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Land South of Glan Usk School, Newport

Acoustics – Assessment of Facade Performance (Condition 12, Planning Application Ref: 13/1279), Phase 3

Date: January 2021

Client Name: Pobl Group

Document Reference: WIE17482-100-TN-2.3.1

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS EN ISO 45001:2018)

Issue	Prepared by	Checked & Approved by
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1. Introduction

1.1. This technical note has been prepared by Waterman Infrastructure and Environment Ltd. (hereafter 'Waterman') on behalf of Pobl Group. The purpose of this note is to provide provisional acoustic performance specifications for the glazing and any trickle ventilators installed within the residential dwellings proposed as part of Phase 3[1] of the development at Land South of Glan Usk School, Newport (hereafter the 'Site'). The information within the note will provide information in relation to the discharge of Planning Condition 12 of Newport City Council (NCC) Application Ref: 13/1279.

1.2. As part of the planning permission granted for the Site by NCC, Condition 12 was set requiring the provision of details relating to the acoustic performance of the glazing and ventilation units within the development buildings. Condition 12 states the following:

Planning Condition 12. Details of Glazing and Ventilation:

Prior to the occupation of any dwelling backing onto the railway or the adjacent industrial land; full details of the glazing specification and trickle vents for the windows of those dwellings shall be provided in writing to the Council. The details shall show that internal noise can be mitigated to the Target Criteria specified in Table 13-12 'Indicative Façade Sound Insulation Performance for Glazing Elements' of Chapter 13 of the submitted Environmental Statement. Where that level of mitigation cannot be achieved with open windows details of an alternative means to ventilate affected rooms shall be provided. Following the Council's written agreement, the glazing, trickle vents and alternative means of ventilation (as required) shall be installed as approved prior to the occupation of those plots.

Reason: to protect the amenity of future occupiers.

1.3. For ease of reference Table 13-12 of the noise chapter of the EIA report is reproduced as **Table 1** below.

[1] For an assessment of the glazing specifications for the dwellings constructed as part of "Phase 2" of the development please, see Waterman report: WIE17842-100-TN-1.2.2.

Table 1: Indicative Façade Sound Insulation Performance for Glazing Elements

Elevation	Period	Incident Façade Noise Level (dB)	Target Criteria (dB)	Minimum Sound Insulation of Glazing dB (R_w+C_{tr})	Example Glazing Configuration (*or equal and approved*)
Eastern Façade Aspects	Daytime $L_{Aeq,16hr}$	67[1]	35	≥28	Standard thermal double glazing (*e.g. 4/12/4mm*) + acoustically passive ventilation (*e.g. trickle vents*)
	Night-time $L_{Aeq,8hr}$	48[1]	30		
	Night-time L_{AFmax}	66[1]	45		

Notes: [1] Calculated incident façade noise level.

1.4. This technical note presents a desk-based study of the potential noise intrusion based on prevailing external noise levels and provide a minimum glazing / acoustic vent specification for the buildings associated with Phase 3 of the development; phase boundaries are illustrated as **Figure 1**.

Site, Setting and Context

1.5. The Site is located on the eastern bank of the River Usk to the north of Newport city centre within a predominantly residential area. The Site is approximately 0.43ha in area and is currently occupied by residential dwellings constructed as part of the Phase 2 (see **Figure 1)** of the development associated with application ref 13/1279.

1.6. The Site is surrounded by the Glan Usk Primary School to the north, a railway with residential properties beyond to the east, an industrial unit to the south and the River Usk to the west. In addition to this, the M4 motorway is located approximately 450m north of the Site and contributes significantly to the ambient noise environment at the Site, whilst being punctuated by regular rail traffic passing on the rail line to the east.

1.7. It should also be noted that the industrial land to the south of the Site is permitted to operate during the night-time period; although this is not currently the case, concerns have been raised in relation to noise emissions from future industrial uses in this area. The potential noise egress from night-time industrial operations has therefore been considered within this assessment, further detail is provided in the following sections.

