PROPOSED CHASSIS DYNAMOMETER, MANUFACTURING AND AUTO SALVAGE

SPRINGVALE ROAD, PARK SPRINGS, GRIMETHORPE, BARNSLEY, S72 7BA

NOISE IMPACT ASSESSMENT

For 'RSP Properties Ltd' On behalf Of 'AC Environment Solutions Ltd'

DYNAMIC RESPONSE
BACK INGROW BRIDGE,
OFF SOUTH STREET,
INGROW,
KEIGHLEY,
WEST YORKSHIRE,
BD21 5AX

V: www.dynamic-res.co.uk
E: enquiries@dynamic-res.co.uk
T: 07541 956192

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Report prepared by:
Dynamic Response
Back Ingrow Bridge
Off South Street
Ingrow
Keighley
West Yorkshire
BD21 5AX

For:
RSP Properties Ltd
8 The Rise
Brierley
Barnsley
South Yorkshire
S72 9LN

On behalf of:
AC Environment Solutions Ltd
C/o BMBC Inward Investment Team
Unit 5A Enterprise Court
Farfield Park
Manvers
Rotherham
South Yorkshire
S63 5DB

Report prepared by:
Anthony Robertshaw BSc (Hons) Dip. AMIOA

This Report Is Believed To Be Accurate And True. However, Should A Mistake Be Found, Please Report It To Us As Soon As Possible. Distance Measurements Have Been Used From Online Mapping Solutions Where Necessary. However, The Accuracy Can Not Be Validated By Us.

A. Robertshaw

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1.0 INTRODUCTION

1.1 Dynamic Response was commissioned by 'AC Environment Solutions Ltd C/o BMBC Inward Investment Team' on behalf of 'RSP Properties Ltd' to assess the likely levels of noise at nearby noise sensitive receptors based on proposals to relocate their existing premises/business 'Darkside Developments' located at 'Bromcliffe Park, Burton Road, Monk Bretton, Barnsley, South Yorkshire, S71 5RN' to proposed new build premises at 'Springvale Road, Park Springs, Grimethorpe, Barnsley, S72 7BA', in connection with a planning application.

1.2 We understand that the main activities undertaken at the existing premises, which are to be relocated, generally include the manufacture of performance automotive parts/upgrades using typical fabrication techniques, chassis dynamometer power runs/specialist tuning of motor vehicles (typically VAG automotive vehicles), and the dismantling of used cars to include the re-sale of car parts/accessories. We further understand that each of the different classifications above are to be contained within a separate unit at the proposed development site, named units 1 to 3.

1.3 The proposed development location is adjacent to existing industrial/commercial premises on both sides of the proposed site boundary including 'Countrywide Healthcare Supplies' directly North, and various small units including 'D.M.Auto' to the South. The proposed development land can be seen in images 1 and 2 below, with the proposed site layout plans as seen in Figures 1 and 2, at the end of Section 1.0.



IMG-1 (Facing 'Tudor Court')



IMG-2 (Facing Springvale Road)

1.4 Based on correspondence received from the Local Authority, we understand that the main concern with regard to noise is the proposed resultant noise levels affecting the nearest residential occupiers/noise receptors directly East of the proposed industrial/commercial premises, located behind allotments, at approximately 205m from the nearest proposed industrial/commercial building façade to the nearest existing residential building façade.

1.5 We further understand that the Local Authority involved initially stated that the following should be considered in relation to any noise survey/assessment at the site;

- BS4142 (1997) 'Method for rating industrial noise affecting mixed residential and industrial areas'
- BS7445-1 (2003) 'Description and measurement of environmental noise'
- BS8233 (1999) 'Sound insulation and noise reduction for buildings'
- World Health Organisation 'WHO' 'Guidlines for community noise'

1.6 Prior to our noise survey at the proposed site, we contacted 'Paul Denton' from Regulatory services at the Local Authority to determine any specific noise criteria and/or survey durations to which the following response was received;

Regarding BS4142:1997 - ***"I would require 4 hours day time and 4 hours night time, I am not concerned when these are done as long as they are representative of the current background noise and the night time measurements are carried out between 23:00 and 7am.***
The nearest domestic properties that I have any concerns with are the ones on Tudor Court that back on to the allotments.
With regards to BMBC policy regarding noise we would ask that any noise generated from a new development is no greater than the existing back ground levels. In addition if the noise source is likely to be tonal than we would asked that it is designed to be 5 dB below current back ground levels."

1.7 In addition to the requirements of BS4142:1997, we understand that any noise should be controlled to be no more than 35 dB L_{Aeq} during the daytime and 30 dB L_{Aeq} during the night-time inside nearby residential dwellings in accordance with World Health Organisation 'WHO' Guidelines for community noise. In terms of BS8233:1999 the criteria relates to between the 'Good' standard 30 dB L_{Aeq} and 'Reasonable' standard 40 dB L_{Aeq} during the daytime, and identical to the 'Good' standard 30 dB L_{Aeq} during the night-time. Various publications including the 'World Health Organisation – Guidelines for community noise' indicate that the sound insulation of a partially opened window provides between a 10-15 dB reduction. Therefore, assuming a worst case minimum 10 dB sound reduction, in order to achieve the internal noise criteria above, the noise levels just outside the nearest residential windows should be no more than 45 dB L_{Aeq} and 40 dB L_{Aeq} during the daytime and night-time periods respectively.

