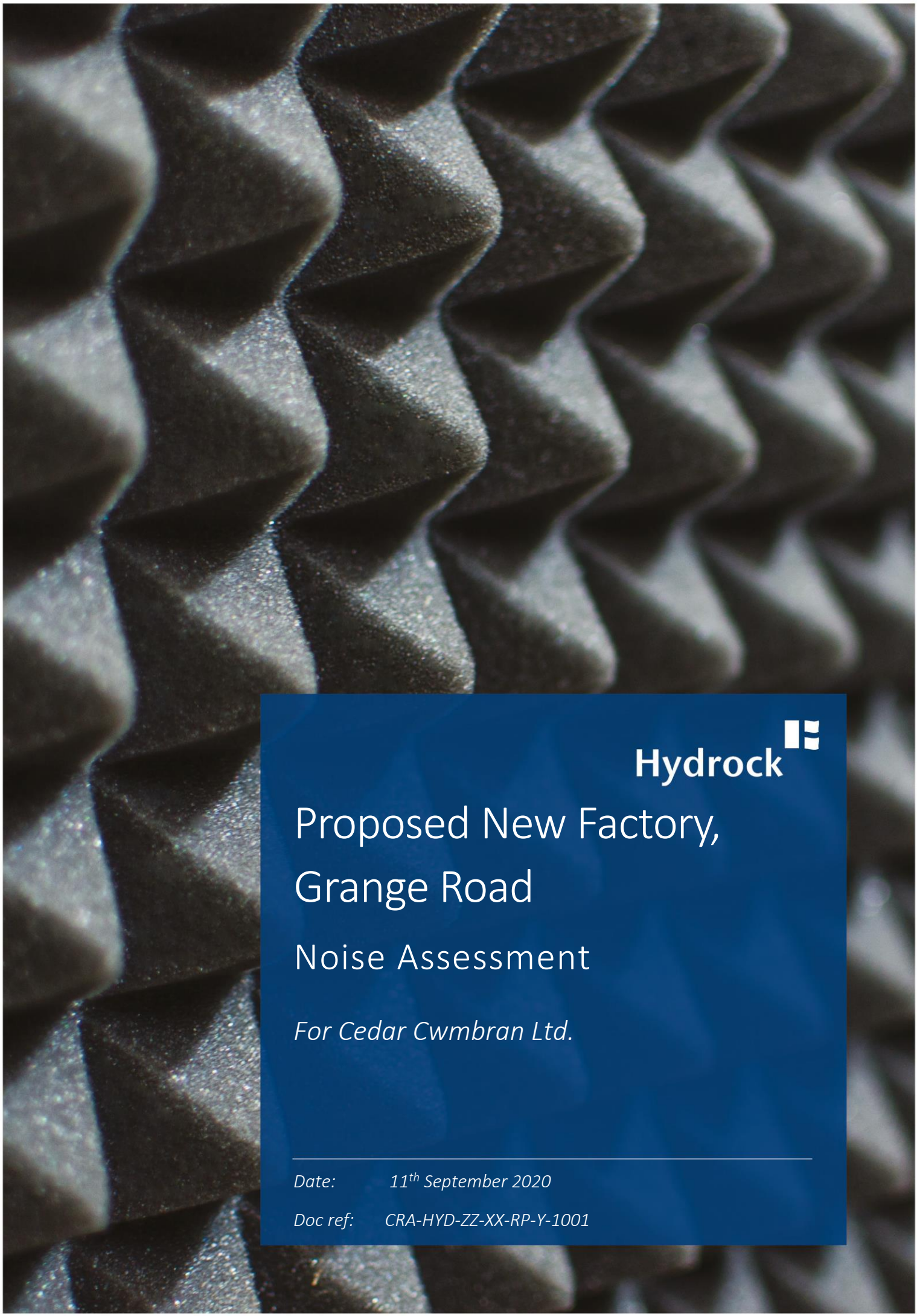

Hydrock

Proposed New Factory, Grange Road

Noise Assessment

For Cedar Cwmbran Ltd.

Date: *11th September 2020*

Doc ref: *CRA-HYD-ZZ-XX-RP-Y-1001*

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1. INTRODUCTION

Hydrock Consultants has been appointed to provide acoustic consultancy services in relation to the proposed development at Grange Road, Cwmbran. Crane Flow Technologies propose to move their existing facility to the adjacent plot immediately to the south.

Background noise levels have been measured on site and at the closest housing to the west over the period 28th August to 3rd September 2020. Source noise levels within and around the existing Crane Flow Technologies' facility were measured on the 1st September 2020.

This report presents an assessment of noise from the proposed facility and the impact at the closest housing. The assessment follows the guidance contained within BS4242:2014+a11:2019 *"Methods for rating and assessing industrial and commercial sound"*.

2. PLANNING POLICY

2.1 Planning Policy Wales, 2018

Planning Policy Wales (PPW), Edition 10, December 2018, sets out the land use planning policies of the Welsh Government.

The primary objective of which is to *"ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales."*

PPW provides the following guidance with regards to noise:

"6.7.12 Planning authorities must consider current and future sources of air and noise pollution as part of developing their strategies for locating new development. The pattern of proposed development should be informed by the sensitivity of, and compatibility of, uses in relation to the sources of airborne pollution and the importance of ensuring appropriate soundscapes. Green infrastructure provision will be an important means of addressing the cumulative impacts of air and noise pollution and soundscapes on individuals and society and provide benefits for social and ecosystems resilience.

6.7.13 When developing strategies, proposing or assessing development proposals it will be essential to understand the implications of the transport demand associated with the proposal and the effect this may have now and in the foreseeable future. When proposing to introduce a development activity into an area the impacts which existing pollution sources (including roads, railways and industrial or commercial operations) have in terms of air and noise pollution should be carefully considered, particularly taking into account any increases in pollution levels which may be reasonably expected in the foreseeable future as a result of increased transport activity.

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission."

2.2 Local Policy

The Local Planning Authority is Torfaen County Borough Council. The Local Development Plan (LDP) was adopted 3rd December 2013. Noise from general developments is covered under Policy BW 1, as follows:

"All development proposals will be considered favourably providing they comply with the following criteria where:-"…"The proposal does not result in unacceptable adverse effects in respect of land contamination, instability or subsidence; air, heat, noise or light pollution; landfill gas; water pollution; or flooding, from or to the proposal"

3. GUIDANCE DOCUMENTS

3.1 British Standard 4142:2014+A1:2019

The standard method for assessing the noise impact from industrial activity in the UK is British Standard BS4242:2014+a11:2019 *"Methods for rating and assessing industrial and commercial sound"*.

A BS4142 assessment is made by determining the difference between the industrial noise under consideration (known as "the specific sound") and the background sound at the receptor.

The Background Sound Level is the sound level in the absence of the specific noise, measured in terms of the "L_{A90}" parameter. The "L_{A90}" parameter is the noise level which excludes the loudest 90% of the measurement time period. Therefore, it represents the underlying continuous noise level. Background sound measurements should normally be at least 15-minutes in duration. BS4142:2014 requires the assessment be based on the typical pre-existing Background Sound Level the receptor. Therefore, it is normally appropriate to do multiple background sound measurements and carry out some statistical analysis to determine the typical level for the period the noise source will be in operation.

The specific sound is assessed in terms of the "L_{Aeq}" parameter at the receptor. The "L_{Aeq}" represents the total sound energy over the assessment time period. The assessment time period should be 1 hour during the day and 15-minutes at night.

A character correction can then be applied to the Specific Noise Level to account for tonal, impulsive, intermittent, or other characteristics that may make the industrial sound more readily distinctive in the context of the existing noise climate. The Specific Noise Level (L_{Aeq}), with the character correction (if necessary), is known as the Rating Level (L_{Ar}). The standard then gives the following criteria for assessment based on the difference between the background sound level (L_{A90}) and the rating level (L_{Ar}):

"a) Typically, the greater this difference the greater the magnitude of the impact.

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

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

The standard highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact. For example, it is relevant for this development that industrial noise from the existing factory is already part of the existing noise climate.

It is also noted that in some circumstances it may be appropriate to consider the absolute sound levels in the context of other guidance, for example guidance relating to sleep disturbance from BS8233:2014 and WHO Guidelines[1]:

"*For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

[1] World Health Organisation (WHO) "Guidelines for Community Noise", Berglund et. al., 1999

Where the background sound levels and rating level are low, absolute levels might be as, or more, relevant than margin by which the rating level exceeds the background. This is especially true at night."

3.2 British Standard BS 8233:2014 & WHO Guidelines

Appropriate noise limits for internal noise levels within residential preemies are recommended in BS 8233:2014 (shown in Table 1 below) and in the World Health Organisation (WHO) *"Guidelines for Community Noise".* Limits are in terms of two noise parameters: the equivalent continuous level (L_{Aeq}) and the maximum level (L_{AFmax}). The L_{AFmax} is the highest noise level in a given period and is determined by individual events such as a vehicle movement or a door slamming. An L_{AFmax} limit is usually only applied at night, when sleep disturbance is most likely to be an issue.

Table 1 below provides the BS 8233:2014 guidance criteria for indoor ambient noise levels in habitable rooms when they are unoccupied.

Table 1: BS 8233 Internal Noise Limits - Residential

BS 8233 Internal Noise Limits - Residential			
Activity	Location	Daytime (07:00-23:00) $L_{Aeq(16hour)}$ dB	Night-time (23:00-07:00) $L_{Aeq(8hour)}$ dB
Resting	Living room	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom	35	30

The indoor ambient noise level guidance of BS 8233:2014 is qualified by various notes, of which applicable ones are given in Table 2 below.

Table 2: BS 8233 Qualifying Notes

BS 8233 qualifying Notes	
Qualifying Note	Description
Note 2	The levels shown in the table above are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the table above.
Note 3	These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.
Note 4	Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.
Note 5	If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.
Note 7	Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable conditions still achieved.

For dwellings the WHO Guidelines state: "*To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35 dB* L_{Aeq}" and "*For a good night's sleep, the equivalent sound level should not exceed 30 dB(A) for continuous background noise, and individual noise events exceeding 45 dB(A) should be avoided.*" Therefore, the day and night-time criterion for dwellings from the WHO Guidelines corresponds with

the BS8233:2014 criterion for living rooms and bedrooms. However, the WHO Guidelines also provide a criterion for individual noise events during the night (45 dB L_{Amax}).

The 45 dB L_{Amax} criterion is not intended to be an absolute limit but it is recommended that the number of individual noise events over this level is controlled. In terms of the number of times this might be exceeded before sleep is significantly affected: "*For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10–15 times per night*" (Vallet & Vernet 1991).

BS 8233:2014 also provides guidance on external noise levels for protection of private amenity spaces for residential demises. A level of 50 dB $L_{Aeq,T,}$ is said to be "desirable" and 55 dB $L_{Aeq,T}$ should generally be regarded as the upper guideline value.

4. OVERVIEW OF DEVELOPMENT PROPOSALS

A new factory for Crane Flow Technologies is proposed on a site to the south of the existing factory. Crane Flow Technologies specialises in the manufacture of large diaphragm valves for industrial fluid transfer applications. The existing 1930s building is becoming uneconomical to maintain and it is necessary to have a modern building to continue manufacturing in the area. The existing factory will be closed.

The factory is located on the edge of the town of Cwmbran. There are existing commercial and industrial building to the north and south. The area to the west is predominantly residential buildings.

The nearest existing noise sensitive receptors to the proposed factory is Llewellyn House at approximately 100m. The nearest receptor to the proposed goods in and delivery areas is Redwick House at approximately 120m. Llewellyn House is approximately 170m from the existing factory and Redwick House 150m. Therefore, nose levels from Crane Flow's operations may increase slightly at these dwellings as a result of the proposed development.

The nearest noise sensitive receptors to the existing factory are Newgate House and Goldcliff House at approximately 130m. Noise levels at these receptors are likely to decrease as a result of the factory move.

The facility currently provides jobs for 180 employees in total, with 90-100 of these commuting by car. The facility operates 24 hours a day on a 3-shift pattern as follows:

- Morning: 0550 to 1400 hours;
- Afternoon: 1400 to 2200 hours;
- Night 2200 to 0600 hours.