2. Assessment Methodology and Environmental Baseline

2.1. To facilitate the assessment of the glazing and ventilation units, noise data surveyed as part of previous assessments undertaken by Waterman was used to calibrate a 3-dimensional noise propagation model of the Site and the proposed / existing portion of the Development. Daytime $L_{Aeq,16hr}$, night-time $L_{Aeq,8hr}$ and night-time L_{AFmax} noise levels were then calculated at the façade of each of the existing and proposed buildings.

2.2. The following subsections provide information in relation to internal ambient noise level criteria (as per the 2017 EIA), the survey data and its application, and a summary of the consultation with NCC in relation to the assessment.

Internal Ambient Noise Level Criteria

BS 8233, Guidance on Sound Insulation and Noise Reduction for Buildings, 2014

2.3. When considering the amenity of future users of the Development, it is important to ensure the critical effects of noise on sleep, annoyance and speech interference are guarded against, as appropriate. The most relevant source of guidance is presented within BS 8233:2014, which recommends desirable internal noise criteria for a range of spaces appropriate to their function.

2.4. **Table 2** summarises the BS8233 guideline internal and external noise level criteria for unoccupied spaces relevant to this Development.

Table 2: 2017 Noise Monitoring Locations and Description of Noise Environment

Activity	Location	Noise Level	
		Day time	Night-time
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedrooms	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$ 45 dB L_{AFmax} [1]

Notes: [1]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_{AFmax}, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB L_{AFmax} more than 10 times a night.

2.5. Further to the above regarding night-time maximum levels, where it is not reasonably practicable to achieve the above guideline, then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events.

Noise Survey Details

At the time of writing (January 2021) the UK is experiencing a number of restrictions in relation to COVID-19. These restrictions have resulted in lower traffic flows on local road networks and hence, in general, lower background noise levels than would typically be expected. Due to this, previous Waterman noise survey data for the Site has been utilised as – due to the relative recency of these surveys, 2013 and 2017 – this is considered to provide a sufficiently representative basis for the following assessments.

A review of the noise surveys and their results is presented in the following sections.

2017 Noise Survey

2.6. A baseline noise survey was undertaken over a typical weekday and weekend period, from Tuesday 9th May to Wednesday 10th May 2017. An unattended sound level meter was installed at on the eastern boundary of the Site and logged concurrent 5-minute period for various noise parameters. Attended short-term measurements were also conducted across the Site to discern the spatial variation in noise level. The location of the measurement positions, along with a description of the prevailing noise environment, is provided within **Table 3** below and illustrated as **Figure 2**.

Table 3: Noise Monitoring Locations and Description of Noise Environment – 2017 Noise Survey

Monitoring Location	Description	Observations and Predominant Noise Sources
LT1	Free-field measurement at the eastern Site boundary fronting the railway lines. Microphone located 1.5 m AGL.	Noise climate dominated by constant distant vehicular traffic on M4 motorway to the south of the site. Although intermittent in comparison, noise from distant rail pass-by (*approximately one passage/fright every 10-minute*) was audible.
ST1	Free-field measurement at the south western boundary of the Site overlooking the River Usk. Microphone located 1.2 m AGL.	Noise climate dominated by constant vehicular traffic on M4 motorway. Contributory noise from children playing during lunch break at Glan Usk Primary School, influencing the noise climate to a degree.
ST2	Free-field measurement at the north western boundary of the Site overlooking the River Usk Microphone located 1.2 m AGL.	
ST3	Free-field measurement at the northern boundary of the Site adjoining Glan Usk Primary School. Microphone located 1.2 m AGL.	

2.7. A summary of the measured noise levels at each of the positions is provided as **Table 4** below.

Table 4: Summary of Measured Noise Levels – 2017 Noise Survey

Monitoring Location	Period	Duration	$L_{Aeq,T}$ dB	$L_{A10,T}$ dB	$L_{A90,T}$ dB		$L_{AFmax,5min}$ dB	
			Ave[1]	Ave[2]	Range	Ave[2]	Range	90th %tile[3]
LT1	Day	12hr	67	65	44 - 60	50	57 - 96	84
	Evening	4hr	56	50	36 - 46	39	42 - 82	77
	Night	8hr	48	45	33 - 56	39	41 - 77	66
ST1	Day	30mins	60	61	45 - 57	53	62 - 76	72
ST2	Day	30mins	59	62	48 - 56	52	63 - 83	75
ST3	Day	30mins	54	56	49 - 51	50	58 - 63	62

Notes: [1] Logarithmic average over the daytime / evening / night-time survey periods; [2] Arithmetic average over the daytime / evening / night-time survey periods. [3] The 90th percentile L_{AFmax} value is presented for the long-term noise monitoring results and is considered to fairly represent typical L_{AFmax} levels being experienced, within the spirit of WHO and BS 8233 guidance. All figures rounded to nearest whole decibel.

