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**OBSIDIAN DEVELOPMENTS LTD**

**PROPOSED RESIDENTIAL ST CLEARS, CARMARTHEN – NOISE ASSESSMENT**

**NOISE ASSESSMENT REPORT**

**NOVEMBER 2021**

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**OBSIDIAN DEVELOPMENTS LTD**


**PROPOSED RESIDENTIAL DEVELOPMENT AT ST CLEARS,  
CARMARTHEN – NOISE ASSESSMENT**

**NOISE ASSESSMENT REPORT**

**NOVEMBER 2021**

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## TITLE

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CA12170-001

## TITLE

PROPOSED SITE LAYOUT WITH MONITORING LOCATIONS

## **EXECUTIVE SUMMARY**

Wardell Armstrong LLP has carried out a noise assessment to accompany a planning application for a proposed residential development comprising houses and related infrastructure on land off Heol Goi at Clears, Carmarthen.

The assessment considered the impact of existing noise upon proposed noise sensitive areas and the potential impact of the construction phase upon existing noise sensitive receptors.

As a result of the assessment, noise from Wynnstay Stores is not considered to be an issue for the development.

The assessment has found that the majority of the site will require no noise mitigation to achieve guideline noise levels. A 1.8m high close boarded fence will be required along the eastern garden boundaries of properties 20 and 27.

The results of the assessment indicate that façade mitigation would be required for some noise sensitive rooms closest to and facing the A40. The mitigation would comprise standard thermal double glazing, together with an alternative means of ventilation. Alternative ventilation is proposed to allow windows to be closed as required by the occupant, whilst maintaining adequate ventilation.

The resulting noise levels will all be in accordance with guidance and policy and there are no planning or technical reasons why this application should be refused on noise grounds.

## **1 INTRODUCTION**

- 1.1.1 Wardell Armstrong LLP (WA) was instructed by Carmarthenshire County Council to prepare a noise assessment report to accompany a planning application for a residential development on land off Heol Goi at St Clears, Carmarthen.
- 1.1.2 The proposals include 66 houses. The proposed layout is shown on Drawing number 001.
- 1.1.3 The site is currently unoccupied. It is made up of open land divided by fencing where Heol Goi meets Lon Fair. Beyond the northern boundary of the site is the A40, the A40 slip road covers the north-eastern corner, beyond which is Wynnstay Stores. To the east of the site is the A4066 with residential properties and farm buildings adjacent to the site boundary. To the south is Lon Fair and Heol Goi, with open farm land beyond. To the west of the site is Cae Glas and further residential properties along Heol Goi.
- 1.1.4 This report assesses the noise impacts upon the site from the A40 and Wynnstay Stores. The assessment has been informed by the Proposed Site Layout plan, which has been provided by Hammond Architectural Ltd. The report includes recommendations for noise mitigation measures as appropriate.

## **2 ASSESSMENT METHODOLOGY**

### **2.1 Consultation and Scope of Works**

2.1.1 Prior to undertaking any works on the noise assessment, the proposed methodology was issued to the Environmental Health Department of Carmarthenshire County Council on 27<sup>th</sup> October 2021. A response was received from Mr C Williams, Environmental Health Practitioner on 4<sup>th</sup> November 2021.

2.1.2 Within the response from Mr Williams, it was agreed that the main sources of noise to be considered within the assessment would be:

- A40 and slip road; and
- Wynnstay Stores.

2.1.3 Mr Williams also requested that a construction noise assessment to be undertaken.

### **2.2 Noise Survey**

2.2.1 As part of this assessment, Wardell Armstrong LLP has carried out noise measurements in order to establish the existing noise levels at the development site. This is discussed further in section 3 of this report.

### **2.3 Assessment Methodology**

2.3.1 An assessment is required to consider any potential noise impact at the site. The potential impacts of the existing sources of noise on the proposed residential area have been assessed with reference to;

- Planning Policy Wales, 2019 (PPW);
- Technical Advice Note 11: Noise (TAN11)
- British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233);
- British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS4142);
- Calculation of Road Traffic Noise, 1988 (CRTN);
- BS5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise (BS5228-1), and Part 2: Vibration (BS5228-2); and,
- Control of Pollution Act 1974.