The shift patterns are expected to be the same in the new factory.

There are 2 to 3 HGVs movements per day associated with operation of the factory. Product is collected in wooden crates and deliveries are generally on pallets. There are also regular courier deliveries and collections. HGVs are unloaded using gas powered fork lifts.

Hydrock have been informed that several items of process plant are likely to be replaced by quieter units or will no longer required in the new facility. These are identified in Section 6.4 of this report.

There are a number of external air handling/extract/ventilation units around the outside of the existing and proposed building.

The proposed development, existing facility, noise sensitive receptors and surrounding are shown on the aerial photograph in Figure 1. The background sound measurement locations are also shown in Figure 1. The proposed site plan is shown in Appendix A.

Figure 1: Proposed development site, existing factory and surroundings showing measurement locations

5. NOISE SURVEY METHODOLOGY

5.1 Background Sound Measurements

A noise survey of the site was undertaken over the period of 28th August 2020 to 3rd September 2020 to measure background sound levels in the area. The noise measurement locations are shown in Figure 1.

Unattended background sound measurements were made continuously for the duration of the survey on the proposed site. The only secure location was to the west of the site. This location (M1) was close to a railway line. Noise from the trains would not affect the background sound measurements as the L_{A90} parameter, which excludes the loudest 90% of the time, is used. Noise from the existing factory was not audible in this location. To allow measurements at M1 to be compared with the actual Background Sound Levels at the receptors, a simultaneous short term attended background sound measurement was made at Llewellyn House.

Measurements were undertaken in accordance with the guidance outlined in BS 4142:2014 and BS 7445-1:2003. All background sound measurements were in free field locations, i.e. at least 3.5m from buildings or other sound reflective surfaces other than the ground. Measurement microphones were 1.2m to 1.5m above ground on a pole or tripod. A wind shield was fitted to the microphone during measurements. The meter calibrations were checked before and after measurements.

Details of the monitoring locations and equipment used are provided in Table 3.

Table 3: Survey Equipment- Background Sound Survey

Monitoring Location	Equipment Used				Type of Measurement	Time Interval	Description of Noise Climate
	Manufacturer	Instrument	Type	Serial No. / Version			
Long Term Measurements	Rion	Sound Level Meter	NL52	01254313	Long term unattended	15 min	Road traffic, occasional trains (Trains irregular enough to not effect Background L_{90} parameter)
		Pre-Amplifier	NH25	76628			
		Microphone	UC59	12139			
Short term Measurements	Bruel & Kjaer	Sound Level Meter	2250	3009207	Manual Short term attended	varied	Varied, see results
		Pre-Amplifier	ZC 0032	23772			
		Microphone	4189	3005149			
All	Bruel & Kjaer	Acoustic Calibrator	4231	3015450	Calibration	N/A	Note: 94.0 dB @ 1kHz, drift within normal tolerances

A record of the weather conditions as published by www.timeanddate.com is presented in Table 4.

Table 4: Weather Data

Period	Mean Temperature Degrees Celsius	Events	Wind Speed m/s	Prominent Wind Direction
Friday, 28 August 2020	17	Clear with some intermittent rain	3 to 6	NE
Saturday, 29 August 2020	17	Clear	4-5	N
Sunday, 30 August 2020	17	Passing Clouds	2-4	N
Monday, 31 August 2020	17	Passing Cloud	2-3	E
Tuesday, 1 September 2020	17	Passing Cloud	1-2	NE
Wednesday, 2 September 2020	17	Passing Cloud	2-4	S
Thursday, 3 September 2020	17	Morning light rain then overcast	5	W

Where average recorded wind speeds during the survey exceeded 5 m/s or significant rainfall occurred, data has been omitted from the Background Sound Level used in the assessment.

5.2 Source Noise Measurements (Existing Factory)

Noise sources within the existing factory were surveyed on the 1st September 2020. A total of 28 measurements were made in and around the factory. In some cases, nearfield measurements of individual items of process or building service plant were measured at a known distance. Where this was not possible, ambient noise level measurements of the reverberant noise within factory areas were made. Details of the equipment used is presented in Table 5.

Table 5: Survey Equipment – Source Noise Levels

Monitoring Location	Equipment Used				Type of Measurement	Time Interval	Notes
	Manufacturer	Instrument	Type	Serial No. / Version			
Source Noise Measurements	Bruel & Kjaer	Sound Level Meter	2250	3009207	Manual Short term attended	varied	
		Pre-Amplifier	ZC 0032	23772			
		Microphone	4189	3005149			
All	Bruel & Kjaer	Acoustic Calibrator	4231	3015450	Calibration	N/A	Note: 94.0 dB @ 1kHz, drift within normal tolerances

6. SURVEY RESULTS

6.1 Long Term Measurements (M1)

The measured noise levels are summarised for each day (0700 – 1900 hours), evening (1900 – 2300 hours) and night (2300 – 0700 hours) of the survey in Table 6.

Table 6: Summary of L_{A90} Measured Noise Levels (M1)

Start Time	End Time	Logarithmic Average $L_{Aeq,\ 15\text{-minute}}$, dB	Arithmetic Mean $L_{Amax,\ 15\text{-minute}}$, dB	Mode Average $L_{A90,\ 15\text{-minute}}$, dB
28/08/2020 07:00:00	28/08/2020 19:00:00	54.8	70.3	46.6
28/08/2020 19:00:00	28/08/2020 23:00:00	61.3	72.6	44.7
28/08/2020 23:00:00	29/08/2020 07:00:00	59.6	63.8	40.9
29/08/2020 07:00:00	29/08/2020 19:00:00	57.7	70.9	44.7
29/08/2020 19:00:00	29/08/2020 23:00:00	53.9	67.3	41.5
29/08/2020 23:00:00	30/08/2020 07:00:00	44.4	56.3	37.4
30/08/2020 07:00:00	30/08/2020 19:00:00	56.2	70.8	39.5
30/08/2020 19:00:00	30/08/2020 23:00:00	59.1	74.9	40.6
30/08/2020 23:00:00	31/08/2020 07:00:00	54.0	61.1	37.7
31/08/2020 07:00:00	31/08/2020 19:00:00	57.9	71.1	38.6
31/08/2020 19:00:00	31/08/2020 23:00:00	57.6	69.8	42.0
31/08/2020 23:00:00	01/09/2020 07:00:00	56.1	59.0	35.6
01/09/2020 07:00:00	01/09/2020 19:00:00	57.1	73.3	44.0
01/09/2020 19:00:00	01/09/2020 23:00:00	60.1	74.3	47.4
01/09/2020 23:00:00	02/09/2020 07:00:00	56.6	62.5	34.7
02/09/2020 07:00:00	02/09/2020 19:00:00	66.3	72.4	47.6
02/09/2020 19:00:00	02/09/2020 23:00:00	57.6	67.9	38.7
02/09/2020 23:00:00	03/09/2020 07:00:00	53.9	62.6	46.7
03/09/2020 07:00:00	03/09/2020 19:00:00	56.4	72.1	49.4

The time histories of the individual 15-minute measurements over the full survey period are presented in Appendix B for each day. Graphs showing the distribution of 15-minute background sound measurements ($L_{A90\ 15\text{-minute}}$) for each period are also presented in Appendix B.

The noise climate during the day was dominated by constant traffic from the nearby road network. Occasional trains were also heard. However, during the time spent on site this averaged about 1 train from each direction per hour and therefore would not have affected the L_{A90} parameter used for background sound measurements.

6.2 Short Term Measurement Locations

An external attended measurement was undertaken at the façade of the proposed offices, which will be within the factory, on 1st September 2020. The results are presented in Table 7.

Table 7 M2 Measurement Results

Start Time	End time	Measured $L_{Aeq,\ 30\ min}$, dB	Measured $L_{A90,\ 30\ min}$, dB
01/09/2020 14:05:00	01/09/2020 14:35:00	50.5	47.8

The noise climate was dominated by constant noise from the nearby road junction with no noise from the existing factory heard. Two trains past during the measurement.

The results of the control measurements close Llewellyn House and Newgate House (M3 & M4) are presented in Table 8, below.

Table 8 M3 & M4 Measurement Results

Position	Start Time	Elapsed time	Measured $L_{Aeq,\,t}$, dB	Measured $L_{A90,\,t}$, dB	Simultaneous Long term Logger $L_{90\,,\,15min}$	Description
M3 (Llewellyn House)	01/09/2020 16:00	15 minutes	55.6	50.6	44.4	Road traffic constant includes content from roundabout and associated roads
M4 (Newgate House)	01/09/2020 16:18:21	6m 47s	61.9	53.7	N/A	Road traffic mainly from St David's road however break in traffic water tower pump heard. See figure

The Background Sound Level at Llewellyn House was approximately 6 dB higher than the level at the long-term monitoring location (M1). This is due to Llewellyn House being closer to Llanfrechfa Way then location M1.

However, the measurements at M1 are considered a suitable proxy for all receptors without adjustment. At night, when there is less traffic, the difference is likely to be less then indicated in Table 8. Furthermore, other receptors which are slightly further from the proposed factory (e.g. Redwick House & Goldcliff House) are also further from Llanfrechfa Way and therefore may have background sound levels that are more similar to the levels measured at M1, even during the day. Therefore, the typical background sound levels measured at M1 will be used as a proxy for the receptors with no adjustment. However, it is noted that the daytime and evening assessments may show a slightly unrealistically high impact at Llewellyn House.

The typical background sound level for use in the assessment, derived from the distribution plots in Appendix B, are presented in Table 9.

Table 9: Typical Background Sound Levels

Period	Typical and M1, L_{A90}, dB
Weekday Day-time (0700 to 1900 hours)	42
Weekday Evening (1900 to 2300 hours)	42
Weekday Nights (1900 to 2300 hours)	34
Weekend Day-time (0700 to 1900 hours)	39
Weekend Evening (1900 to 2300 hours)	39
Weekend Nights (1900 to 2300 hours)	37

6.3 Nose from Existing Water Tower

Plant associated with the existing water tower on the existing factory site was heard at M4 during breaks in traffic flow. The level of this was estimated at about 45 dBA as shown in Figure 3. Note, the water tower is not moving to the new facility.

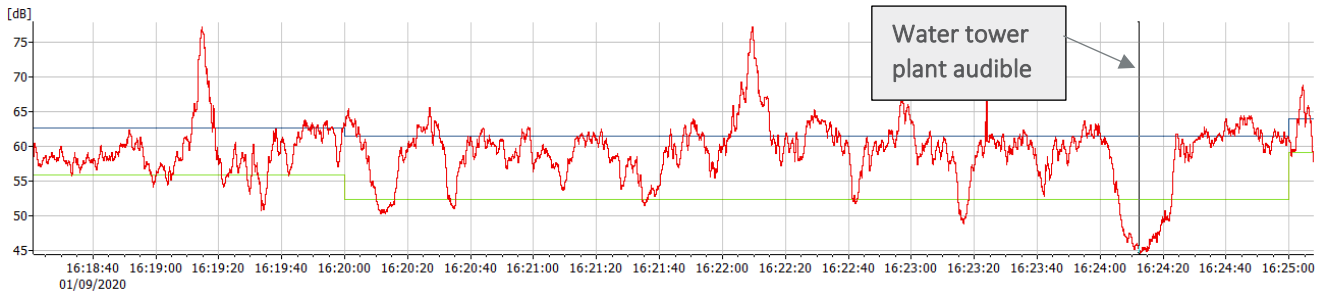


Figure 2: Fast logged trace ($L_{AF\ 100ms}$) of existing with water tower plant from factory heard at line curser position with drop in traffic flow

6.4 Existing Factory measurements

The results of the source noise measurements made in and around the existing Crane Flow Technologies' facility are presented in Table 9, below.

