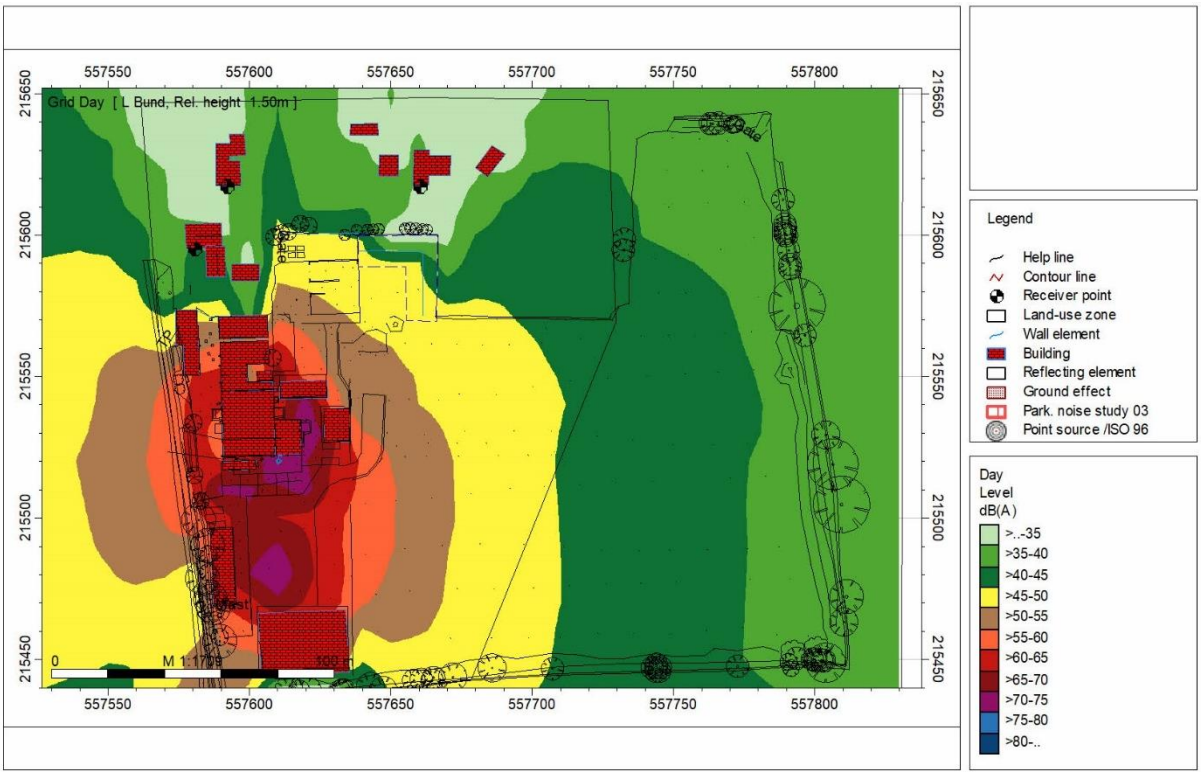

Figure E11 – Noise Contour Plot: : L-shape bund with 1.8 m screen atop (Situation 11).