2.3.2 Further details of Legislation, Policy and Guidance documents is found in Appendix A.

### 3 BASELINE CONDITIONS

#### 3.1 Noise Survey

3.1.1 On the 11<sup>th</sup> November and the 12<sup>th</sup> November 2021, Wardell Armstrong LLP carried out a noise survey at the proposed development site.

3.1.2 Noise measurements were carried out at six monitoring locations (MLs) considered to be representative of the proposed receptors nearest to each individual noise source at the site, as detailed in Table 1 below. The MLs are also shown on drawing CA12170-001.

Table 1: Summary of Noise Monitoring Locations				
Location	Location Description	Monitored Source	Time Period Monitored	
			Start	End
ML1	North-western corner of site at the boundary with the A40. Approximately 20m from the road.	A40	1230hrs 11 <sup>th</sup> November 2021	1000hrs 12 <sup>th</sup> November 2021
ML2	Eastern site boundary, approximately 65m from Wynnstay	Wynnstay Stores	1249hrs 11 <sup>th</sup> November 2021	1259hrs 11 <sup>th</sup> November 2021
ML3	Eastern site boundary, approximately 65m from Wynnstay	Wynnstay Stores	1300hrs <sup>th</sup> November 2021	1315 11 <sup>th</sup> November 2021
ML4	Eastern site boundary, approximately 60m from Wynnstay	Wynnstay Stores	1316hrs 11 <sup>th</sup> November 2021	1333hrs 11 <sup>th</sup> November 2021
ML5	Eastern site boundary, approximately 45m from Wynnstay	Wynnstay Stores	1334hrs 11 <sup>th</sup> November 2021	1349hrs 11 <sup>th</sup> November 2021
ML6	Eastern site boundary, approximately 35m from Wynnstay	Wynnstay Stores	1352hrs 11 <sup>th</sup> November 2021	1407hrs 11 <sup>th</sup> November 2021

3.1.3 Noise measurements were made using two Class 1, integrating sound level meters. The sound level meter was calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No drift in the calibration over 0.5dB during the survey was noted.

3.1.4 The weather conditions remained dry with wind speeds below 5m/s for the majority of the survey with higher wind speeds noted between 0000hrs and 0600 hours. These periods have been removed from the assessment.

3.1.5 For the purpose of this assessment daytime hours are taken to be 0700 to 2300 hours and night-time hours to be 2300 to 0700 hours.

- 3.1.6 A-weighted<sup>1</sup>  $L_{eq}$ <sup>2</sup>  $L_{90}$ <sup>3</sup> and maximum noise levels were measured to comply with the requirements of BS8233 and BS4142. A-weighted and  $L_{10}$ <sup>4</sup> noise levels, together with minimum sound pressure levels, were also measured to provide additional information. The measured noise levels are set out in full in Appendix B.
- 3.1.7 Partially attended noise monitoring allowed observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels. The observations identified the following:

**Road Noise:** Noise from the A40 road was dominant at all times.

**Wynnstay Stores:** Some activity was visible but not audible at the depot throughout the period of measurement. The facility is only operational during the daytime, therefore no night-time monitoring was undertaken. There was no plant visible or audible in the vicinity of the site, therefore this will not be considered further within the assessment.

**Other:** Faint birdsong was audible throughout the site, throughout the survey.

## 3.2 Noise Levels

- 3.2.1 The measured noise levels at ML1 have been divided into daytime (0700-2300 hours) and night-time (2300-0700 hours) categories arithmetically averaged to give one noise level for daytime and night-time. The periods of higher recorded wind speeds have been removed from the assessment.
- 3.2.2 The overall measured levels at MLs 2 to 6 and the calculated noise levels for ML1 are shown below in Table 2.

---

<sup>1</sup> A' Weighting                      An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions

<sup>2</sup>  $L_{eq}$                                       Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.

<sup>3</sup>  $L_{90}$                                       The noise level which is exceeded for 90% of the measurement period.

<sup>4</sup>  $L_{10}$                                       The noise level which is exceeded for 10% of the measurement period.



Table 2: Measured Daytime and Night-time		
Monitoring Location	Time Period	Calculated Noise Level (Figures in dB L <sub>Aeq</sub> )
ML1	Daytime (0700-2300)	61.2
	Night-time (2300-0700)	57.0
ML2	Daytime (1243-1259)	58.2
ML3	Daytime (1300-1315)	55.5
ML4	Daytime (1316-1333)	52.2
ML5	Daytime (1334-1349)	52.8
ML6	Daytime (1352-1407)	50.8

3.2.3 Maximum noise guideline levels should not be exceeded more than 10 times in a night, therefore the 10<sup>th</sup> highest maximum noise level measured at ML1 during the night-time will be used within the assessment. These are summarised in Table 3.