Table 10: Source Noise Measurements

Production area/Location	Source and Distance	Elapsed time (MM:SS)	Measured Levels, $L_{Aeq,\ t}$, dB	Moving to New Factory?	Description
Mill room (Internal)	Carter mill at 1.2m	03:21	84	Yes	Mill room, where rubber would be milled and press rolled to impregnate fabrics with heat and pressure. Typically, not all machines would be on at once (about 5 mill machines in total) as each does a slightly different process. This is the noisiest process that is moving to new site. Character is broadband with grinding sounds.
	Middle of mill room	05:35	86	Yes	
Main Large Production Hall (Internal)	Bank of 5 x valve press bonders 2.8m	03:01	74	Yes	Extract fan noise, process does not cause noise in of itself
	North end of production area (reverberant)	01:02	71	Mixed	Broadband noise from extract fans but attenuated at position, some mill area bleed
PTFE Area	Multiple process plant, 0.8m from nearest	01:16	65	Yes	Whirring idle motors (extract fans not running, not full measurement of process)
IDV Processing within Main Production Hall (Internal)	Reverberant level without paint process	02:14	66	Yes	Radio playing most movement of product and extraction fans
	Reverberant level with paint process plant (18m)	01:02	73	No	Same as above but paint process on (not moving site)
Main Large Production Hall (Internal)	Paint Process 5m	01:02	77	No	Closer to paint process
	Reverberant level multiple sources including paint process and store activity	02:09	66	No	South end of production building similar to F06
IDV Lining Cell (Internal)	Reverberant level, middle of room, multiple process plant	01:01	76	No	Broadband but fairly low noise, not going to new building.

Production area/Location	Source and Distance	Elapsed time (MM:SS)	Measured Levels, $L_{Aeq,t}$, dB	Moving to New Factory?	Description
Wheel Abrasion Room (Internal)	Reverberant level, middle of room, multiple process plant	01:01	84	No	grinding sounds
Dispatch (Internal)	Reverberant level, middle of room, not much activity.	03:04	68	Yes	Ambient 1 forklift assigned 2 to goods in, roller door open as broken will be replaced and generally kept closed
HC4 Machining (same room as Dispatch)	VMCV1000 XP2 - 2.5m, TNA600 -4m	01:31	70	Yes	HC4 Machining, quiet machines running contained processes a few pumps and motors making noises.
HC4 Machining (Internal)	2.4m to pumps/ motors of mandellic	01:31	72	Yes	Same as above
Goods in Bay (internal) door open	Reverberant level mid-bay	00:32	58	Yes	Ambient not much happening
Goods In (External)	forklift 4m	00:32	71	Yes	forklift nearby incl. vehicle horn and crashing and bashing
	forklift 17m	00:40	57	Yes	buzz of lit inside (External)
Water Tower Pump (External)	Pump 4m	00:37	72	No	Heard at Goldcliff court in breaks of traffic on previous visit, general machinery pump sound
HC4 Assembly (Internal)	Reverberant level middle of room	00:32	58	Yes	Clean/quiet high frequency noise
Just outside HC4 Assembly (External)	Extract roof outlet 28m	01:23	56	No	Broadband Extract noise heard from roof just outside HC4 Assembly, (extract outlet from Main production area (External)
Corner of on-site Roundabout (External)	Forklift, 10m	01:04	62	Yes	Gas powered fork lift
Pump House 1 (Internal)	Pump, 1m	02:27	70	Yes	Continuous plant broadband noise. (Internal, small room)
Pump house 2 (Internal)	Unknown plant 1m	02:19	80	Yes	Continuous plant broadband noise. (Internal, small room)
Compressor Room (Internal)	GA75 USD 1.6m	01:31	84	Yes, sited externally	Compressor (Internal, small room)
Extract for lining area 1 (External)	Extract plant 3m	01:01	66	No	Extract for lining area not going to building north-east
Extract for lining area 2 (External)	Extract Plant 3m	01:13	69	No	Same as 026 but south west closer to AHU part of extract plant
Goods Gate/Turning Area (External)	General factory break-out noise and plant 20m south of factory building	05:07	45	No	External extract plant for lining area

7. PREDICTION OF SPECIFIC SOUND LEVEL

The specific sound level from the proposed factory has been predicted based on the measurements made at the existing facility on the 1st September 2020. The following noise sources are considered independently:

- Noise from main production areas in the factory building;
- Externally venting and external mounted plant;
- Deliveries and collections.

Noise from development traffic on the public roads is not considered further as this is not expected to increase or change significantly from existing.

7.1 Noise from Factory Building Main Production Areas

Noise levels within the proposed factory have been estimated based on the reverberant noise measurements made within the existing building presented in Table 11. The average measured reverberant noise level within the Main Production Hall is also presented in Table 11.

Table 11: Internal Reverberant Noise Level in Main Factory

Description	SPL Reverberant, L_{Aeq}, dB
North End Of Production Area (Reverberant)	71
Reverberant Level Without Paint Process IDV Processing Within Main Production Hall (Internal)	66
Reverberant Level, Middle of Room, Not Much Activity. Dispatch (Internal)	68
Reverberant Level Mid-Bay Goods in Bay (Internal) Door Open	58
Reverberant Level Middle of Room HC4 Assembly (Internal)	58
Average	67

The average reverberant noise level from Table 11 and the average noise spectrum have been used to calculate noise break-out from the factory at the nearest receptor, Llewellyn House, 100m away. The calculation has followed the simple method from BS EN ISO 12354-4:2017. The calculation is provided in Appendix C. The following assumptions have been made:

- The form of construction of external walls and roof will be insulted metal panel such as those supplied by Kingspan (R_w 24 dB assumed);
- 2.4m^2 of unattenuated ventilation openings in the façade facing the receptors;
- Large roller shutter access doors will normally be closed.

Based on the above, the predicted Specific Noise Level at Llewellyn House is 31 dB L_{Aeq}. This is expected to be a relatively broad band continuous noise.

7.2 Noise from External Sources

The Mill was one of the noisiest plant items measured in the existing factory. This will be in a separate room at the south east corner of the proposed factory building. Noise levels measured within the Mill enclosure at the existing facility are presented in Table 12, below.

Table 12: Mill Room Noise Levels

Description	SPL Reverberant, L_{Aeq}, dB
Middle of Mill Room	86
Carter Mill	86
Average	86

The Mill is approximately 260m from the nearest existing noise sensitive receptors. The façade and any ventilation opening to the Mill room will be screened from receptors by the factory building. Therefore, even assuming just 10dB of attenuation from the Mill room façade, for a façade with large unattenuated ventilation openings, the Mill noise level at receptors is not expected to exceed 10 dB L_{Aeq}. Therefore, noise from the Mill is not significant in terms of the overall specific noise levels from the proposed factory.

Some external plant that was measured during the survey of the existing facility will be replaced with quieter units. There may be additional building services plant which will be specified during the detailed design stage and therefore cannot be assessed at this time.

Noise from new and additional extract and ventilation plant should be assessed at the appropriate time to ensure adequate plant noise control measures are incorporated. Limits have been provided in Table 13 which are suitable to ensure any new or additional plant has a low noise impact at receptors and does not significantly increase the cumulative noise levels from the proposed factory.

Table 13: Noise limits for New and Additional Extract & Ventilation Plant not Otherwise Considered in this Report

Location	Noise Limit for Additional Plant, L_{Ar}, dB
Weekday Day-time/Evening (0700 to 2300 hours)	37
Weekend Day-time/Evening (0700 to 2300 hours)	34
Nights (1900 to 2300 hours)	29

The plant noise limits presented in Table 13 are in terms of the BS4142:2014 rating level and therefore the appropriate character correction should be applied if required. The limits are free-field noise level and apply at the façade of all pre-existing residential properties.

The limits in Table 13 are not expected to be onerous and may be achieved without mitigation depending on plant location. Some new extract & ventilation plant may require mitigation such as atmosphere side attenuation or enclosures for external plant to achieve the limits.

7.3 Noise from Deliveries and Collections

Noise sources associated with deliveries and collections to the proposed factory are as follows:

- fork lift activity
- lorry movements
- lorry engines idling in the service yard

Three fork lift noise measurements were made during the survey of the existing facility. These have been normalised to a distance of 1m in Table 14, below

Table 14: Fork Lift Measurements

Description	Noise Levels, L_{Aeq}, dB
Forklift Measurement 1	83
Forklift Measurement 2	82
Forklift Measurement 3	82

It was not possible to measure noise from an HGVs manoeuvring or idling during the survey. Therefore, measurements from Hydrock's library of noise data has been used. Noise levels of lorries manoeuvring in service yards are presented in Table 15. All measurements or lorries manoeuvring included audible reversing warnings. These measurements have been normalised to a distance of 1m.

Table 15: Measured Noise Levels from Lorries Manoeuvring

Location	Description	L_{Aeq}, dB @ 1m
Drinks Warehouse	17 tonne rigid lorry manoeuvring slowly (including airbrakes)	87
	17 tonne lorry idling	82
	17 tonne lorry manoeuvring slowly	87
Sainsbury's	Articulated HGV Arriving	87

BS4142:2014 requires noise from the commercial activity (the Specific Noise Level) to be assessed over 15-minutes during the night and 1 hour during the day. The Specific Noise Level for deliveries at the closest receptor (Redwick House), 120m average distance, has been calculated over the daytime and night-time assessment period. The calculations are set out in Table 16 & 17, below. The following noise sources are considered:

- An articulated lorry pulling in to the delivery area and manoeuvring;
- Lorry idling for a short time;
- Fork lift unloading the vehicle for the remaining time.

The following assumptions are made:

- Lorries travel at 2.2 m/s on site;
- A lorry will take a maximum of approximately 41 seconds to drive from the site entrance to a loading bay (based on 90m driving distance to furthest potential stopping point);
- A lorry will take a maximum of approximately 90 seconds to manoeuvre ready for loading/unloading;
- Lorries will typically allow the engine to idle for no more than 60 seconds after coming to a stop;
- A forklift will unload the vehicle for the remainder of the assessment period (15-minutes)
- Fork lift horns will not be used.

Table 16: Estimated Specific Noise Level from Deliveries and Collections at Redwick House – Daytime

Noise Source	Ref. Distance (m)	Source Noise Level (LAeq, dB)	On-time (seconds)	On Time Correction	Distance to Receptor (m)	Distance Correction	Receptor Noise Level ($L_{Aeq\ 15\ minutes}$, dB)
Forklift	1	82	3409	-0.2	120	-41.6	40.2
HGV driving on site	1	87	41	-19.4	120	-41.6	26.0
HGV manoeuvring	1	87	90	-16.0	120	-41.6	29.4
HGV idling	1	82	60	-17.8	120	-41.6	22.6
Specific noise level at receptor ($L_{Aeq\ 15\ minute}$, dB)							41

Table 17: Estimated Specific Noise Level from Deliveries and Collections at Redwick House – Night-time

Noise Source	Ref. Distance (m)	Source Noise Level (LAeq, dB)	On-time (seconds)	On Time Correction	Distance to Receptor (m)	Distance Correction	Receptor Noise Level ($L_{Aeq\ 1\ hour}$, dB)
Forklift	1	82	709	-1.0	120	-41.6	39
HGV driving on site	1	87	41	-13.4	120	-41.6	32
HGV manoeuvring	1	87	90	-10.0	120	-41.6	35
HGV idling	1	82	60	-11.8	120	-41.6	29
Specific noise level at receptor ($L_{Aeq\ 15\ minute}$, dB)							42

Distance attenuation is based on geometric divergence only with no consideration of ground absorption, air absorption or shielding. Therefore, actual noise levels from the considered sources are likely to be slightly lower than predicted.

8. BS4142:2014 ASSESSMENT

8.1 Noise from Factory Building and Continuously Operating Noise Sources

A BS 4142:2014 assessment of noise from the proposed Crane Flow Technologies' factory building and plant at Llewellyn House during the night-time is presented in Table 18, below.

Table 18: BS4142:2014 Assessment – Factory Building Noise Sources at Night

Results		Commentary
Measured Background Sound Level (L_{A90}, dB)	34 dB	Typical night-time Background Sound Levels measured on site. Actual Background Sound Levels at Llewellyn House may be slightly higher than this.
Specific Sound Level - (L_{Aeq}, dB)	33 dB	Cumulative noise level from factory building (31 dB L_{Aeq}) and fixed plant (29 dB L_{Aeq} limit).
BS4142 Rating Level (L_{Ar})	33 dB	No character correction is deemed to apply to factory noise at receptors. Noise from the existing factory is broadband and continuous with no particularly distinctive characteristics and there is no reason to believe the new factory will be any different. Noise from modern ventilation plant in good condition does not generally require a character correction. However, if one is applicable this effectively reduces the allowable plant noise limit in terms of L_{Aeq}.
Excess of Rating Level over Background Sound level (dB)	(33 - 34) = -1 dB	Represents a low impact

The assessment indicates that noise from the proposed new factory would be a low impact at night and therefore at all other times too. The assessment considered the noise impact at Llewellyn House. The impact would be lower at all other receptors including Redwick House.