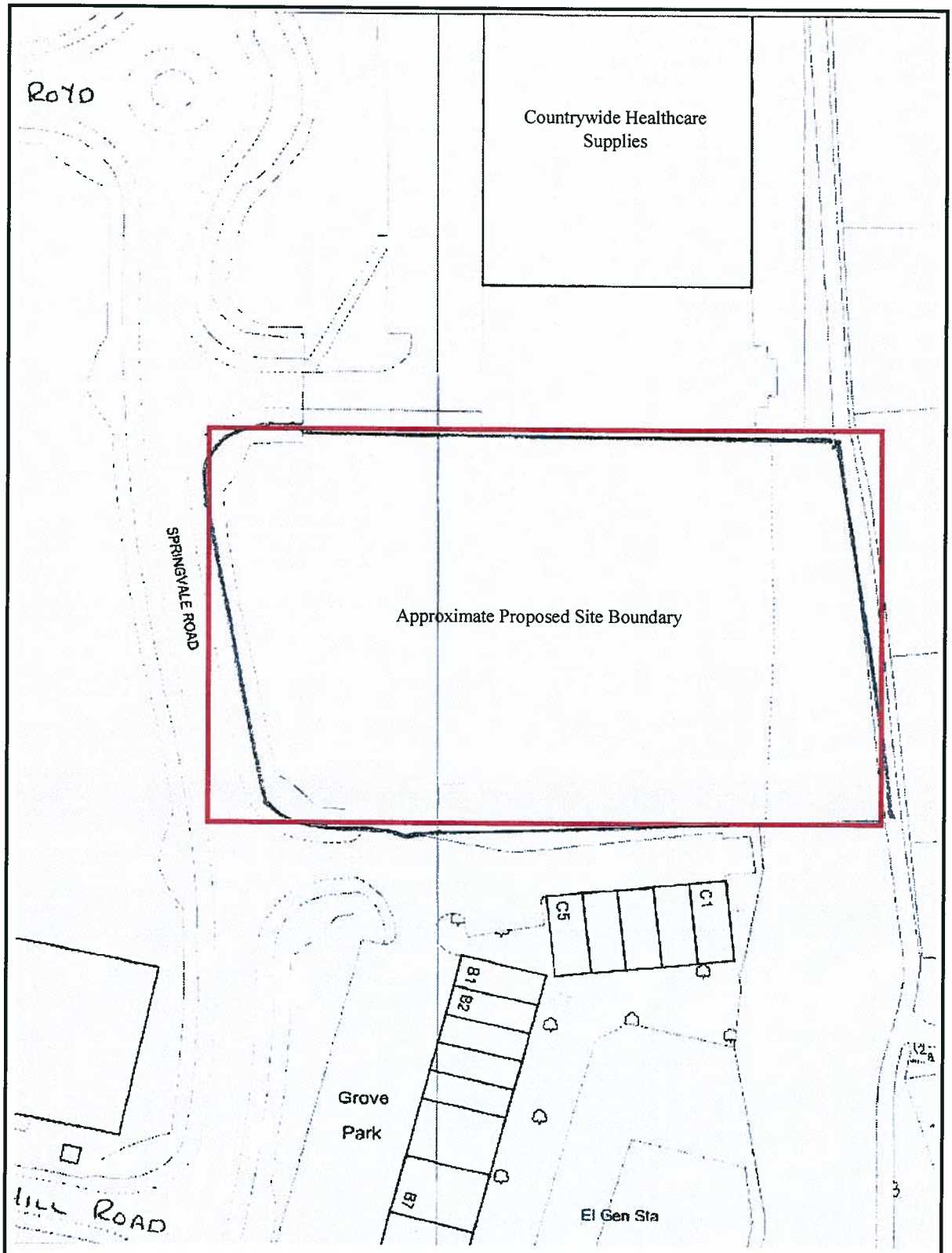
1.8 BS7445-1 (2003) Description and measurement of environmental noise, quote, '***defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.***'(BS7445-1 2003, Page 1). The measurement

procedures and general principles as detailed in BS7445-1 have been followed unless the appropriate alternate assessment standard suggests/or requires otherwise.

1.9 The assessment has included:

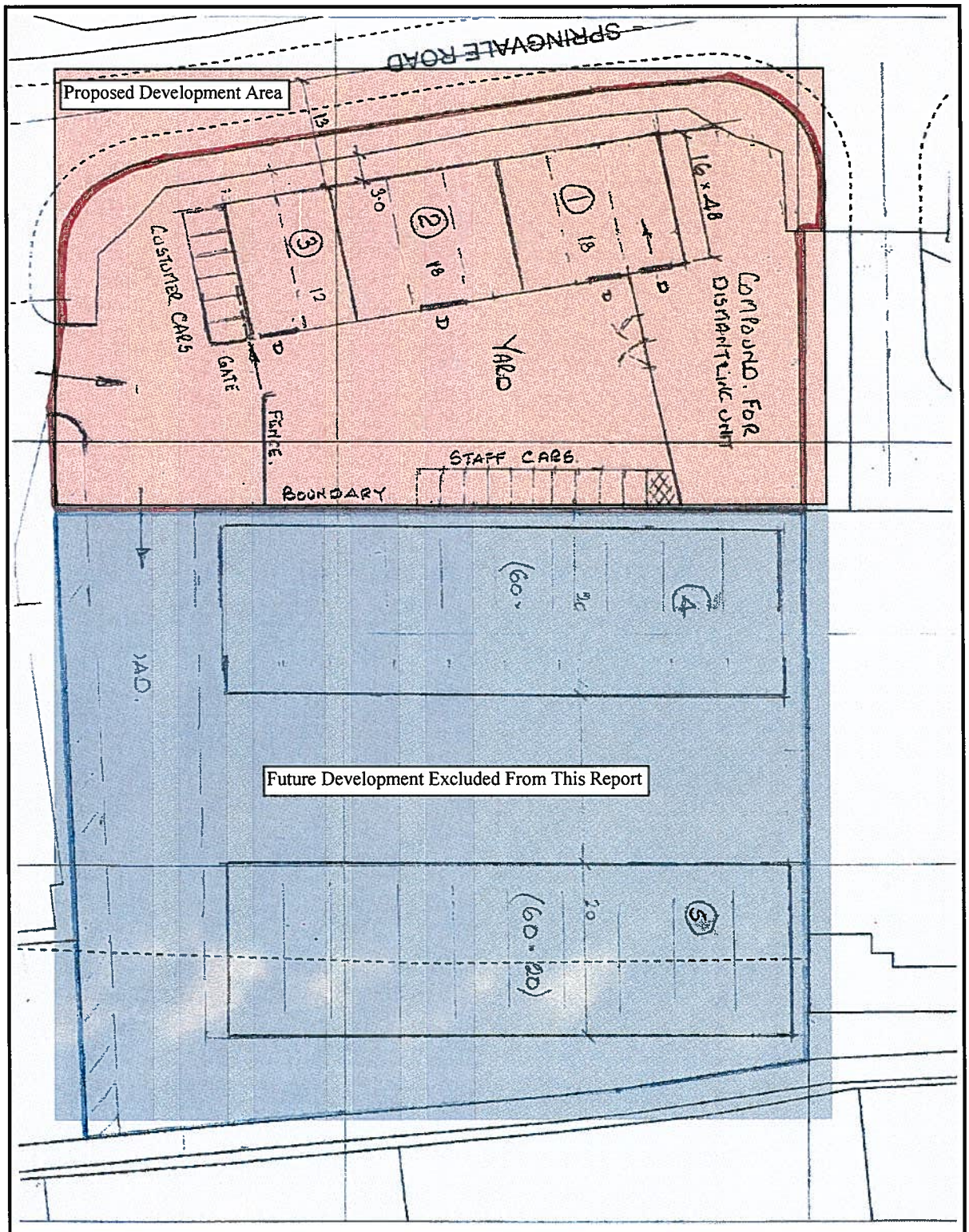
- An inspection of the site and surroundings;
- Daytime and night-time measurements of existing ambient background noise levels;
- Daytime measurements of any proposed activity/equipment noise;
- An assessment of noise break-out from the proposed industrial/commercial premises;
- Recommendation of an appropriate noise mitigation scheme, if necessary.