Table 3: Summary of the Maximum Night-time (Figures in dB L <sub>Afmax</sub> )	
Monitoring Location	10 Highest Measured Maximum Measured Noise Levels
ML1	70.4

3.2.4 This measured level has been used to determine the noise impact and appropriate mitigation required to achieve internal noise guideline levels at the proposed development and existing sensitive receptors.

## **4 NOISE IMPACT ASSESSMENT**

4.1.1 The measured levels have been used to assess the potential impact of existing sources of noise on proposed receptors, and of the impact of construction noise upon existing noise sensitive receptors.

### **4.2 Assessment of TAN 11 Noise Exposure Categories**

4.2.1 The results show that during the daytime, the southern 40m of the site fall within category A of TAN 11 and the remainder of the site falls within category B. During the night-time, the entire site falls within category B.

4.2.2 Advice for proposed development within Category A states that noise need not be considered as a factor in granting planning permission.

4.2.3 Advice for proposed developments that fall within Category B states that noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.

4.2.4 Therefore, further calculations have been undertaken to determine the indoor and outdoor levels at the development during the daytime and night-time.

### **4.3 BS8233 Assessment of Daytime Noise Levels in Outdoor Living Areas**

4.3.1 Table 2 shows that during the daytime, noise levels affecting the development site would be between 52 and 61dB<sub>L<sub>Aeq,16hour</sub></sub> within the site. The BS8233 upper guidance level of 55dB<sub>L<sub>Aeq,16hour</sub></sub> will be exceeded in outdoor living areas in the northern parts of the site. Therefore, some mitigation is required to secure suitable external noise levels in garden areas of the proposed development. Mitigation measures are covered in Section 5 of this report.

### **4.4 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms**

4.4.1 The daytime noise levels in noise sensitive rooms of the proposed dwellings have been assessed in accordance with the accepted criteria for living rooms and bedrooms during the day. The acceptable daytime noise level within living rooms and bedrooms is 35dB <sub>L<sub>Aeq,16hour</sub></sub>.

4.4.2 As the proposed construction details for the development are unknown, before internal noise levels can be calculated 3dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing façades when the buildings are in place.

4.4.3 The noise levels at the façades of the proposed properties have been calculated, with reference to the proposed site layout plan submitted as part of this application together with the level of attenuation required to achieve 35dB  $L_{Aeq}$  in the living rooms and bedrooms during the daytime. The noise levels at facades of properties closest to and facing the noise sources have been summarised in Table 4.

<b>Table 4: Façade Noise Level at the Development Façade and Level of Attenuation Required to Achieve the Internal Daytime Guideline Noise Level (Figures in dB(A))</b>		
<b>Facades</b>	<b>Noise Level at the Façade of the Development</b>	<b>Level of Attenuation Needed to Achieve Noise Guideline Level in Living Room and Bedroom Areas</b>
Northern façade of dwelling 1-13	55.1	20.1
North-eastern façade of dwelling 14-15	55.3	20.3
North-eastern façade of dwelling 16-17	55.7	20.7
North-eastern façade of dwelling 18-19	56.0	21.0
North-eastern façade of dwelling 20	56.7	21.7
Northern façade of dwelling 24	61.0	26.0
Northern façade of dwelling 25	60.9	25.9
Northern façade of dwelling 26	60.6	25.6
Northern façade of dwelling 27	60.2	25.2
Northern façade of dwelling 28	62.4	27.4
Northern façade of dwelling 29	62.3	27.3
Northern façade of dwelling 30	62.2	27.2
Northern and western façades of dwelling 31-34	62.3	27.3

#### 4.5 Assessment of Night-Time Noise Levels in Bedrooms

4.5.1 In accordance with the accepted criteria, the acceptable night-time noise levels within bedroom areas is 30 dB  $L_{Aeq, 8hour}$ . Individual noise events should not normally exceed 45dB  $L_{Amax,f}$ .