From BS4142:2014 the assessment level "*is an indication of the specific sound source having a low impact, depending on the context*". The context in this case is as follows:

- The proposed development would not result in an entirely new noise source being introduced to the area and the closest receptors to the new factory are already affected to some degree by noise from the existing factory;
- Noise levels from Crane Flow Technologies will increase slightly at some dwellings but fall at others as a result of the development;
- The predicted noise levels are relatively low and would typically not be audible inside a dwelling even with windows open.

Therefore, in consideration of the context as set out above, the rating level of 1 dB below the existing night-time background sound level certainly represents a *"low impact"* in terms of BS 4142:2014.

BS4142:2014 requires an assessment of uncertainty. Uncertainty relating to the proposed plant has been addressed by providing a noise limit for all plant that we have been unable to consider at this stage. Assumptions regarding building envelope sound insulation and noise propagation over distance err on the side of caution. The most likely cause for noise levels to be higher than predicted would be operational factors such as factory doors being left open for significant periods. It is understood from Crane Flow Technologies that factory doors are normally kept closed.

8.2 Noise from Deliveries and Collections

A BS 4142:2014 assessment of noise from deliveries and collections to the proposed Crane Flow Technologies factory at Redwick House during the night-time (2300 to 0700 hours) is presented in Table 19, below.

Table 19: BS4142:2014 Assessment – Deliveries and Collections at Night

Results		Commentary
Measured Background Sound Level (L_{A90}, dB)	34 dB	Typical night-time background sound level measured on site.
Specific Sound Level - (L_{Aeq}, dB)	42 dB	Predicted noise level from HGV delivery and forklift activity over 15 minutes.
BS4142 Rating Level (L_{Ar})	42 dB	No character correction is deemed to apply as noise from the delivery is not clearly distinctive at these distances in the context of normal road noise and existing factory noise in the area.
Excess of Rating Level over Background Sound level (dB)	(42 - 34) = 8 dB	Potentially an indication of an adverse impact from night-time deliveries depending on the context.

A BS 4142:2014 assessment of noise from deliveries and collections to the proposed Crane Flow Technologies factory at Redwick House during the daytime and evening (0700 to 2300 hours) is presented in Table 19, below.

Table 20: BS4142:2014 Assessment – Deliveries and Collections at Night

Results		Commentary
Measured Background Sound Level (L_{A90}, dB)	42 dB	Typical daytime background sound level measured on site.
Specific Sound Level - (L_{Aeq}, dB)	41 dB	Predicted noise level from HGV delivery and forklift activity over 1 hour.
BS4142 Rating Level (L_{Ar})	41 dB	No character correction is deemed to apply as noise from the delivery is not clearly distinctive at these distances in the context of normal road noise and existing factory noise in the area.
Excess of Rating Level over Background Sound level (dB)	(41 - 42) = -1 dB	Represents a low impact

The assessment indicates that noise from deliveries and collections would be a low impact during the day but may result in an adverse impact during the night. The assessment considered the noise impact at Redwick House. The impact would be lower at all other receptors including Llewellyn House.

For delivery and collection noise the following context should be considered:

- Only a single residential building will be affected;
- There are relatively few deliveries each day (2-3);
- The affected receptor is already exposed to noise of this type from the existing factory and HGVs on St David's Road delivering to industrial and commercial premises further north;
- Night-time predicted noise levels are not that significant in terms of sleep disturbance criteria, which may be more applicable to the assessment of night-time noise than the BS4142:2014 assessment, given that the character of the noise source is not dissimilar to the character of the existing noise climate. E.g. with windows open, noise levels in a bedroom of Redwick House at night will be 3dB below the recommended noise limit for bedrooms from BS8233:2014 (assuming 15dB of attenuation through the open window);
- Noise levels from Crane Flow Technologies is expected to decrease slightly at the affected receptor at all other times, when deliveries are not taking place.

Therefore, in consideration of the context as set out above, the rating level of 1 dB below the existing daytime background sound level certainly represents a low impact during the day. Deliveries and collections at night are not expected to result in a significant adverse impact considering the context.

BS4142:2014 requires an assessment of uncertainty. Multiple measurements of HGVs and forklifts have been done with good consistency between results. This indicates the measured source noise levels are reliable. However, specific materials handling noises have not been considered. The type of pallets and crates used by Crane Flow Technologies are not expected to result in excessive materials handling noise. Loud bangs from vehicle doors and lifts being closed and pallets being put down hard can result in a noise impact and adverse comment form neighbours. However, it is thought this can be effectively managed by Crane Flow Technologies.

9. SUMMARY AND CONCLUSIONS

Hydrock Consultants are appointed to provide acoustic consultancy services in relation to the proposed new factory for Crane Flow Technologies at Grange Road, Cwmbran. The new factory will replace an existing one immediately to the north.

The factory move will result in slightly reduced noise levels from Crane Flow Technologies' operations at some receptors and slightly increased noise levels at others.

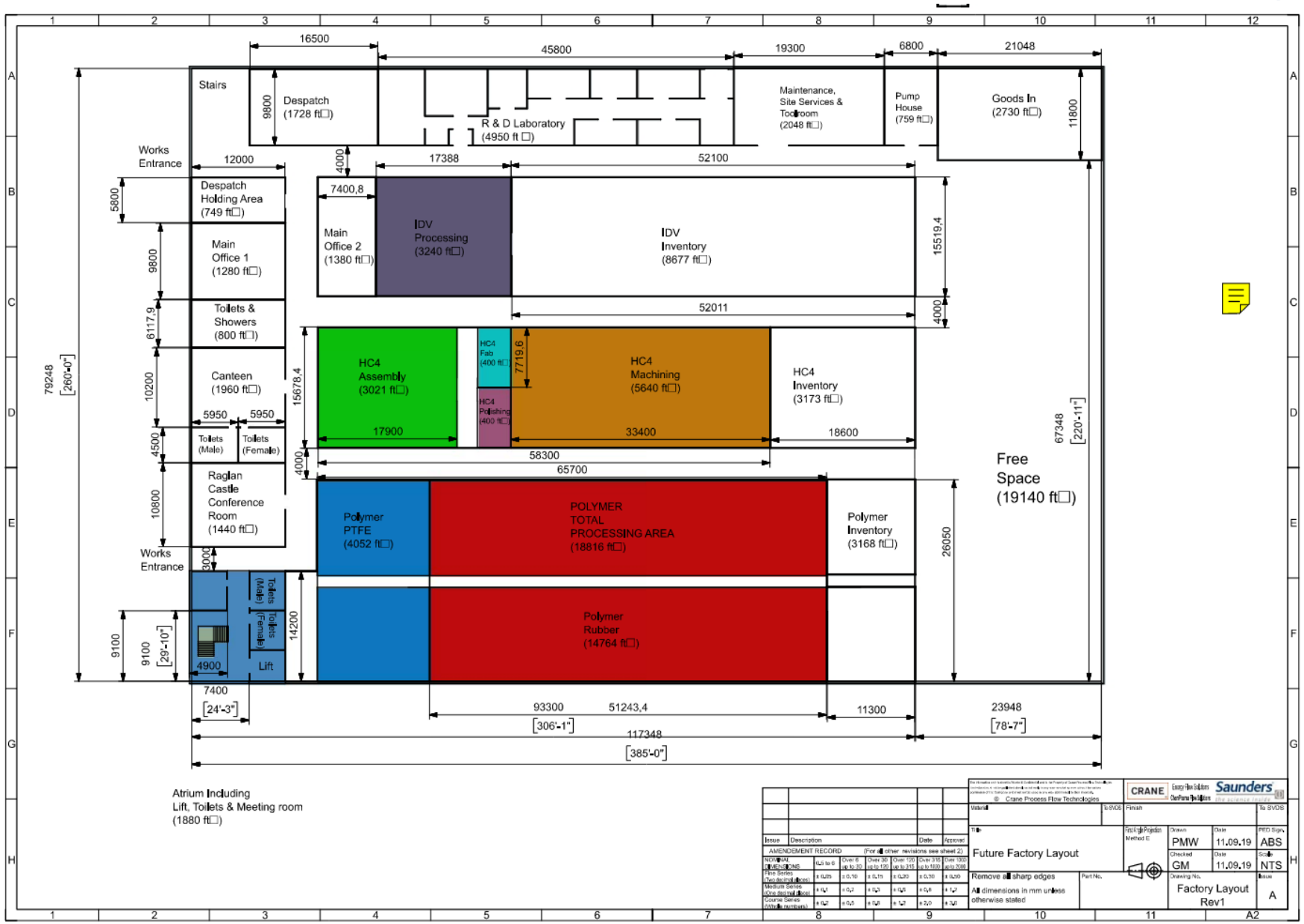
The impact of the increased industrial noise at some receptors has been assessed based on the guidance contained in BS4142:2014 as amended. The impact of noise from the new factory, including deliveries and collections, is low or negligible at all receptors.

There may be some new items of plant associated with the new factory that could not be measured at the existing facility and have not yet been specified. These should comply with the noise limits set out in Section 7.2 (Table 3).

If night-time HGV deliveries or collections are expected then it may be appropriate to consider low noise delivery management strategies within the factories Noise Management Plan. However, night-time deliveries and collections are possible with a minimal noise impact on neighbours.

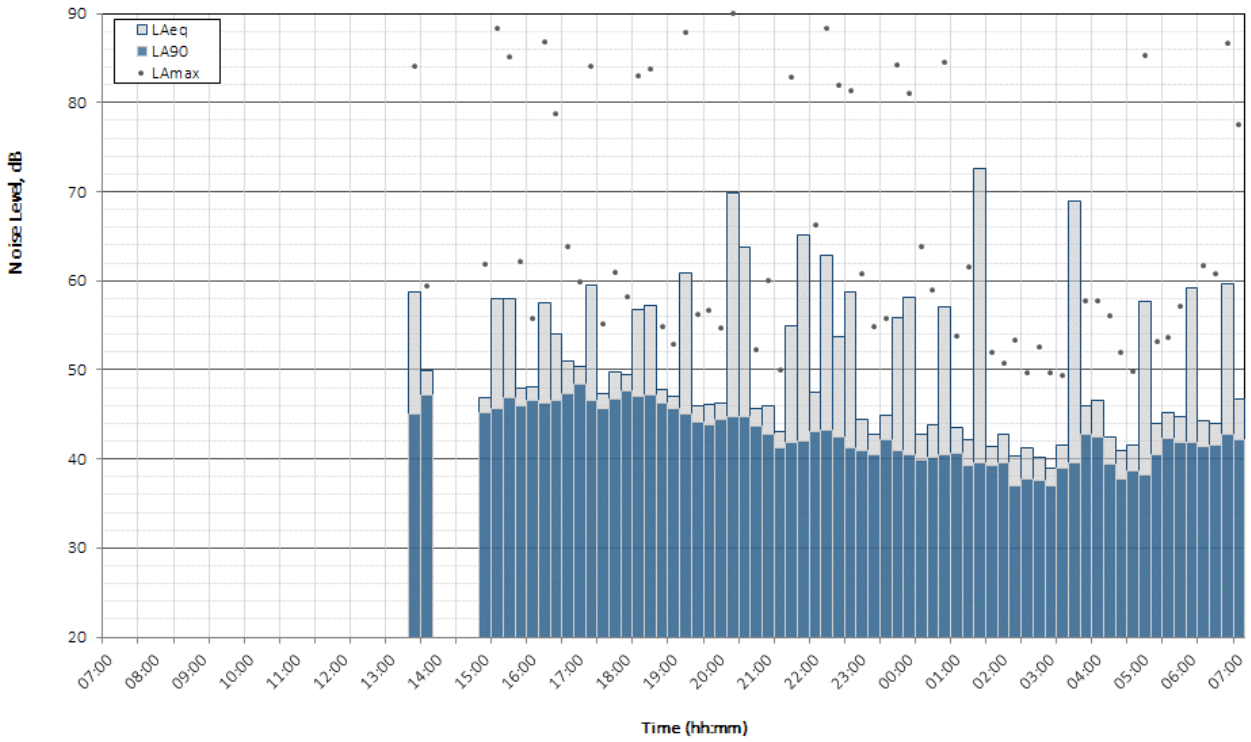
The proposed development will not result in significant changes to the noise climate in the area and will not result in unacceptable adverse effects from noise. Therefore, with reference to Torfaen County Borough Council's Local Development Plan (Policy BW 1) there is no reason that the development should be refused on the grounds of noise pollution.