1.10 Noise levels referred to in this report, with exception of measurement results where deemed applicable, have been rounded to the nearest whole decibel (dB) as fractions of decibels are imperceptible.



*Plans Provided By The Client For Use Within This Report

Figure 1 - Site Location Plan	Report No. DYN021213_3A/1	Dynamic RESPONSE



*Plans Provided By The Client For Use Within This Report

Figure 2 - Site Layout Plan	Report No. DYN021213_3A/1	Dynamic RESPONSE

2.0 BACKGROUND NOISE LEVEL SURVEY

2.1 Measurements of the existing background noise climate were carried out at a position deemed representative of the nearest likely to be affected existing residential occupiers/noise receptors. The measurement position was adjacent to the boundary of the nearest accessible dwelling No. '38 Tudor Court'. As access to the rear elevations of the properties on 'Tudor Court' was not possible, measurements of the existing background climate were taken from a pedestrian right of way, directly South of No. '38 Tudor Court'. The public right of way actually extends up to the fence and rear side elevation of No. '38 Tudor Court'. Therefore, this measurement position was deemed representative of the most noise sensitive building façade of the nearest existing residential occupiers/noise receptors of 'Tudor Court'.

2.2 We understand that the proposed industrial/commercial premises are likely to operate during typical daytime hours only. However, the Local Authority has requested that measurement of the existing background noise climate be undertaken during both daytime and night-time periods representative of a worst case scenario. As previously mentioned, we understand that the Local Authority has requested that the following be undertaken;

'I would require 4 hours day time and 4 hours night time, I am not concerned when these are done as long as they are representative of the current back ground noise and the night time measurements are carried out between 23:00 and 7am.'

Therefore, background noise measurements were recorded during the daytime on Thursday 30th January 2014 between 09:00 – 13:00 hours, and during the night-time on Wednesday 29th/Thursday 30th January 2014 between 03:00 – 07:00 hours, showing compliance with the statement above.

2.3 The background noise levels were measured at a height of approximately 1.2m above ground level over 15 minute sample durations, and included octave band level analysis. The noise measurements were recorded using a Norsonic NOR-140 Type 1 Sound Level Meter (Serial No. 1403571). The calibration level of the meter was checked before and after the surveys with a Norsonic Type 1251 sound calibrator (Serial No. 31829) with no variation in level observed. The microphone had a wind shield fitted.

2.4 The weather conditions for both the daytime and night-time surveys were dry, cold and with a very light breeze. It was noted that during these measurements of background noise the dominant noise sources

appeared to be due to local and distant road traffic noise and noise emanating from other nearby commercial/industrial premises.

2.5 The results of the background noise survey are detailed in Appendix II and the lowest measured ambient $L_{A90(1\ hour)}$ noise level has been summarised in Table 1.

Table 1: Existing Ambient Noise Levels

Time (Hours)	Noise Levels, dB			Measurement Location
	L_{Aeq}	L_{A90}	L_{Amax}	
Daytime 11:00 – 12:00 Hours	43	39	71	Representative Of The Nearest Noise Sensitive Receivers Located At 'Tudor Court' @ Approximately 205m From The Nearest Proposed Building Facade
Night-Time 04:00 – 05:00 Hours	35	32	60	

2.6 The lowest measured ambient $L_{A90(1\ hour)}$ noise levels i.e. 39 dB daytime and 32 dB night-time as seen in Table 1, have been used as the reference noise level in our noise impact assessment.

3.0 INTERNAL NOISE BREAK-OUT AND RECOMMENDATIONS

3.1 In order to assess if the proposed industrial/commercial building envelope design is likely to control noise break-out to a suitable level, it is considered necessary to predict the resultant noise levels at the nearby residential occupiers/noise receptors based on the proposed building constructions accordingly.

3.2 We understand that the proposed building constructions are as follows;

- External Walls: Up to 2.4m height – Approximate; Twin leaf cavity wall comprising 100mm brick work, 50mm insulated air cavity and 100mm concrete block work. Concrete block assumed to be light weight i.e. 450 Kg/m^3 density, and insulation having a minimum 33Kg/m^3 density.
- External Walls: Above 2.4m height – Approximate; Steel cladding system comprising 0.6mm steel sheet, 40mm thick insulation and 0.6mm steel sheet.
- Roof: – Approximate; Steel cladding system comprising 0.6mm steel sheet, 40mm thick insulation and 0.6mm steel sheet.
- Main Access Door: Roller shutter door ; No Glazing in noise containment areas.

3.3 As the premises are proposing to relocate, we were able to visit the existing business in order to measure any noise produced internally during typical manufacturing, chassis dynamometer operating and vehicular dismantling.

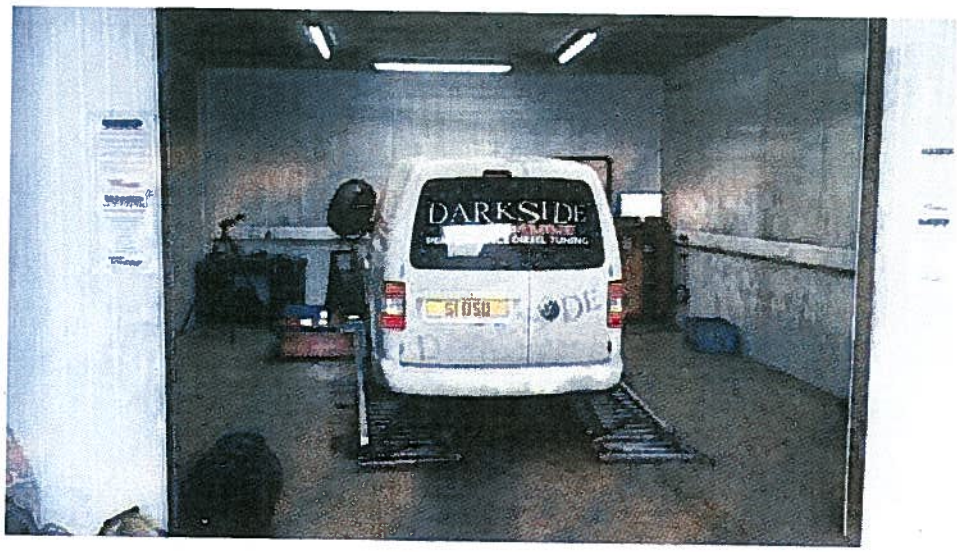
3.4 The noise measurements recorded inside the main 'Darkside Developments' building were undertaken whilst vehicle repairs, general fabrication and small scale product development activities were occurring. The sound level meter was left recording at a height of approximately 1.2m above ground level for a duration of 2 hours to assess the likely to be generated internal noise levels. Staff stated that the activities observed were generally representative of a typical day to day occurrence. Similarly, the noise levels were monitored in the salvage/dismantling unit during typical activities. Unfortunately, the work load was limited on the day of our survey and a shorter noise survey was carried out. The activities observed included movement/cataloguing of components and dismantling of large items using battery and air operated impact guns. We were informed that the stripping of car parts using impact guns is considered to be the loudest operation occurring in the dismantling yard, and it is not uncommon for this level of noise to continue for complete 1 hour durations.

