FORMANT.

STRAIGHTFORWARD ACOUSTIC DESIGN

SWITCH

BASELINE NOISE SURVEY REPORT

Project no. P1237
Report ref. 26CB02-FOR-10-XX-T-OJ-0001
Date 17-05-2023
Revision P01

FORMANT.
STRAIGHTFORWARD ACOUSTIC DESIGN

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REVISION HISTORY

Date	Revision	Notes
17/05/2023	P01	For information

EXEC SUMMARY

Formant has been appointed by Morgan Sindall to review the soundscape at the site of a proposed development to house the South Wales Industrial Transition from Carbon Hub (SWITCH), on land at Harbour Side, Port Talbot.

The proposed development contains spaces which will be sensitive to environmental noise intrusion and noise from the proposed building services plant has the potential to affect nearby noise sensitive receptors (NSRs). This report summarises the results of a baseline noise survey at the site and an assessment of potential noise impacts arising from the proposed development.

NOISE AFFECTING THE PROPOSED DEVELOPMENT

The existing site comprises a former industrial site which has been cleared and currently comprises an access road and gravel areas. Audible noise sources during the survey included traffic on Harbour Way and distant road traffic from the north (likely to be the M4).

The ambient sound levels ranged from 51 to 58 dBL_{Aeq}, which exceeds the thresholds for natural ventilation for some of the spaces within the proposed development. However, subject to some good acoustic design measures, natural ventilation may be possible for the development. For example, the site layout should aim to maximise the set-back distance from Harbour Way and internal space planning should avoid noise-sensitive rooms being on the Harbour Way elevations. These issues can be explored as the design develops.

No additional glazing, façade or roof acoustic upgrades are likely to be required in order to control environmental noise break-in to the proposed building.

PLANT NOISE EMISSIONS

The nearest noise sensitive receptors (NSRs) to the site are houses to the north, east and west of the site. Background sound levels at the site were fairly high due to the constant traffic noise from the north, with the lowest 30-minute measurement being **48 dBL_{A90}.** Noise data from the Welsh Government's noise mapping indicates that night time noise levels are typically around 5 dB lower than daytime at the location of the proposed building, therefore a representative background sound level of **43 dBL_{A90} has been adopted for assessment of night time noise emissions**.

Plant selections are not known at this stage, but noise emissions limits have been set based on BS 4142 and the BREEAM Pol 05 limit of '5 dB below background', i.e. **rating sound levels at nearby receptors should not exceed 43/38 dB$L_{A,r}$ (day/night)**. It is considered that these limits are considered achievable with standard plant and attenuation measures.

1 INTRODUCTION

Formant has been appointed by Morgan Sindall to assess the soundscape at the site of a proposed development to house the South Wales Industrial Transition from Carbon Hub (SWITCH), on land at Harbour Side, Port Talbot. The proposed design is at a very early stage and the exact location/design of the building is not yet finalised.

This report provides:

a) A description of the proposed development and its potential impacts,
b) A summary of applicable legislation, policy and guidance,
c) The results of a baseline noise survey undertaken at the site and
d) An initial assessment of potential noise impacts.

2 PROPOSED DEVELOPMENT

2.1 THE SITE

The site is bounded by existing light industrial/commercial premises to the west; by the A4241 Harbour Way to the south; by the former Magistrates Court (now offices) to the east; and by the harbourside car park and Port Talbot Parkway railway station to the north. The nearest noise sensitive receptors (NSRs) are the light industrial/office accommodation to the east/west of the site. The nearest residential properties are some distance away on the opposite side of the railway line/A48.

A site plan, showing the location of the proposed building and the location of the nearby noise sensitive receptors (NSRs) is shown in Figure 1.

2.2 EXISTING SOUNDSCAPE

The existing soundscape at the site is generally dominated by traffic noise from Harbour Way, which had a fairly constant flow of vehicles, including some HGVs, during the survey. The background soundscape is also affected by distant traffic noise which appeared to come from the north, possibly from the M4. No significant noise from nearby industrial or commercial buildings was noted during the survey although occasional noises were audible at times from industrial buildings to the southeast. Trains passing through the nearby station were audible at times, but did not provide a significant contribution to the soundscape.

2.3 PROPOSED DEVELOPMENT AND POTENTIAL NOISE IMPACTS

The proposed development comprises the construction of a new-build university research building containing offices, labs, workshops and associated spaces. Externally, new car parking and landscape area are proposed. The environmental noise levels at the site also have the potential to cause adverse noise impacts for users of the proposed buildings themselves.