2.8. It was observed that transportation noise was the dominant prevailing noise source with localised contribution from Crawford Industrial Estate to the south of the Site. However, specific measurement of the industrial activities was not undertaken as part of this survey; as such, a measurement taken as part of the 2013 survey has been incorporated into the model to account for this source.

2013 Noise Survey

2.9. As stated above, a measurement taken in support of a 2013 assessment of the suitability of the Site for residential development has been incorporated into this assessment. As part of the 2013 report (Waterman Document Ref: *EED13478-102-R-3.1.3*) an assessment of potential night-time industrial emissions from Crawford Industrial Estate (hereafter the 'Industrial Site') was undertaken due to this being a raised during the consultation with NCC. It is considered that – although this data is relatively dated – it would be suitable for incorporation into this assessment as it is representative of reasonable worst-case industrial noise emissions that may occur during the day and night-time periods.

2.10. Baseline noise surveys were undertaken from the 21st and 22nd February 2013. Monitoring locations were selected to represent the proposed potentially sensitive receptors within the Development. The selected monitoring locations are described in **Table 5,** relevant measurement locations have been represented within **Figure 2**.

Table 5: Noise Monitoring Locations and Description of Noise Environment – 2013 Noise Survey

Monitoring Location	Description	Observations and Predominant Noise Sources
LT1	Long term unattended noise measurement of railway	Noise climate dominated by infrequent rail noise and distant road traffic noise
ST1	Short term attended measurement representative of nearest proposed dwelling to Crawford Trading Estate	Noise climate dominated by infrequent rail noise and distant road traffic noise with noise audible from Crawford Trading Estate

Monitoring Location	Description	Observations and Predominant Noise Sources
ST2	Short term attended measurement representative of western site boundary	Noise climate dominated by infrequent rail noise and distant road traffic noise
ST3	Short term attended measurement representative of nearest proposed dwelling to Glan Usk Primary School	Noise climate dominated by road traffic noise and distant rail noise.
ST4	Snapshot measurement location of freight train noise, approximately 14m from rail head	Freight train noise dominant during measurements, Crawford Trading Estate Noise occasionally audible

2.1. Noise measurements undertaken at ST1 were subject to sources emanating from the Industrial Estate. Noise sources were identified as emanating from the rear of JS Payne Ltd Structural Architectural Steel and Stainless-Steel Fabricators. Although this JS Payne Ltd. is no longer operational at the Industrial Site, noise emissions have been used here as a representative of typical noise emissions which could occur due to other operators at the Industrial Site.

2.2. Noise sources predominantly included forklift truck movements in the yard and grinding noises emanating from the building, which was noted to have access doors open during operations, presumably for ventilation purposes.

2.3. Measured noise levels at ST1 are presented as **Table 6**.

Table 6: Noise measurements - JS Payne Ltd

Location	Monitoring Period	$L_{Aeq,30min}$	$L_{A10,30min}$	$L_{A90,30min}$	L_{AFmax}	
					Max	90th %tile
ST1	Operational Noise 11:00 – 11:30	57	58	49	84	83
	Ambient noise (no audible operations) 15:00 – 15:30	53	55	49	67	66

2.4. Subtracting the ambient noise from the operational noise leaves a level of ~54dB $L_{Aeq,30min}$; attributable to the industrial operations. This level will be used in both the day and night-time periods so as to provide a worst-case assessment.

2.5. Additionally, the previous report analysed the $L_{p,1s}$ data from the measurement to determine the likely average L_{AFmax} level for the measured period of operation. The L_{AFmax} level of individual spikes in the $L_{p,1s}$ data were estimated by calculating the differential between the above maximum level (84 dB L_{AFmax}) and its corresponding $L_{p,1s}$ peak, then applying this to all other spikes in the $L_{P,1s}$ data that were attributable to the Industrial Site activities. These levels were then averaged arithmetically, resulting in an average level of 74 dB L_{AFmax}; this level has been used within this assessment.