3.5 Whilst the process of manufacturing in terms of fabrication, and hand stripping of car parts is relatively common in industrial/commercial areas, and is considered self explanatory, operation of a chassis dynamometer is less common. A chassis dynamometer is used to measure the power output of an engine

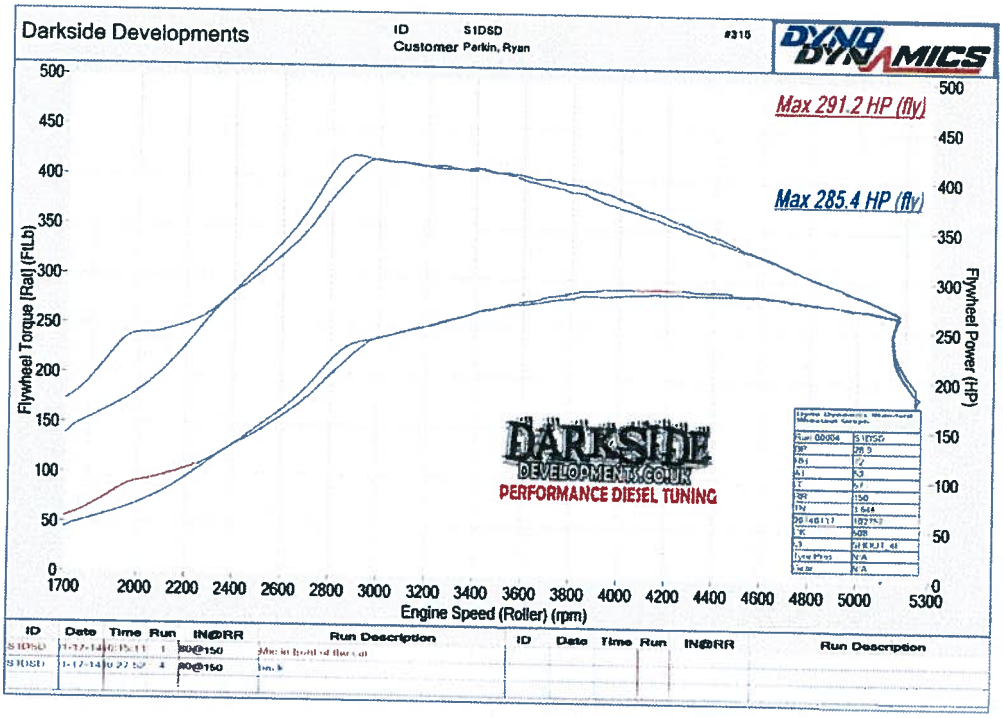
and is also known as a rolling road. A vehicle is driven onto rollers where the car is then secured to the machine and literally operated at maximum power output for a short duration of time, typically between 20 seconds to 60 seconds depending on the vehicle. A computer interface then produces a power output specification in terms of torque etc., to be given to a customer or used as a starting point for performance tuning. We further understand that in any typical working hour, a maximum of 6 no. rolling road power runs will be undertaken i.e. 1 no. every 10 minutes. Images 3 to 5 show the proposed chassis dynamometer, a typical vehicle attached to the chassis dynamometer and the resultant power output.



IMG-3 Chassis Dynamometer Setup



IMG-4 Vehicle Loaded To Chassis Dynamometer



IMG-5 Typical Computer Generated Power Output Specification

3.6 During our noise survey, with the exception of one vehicle, 2 no. power runs were undertaken whilst we measured the resultant noise level at the front and rear of the chassis dynamometer cell. In order to demonstrate a worst case scenario, 4 vehicles were tested all of a different age and with various modifications. The vehicles and details of the modifications can be seen below;

- Test Vehicle 1 – Vw Caddy Van (2005) – Darkside Development Owned Highly Modified Vehicle

2.0 16v BKD PD140 engine conversion, Darkside Developments turbo kit with tubular stainless manifold and 3" downpipe, gtb2260vklr ball bearing water cooled turbocharger, Audi S3 intercooler with alloy end tanks, alloy intercooler pipework kit, bkd airbox, maf sensor and tip, egr delete race pipe (shortened), egr cooler delete, 4 bar map sensor, 2.5" mandrel bent exhaust system with discreet tip, re-map with maf and egr delete.

- Test Vehicle 2 – Rover 75 Estate (2004) – Lightly Modified Vehicle

2.0 Turbo Diesel, exhaust de-cat pipe and re-map.

- Test Vehicle 3 – Vw Golf Estate (Approx. 1999)

1.9 Turbo Diesel, Miltek style modified exhaust, larger turbocharger, larger injectors, modified intake system and re-map.