Appendix A Proposed Site Plan

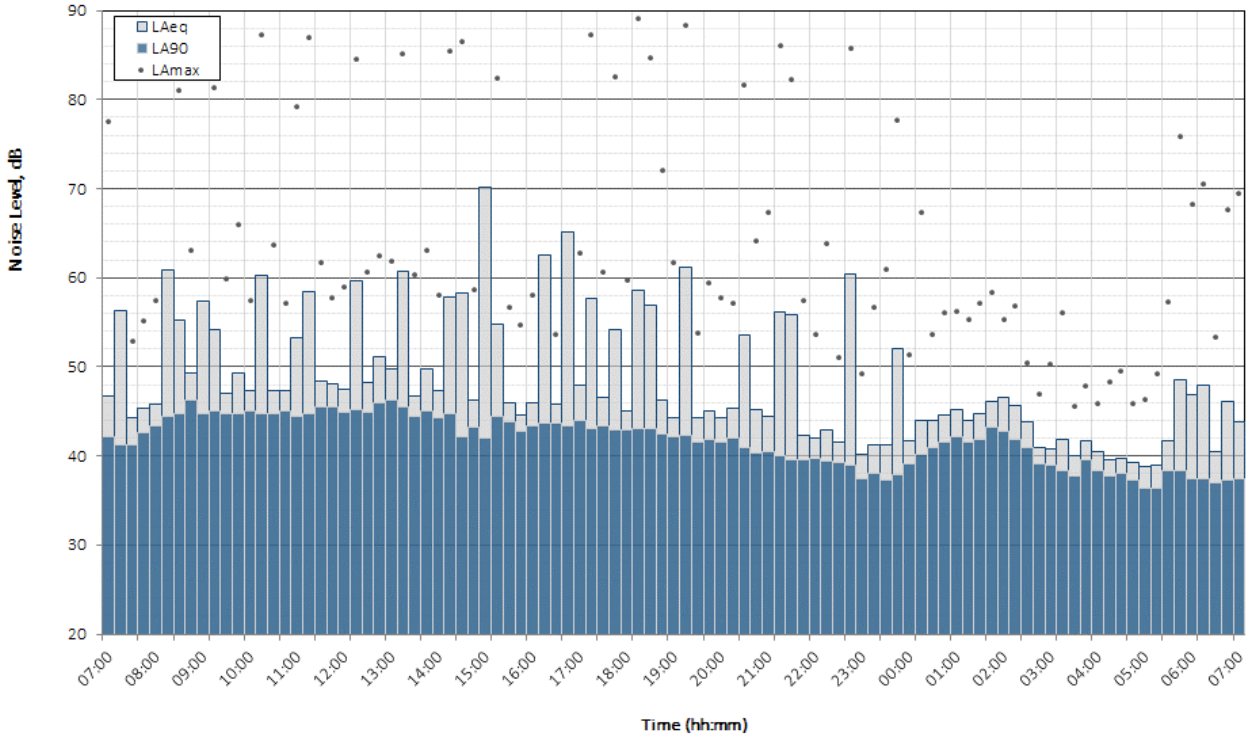

16500
45800
19300
6800
21048
Stairs
9800
Despatch
(1728 ft□)
R & D Laboratory
(4950 ft □)
Maintenance,
Site Services &
Tearoom
(2048 ft□)
Pump
House
(759 ft□)
Goods In
(2730 ft□)
11800
Works
Entrance
12000
4000
17388
52100
5800
Despatch
Holding Area
(749 ft□)
7400,8
Main
Office 2
(1380 ft□)
IDV
Processing
(3240 ft□)
IDV
Inventory
(8677 ft□)
15519.4
9800
Main
Office 1
(1280 ft□)
52011
4000
6117.9
Toilets &
Showers
(800 ft□)
79248
[260'-0"]
10200
Canteen
(1960 ft□)
HC4
Assembly
(3021 ft□)
HC4
Fab
(400 ft□)
7719.6
HC4
Machining
(5640 ft□)
HC4
Inventory
(3173 ft□)
15678.4
5950
5950
HC4
Polishing
(400 ft□)
4500
Toilets
(Male)
Toilets
(Female)
17900
33400
18600
67348
[220'-11"]
4000
58300
65700
Free
Space
(19140 ft□)
10800
Raglan
Castle
Conference
Room
(1440 ft□)
Polymer
PTFE
(4052 ft□)
POLYMER
TOTAL
PROCESSING AREA
(18816 ft□)
Polymer
Inventory
(3168 ft□)
26050
Works
Entrance
3000
Toilets
(Male)
Toilets
(Female)
14200
Polymer
Rubber
(14764 ft□)
9100
9100
[29'-10"]
4900
Lift
7400
[24'-3"]
93300
[306'-1"]
51243,4
11300
23948
[78'-7"]
117348
[385'-0"]
Atrium Including
Lift, Toilets & Meeting room
(1880 ft□)
CRANE
Saunders
Future Factory Layout
PMW
11.09.19
ABS
GM
11.09.19
NTS
Factory Layout
Rev1
A

Appendix B Noise Monitoring Results

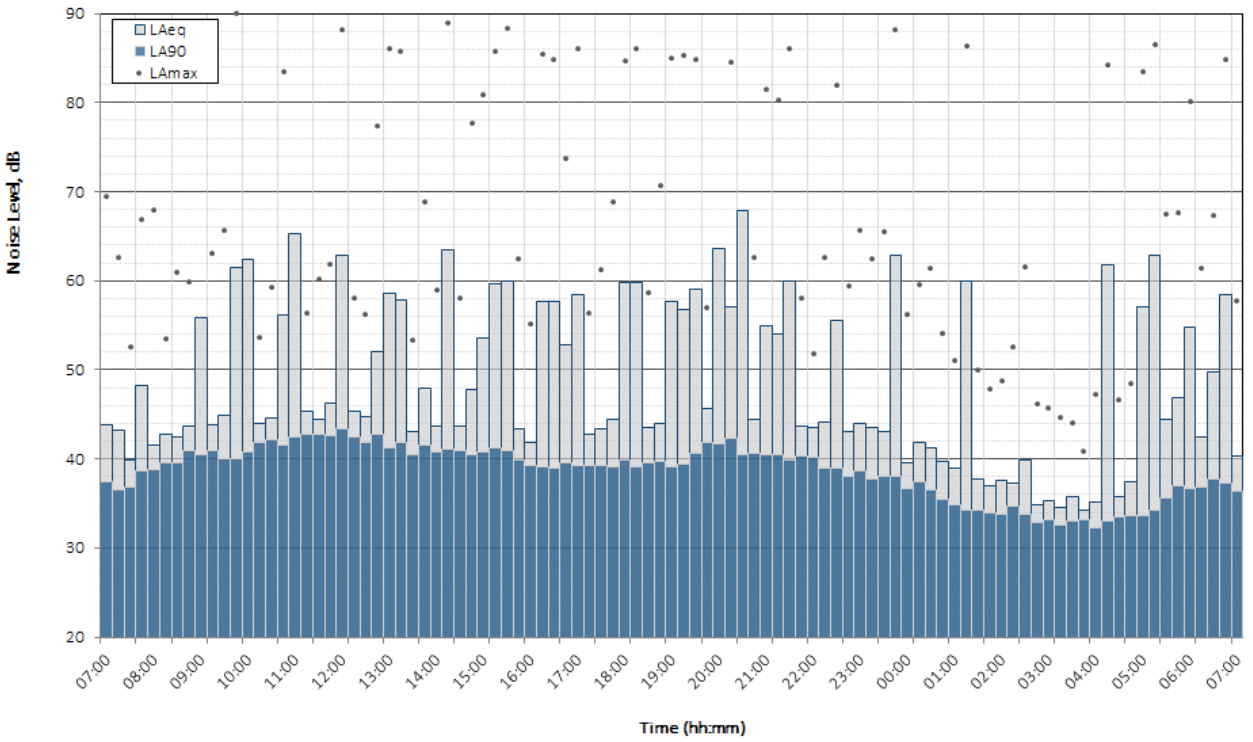
Crane Process Flow Background Long-term Logger
Noise Time History Plot
Friday 28 August 2020



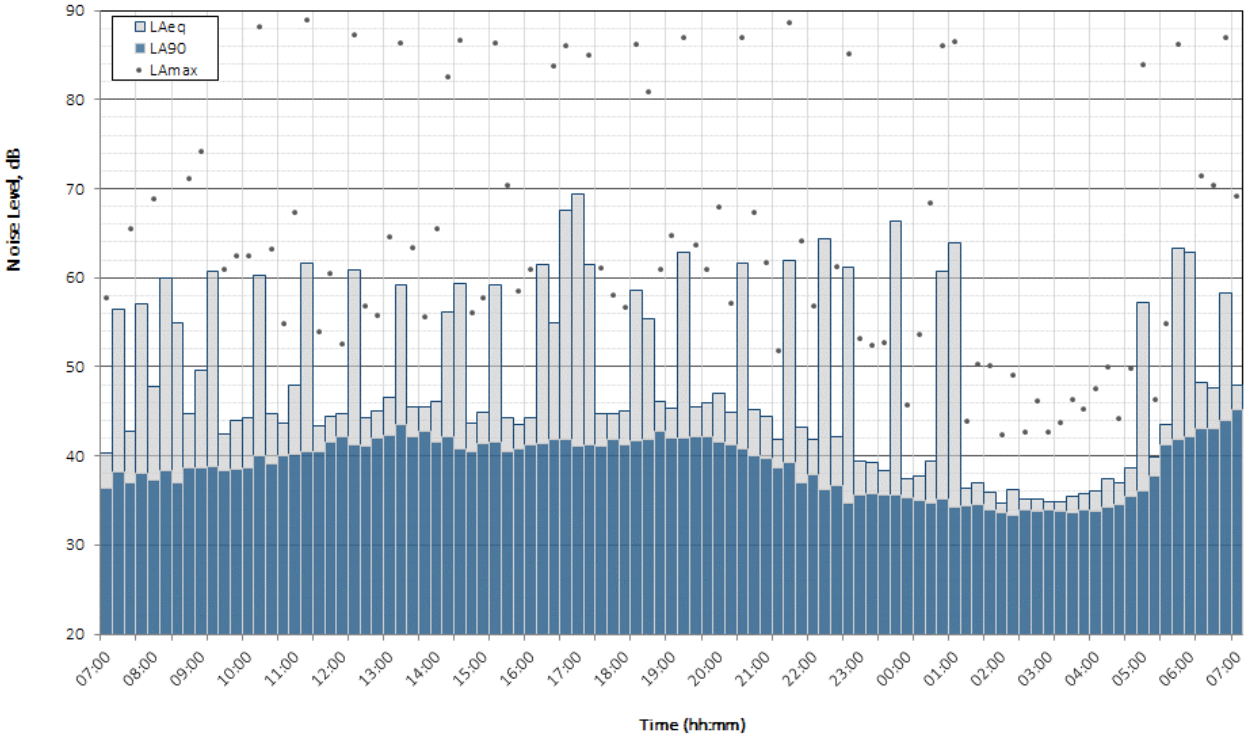
Crane Process Flow Background Long-term Logger
Noise Time History Plot
Saturday 29 August 2020



Crane Process Flow Background Long-term Logger
Noise Time History Plot
Sunday 30 August 2020