3. Assessment

External Levels at Proposed Development Buildings (Phase 3)

3.1. Noise levels have been calculated for the daytime ($L_{Aeq,16hr}$) night-time ($L_{Aeq,8hr}$) – including maximum levels during the night-time (L_{AFmax}) and are presented within **Figures 3**, **4** and **5**. As indicated within the figures, $L_{Aeq,T}$ noise levels are highest in the east of the Site during both the day and night-time periods due to the nearby rail traffic, this also applies to night-time L_{AFmax} levels. Contribution from the industrial sources to the south are less significant than that of the rail noise for the Phase 3 premises, however, industrial emissions do have some effect on noise levels the southern-most dwellings.

3.2. The highest predicted free-field façade levels for each of the parameters under assessment is presented in **Table 7** below. It should be reiterated that the Industrial Site is no longer occupied by JS Payne Ltd. and that the current operators (a tool and plant hire company) operate during daytime hours only. As such, the assessment of industrial noise during the night-time period is worst case.

Table 7: Highest Calculated Free-field Façade Levels

Period	Parameter	Highest Calculated Free-field Façade Level	Source
Day	$L_{Aeq,16hr}$	69 dB	Rail Traffic
Night	$L_{Aeq,8hr}$	50 dB	Rail Traffic
	L_{AFmax}	68 dB	Rail Traffic

Glazing / Vent Performance Specification

The noise propagation model has been used to determine the highest façade noise level at each of the Phase 3 development buildings. Potential noise break-in and subsequent required glazing and vent performance has then been calculated based on eternal noise levels, typical building internal layouts, and elevations provided by Engie.

3.3. **Figure 6** indicates the facades where specific noise mitigation would be required and should be read in conjunction with the glazing / ventilator performance outlined in **Table 8** below. It should be noted that the specifications are based on an assumed 'solid' portion of the façade performance of 50 dB R_w+C_{tr}. This would be achieved with standard masonry external wall constructions, as currently proposed.

Table 8: Glazing and Ventilator Performance Specification

Mitigation Required (See Figure 6)	Minimum Glazing Unit Performance	Minimum Trickle Ventilator Performance (open / closed)	Notes
No Specific Mitigation	N/A	N/A	No specific façade performance required, natural ventilation via open windows suitable.
Specification 1	27 dB R_w+C_{tr} (Standard thermal glazing unit)	28 / 33 dB $D_{ne,w}+C_{tr}$[1]	Standard thermal double glazing paired with passive acoustic vents.
Specification 2	29 dB R_w+C_{tr}	30 / 35 dB $D_{ne,w}+C_{tr}$[1]	Enhanced acoustic glazing unit paired with passive acoustic vents.

Note: [1]Trickle vent performance specification based on a single ventilator within a space, for each additional ventilator within the space the performance of all ventilators should be uplifted by 3 dB.

It should be noted that the above specifications are for guidance purposes and only apply to the facades of any bedroom and living room areas. For all other areas of the dwellings, it is considered that standard thermal double glazing and natural ventilation via open windows would be suitable.

Example glazing configurations / constructions for both Specifications 1 and 2 are provided as **Table 9** below, with example ventilator products provided within **Table 10**. These examples are included only for the purpose of guidance to both procurement and the LA, any similarly performing glazing units / trickle vents would be suitable.

Table 9: Example Suitable Glazing Configurations

Mitigation Required (See Figure 6)	Minimum Glazing Unit Performance	Example Glazing Configuration
Specification 1	27 dB R_w+C_{tr}	6mm / 12mm / 6mm Double Glazing Unit
Specification 2	29 dB R_w+C_{tr}	8mm / 12mm / 4mm Double Glazing Unit

Note: The configurations described above are based on test information about standard glazing products provided by Pilkington, laboratory test data should be provided for any proposed glazing units.