The new building will include building services plant, some of which (e.g. air-source heat pumps, condensers, etc) may be located outside the building. The design is at a very early stage, therefore the location and specification of the building and the plant is not currently known, but it has the potential to cause noise disturbance for nearby NSRs, if not adequately screened/attenuated.

2.4 SITE PLAN AND MEASUREMENT POSITIONS

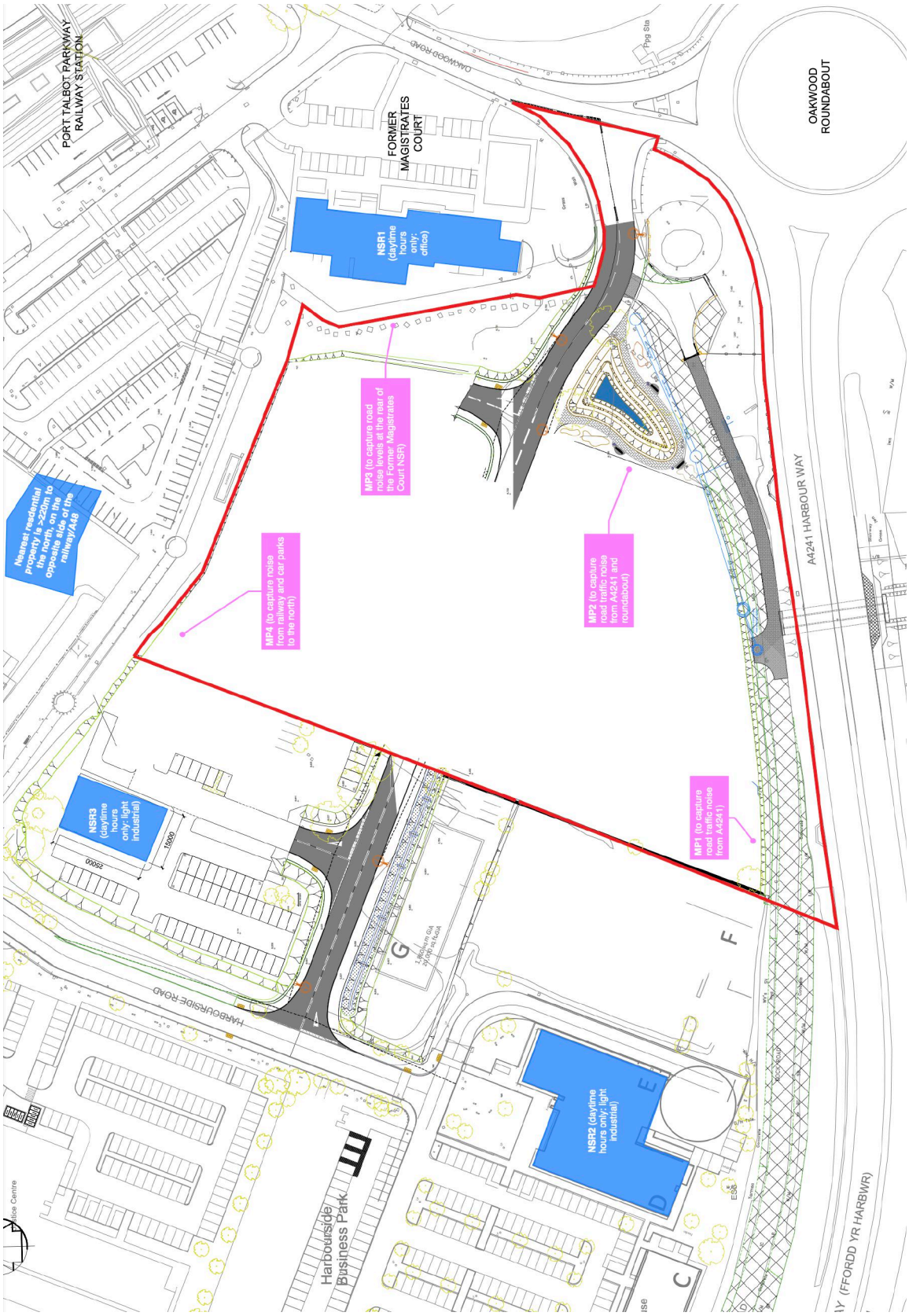
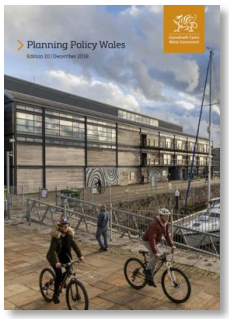


Figure 1: Site location plan showing measurement positions (MP1-4) and nearby NSR locations

3 LEGISLATION, POLICY AND GUIDANCE

3.1 LEGISLATION



No specific legislation is relevant to the noise impact assessment for the proposed development.