The noise levels at the façades of the proposed properties have been calculated, with reference to the proposed site layout plan submitted as part of this application together with the level of attenuation required to achieve 30dB  $L_{Aeq, 8hour}$  and 45dB  $L_{Amax,f}$  in the bedrooms during the night-time period. The noise levels at facades of properties closest to and facing the noise sources have been summarised in Table 5.

<b>Table 5: Façade Noise Level at the Development Façade Level of Attenuation Required to Achieve the Internal Night-time Guideline Noise Level (Figures in dB(A))</b>			
<b>Facades</b>	<b>Noise Level at the Façade of the Development (L<sub>Aeq</sub>)</b>	<b>Maximum Noise Level at the Façade of the Development (L<sub>Amax,f</sub>)</b>	<b>Level of Attenuation Needed to Achieve the Noise Guideline Levels in Bedrooms</b>
Northern façade of dwelling 1-13	50.9	55.2	20.9
North-eastern façade of dwelling 14-15	51.1	55.6	21.1
North-eastern façade of dwelling 16-17	51.5	56.4	21.5
North-eastern façade of dwelling 18-19	51.8	57.0	21.8
North-eastern façade of dwelling 20	52.5	58.4	22.5
Northern façade of dwelling 24	57.1	72.3	27.3
Northern façade of dwelling 25	57.0	72.1	27.1
Northern façade of dwelling 26	56.7	71.5	26.7
Northern façade of dwelling 27	56.3	70.7	26.3
Northern façade of dwelling 28	58.5	75.2	30.2
Northern façade of dwelling 29	58.4	74.9	29.9
Northern façade of dwelling 30	58.3	74.6	29.6
Northern and western façades of dwelling 31-34	58.4	74.9	29.9

#### **4.6 Construction Noise and Vibration Assessment**

##### ***Noise from Earthworks and Construction Phase Activities***

- 4.6.1 The activities associated with the earthworks and construction phase of the Proposed Development will have the potential to generate noise and create an impact on the surrounding area.
- 4.6.2 Construction noise can have disturbing effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by noise sources which will change location throughout the construction period. The duration of site operations is also an important consideration. Higher noise levels may be acceptable if it is known that the levels will occur for a limited period only.
- 4.6.3 For the purposes of this assessment, the occupants of residential properties in the vicinity of the site are considered to be the receptors most likely to be affected by the construction phases of the Proposed Development. The receptors will those adjacent to the eastern, southern and western boundaries of the site.

- 4.6.4 The construction phase assessment will be carried out for the monitoring locations 5, 6 and these represent the quieter areas and considered representative of the adjacent receptors to the east, south and west of the site. A noise impact at other existing sensitive receptors may be noticed but will be less than at the assessed locations.
- 4.6.5 The daytime measured noise levels, from the baseline noise survey at ML5 and ML6 respectively are considered representative of the nearest existing sensitive receptors to the site and have been provided below in Table 6.

<b>Table 6: Construction Noise Assessment Criteria</b>				
<b>Receptor</b>	<b>Average Measured Noise Levels (dB LAeq)</b>	<b>Ambient Noise Level Rounded to the nearest 5dB(A) (dB LAeq)</b>	<b>Appropriate Category Value A, B or C in accordance with BS5228-1</b>	<b>Noise Level above which activities of the Construction Phase may cause a significant impact at the Receptor (dB LAeq)</b>
ML5	52.8	55	A	65
ML6	50.8	50	A	65

- 4.6.6 The earthworks and construction phase activities have the potential to generate short term increases in noise levels, above those recommended in BS5228-1. The levels of noise received at the receptors closest to the Proposed Development would depend on the sound power levels of the machines used, the distance to the properties, the presence of screening or reflecting surfaces and the ability of the intervening ground to absorb the propagating noise.
- 4.6.7 The distance of the noise sensitive receptor to the Proposed Development will vary depending on the phase of the Proposed Development under construction. Given the potentially small distances between the construction activities and residential dwellings, noise levels at the receptors may occur above those detailed in Table 6. The noise generated by the earthworks and construction phases of the Proposed Development may therefore exceed Category A in BS5228 at the existing sensitive receptors located in the immediate vicinity of the construction phases of the proposed development.
- 4.6.8 The noise impact of the construction phase on existing residential properties is medium to small.

4.6.9 It is therefore recommended that mitigation measures be put in place that will reduce the scale of the potential effect.