- Test Vehicle 4 – Vw Polo (Approx. 2011)

1.6 Turbo Diesel, dpf delete and re-map

3.7 The results of our various internal noise surveys can be seen in Table 2.

Table 2: Internal Noise Levels – Task Specific

Description	Sound Pressure Level (dB_{Leq}) @ Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
'Darkside Developments' Building 1 Main Manufacturing/Repair Area Internally Generated Noise Produced During Typical Manufacturing/Fabricating Activities And Vehicle Modifications Welding, Grinding, Impact Guns, Sanding, Hammering, Band Saw Cutting, Vehicle Lifts Etc. 5 Minute Samples 2 hour Total Sample Duration	69	63	62	64	63	62	62	56	69
	68	66	63	69	66	69	68	68	75
	70	65	62	65	63	63	62	56	69
	69	63	58	63	62	65	65	61	71
	68	64	61	66	70	74	78	77	82
	68	63	58	64	66	68	67	61	73
	71	61	62	65	63	69	72	77	79
	68	66	61	62	65	67	71	78	79
	70	66	62	64	67	69	74	79	81
	74	65	61	63	63	64	69	75	76
	70	61	56	56	55	55	49	43	61
	69	63	57	56	55	54	49	43	60
	71	64	61	62	60	60	60	55	67
	70	65	61	65	65	69	69	67	75
	65	66	63	67	61	57	54	49	67
	69	68	68	70	69	69	71	77	79
	70	68	72	74	73	74	75	79	82
	66	69	66	70	69	72	72	71	78
	70	70	67	68	69	71	71	71	77
	66	68	63	62	62	61	63	70	72
	68	65	67	69	70	72	71	67	78
	68	64	59	59	60	64	66	70	73
	70	65	60	64	63	64	66	65	72

	69	66	65	71	68	65	68	74	76
'Darkside Developments' Building 2 Chassis Dynamometer Cell Inside Rolling Road With Wind Fans Operating Only 1 Minute Samples In Between power runs	76	76	84	79	79	76	72	64	84
	65	76	83	78	79	74	70	64	83
	66	76	84	77	80	75	71	65	83
	66	74	84	77	81	78	74	67	85
	65	74	83	77	79	75	70	64	83
Power Run Vw Caddy Van Measurement Position Near Bonnet Front Of Rolling Road	85	95	102	99	105	104	101	97	110
	86	106	105	103	106	106	103	99	111
Power Run Vw Caddy Van Measurement Position Near Exhaust Rear Of Rolling Road	84	104	103	101	104	102	100	96	108
	86	99	104	102	105	103	101	98	110
Power Run Rover 75 Estate Measurement Position Near Bonnet Front Of Rolling Road	81	88	88	89	94	97	94	91	101
	81	88	88	89	95	97	94	91	101
Power Run Rover 75 Estate Measurement Position Near Exhaust Rear Of Rolling Road	87	84	86	86	92	94	91	87	98
	87	84	85	86	91	93	90	86	98
Power Run Vw Golf Estate Measurement Position Near Bonnet Front Of Rolling Road	75	89	91	93	98	100	97	90	105
	75	90	92	93	98	100	97	89	105
Power Run Vw Golf Estate Measurement Position Near Exhaust Rear Of Rolling Road	77	87	88	91	96	98	95	88	102
	76	87	88	90	96	98	95	88	102
Power Run Vw Polo Hatchback Measurement Position Near Bonnet Front Of Rolling Road	78	89	91	94	100	102	96	88	106
	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
Power Run Vw Polo Hatchback Measurement Position Near Exhaust Rear Of Rolling Road	77	82	86	88	94	96	90	83	100
	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
'Darkside Developments' Building 3 Salvage/Dismantling Operations Internally Generated Noise Produced During Typical Hand Stripping First Three Readings, Hand Operations	57	59	54	55	54	52	49	42	59
	57	58	51	53	51	51	46	37	57
	57	60	53	53	52	54	47	37	59
	65	70	81	78	76	78	78	75	84
	66	68	78	78	76	77	76	74	83

Only. Second Three Readings Including Impact Guns/Socket Impact Drivers 5 Minute Samples 30 Minute Total Sample Duration	64	69	82	81	76	67	67	71	82

3.8 In order to represent a worst case scenario regarding internally generated noise, we have considered the highest average 15 minute noise level produced from inside the main manufacturing area and assumed that this level may continue constantly over a 1 hour or indefinite period. Similarly, as seen In Table 2, the highest noise levels produced during the chassis dynamometer power run was that of the Vw Caddy van, and the highest constant noise level believed to occur frequently in the dismantling unit, the impact guns. This results in a worst-case frequency spectra and overall noise level in each proposed area/unit to be as seen in Table 3.

Table 3: Proposed Noise Assessment Internal Noise Levels

Description	**Sound Pressure Level (dB_{Leq}) @ Octave Band Centre Frequency (Hz)**								**dB(A)**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
Noise In Proposed Unit 1 Salvage (Worst-case)	65	70	81	78	76	78	78	75	84
Noise In Proposed Unit 2 Manufacturing/Repair (Worst-case)	69	68	69	72	71	72	73	77	80
Noise In Proposed Unit 3 Chassis Dynamometer (Worst-case)	86	106	105	103	106	106	103	99	111

3.9 From correspondence with the client, we understand that as a worst-case scenario the maximum amount of power runs undertaken on the chassis dynamometer would be 6 no. in any 1 hour period. Therefore, the equivalent continuous noise level can be corrected over a 1 hour period using specific noise on/off corrections as per BS4142, which results in a correction value of -10.

3.10 Based on the measured/calculated internal noise levels, assuming any holes/gaps in the proposed constructions are completed sealed/made good, and external doors remain closed, we have predicted the resultant noise levels, based on the facades directly facing the nearest residential properties, to the East of the proposed development site to be as seen in Table 4. The acoustic performance of the various building elements have been calculated using a software package called 'Insul' which is usually accurate to within +/- 3 dB.

Table 4 Predicted Resultant Noise Levels

Measurement Location / Noise Receptor	dB(A)
Noise Break-out From Proposed Unit 1 Nearest Residential Occupants/Noise Receptors At 'Tudor Court' @ Approximately 205m	25 (1 hour)
Noise Break-out From Proposed Unit 2 Nearest Residential Occupants/Noise Receptors At 'Tudor Court' @ Approximately 205m	18 (1 hour)
Noise Break-out From Proposed Unit 3 Nearest Residential Occupants/Noise Receptors At 'Tudor Court' @ Approximately 205m	40 (1 hour)

3.11 As multiples of noise source increase the resultant noise level at a receiving point, it is considered to use decibel addition to produce a combined noise level at approximately 205m. The calculated combined noise level can be seen in Table 5.