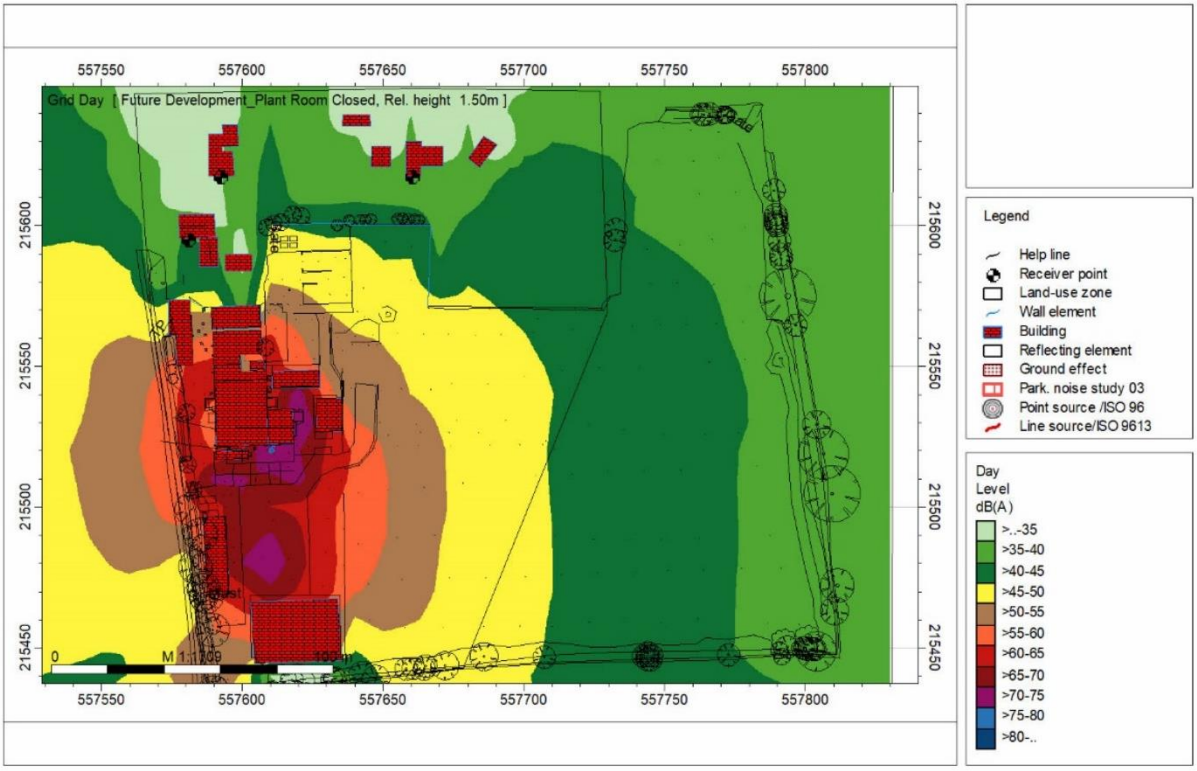

Figure E12 – Noise Contour Plot: Plant Room door fixed closed (Situation 12).