Table 10: Example Suitable Ventilator Products

Mitigation Required (See Figure 6)	Minimum Trickle Ventilator Performance (open / closed)	Example Trickle Vent Product
Specification 1	28 / 33 dB $D_{ne,w}+C_{tr}$[1]	Titan TA5220 (SF Xtra Vent) + TA5005 (SF 418) 2500EA
Specification 2	30 / 35 dB $D_{ne,w}+C_{tr}$[1]	

Note: The products described above are based on test information about standard glazing products provided by Titan, laboratory test data should be provided for any proposed trickle vents. As stated in **Table 8**, trickle vent performance specification is based on a single ventilator within a space, for each additional ventilator within the space the performance of all ventilators should be uplifted by 3 dB.

4. Conclusions & Recommendations

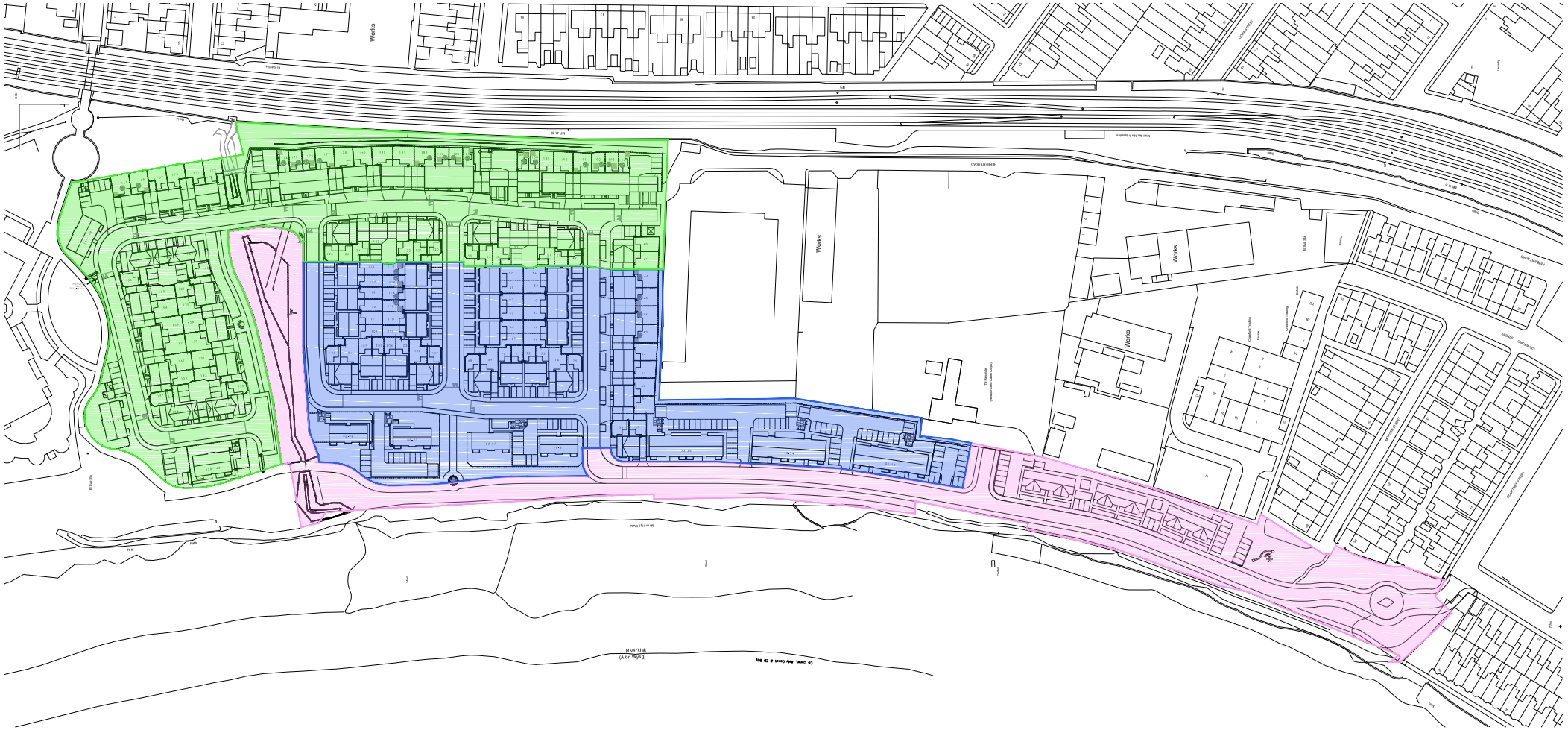
4.1. This technical note has been prepared by Waterman Infrastructure and Environment Ltd. (hereafter 'Waterman') on behalf of Pobl Group. This note presents acoustic performance specifications for glazing and ventilation units for the properties proposed as part of Phase 3 works for the development at Land South of Glan Usk School, Newport (hereafter the 'Site'), in relation to Planning Condition 12 of Newport City Council (NCC) Application Ref: 13/1279.