#### ***Noise from Construction Vehicles***

4.6.10 In addition to the earthworks and construction activities, vehicle movements to and from the Proposed Development have the potential to generate noise at existing sensitive receptors, in the immediate vicinity of the local road network.

4.6.11 At this stage, detailed traffic data relating to the likely numbers of construction vehicles is not available. However, the number of construction vehicles is not considered to be significant, relative to the existing flows on the major road links surrounding the Proposed Development. It is therefore considered that the level of road traffic noise at sensitive receptor locations will not change significantly due to construction vehicles during the construction phases of the Proposed Development and this impact has not therefore been considered further.

#### **Vibration from Earthworks and Construction Phase Activities**

4.6.12 Work involving heavy plant on an open site is likely to generate vibration, which may, in certain circumstances, propagate beyond the boundary of the Site. In situations where particularly heavy plant, vibrating compaction equipment or piling rigs are being used close to the Site boundary, nearby properties may experience ground-borne vibration.

4.6.13 The sensitive receptors most likely to be affected by vibration generated by the earthworks and construction phase works of the Proposed Development are those adjacent to the eastern, southern and western site boundaries.

4.6.14 At this distance, it is possible that vibration due to the operation of various construction plant, and in particular a vibratory roller, may be above the threshold of complaint. However, the vibration levels are highly unlikely to be above the threshold of structural damage. It is possible that residential properties would therefore potentially experience some adverse impact. However, these would be transient only and for very limited periods during the works, i.e. when activities take place at the Proposed Development boundaries.

4.6.15 The vibration impact of the construction works at existing and proposed residential receptors is large to small when works are closer than 10m but will be medium to small when works are beyond 10m and effects will be temporary.

## 5 MITIGATION MEASURES

- 5.1.1 The results of the noise survey indicate that some noise sensitive rooms and outdoor living areas in the northern parts of the site will require mitigation due to traffic noise.
- 5.1.2 Wynnstay Stores will not impact proposed residential receptors and no mitigation will be required for this.
- 5.1.3 This section of the report determines the appropriate mitigation which is required to provide a good standard of amenity in proposed noise sensitive areas from existing and proposed noise sources.

### 5.2 Assessment of External Noise Levels

- 5.2.1 The measured noise levels, as detailed in Table 2 of this report, indicate that mitigation measures will be required to ensure that outdoor living areas achieve the recommended outdoor noise guidance value.
- 5.2.2 Noise levels in outdoor living areas that are nearest to and facing the A40 would exceed the recommended guideline level of  $55\text{dB}_{\text{Leq},16\text{hour}}$  for external areas. To mitigate noise levels in outdoor living areas noise barriers will be required.
- 5.2.3 Calculations have been undertaken following the CRTN methods to determine the required barrier heights to achieve  $55\text{dB}_{\text{Leq},16\text{hour}}$  in gardens. The majority of gardens will require no mitigation due to the proposed layout of the development screening gardens. A 1.8m high close-boarded fence will be required along the eastern boundary of dwellings 20 and 27.

### 5.3 Assessment of Internal Noise Levels

- 5.3.1 In the absence of design details for the building facades, it has been assumed that the glazing to noise sensitive rooms would comprise about 25% of the facade area. To calculate the overall attenuation provided by this percentage of glazing in a brick or block facade, a non-uniform partition calculation can be used.
- 5.3.2 The calculation combines the different degrees of attenuation of the wall element and the window element. A facade element comprising solid brick or blockwork, will attenuate by 50-55dB (BS8233: Table E1.A) whereas standard double glazing will attenuate road traffic noise by 26-29dB(A) (BRE Digest 379 "Double glazing for heat and sound insulation"). The overall noise attenuation provided by this combination is, therefore, between 32.0dB(A) and 35.0dB(A).

5.3.3 The noise attenuation requirements for proposed noise sensitive rooms nearest to the noise sources are summarised in Table 4 and 5. With windows open for ventilation purposes, the attenuation provided by the façade will be approximately 13dB(A). The majority of the dwellings across the site will achieve internal noise guideline levels even with windows open. However, in dwellings closest to and facing the A40, this would potentially allow the internal noise guideline level to be exceeded in some noise sensitive rooms closest to them.