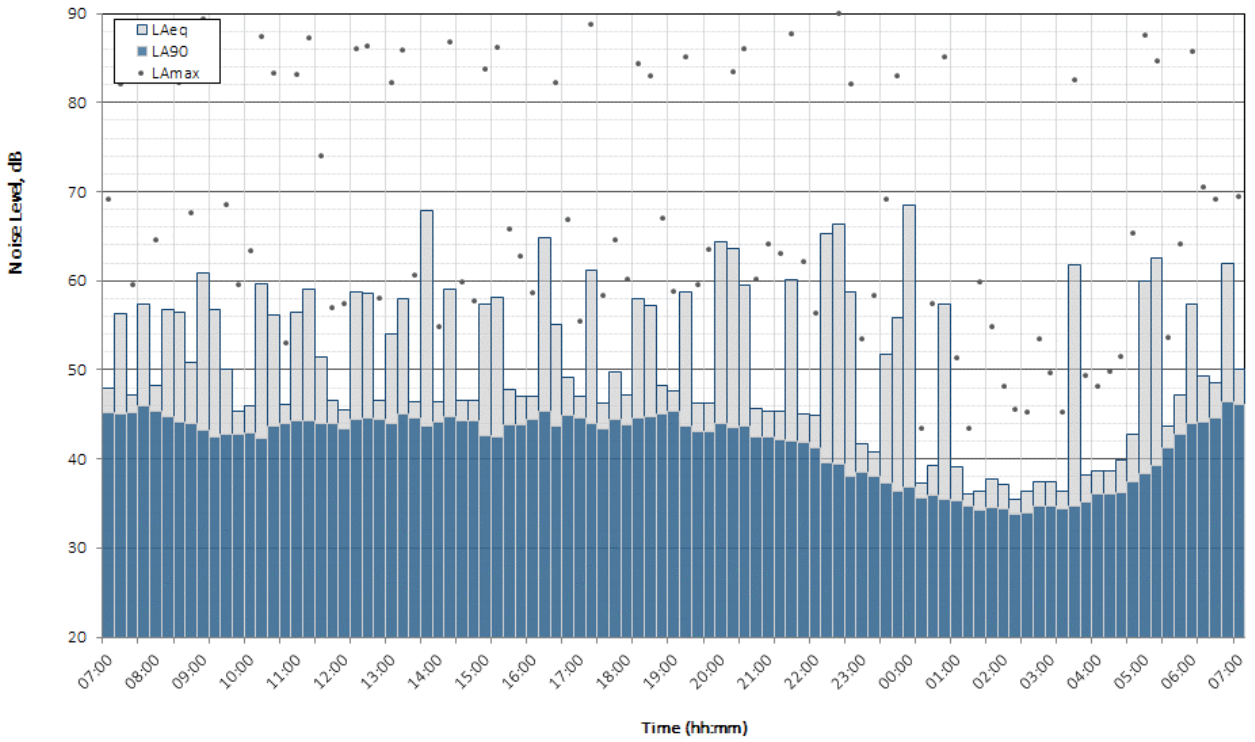


Crane Process Flow Background Long-term Logger
Noise Time History Plot
Monday 31 August 2020



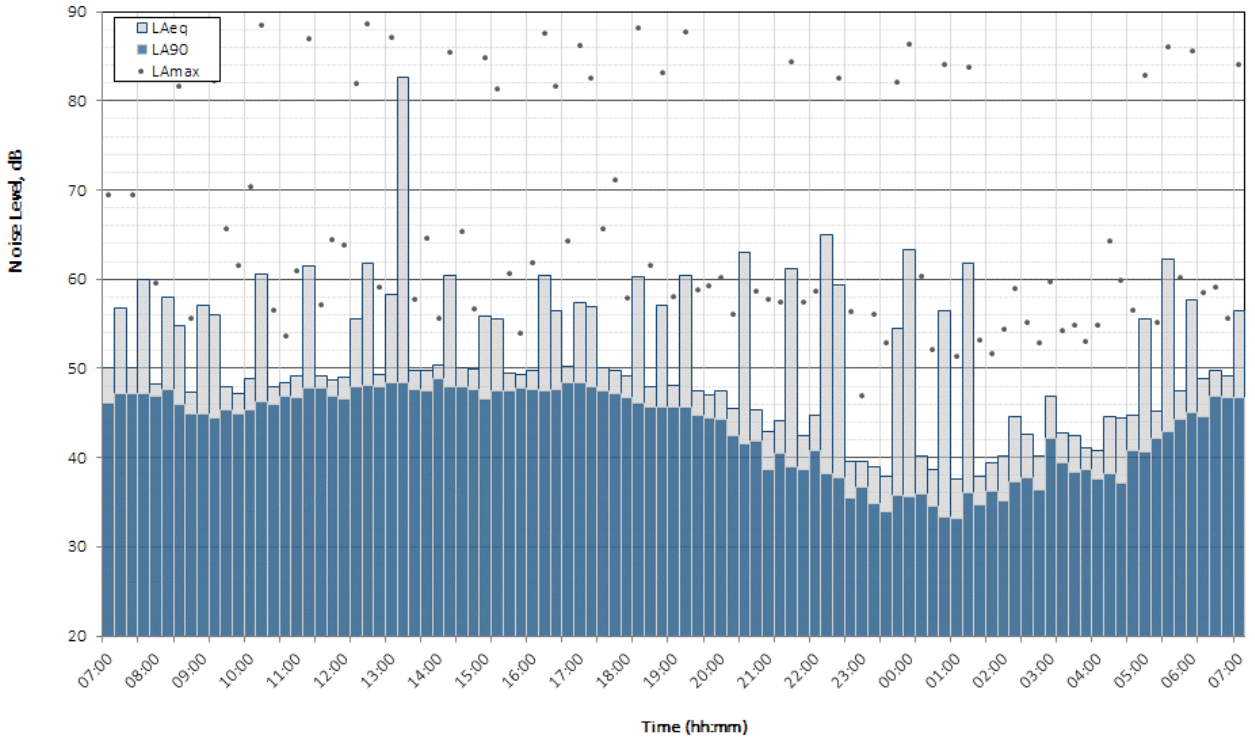
Crane Process Flow Background Long-term Logger
Noise Time History Plot
Tuesday 1 September 2020

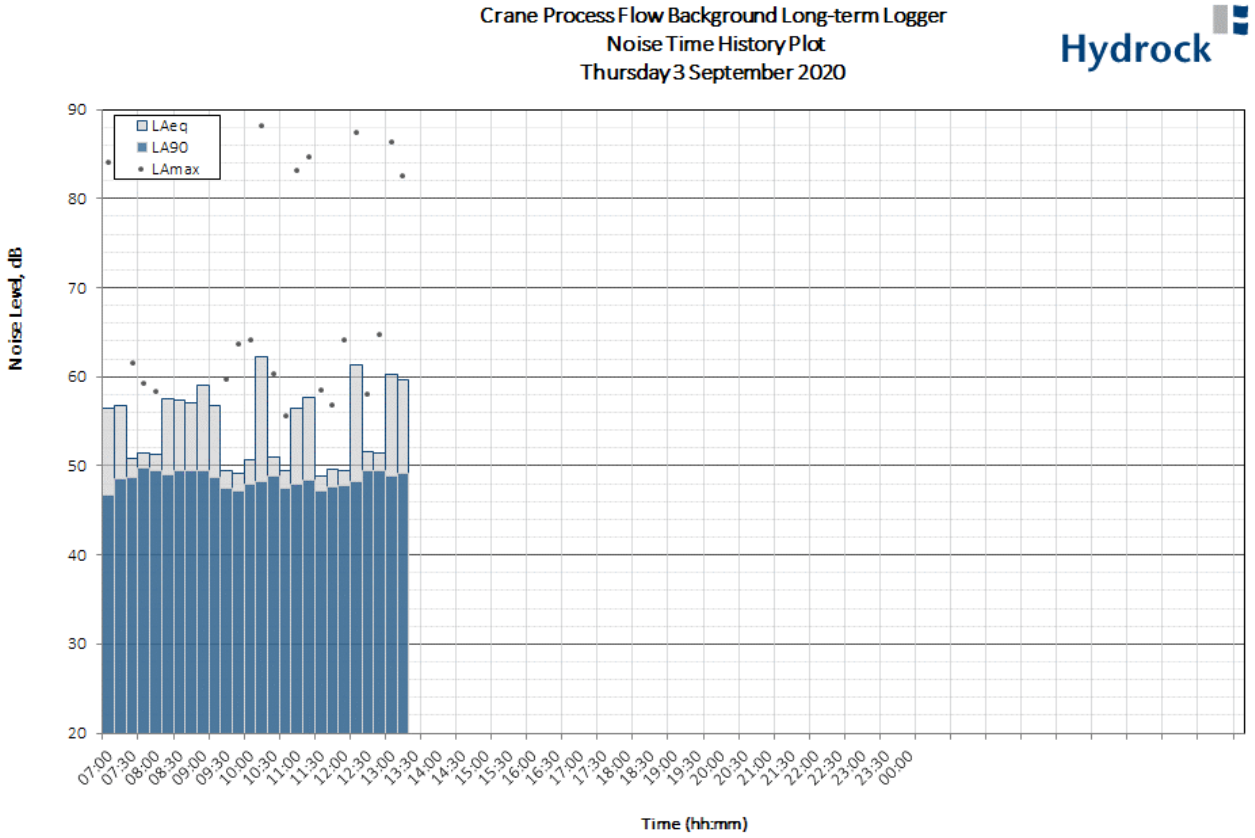
Hydrock



Crane Process Flow Background Long-term Logger
Noise Time History Plot
Wednesday 2 September 2020