3.2 POLICY

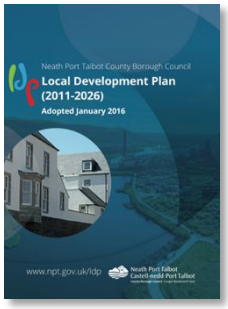
NATIONAL POLICY

Planning Policy Wales (PPW) sets out the policy framework for all planning applications in Wales. It provides broad objectives with respect to creating appropriate soundscapes and managing noise pollution which have been considered in this assessment.

Technical Advice Note (Wales) 11 (TAN11) sets out the Welsh Assembly Government's current policy on noise-related planning issues. TAN11 provides guidelines on minimising the impact of environmental noise on noise-sensitive developments and the impact of proposed developments on nearby NSRs.

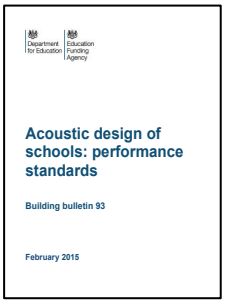
LOCAL POLICY

Paragraph 5.3.46 of the NPT Local Development Plan states that



> *"In relation to noise, potentially noisy proposals should not be located close to sensitive uses (such as hospitals, schools and housing) and new noise-sensitive developments should not be located near to existing noisy uses (including industry and existing or proposed transport infrastructure) unless it can be shown that adverse effects can be dealt with through mitigation measures incorporated into the design."*

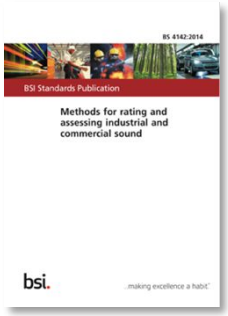
We consulted the Environmental Health Officer (EHO) at NPTCBC prior to undertaking this noise assessment. A copy of the consultation is provided in the appendix to this report. No response has been received from the EHO at the time of writing.



3.3 GUIDANCE

BB93 ACOUSTIC DESIGN OF SCHOOLS

BB93 provides design criteria and an assessment methodology for education buildings, which has been adopted for assessing noise break-in into the building.



BS 4142:2014

BS4142 provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations and has been used as the basis for the assessment of plant noise emissions.

4 BASELINE NOISE SURVEY

4.1 MEASUREMENT METHODOLOGY

Environmental noise measurements were undertaken at positions MP1 to MP4 (as shown in Figure 1) by Paul Driscoll between 11:30 and 14:20 hrs on 16 May 2023. Noise measurements were undertaken approximately 1.5 metres above local ground level, at a distance of at least 3 metres from the façade of any buildings and they are considered representative of free field measurements. Measurements were made in line with BS 7445:2003 *Description of Environmental Noise*.

4.2 EQUIPMENT

The following measurement equipment was used to conduct the survey:

- Nti XL2 Class 1 Sound level meter, SNo. A2A-18665-E0,
- Nti Larson Davies CAL200 Calibrator, SNo. 18652

All measurement equipment owned or hired and operated by Formant has annual or bi-annual calibration checks carried out by external companies traceable to UKAS or national standards. Copies of all calibration records are kept and can be provided upon request.

4.3 WEATHER CONDITIONS

Weather conditions during the attended measurements were warm and sunny with partial cloud cover, no precipitation and a gentle breeze. The wind speeds increased towards the end of the survey, but the results were not significantly affected by the weather conditions and are considered to be suitable for use in the noise assessment.

4.4 NOISE PARAMETERS

A full range of noise data was captured during the survey including the following statistical measurements:

L_{Amax} The sound pressure level of the single noisiest event during the measurement period.

L_{Aeq} Time averaged sound pressure level. This is generally considered to be an acceptable representative descriptor of environmental noise.

L_{A90} Sound pressure level exceeded for 90% of the measurement period, this is generally accepted to be indicative of the continuous background noise level.