5.3.4 Table 7 below sets out the sound insulation requirements for sensitive rooms during the daytime and night-time.

Table 9: Living Room and Bedroom Façade Mitigation Requirements for Noise Sensitive Rooms		
Plots and facades	Glazing Specification	Ventilation Specification
Northern façade of dwelling 1-13	Pilkington 6/(6-16)/6	Greenwood 2500EAW.AC1
North-eastern façade of dwelling 14-15		
North-eastern façade of dwelling 16-17		
North-eastern façade of dwelling 18-19		
North-eastern façade of dwelling 20		
Northern façade of dwelling 24		
Northern façade of dwelling 25		
Northern façade of dwelling 26		
Northern façade of dwelling 27		
Northern façade of dwelling 28		
Northern façade of dwelling 29		
Northern façade of dwelling 30		
Northern and western façades of dwelling 31-34		
<i>It should be noted that alternative glazing and ventilation may be used providing that the sound reduction is equal to or greater than the models specified.</i>		

## 5.4 Acoustic Ventilation Requirements

5.4.1 It is recommended that the acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations 2000 Approved Document F1 Means of Ventilation and British Standard BS5925 1991: “Code of Practice for Ventilation Principles and Designing for Natural Ventilation”. Acoustic ventilation is only recommended for noise sensitive rooms, which are bedrooms and living rooms.



5.4.2 The implementation of the recommended glazing together with appropriate acoustic ventilation should ensure that the required internal daytime and night-time noise limits are achieved.

5.4.3 The façades of the majority of the properties further into the site will be protected by the buildings themselves and/or be screened by other buildings. Therefore, windows will be able to be opened for ventilation and acoustic ventilation may not be required for these plots. The requirement for acoustic ventilation can be confirmed on a plot-by-plot basis, before commencement of the development.

## **5.5 Noise from Earthworks and Construction**

5.5.1 To reduce the potential impact of noise levels generated by the construction phase of the Proposed Development, at existing receptor locations in the immediate vicinity of the Site, mitigation measures will be required.

5.5.2 Best working practice will be implemented during each phase of the earthworks and construction works at the Site. The construction works will follow the guidelines in BS5228-1 and the guidance in BRE Controlling particles, vapour and noise pollution from construction Sites, Parts 1 to 5, 2003.

5.5.3 The following measures will be put in place to minimise noise emissions:

- When works are taking place within close proximity to those sensitive receptors identified, screening of noise sources by temporary screen may be employed;
- All machinery should be regularly maintained to control noise emissions, with particular emphasis on lubrication of bearings and the integrity of silencers;
- Site staff should be aware that they are working adjacent to a sensitive area and avoid all unnecessary noise due to misuse of tools and equipment, unnecessary shouting and radios;
- A further measure to reduce noise levels at the sensitive receptors would include, as far as possible, the avoidance of two noisy operations occurring simultaneously in close proximity to the same sensitive receptor;
- Adherence to any time limits imposed on noisy works by the local authority;
- Implement set working hours during the week and at weekends;
- Ensure engines are turned off when possible; and

- Should earthworks/earthworks and construction activities need to be carried out during night-time hours, the local authority could include a planning condition which requests advance notice and details of any night working to be provided.

## 5.6 Vibration from Earthworks and Construction

- 5.6.1 BS5228-2 recognises that the most common form of vibration associated with piling is the intermittent type derived from conventional driven piling.
- 5.6.2 To minimise the potential for vibration to be generated by any necessary piling it is recommended that careful consideration is given to the type of piling to be used. For example, auger bored piles would be preferable to driven piles with regards to a reduced potential for noise and vibration to be generated. However, it is recognised that the piling process will need to be selected on the basis of the strata to be encountered, the loads to be supported and the economics of the system.
- 5.6.3 The receptors likely to be affected by piling will vary depending of the phase of the Proposed Development under construction. Once the precise building locations, ground conditions for each location and type(s) of piling are confirmed, vibration levels could be estimated and recommendations for control made as appropriate.
- 5.6.4 To keep ground borne vibration to a minimum the following measures, as referred to in BS5228-2, should be put in place:
- Substitution: Where reasonably practicable, plant and or methods of work likely to cause significant levels of vibration at the receptors identified, should be replaced by less intrusive plant/methods of working; and
  - Vibration Isolation of plant at source: This may prove a viable option where the plant is stationary (e.g. a compressor, generator) and located close to a receptor.
- 5.6.5 There are a number of measures which can be implemented, depending upon the type of piling chosen. BS5228-2 indicates that mitigation might include: use of alternative methods, removal of obstructions, provision of cut-off trenches, reduction of energy input per blow, reduction of resistance to penetration. Continuous flight augering would cause minimal vibration even when very close to the piling operation.
- 5.6.6 As the construction programme and methodologies become more defined it is suggested that earthworks and construction vibration be reconsidered and that a detailed strategy for control be implemented.