Hydrock




Crane Process Flow Background Long-term Logger
Noise Time History Plot
Thursday 3 September 2020
Hydrock
LAeq
LA90
LAmax
Noise Level, dB
90
80
70
60
50
40
30
20
07:00
07:30
08:00
08:30
09:00
09:30
10:00
10:30
11:00
11:30
12:00
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
16:30
17:00
17:30
18:00
18:30
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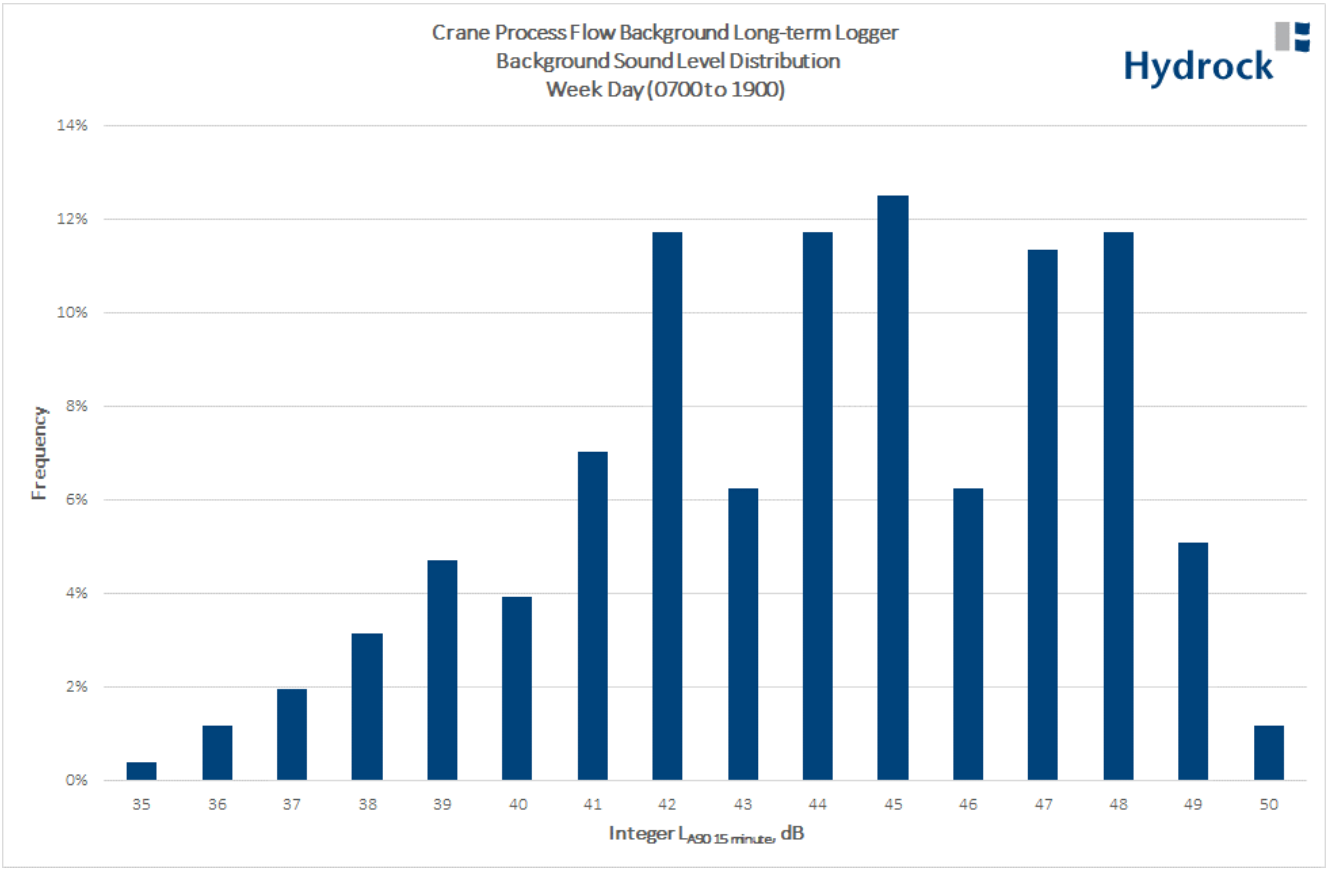
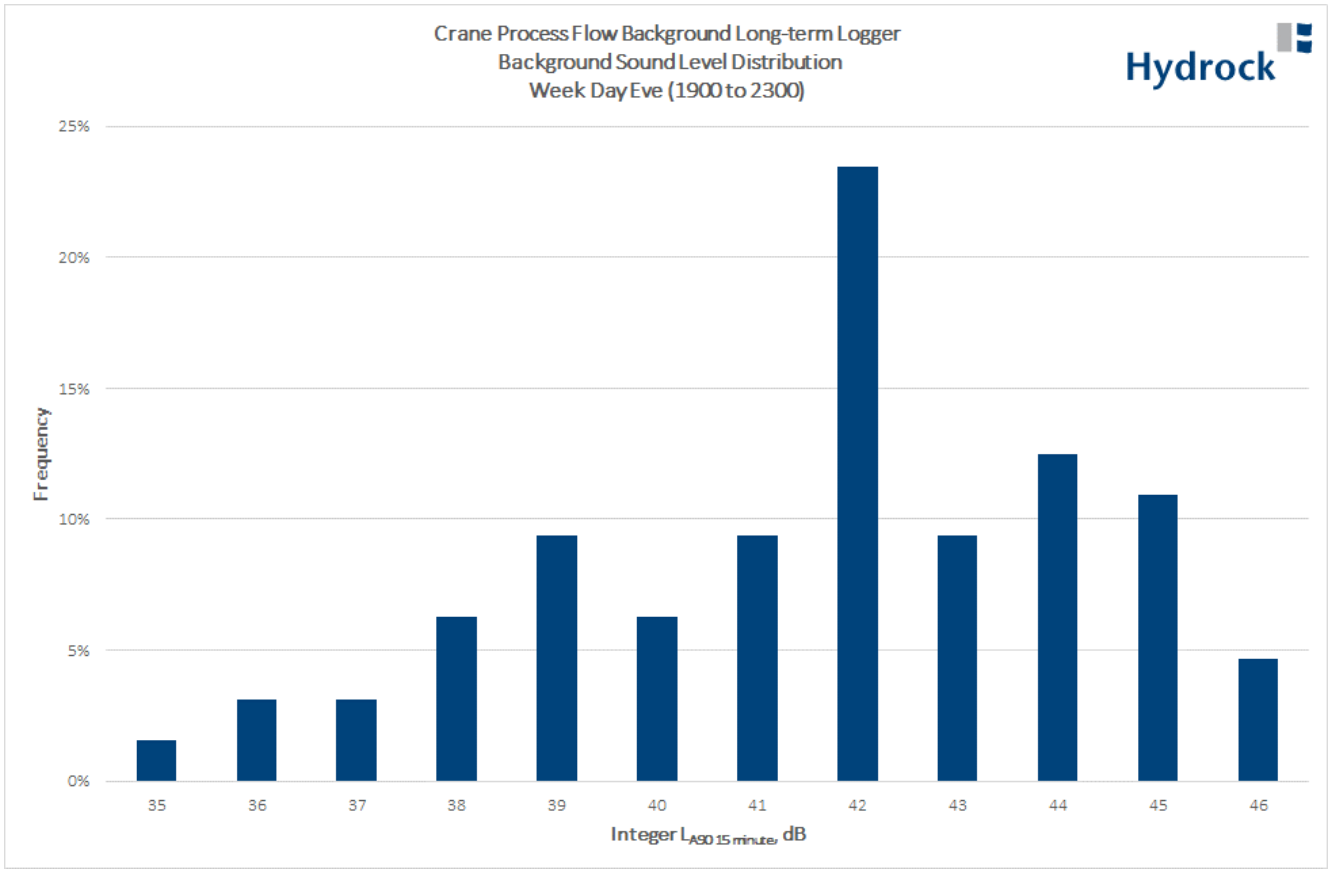
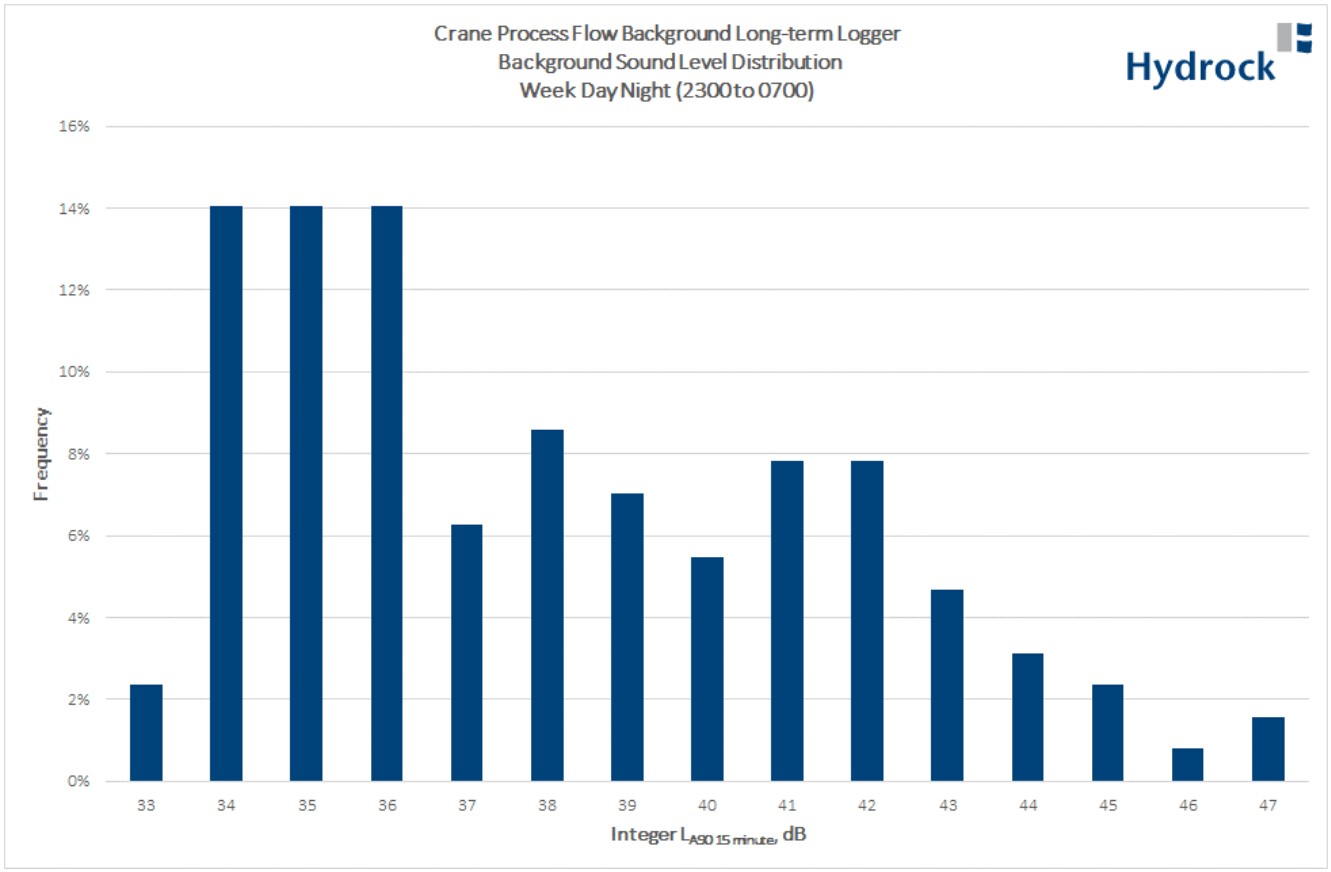
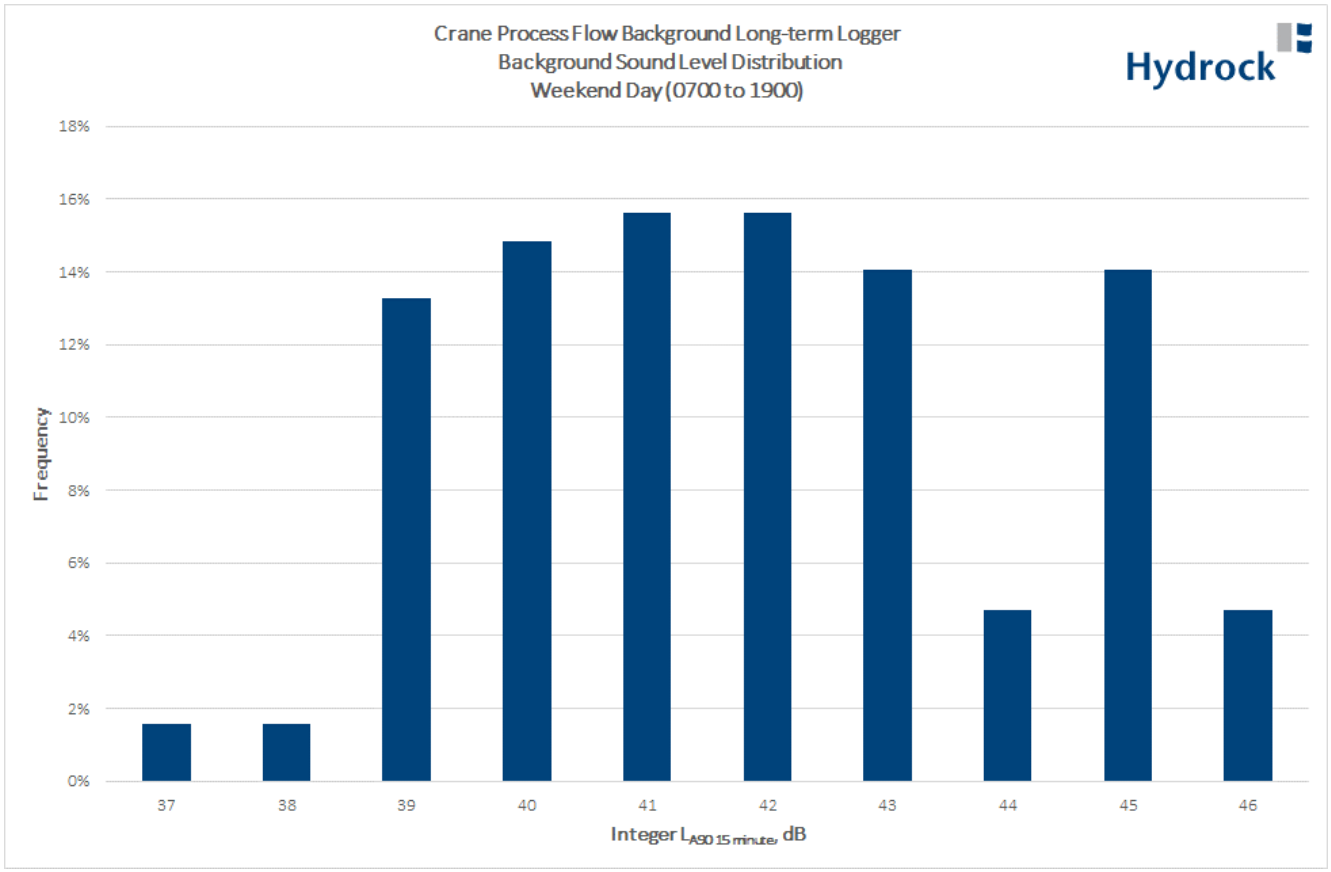
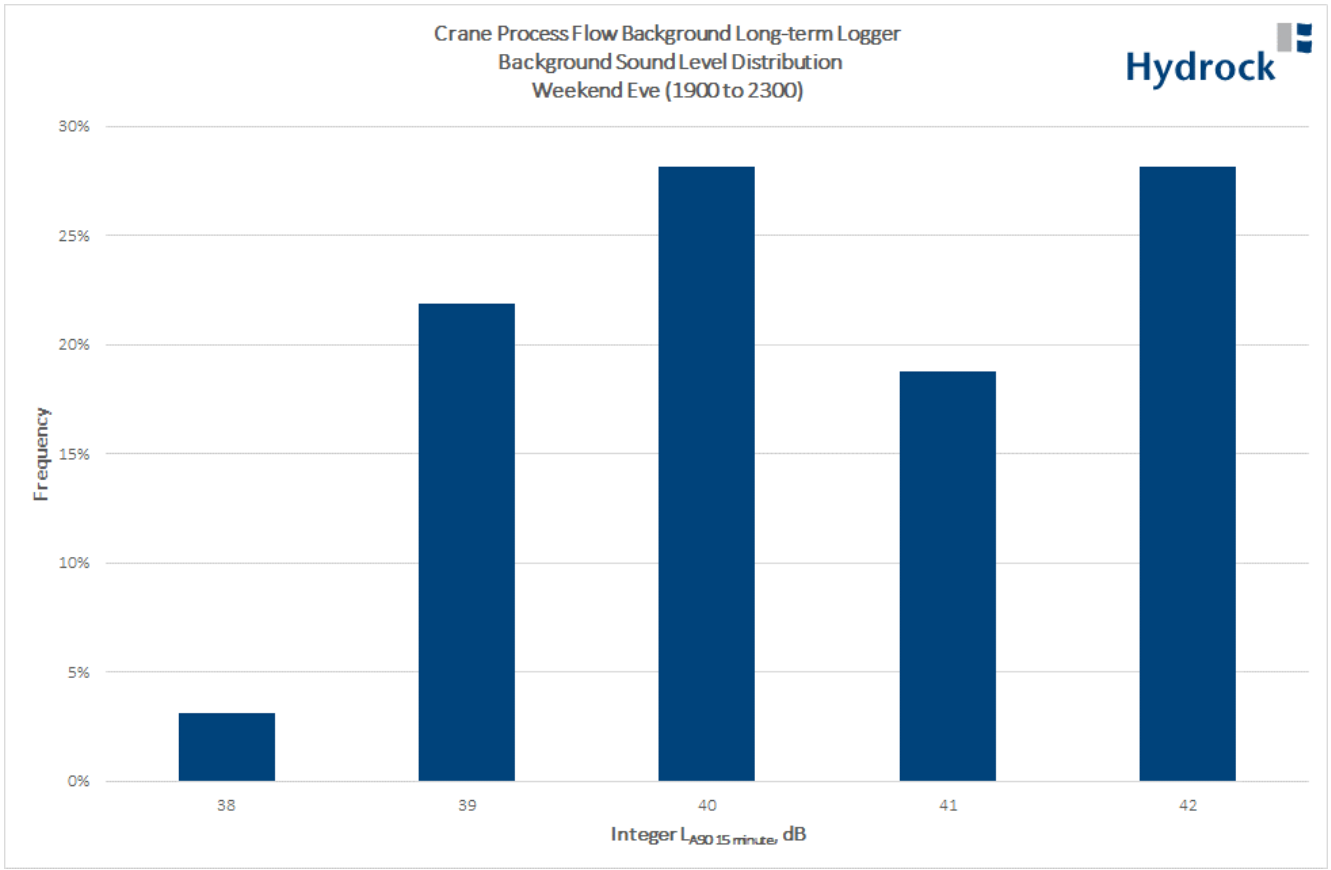
21:00
21:30
22:00
22:30
23:00
23:30
00:00
Time (hh:mm)