Table 5: Combined Noise Levels

Measurement Location / Noise Receptor	Combined Noise Level dB(A)
Nearest Residential Occupants/Noise Receptors At 'Tudor Court' @ Approximately 205m	40

3.12 Therefore, without any further assessment, it is clear that the chassis dynamometer will need further noise mitigation design advice in order to reduce the resultant noise levels to a suitable level. From a discussion with the client, we understand that a 'Kingspan' type insulation panel comprising approximately 0.5mm steel sheet, 150mm insulation (40 Kg/m3 density) and a second layer of 0.5mm steel sheet has been used at the existing site, albeit not yet complete. If this approach is considered it will reduce the resultant noise levels. However, our predictions indicate that it may not reduce the resultant noise levels enough at the proposed site. Therefore, we would initially recommend a more traditionally constructed booth be constructed measuring 8.0 x 6.0 x 3.0m comprising;

- A single thickness 100mm solid concrete block work wall (minimum 1250 Kg/m^3 density i.e. medium weight). Roof constructed using 100mm timber battens sealed from above using 18mm OSB particle board or plywood. Install a minimum 100mm thickness of insulation between the joists having a minimum 33Kg/m^3 density and finish below with 1 no. layer of 15mm thick 'British Gypsum Soundbloc plasterboard' with taped/sealed joints, and a plaster skim. Suitable acoustic entrance doors to be installed at the vehicle entrance point to the booth in connection with an agreed specification by us, when finalised details are known.

3.13 Considering the proposed specification for the chassis dynamometer booth, we have predicted a combined noise level as seen in Table 6.

Table 6: Combined Noise Levels

Measurement Location / Noise Receptor	Combined Noise Level dB(A)
Nearest Residential Occupants/Noise Receptors At 'Tudor Court' @ Approximately 205m	27

4.0 NOISE ASSESSMENT(S)

4.1 As previously mentioned, we understand that any noise assessment at the proposed site must be in accordance with British Standard 4142: 1997, 'Method for Rating industrial noise affecting mixed residential and industrial areas', World Health Organisation 'WHO' Guidelines for community noise and BS8233 (1999) Sound insulation and noise reduction for buildings.

4.2 With regard to the 35 dB L_{Aeq} internal noise level during the daytime and 30 dB L_{Aeq} internal noise level during the night-time inside nearby residential dwellings in accordance with World Health Organisation 'WHO' Guidelines for community noise and BS8233 (1999) Sound insulation and noise reduction for buildings, the predicted resultant noise levels should be considerably below the limit values calculated in Section 1.7.

4.3 BS 4142 requires the noise from the equipment (in L_{Aeq}) to be compared with the background noise level (L_{A90}) in the absence of any machine noise. A correction to obtain the 'Specific Noise Level' is sometimes necessary along with a 5 dB 'acoustic feature' penalty, which is added for any machinery that gives rise to sudden peaks of noise or discreet tones to obtain the 'Rating Level'.

4.4 British Standard 4142 states that if the rated noise level exceeds the L_{A90} background noise level by 10 dB or more, then complaints would be likely, an excess of around 5 dB over the background noise level is viewed as being 'of marginal significance', and a noise rating level of 10 dB below the background noise is a positive indication that complaints will be unlikely.

4.5 We further understand that the Local Authority involved has stated that the noise impact at the nearest residential occupiers/noise receptors, should not exceed the existing background noise level, and if the noise is considered tonal, then any noise should be -5 dB below the existing background noise level. In addition, the 'Acoustic penalty' should be added where necessary. Our BS4142 assessment can be seen in Table 7. From a conversation with the client, all activities at the proposed site are expected to operate strictly during daytime hours i.e. commencing at 07:00 hours and lasting until a client advised 21:00 hours. In the event that for whatever reason any activity was to occur during the night-time period, it would include the dynamometer only, and not salvage or development/fabrication activities meaning the resultant noise impact would be as follows.

Table 7: Assessment to British Standard 4142: 1997

What/Where	Specific Noise Level L_{Aeq}	Correction(s)	Rating Level	Background Noise Level $L_{A90(15\ minute)}$	Excess Of Rating Level Over Background Noise Level
At 'Tudor Court' Daytime	27 dB	AF +5 SNC 0	32 dB	39 dB	-7
At 'Tudor Court' Night-time	13 dB	AF +5 SNC 0	18 dB	32 dB	- 14

***AF = Acoustic Feature Correction, SNC = Specific Noise Correction**

4.6 Therefore, the predicted/calculated daytime and night-time rating noise level of 32 and 18 dB, should fall under the category that complaints would be less than 'of marginal significance', in accordance with BS 4142. In addition, provided the recommendations/noise mitigation measures in this report are carried out, the amended Local Authority noise criteria design limit that of an excess of rating over background level of 0 dB and -5 dB, should also be met.

4.7 In addition to the predicted resultant noise break-out via the proposed building envelope design, we understand that an extraction system will be installed in the future in order to remove/ventilate the proposed chassis dynamometer booth. It has been suggested that the extractor may be that of a 'Sodeca CMR-1135-2T' fan unit. However, as the proposed mounting location and duct entry/termination points etc., are not yet know, it is deemed more appropriate to provide a noise emission target value which can be given to the extraction system equipment suppliers/manufacturers.

4.8 It should be remembered that multiples of noise levels increase the resultant noise level at a receiving point. Therefore, in order to comply with the excess of rating above background noise level requirements detailed previously, the noise level of any extraction equipment when predicted/calculated to the nearest residential occupiers/noise receptors should be no more than the levels outlined in Table 8.

Table 8: Extraction Noise Emission Limit Criteria

Location	Maximum Noise Level
'Tudor Court' Residences @ Approx. 205m Distance	20 dB

5.0 SUMMARY AND CONCLUSIONS

5.1 Dynamic Response has carried out a noise impact assessment for 'AC Environment Solutions Ltd C/o BMBC Inward Investment Team' on behalf of 'RSP Properties' based on proposals to relocate their 'Darkside Developments' existing premises at 'Bromcliffe Park, Burton Road, Monk Bretton, Barnsley, South Yorkshire, S71 5RN' to proposed new build premises at 'Springvale Road, Park Springs, Grimethorpe, Barnsley, S72 7BA', in connection with a planning application.

5.2 This has involved carrying out a background noise survey representative of the existing residential occupiers/noise receptors to the East of the proposed development, the calculation of resultant noise levels due to noise break-out which could be likely to affect nearby residents, and an assessment of the noise impact in accordance with British Standard 4142: 1997, 'Method for Rating industrial noise affecting mixed residential and industrial areas', World Health Organisation 'WHO' Guidelines for community noise and BS8233 (1999) 'Sound insulation and noise reduction for buildings'.

5.3 Based on our understanding of the supplied information and the noise levels recorded during our noise survey, our noise impact assessment demonstrates that provided any recommendations/noise mitigation measures in this report are implemented, the predicted/calculated daytime rating noise levels, should fall under the category that complaints would be less than 'of marginal significance', in accordance with BS 4142 and noise should not exceed the specified World Health Organisation 'WHO' Guidelines for community noise and BS8233 (1999) 'Sound insulation and noise reduction for buildings' criteria. Furthermore, the Local Authority noise criteria design limit should also be met in relation to a 0 dB amd -5 dB excess of rating above existing background noise level.