4.5 MEASUREMENT UNCERTAINTY

The survey was undertaken during office hours, representative of the time when the building will be in operation and during school term-time, therefore vehicle activity on local roads is assumed to be representative of typical conditions. Due to the lack of a suitable location to leave a noise logger, it was only possible to undertaken short-term attended measurements as opposed to long-term unattended noise logging. However the results have been cross-checked against the Welsh Government's noise mapping for the site to reduce any uncertainty arising.

4.6 MEASUREMENT RESULTS

Position and description	Parameter	Result	Photo
MP1 South-western corner of the site, close to the A4241 Harbour Way. Background soundscape dominated by steady distant traffic noise which appeared to come from the north, possibly from the M4 or A48. Ambient soundscape dominated by traffic on Harbour Way, with birdsong and some distant industrial noise audible at times.	Time	12:10 hrs	
	Duration	30 mins	
	L_{Aeq}	**59 dB**	
	L_{Amax}	70 dB	
	L_{A90}	49 dB	
MP2 South-eastern site boundary, close to the attenuation pond. Soundscape as per MP1 but with slightly less contribution from traffic on harbour Way and occasionally audible trains passing through Port Talbot Parkway Station.	Time	12:43 hrs	
	Duration	30 mins	
	L_{Aeq}	**54 dB**	
	L_{Amax}	72 dB	
	L_{A90}	48 dB	
MP3 North-eastern part of the site, representative of the location of the former Magistrate Building (NSR). Soundscape as per MP2.	Time	13:16 hrs	
	Duration	30 mins	
	L_{Aeq}	**52 dB**	
	L_{Amax}	64 dB	
	L_{A90}	49 dB	
MP4 North-western part of the site. Soundscape as per MP3 but wind speeds began to increase during the measurement, which may have raised the measured noise levels slightly above 'normal' conditions.	Time	13:51 hrs	[No image]
	Duration	30 mins	
	L_{Aeq}	**51 dB**	
	L_{Amax}	62 dB	
	L_{A90}	48 dB	

Table 1: Noise survey results summary

5 NOISE AFFECTING THE PROPOSED BUILDING

5.1 VENTILATION STRATEGY

BB93 provides internal ambient noise level (IANL) criteria for each different type of space within education buildings and these are considered appropriate standards to base the design upon. BB93 also permits a +5 dB relaxation to the IANL criteria for naturally ventilated spaces, stating that the IANL criteria can normally be achieved with:

- Single-sided ventilation where external noise levels exceed the IANL criteria by up to 16 dB
- Cross-ventilation where external noise levels exceed the IANL by up to 20 dB.

The following criteria are therefore applicable:

Type of space	BB93 IANL criterion	External noise limit to support single-sided natural vent	External noise limit to support natural cross-vent
Teaching spaces/seminar rooms	35 $dBL_{Aeq,30mins}$	51 $dBL_{Aeq,30mins}$	55 $dBL_{Aeq,30mins}$
Study rooms, Workshops (based on resistant materials) Laboratories	40 $dBL_{Aeq,30mins}$	56 $dBL_{Aeq,30mins}$	60 $dBL_{Aeq,30mins}$

Table 2: BB93 IANL limits and associated external noise limits for natural vent

The measurements across the site were within a range of 51 to 59 dBA, which exceeds the lower thresholds for some types of space. Further work will be required to develop a suitable ventilation strategy once the location of the building and the internal layouts are developed, but **at this stage the following good acoustic design advice is offered:**

1) The internal layout should try to avoid locating the most noise sensitive spaces on elevations which have line of sight to Harbour Way.
2) The northern parts of the site were quieter than the southern parts and with the screening of Harbour Way afforded by the building itself, it is expected that natural ventilation is likely to be a feasible option for all rooms on north facing elevations.
3) With a suitable set-back distance from Harbour Way it may be possible to naturally ventilate some less noise sensitive spaces on that elevation as well.

5.2 BUILDING ENVELOPE

The noise levels are not sufficiently high to warrant significant increases in glazing or building envelope sound insulation performance. Standard thermal double glazing and most standard façade cladding/drylining build-ups are expected to provide sufficient sound insulation. Therefore **no additional acoustic façade or roof upgrades are expected to be necessary**.