## 6 CONCLUSIONS

- 6.1.1 Wardell Armstrong has carried out a noise assessment for a proposed residential development on land off Heol Goi in St Clears, Carmarthen. The report has been prepared to accompany a planning application for the proposed development.
- 6.1.2 An assessment has been carried out to consider the potential impact of noise on the proposed development and of the construction phase of the site upon the existing residential receptors.
- 6.1.3 Noise from the Adjacent commercial property Wynnstay is not considered an issue for the site.
- 6.1.4 The results of a noise survey indicate that the dominant sources of noise affecting the development site are traffic on the A40.
- 6.1.5 The majority of the site will require no internal or external mitigation. Property numbers 20 and 27 will require a 1.8m high close boarded fence along the eastern boundaries of the gardens to achieve the required outdoor living area guideline noise levels .
- 6.1.6 In order to achieve the recommended internal noise guideline levels, double glazing, such as Pilkington 6/(6-16)/6 will be required in some noise sensitive rooms which are closest to and facing the A40. An alternative means of ventilation such as the Greenwood 2500EAW.AC1 trickle vents, or similar, would be required to allow the windows to remain closed when the occupant so chooses.
- 6.1.7 With the implementation of the proposed mitigation measures, there are no planning or technical reasons with regard to noise why the proposed development should not go ahead.

## APPENDICES

## **Appendix A**

### **Legislation, Policy and Guidance**

## Policy, Standards and Guidance

### Appendix A

#### **Planning Policy Wales**

Planning Policy Wales (PPW) is the current planning policy guidance within Wales. The planning guidance defines the primary objective of the document in paragraph 1.2 as follows:

*'...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...'*

In particular reference to noise Paragraph 6.7.3 of the PPW states:

*'Problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance. Noise action plans drawn up by public bodies aim to prevent and reduce noise levels where necessary and preserve soundscape quality where it is good. Noise levels used to identify priority areas contained in noise actions plans are usually set quite high in order to focus resources on the most polluted areas and noise must meet a number of tests before it qualifies as a statutory nuisance. Lower levels of noise however, can still be annoying or disruptive and impact on amenity and as such should be protected through the planning process wherever necessary.'*

#### **Technical Advice Note 11: Noise (TAN 11)**

TAN 11 is used to categorise noise levels for proposed residential developments. TAN 11 presents four noise exposure categories (NECs), ranging from A to D, where A represents the lowest noise levels, and D is for sites with higher noise levels. A breakdown of the NECs, and subsequent advice is provided below in Table 1 and 2.

Time	Noise Exposure Category			
	A	B	C	D
0700-2300	<55	55 - 63	63 - 72	>72
2300-0700 <sup>(2)</sup>	<45	45 - 57	57 - 66	>66

#### **Footnote**

<sup>(1)</sup> **Noise levels:** the noise level(s) ( $L_{Aeq,T}$ ) used when deciding the NEC of a site should be representative of typical conditions.

<sup>(2)</sup> **Night-time noise levels (2300-0700):** sites where individual noise events regularly exceed  $82dB_{L_{Amax}}$  (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the  $L_{Aeq,8H}$  (except where the  $L_{Aeq,8H}$  already puts the site in NEC D).

Table 2: Advice relating to noise exposure category		
NEC	Significance	Advice
A	Negligible	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.
B	Minor	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.
C	Moderate	Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Major	Planning permission should normally be refused.

TAN 11 also states that:

*“This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.”*

**British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings**

British Standard 8233 “Guidance on sound insulation and noise reduction for buildings” 2014, suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation;

- 35 dB  $L_{Aeq}$  (16 hour) during the day time in noise sensitive rooms
- 30 dB  $L_{Aeq}$  (8 hour) during the night time in bedrooms
- 45 dB  $L_{Amax,F}$  during the night time in bedrooms
- 50 dB  $L_{Aeq}$  (16 hour) desirable external noise levels for amenity space such as gardens and patios
- 55 dB  $L_{Aeq}$  (16 hour) upper guideline value which would be acceptable in noisier environments.