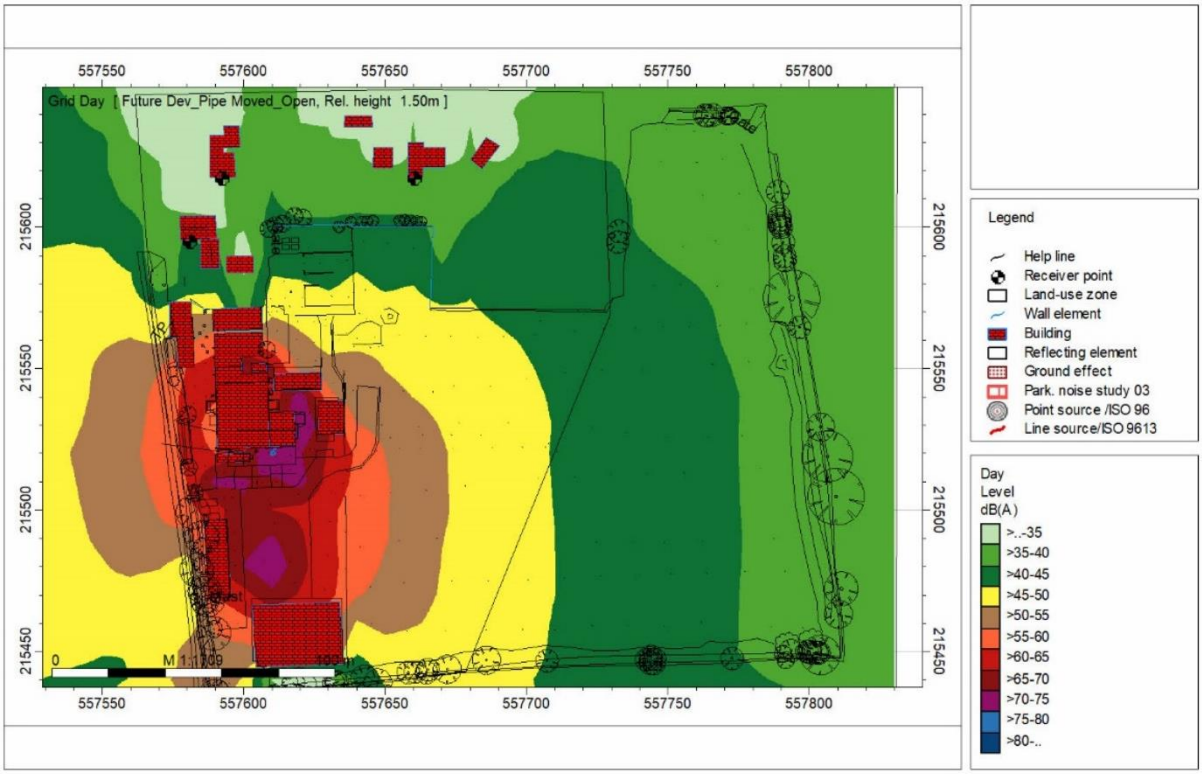

Figure E13 – Noise Contour Plot: Plant Room hissing pipe moved behind building (Situation 13).