5.4 At this stage, a maximum noise emission target has been created in relation to future proposed extraction system equipment as the final positioning and ducting requirements etc. are not known. In addition, specialist acoustic doors have been recommended in our noise mitigation specification, which should our mitigation scheme be implemented, any acoustic door specification will need to be agreed with us prior to installation to ensure the required acoustic performance is achieved based on an accepted door type.

5.5 If any equipment/activity or position/arrangement of any equipment/activity, building constructions and/or structures alter for whatever reason, the noise impact at the nearest nearby residential property should be re-assessed accordingly. Any recommendations in this report have been given for acoustical reasons only. Therefore if relevant, any other requirements, for example structural, fire or otherwise, should be checked by the relevant professional.

APPENDIX I – NOISE UNITS AND INDICES

dB

The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. When measuring sound (or noise) levels, it usually ranges from 0 dB (the threshold of hearing) to 140 dB (the threshold of pain).

dB(A)

Are decibels measured using a sound level meter using a frequency rating which relates sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) generally agree with peoples assessment of loudness.

Hz

Is a unit of frequency which is equal to one cycle per second. The frequency is related to the pitch of a sound.

L_{Aeq}

This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period.

L_{Amax}

This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10}

Is the A-weighted noise level exceeded for 10% of the measurement duration (T).

L_{A90}

Is the A-weighted noise level exceeded for 90% of the measurement duration (T) and is generally used to define the background noise level.

SEL

This is the 'sound exposure level' of a single event (such as a passing train) and is the L_{Aeq} value of the whole event normalised to a 1 second period level of a sound.

APPENDIX II – RESULTS OF NOISE SURVEYS

Dates: Wednesday 29th/Thursday 30th January 2014 (Background Noise Survey)
Friday 17th January 2014 (Existing Premises Noise Survey)

Equipment: NOR-140 Type 1 Sound Level Meter (Serial No. 1403571)

Weather: Dry, Cold And With A Very Light Breeze

Measurement Location(s): See Below

Table A1: Background Noise Levels Night-time

Location	Time	L_{Aeq}	L_{Amax}	L_{A90}	Comments
Representative Of The Nearest Noise Sensitive Receivers Located At 'Tudor Court' @ Approximately 205m From The Nearest Proposed Building Facade	03:00 - 03:15	34.8	51.9	31.5	Dominant Noise Sources Appeared To Be Due To Local And Distant Road Traffic Noise And Noise Emanating From Other Nearby Commercial/Industrial Premises. Some Bird Song Audible During Early Hours And Occasional Aircraft Passes
	03:15 - 03:30	35.0	54.7	30.5	
	03:30 - 03:45	38.2	54.7	32.3	
	03:45 - 04:00	45.3	63.2	32.6	
	04:00 - 04:15	34.5	59.5	31.0	
	04:15 - 04:30	34.0	56.1	31.2	
	04:30 - 04:45	35.0	53.5	31.9	
	04:45 - 05:00	35.2	56.1	32.4	
	05:00 - 05:15	36.3	59.8	32.7	
	05:15 - 05:30	56.6	83.6	34.3	
	05:30 - 05:45	38.0	69.0	34.6	
	05:45 - 06:00	37.3	55.6	34.2	
	06:00 - 06:15	38.7	54.9	36.0	
	06:15 - 06:30	38.7	62.3	35.9	
	06:30 - 06:45	38.6	58.6	35.6	
	06:45 - 07:00	38.5	68.3	35.5	

Table A2: Background Noise Levels Daytime

Location	Time	L_{Aeq}	L_{Amax}	L_{A90}	Comments
Representative Of The Nearest Noise Sensitive Receivers Located At 'Tudor Court' @ Approximately 205m From The Nearest Proposed Building Facade	09:00 - 09:15	42.7	59.0	40.2	Dominant Noise Sources Appeared To Be Due To Local And Distant Road Traffic Noise And Noise Emanating From Other Nearby Commercial/Industrial Premises. Some Bird Song Audible During Early Hours And Occasional Aircraft Passes
	09:15 - 09:30	42.9	60.2	40.8	
	09:30 - 09:45	42.3	53.6	40.7	
	09:45 - 10:00	42.4	54.0	40.9	
	10:00 - 10:15	42.6	59.5	40.5	
	10:15 - 10:30	43.2	63.2	41.2	
	10:30 - 10:45	42.9	58.1	41.0	
	10:45 - 11:00	44.8	62.3	40.9	
	11:00 - 11:15	44.2	61.1	39.5	
	11:15 - 11:30	41.5	64.6	39.3	
	11:30 - 11:45	41.7	60.2	39.6	
	11:45 - 12:00	43.2	70.8	39.5	
	12:00 - 12:15	43.7	57.1	41.4	
	12:15 - 12:30	47.4	71.2	42.0	
	12:30 - 12:45	45.3	61.8	41.9	
	12:45 - 13:00	45.2	60.5	42.1	

APPENDIX III – CALCULATION(S)

Project Number	021213_3A
Description	Darkside Developments, Springvale Road - Unit 1 Salvage

Noise Break-out Spreadsheet

Dynamic RESPONSE

	63	125	250	500	1k	2k	4k	8k	A	Element details
SPL_{int}	65	70	81	78	76	78	78	75		
Wall										
SPL_{int}	65	70	81	78	76	78	78	75	84	→ Composite Darkside
Element *SRI*	13	17	22	26	26	28	43	44		
Area (S) = 108	20	20	20	20	20	20	20	20		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	12	13	19	12	10	10	-5	-9	16	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
Roof										
SPL_{int}	65	70	81	78	76	78	78	75	84	→ Darkside 0.6mm Steel, 40mm Insulation, 0.6mm Steel
Element *SRI*	11	15	20	24	24	26	41	42		
Area (S) = 288	25	25	25	25	25	25	25	25		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	15	16	22	15	13	13	-2	-6	20	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 17$
Door	Is door lobbied?	No								
SPL_{int}	65	70	81	78	76	78	78	75	84	
Element *SRI*	9	12	13	14	16	18	24	26		→ Hollow, cracks, poor
Area (S) = 45	17	17	17	17	17	17	17	17		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		→ No Lobby $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
Lobby absorption (A) =										
At receiver	12	14	24	20	16	16	10	5	23	→ ~~Lobby~~ $= SPL_{int} - 2 \times SRI + 20\log S - 20\log(r) - 14 - 10\log(A)$
Glazing										
SPL_{int}	65	70	81	78	76	78	78	75	84	
Element *SRI*	200	200	200	200	200	200	200	200		→ No windows or glazing
Area (S) = 0	-200	-200	-200	-200	-200	-200	-200	-200		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	-395	-390	-379	-382	-384	-382	-382	-385	-376	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$