4.2. A 3-dimensional noise propagation model of the existing buildings at the development site was created based on the current development layouts and calibrated to previous noise measurements undertaken by Waterman. The output of the noise models was used in conjunction with typical building architectural layouts to determine the required performance of glazing and ventilator units installed within bedrooms and living spaces.

4.3. Overall, it is considered that the target internal noise levels presented within **Table 1** can be achieved through the provision of acoustically rated glazing units and passive ventilators, as specified within **Table 8** and **Figure 6** of this technical note. Therefore, with the façade provisions, the requirements or Condition 12 would be achieved.

FIGURES

Figure 1: Development Phasing



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Scale 1:1250

0 25 50 75 100 125

KEY

- Phase 1
- Phase 2
- Phase 3

REV.	DESCRIPTION	DATE

CLIENT
Pobl Group

JOB TITLE
Herbert Road, Newport

DRAWING TITLE
Phase 1, 2 & 3 - Location Plan

SCALE @ A3	DATE	DRAWN BY
1:1250	June '20	WC
JOB NO.	DRAWING NO.	REVISION
1996	LP-P1,2&3-01	-

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Figure 2: Noise Monitoring Locations – 2013 and 2017 Noise Surveys

X 2017 Noise Monitoring Locations

X Industrial Noise Monitoring Location from 2013 Survey

N

Project Details	WIE17482-100: Land South of Glan Usk School, Newport
Figure Title	Figure 2: Noise Monitoring Locations – 2013 and 2017 Noise Surveys.
Figure Ref	WIE17482-100_GR_NM_1
Date	September 2020
File Location	\\s-lncs\wiel\projects\wib15079\100\graphics\nm\issued figures

Figure 3: Free-field Facade Noise Levels – Daytime dB $L_{Aeq,16hr}$

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Land South of Glan Usk School, Newport

Figure 3: Free-field Facade Noise Levels - Daytime

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Noise Levels dB LAeq,16hr

- ... < 55 dB(A)
- 55 <= ... < 60 dB(A)
- 60 <= ... < 63 dB(A)
- 63 <= ... < 66 dB(A)
- 66 <= ... < 69 dB(A)
- 69 <= ... < 72 dB(A)
- 72 <= ... dB(A)

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Figure 4: Free-field Facade Noise Levels – Night-time dB $L_{Aeq,8hr}$

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Land South of Glan Usk School, Newport

Figure 4: Free-field Facade Noise Levels - Night-time

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Noise Levels dB LAeq,8hr

- ... < 55 dB(A)
- 55 <= ... < 60 dB(A)
- 60 <= ... < 63 dB(A)
- 63 <= ... < 66 dB(A)
- 66 <= ... < 69 dB(A)
- 69 <= ... < 72 dB(A)
- 72 <= ... dB(A)

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Figure 5: Free-field Facade Noise Levels – Night-time dB L_{AFmax}

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Land South of Glan Usk School, Newport

Figure 5: Free-field Facade Noise Levels - Night-time Lmax

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Noise Levels dB LAFmax

- ... < 65 dB(A)
- 65 <= ... < 70 dB(A)
- 70 < = ... < 73 dB(A)
- 73 <= ... < 76 dB(A)
- 76 <= ... < 79 dB(A)
- 79 <= ... < 82 dB(A)
- 82< = ... dB(A)

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Figure 6: Facade Mitigation Specification

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Figure 6: Mitigation Requirements

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See performance specification in Table 8 of WIE17482-100-TN-2.1.2

- No Mitigation Required
- Specification 1
- Specification 2

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