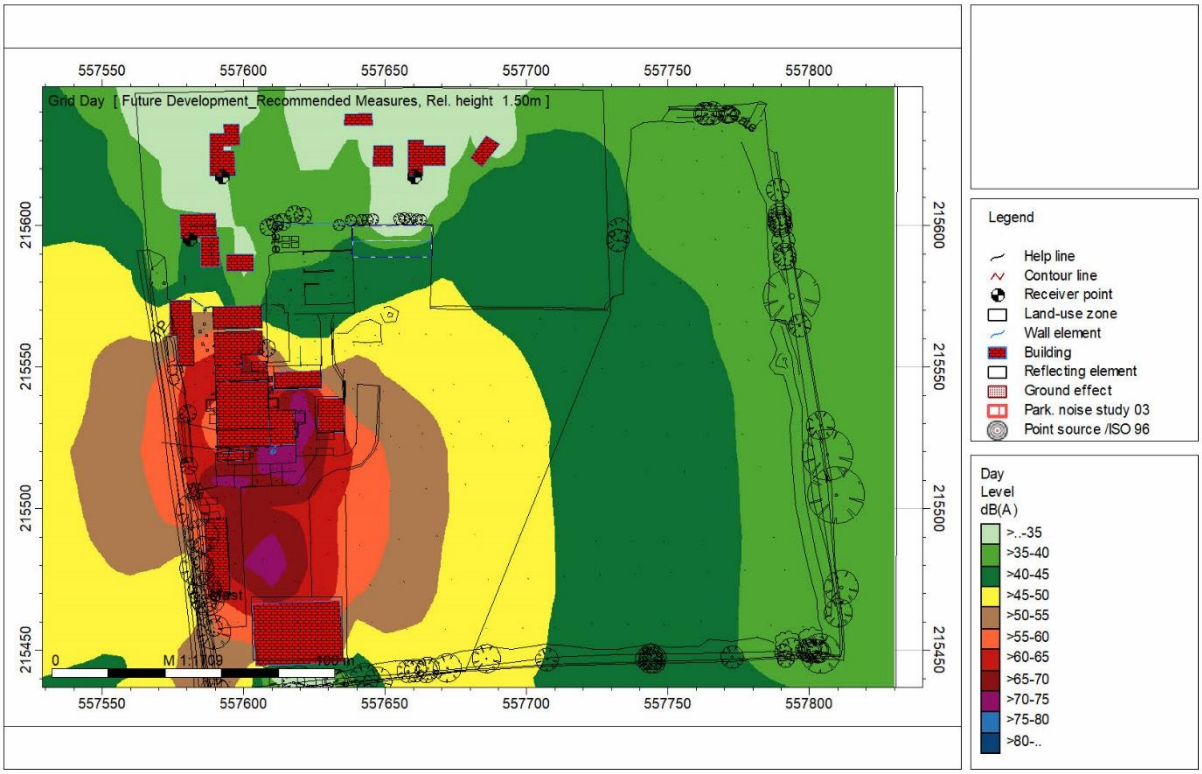

Figure E14 – Noise Contour Plot: Combined mitigation measures with proposed bunding and Plant Room amendments (Situation 14).

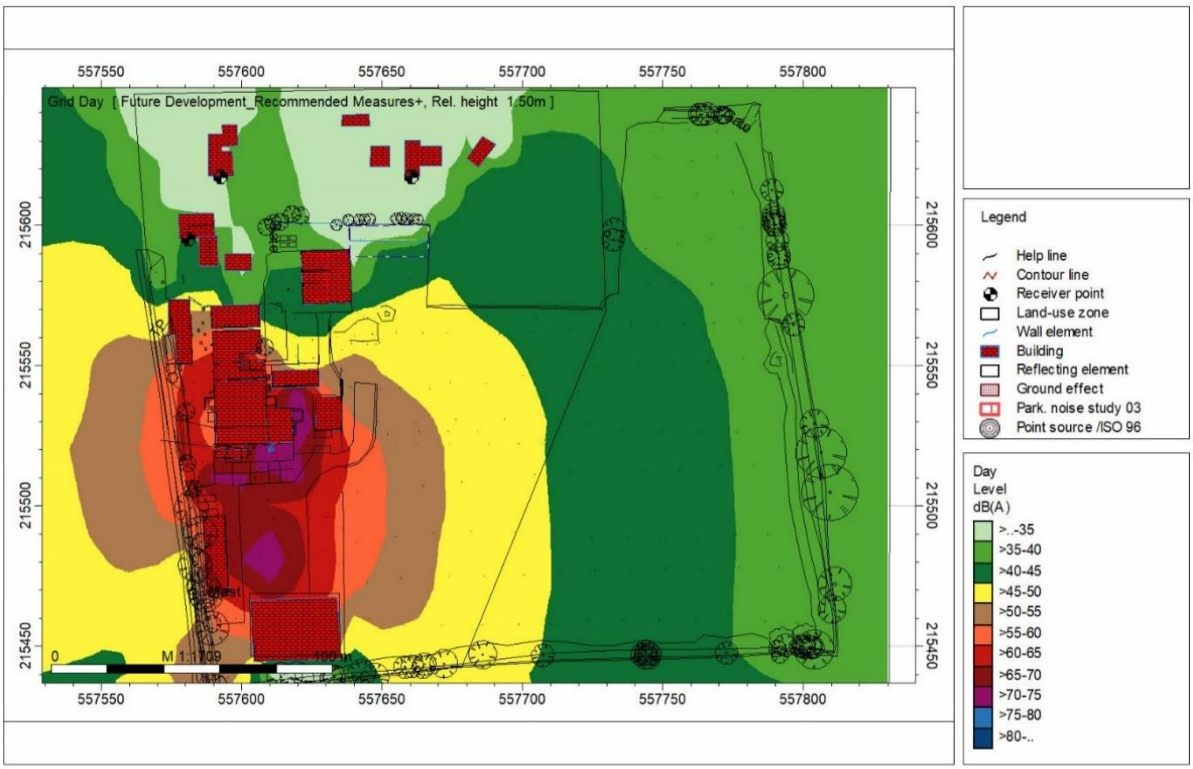

Figure E15 – Noise Contour Plot: Combined mitigation measures with proposed bunding and building erected to replace dilapidated chicken shed (Situation 15).