Overall Results

	63	125	250	500	1k	2k	4k	8k	A
Resulting	18	20	27	22	19	19	11	6	25

Project Number	021213_3A
Description	Darkside Developments, Springvale Road - Unit 2 Manufacturing

Noise Break-out Spreadsheet

Dynamic RESPONSE

	63	125	250	500	1k	2k	4k	8k	A	Element details
SPL_{int}	69	68	69	72	71	72	73	77		
Wall										
SPL_{int}	69	68	69	72	71	72	73	77	80	
Element SRI	13	17	22	26	26	28	43	44	→	Composite Darkside
Area (S) = 108	20	20	20	20	20	20	20	20		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	16	11	7	6	5	4	-10	-7	10	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
Roof										
SPL_{int}	69	68	69	72	71	72	73	77	80	
Element SRI	11	15	20	24	24	26	41	42	→	Darkside 0.6mm Steel, 40mm Insulation, 0.6mm Steel
Area (S) = 288	25	25	25	25	25	25	25	25		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	19	14	10	9	8	7	-7	-4	13	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 17$
Door	Is door lobbied?	No								
SPL_{int}	69	68	69	72	71	72	73	77	80	
Element SRI	9	12	13	14	16	18	24	26	→	Hollow, cracks, poor
Area (S) = 22.5	14	14	14	14	14	14	14	14		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
Lobby absorption (A) =										
At receiver	13	9	9	11	8	7	2	4	14	→ No Lobby: $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
										~~Lobby~~: $= SPL_{int} - 2 \times SRI + 20\log S - 20\log(r) - 14 - 10\log(A)$
Glazing										
SPL_{int}	69	68	69	72	71	72	73	77	80	
Element SRI	200	200	200	200	200	200	200	200	→	No windows or glazing
Area (S) = 0	-200	-200	-200	-200	-200	-200	-200	-200		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	-391	-392	-391	-388	-389	-388	-387	-383	-380	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$

Overall Results

	63	125	250	500	1k	2k	4k	8k	A
Resulting	22	17	14	14	12	11	3	5	18

Project Number	021213_3A
Description	Darkside Developments, Springvale Road - Unit 3 Dynamometer

Noise Break-out Spreadsheet

	63	125	250	500	1k	2k	4k	8k	A	Element details
SPL int	86	106	105	103	106	106	103	99		
Wall										
SPL int	86	106	105	103	106	106	103	99	111	
Element *SRI*	13	17	22	26	26	28	43	44	→	Composite Darkside
Area (*S*) = 72	19	19	19	19	19	19	19	19		
Distance (*r*) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	31	47	41	35	38	36	18	13	42	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
Roof										
SPL int	86	106	105	103	106	106	103	99	111	
Element *SRI*	11	15	20	24	24	26	41	42	→	Darkside 0.6mm Steel, 40mm Insulation, 0.6mm Steel
Area (*S*) = 192	23	23	23	23	23	23	23	23		
Distance (*r*) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	35	51	45	39	42	40	22	17	46	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 17$
Door	Is door lobbied?	No								
SPL int	86	106	105	103	106	106	103	99	111	
Element *SRI*	9	12	13	14	16	18	24	26	→	Hollow, cracks, poor
Area (*S*) = 22.5	14	14	14	14	14	14	14	14		
Distance (*r*) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
Lobby absorption (*A*) =										→ No Lobby $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
At receiver	30	47	45	42	43	41	32	26	47	→ ~~Lobby~~ $= SPL_{int} - 2\times SRI + 20\log S - 20\log(r) - 14 - 10\log(A)$
Glazing										
SPL int	86	106	105	103	106	106	103	99	111	
Element *SRI*	200	200	200	200	200	200	200	200	→	No windows or glazing
Area (*S*) = 0	-200	-200	-200	-200	-200	-200	-200	-200		
Distance (*r*) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	-374	-354	-355	-357	-354	-354	-357	-361	-349	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$

Overall Results

	63	125	250	500	1k	2k	4k	8k	A
Resulting	37	53	49	44	46	44	33	27	50

Project Number	021213_3A
Description	Darkside Developments, Springvale Road - Unit 3 Dynamometer

Noise Break-out Spreadsheet

Dynamic RESPONSE

	63	125	250	500	1k	2k	4k	8k	A	Element details
SPL_{int}	71	83	81	73	69	67	56	51		
Wall										
SPL_{int}	71	83	81	73	69	67	56	51	77	
Element *SRI*	13	17	22	26	26	28	43	44		→ Composite Darkside
Area (S) = 72	19	19	19	19	19	19	19	19		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	16	24	18	6	1	-3	-29	-35	12	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
Roof										
SPL_{int}	71	83	81	73	69	67	56	51	77	
Element *SRI*	11	15	20	24	24	26	41	42		→ Darkside 0.6mm Steel, 40mm Insulation, 0.6mm Steel
Area (S) = 192	23	23	23	23	23	23	23	23		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	20	27	21	9	4	0	-26	-32	16	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 17$
Door	Is door lobbied?	No								
SPL_{int}	71	83	81	73	69	67	56	51	77	
Element *SRI*	9	12	13	14	16	18	24	26		→ Hollow, cracks, poor
Area (S) = 22.5	14	14	14	14	14	14	14	14		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		→ No Lobby $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$
Lobby absorption (A) =										
At receiver	15	24	22	13	6	2	-15	-22	16	→ ~~Lobby~~ $= SPL_{int} - 2 \times SRI + 20\log S - 20\log(r) - 14 - 10\log(A)$
Glazing										
SPL_{int}	71	83	81	73	69	67	56	51	77	
Element *SRI*	200	200	200	200	200	200	200	200		→ No windows or glazing
Area (S) = 0	-200	-200	-200	-200	-200	-200	-200	-200		
Distance (r) = 205	-46	-46	-46	-46	-46	-46	-46	-46		
At receiver	-389	-378	-379	-387	-392	-394	-404	-409	-384	→ $= SPL_{int} - SRI + 10\log S - 20\log(r) - 14$

Overall Results

	63	125	250	500	1k	2k	4k	8k	A
Resulting	22	30	25	15	9	5	-14	-21	20