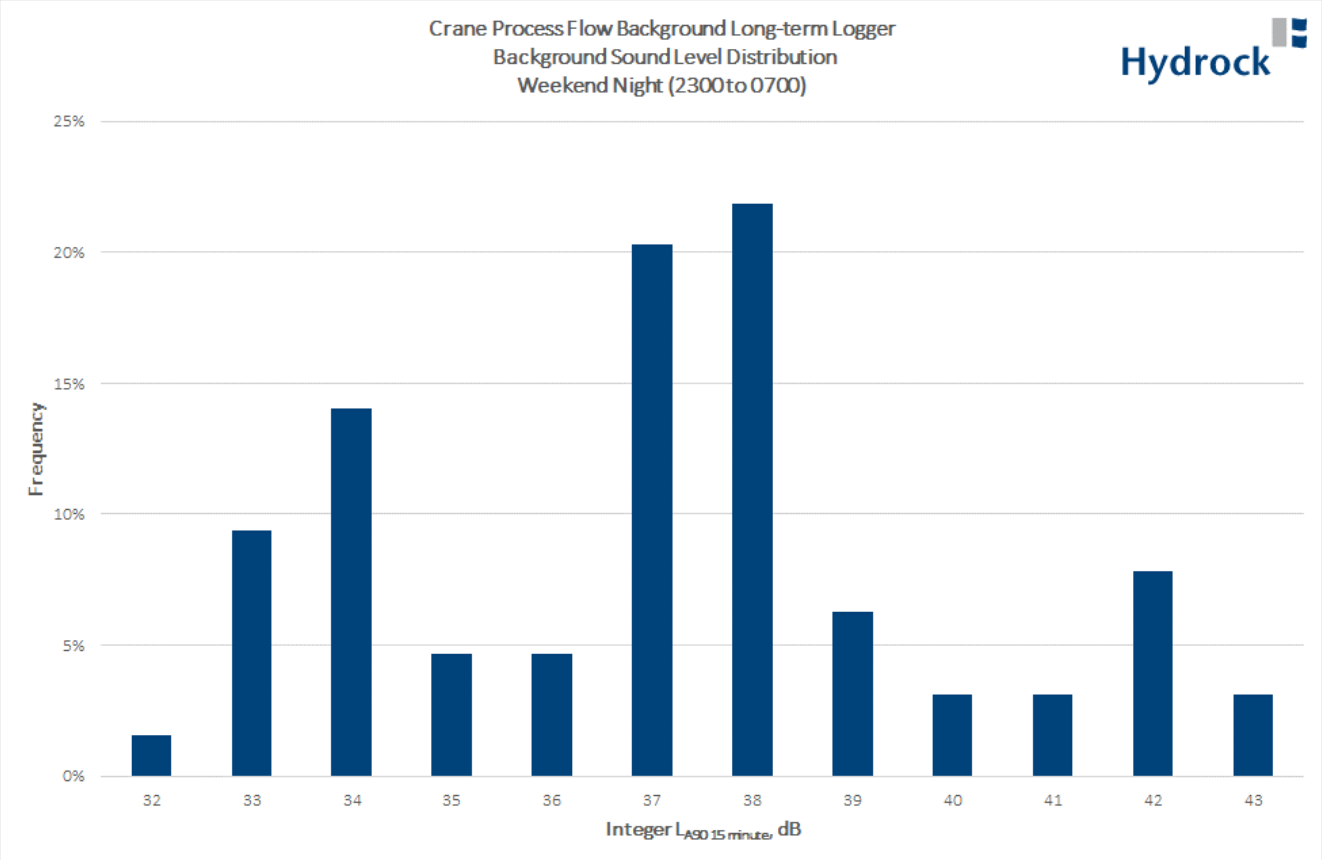

Crane Process Flow Background Long-term Logger
Background Sound Level Distribution
Week Day (0700 to 1900)
Hydrock
Frequency
14%
12%
10%
8%
6%
4%
2%
0%
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
Integer $L_{A90\ 15\ minutes}$ dB


Crane Process Flow Background Long-term Logger
Background Sound Level Distribution
Week Day Eve (1900 to 2300)
Hydrock
25%
20%
15%
10%
5%
0%
Frequency
35
36
37
38
39
40
41
42
43
44
45
46
Integer $L_{A90\ 15\ minute}$ dB


Crane Process Flow Background Long-term Logger
Background Sound Level Distribution
Week Day Night (2300 to 0700)
Hydrock
16%
14%
12%
10%
8%
6%
4%
2%
0%
Frequency
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
Integer $L_{A90\ 15\ minute}$ dB


Crane Process Flow Background Long-term Logger
Background Sound Level Distribution
Weekend Day (0700 to 1900)
Hydrock
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
Frequency
37
38
39
40
41
42
43
44
45
46
Integer $L_{A90\ 15\ minute}$ dB


Crane Process Flow Background Long-term Logger
Background Sound Level Distribution
Weekend Eve (1900 to 2300)
Hydrock
30%
25%
20%
15%
10%
5%
0%
Frequency
38
39
40
41
42
Integer $L_{A90\ 15\ minute}$ dB


Crane Process Flow Background Long-term Logger
Background Sound Level Distribution
Weekend Night (2300 to 0700)
Hydrock
25%
20%
15%
10%
5%
0%
Frequency
32
33
34
35
36
37
38
39
40
41
42
43
Integer $L_{A90\,15\,minute}$ dB

Appendix C Sample of Calculations

Calculation Method: BS EN ISO 12354-4:2017 Simplified
Project: Crane Cwmbran
Date 10/09/2020

					Octave Band Centre Frequency, Hz							
					63	125	250	500	1000	2000	4000	R_w dB(A)
Internal Noise level												
Wedding Music - Rock Band	$L_{p\ inside}$, dB				69.9	66.6	67.1	65.7	61.6	57.7	51.2	67.0
Sound Power of Building Side	$L_W = L_{p,in} + C_d - R' + 10\lg\frac{S}{S_o}$											
Element		S, m²	A_{barr}	Cd								
Vent	R', dB	1.2	0	-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Sound Power Level	L_w, dB				67.7	64.4	64.9	63.5	59.4	55.5	49.0	64.8
Vent	R', dB	1.2	0	-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Sound Power Level	L_w, dB				67.7	64.4	64.9	63.5	59.4	55.5	49.0	64.8
Roof	R', dB	4636.0	-5	-3	12.0	15.0	19.0	23.0	24.0	22.0	40.0	
Sound Power Level	L_w, dB				86.6	80.3	76.8	71.4	66.3	64.4	39.9	73.9
Wall & Roof (Kingspan 40mm Insulated Panel)	R', dB	760.0	0	-3	12.0	15.0	19.0	23.0	24.0	22.0	40.0	24.0
Sound Power Level	L_w, dB				83.7	77.4	73.9	68.5	63.4	61.5	37.0	71.1
Total sound power of building envelope	**$L_{w,e}$, dB**				**88.4**	**82.1**	**78.6**	**73.2**	**68.1**	**66.2**	**41.7**	**75.8**
Total sound power of openings	**$L_{w,o}$, dB**				**70.7**	**67.4**	**67.9**	**66.5**	**62.4**	**58.5**	**52.0**	**67.8**
Sound Pressure Level at Receptor	$L_p = 10\lg\left(10^{L_{W,e}/10} + 10^{L_{W,o}}\right) - A'_{tot}$				$A'_{tot} = -10\lg\frac{4S_o}{\pi S}\tan^{-1}\frac{L}{2d}\tan^{-1}\frac{H}{2d}$							
Total Attenuation	d (m) =	100	A'_{tot}, dB		45.0	45.0	45.0	45.0	45.0	45.0	45.0	
SPL at Receptor			**L_p, dB**		**43.5**	**37.2**	**34.0**	**29.0**	**24.1**	**21.9**	**7.4**	**31.4**