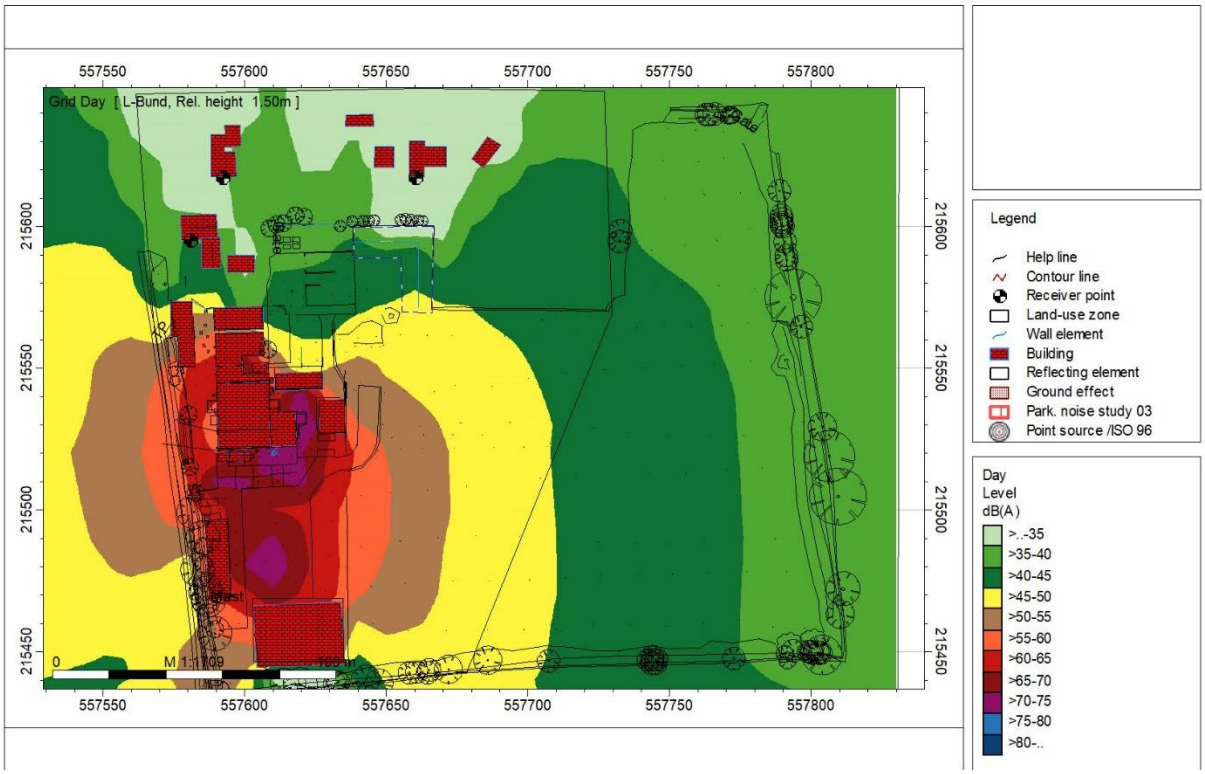

Figure E16 – Noise Contour Plot: Combined mitigation measures with 'L' shape bunding along northern boundary (Situation 16).

Appendix F: Acousticians Qualifications and Status

Dominic Attwell BEng. (Hons) AMIOA

Position Held: Acoustic Consultant.

Qualifications: BEng. (Hons) Audio Acoustics.

Affiliations: Associate Member of the Institute of Acoustics.

Acoustics Experience: 5 years.

James Blakeley BSc. (Hons) MIOA

Position Held: Senior Acoustic Consultant.

Qualifications: BSc. (Hons) Audio Technology.

Affiliations: Member of the Institute of Acoustics.

Acoustics Experience: 9 years.