6 PLANT NOISE EMISSIONS FROM THE DEVELOPMENT

6.1 BACKGROUND NOISE LEVELS

In order to set appropriate noise emissions limits for noise from the proposed development, it is necessary to determine a representative value for the daytime background noise (L_{A90}). The lowest measured background sound level **(L_{A90} 48 dB) has been adopted as the representative daytime background sound level at nearby NSRs.**

Although it was not possible to obtain night-time background sound levels during the survey, we have reviewed the data from the Welsh Government's noise mapping which can be found at the *Wales Noise Viewer* website (http://www.extrium.co.uk/walesnoiseviewer.html).

The data for this site shows that there is a difference of approximately -5 dB between the daytime and night time sound levels at the site (based on the traffic noise contour lines for the L_{day} and L_{night} parameters). On this basis it is reasonable to assume that **the representative night-time background sound level at the site would be around L_{A90} 43 dB**.

Given the exposure of the site to constant distant noise from the M4 and the fact that the nearest residential receptors are located closer to the M4, this figure is considered conservative but achievable, therefore we do not believe that additional night-time noise measurements are required.

6.2 ASSESSMENT CRITERIA

In line with BREEAM Pol 5 and BS 4142, we propose Rating sound limits 5 dB lower than the background noise level at nearby residential receptors. The **rating sound limits are $L_{A,r}$ 43/38 dB (day/night) at the location of the nearby NSRs.**

6.3 PROPOSED PLANT AND SOURCE NOISE LIMITS

The nearest NSRs are offices/light industrial premises, which are only noise-sensitive during daytime hours. The nearest residential NSR is located some distance away and well screened by intervening buildings. Therefore we expect to find that the plant noise attenuation requirements will be determined by the daytime limits at the adjacent buildings.

Assuming a notional plant location at the centre of the proposed site, distance attenuation of around 47 dBA is predicted which would mean that unscreened plant would need to be no greater than 85 dBA (sound power). Higher sound power levels would be permissible if the plant is screened, attenuated or has reduced night time noise emissions.

The M&E plant selections and design have not been developed at this stage of the design, however it is considered that the above limits can be met with provision of standard attenuation and screening measures. Therefore no significant M&E plant noise impacts are predicted.

APPENDIX: CONSULTATION WITH EHO

From: Paul Driscoll (Formant)
Sent: 08 May 2023 22:35
To: Simon Evans (NPT)
Subject: SWITCH Building Noise Assessment

Hi Simon

I hope you are well. We haven't spoken for a long time – I think it was when I was working on Swansea Bay Technology Centre in Baglan – so I hope you are still the right person to consult about the noise assessment we are currently planning in Port Talbot? Hopefully a fairly straightforward one.

PROPOSED SITE

Attached is a site plan showing the redline boundary (the location of the building is tbc as we're only at the very beginning of the design process). The surrounding buildings appear to be either office or light industrial, so we are assuming they will only be noise sensitive during daytime hours. The nearest residential properties are some distance away on the opposite side of the railway line/A48.

PROPOSED DEVELOPMENT

The proposed building will contain workshops, labs, offices and associated spaces to be occupied by Swansea University research staff. It will be named SWITCH (South Wales Industrial Transition from Carbon Hub) and it will be an open access facility working with the steel and metals industry on initiatives such as low carbon steel manufacturing processes, recovery/recycling of materials/by-products and creating advanced materials.

POTENTIAL NOISE IMPACTS

Based on our current understanding of the proposed scheme, we believe it will:

a) Contain some areas which will be moderately sensitive to environmental noise during daytime hours (e.g. meeting/seminar rooms)
b) Contain building services and process-related plant which could disturb nearby buildings
c) Be unlikely to generate significant activity noise as the workshops will all be housed inside the building and this type of use is in keeping with other buildings in the local area.

PROPOSED NOISE ASSESSMENT

The attached site plan shows our proposed noise survey positions and the reason for choosing them. These may change when we get to site, depending on what we find, but we envisage 20-30 min measurements in each position should suffice to capture the daytime soundscape. We will use the measurement results to assess noise break-in in line with BB93/BS 8233 and to set noise emissions limits in line with BS 4142 (typically $L_{A,r}$ no greater than L_{A90}, unless you have a local policy which is different from this?). Unfortunately there is no secure location on site to leave a noise logger, so to set plant noise emissions limits at night, we propose to extrapolate the daytime measurement results with a 5 dB correction, as this is the difference between the L_{day} and L_{night} levels on the Extrium noise mapping for this area.

I hope that's all clear. If there's anything you'd like to discuss or change, please let me know asap as we are going to be starting the survey during w/c 15 May.

Regards,

Paul Driscoll
Acoustics Director, Formant Ltd.