In addition, for internal noise levels it states;

*“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 internal conditions still achieved.”*

Furthermore, with regard to external noise, the Standard states;

*“However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas,*

such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.

***British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound (BS4142):***

BS4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and
- ambient, background and residual sound levels, for the purposes of:
  - 1) Investigating complaints;
  - 2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
  - 3) Assessing sound at proposed new dwellings or premises used for residential purposes.

The purpose of the BS4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

BS4142 refers to noise from the industrial source as the ‘specific noise’ and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with industrial noise. The ‘specific noise’ sources, of the existing industrial premises that have been observed are detailed in Section 3 of this report.



BS4142 assesses the significance of impacts by comparing the specific noise level to the background noise level ( $L_{A90}$ ). Section 3 of this report provides details of the background noise survey undertaken.

Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular, BS4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS4142 are as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- 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 having a low impact, depending on the context.

During the daytime, BS4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

Where the initial estimate of the impact needs to be modified due to context, BS4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and,
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

***Good Practice Guide on the Control of Noise from Pubs and Clubs, March 2003***

The good practice guide provides guidance for the assessment of noise from affecting noise sensitive properties, from the public and private use of public houses and other similar premises. The main noise sources considered are music, singing, public address systems, children's play areas, beer gardens, people in general, car parks and access roads, deliveries, collections, materials handling, plant and machinery and skittle alleys.

The guidance states that there should be an attempt to ensure that:

*“for premises where entertainment takes place on a regular basis, music and associated sources should not be audible inside noise-sensitive property at any time”*

*and*

*“for premises where entertainment takes place less frequently, music and associated sources should not be audible inside noise-sensitive property between 23:00 and 07:00 hours”*

The guidance also suggests some mitigation measures for the control of noise from pubs, such as the following:

- The determination of an appropriate level of sound insulation based on realistic source and receptor levels;
- Automatic door closers;
- The provision of well-sealed acoustic doors on emergency exits;
- The provision of sound insulated windows;
- Where possible, plant and machinery should be positioned in a way that the building structure provides as much screening as possible for nearby noise sensitive properties; and
- Regular maintenance should be carried out on all plant and machinery to ensure noise disturbance from such sources is kept to a minimum.

***British Standard 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites – Part 1: Noise***

BS5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of large projects. For the purposes of this noise assessment, the noise likely to be generated by the earthworks and construction phase, have been assessed against significance criteria established, using the BS5228-1 ABC Method.

The ABC method for determining significance criteria requires the ambient noise levels at existing sensitive receptors to be determined. The ambient noise levels at each existing receptor location are then rounded to the nearest 5dB(A) to determine the appropriate threshold value in accordance with the category value, A B or C, as detailed in Table 2.

<b>Table 2: Thresholds of Significant Impact from Construction Noise at Residential Receptors in accordance with the ABC Method of BS5228-1</b>			
<b>Assessment Category and Threshold Value Period (L<sub>Aeq</sub>)</b>	<b>Threshold Value, in decibels (dB)</b>		
	<b>Category A *<sup>1</sup></b>	<b>Category B *<sup>2</sup></b>	<b>Category C *<sup>3</sup></b>
Daytime (0700 to 1900 hours) and Saturdays (0700 to 1300 hours)	65	70	75
* <sup>1</sup> Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than this value.			
* <sup>2</sup> Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.			
* <sup>3</sup> Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.			

The noise level likely to be generated at the receptor during the construction phase, i.e. the ambient noise level plus construction noise, is then compared to the appropriate category value. If the noise level is greater than the appropriate category value, a significant noise impact may be registered.

For the purposes of this assessment it is possible to estimate the degree of impact from the Site works (earthworks and construction), according to the suggested standards, by reference to the time periods during which noise levels may occur in excess of the quoted values. These levels can be seen in Table 3.

<b>Table 3 Construction Noise Assessment Significance Criteria</b>	
<b>Magnitude of Impact</b>	<b>Criteria for assessing Construction Noise Impact</b>
Large	Noise levels exceed the Assessment Category threshold level for the duration of the construction works.
Medium	Noise levels exceed the Assessment Category threshold level for periods of more than one month, but for significantly less than the whole duration of the construction works.
Small	Noise levels exceed the Assessment Category threshold level for periods of less than one month.
Negligible	Noise levels do not exceed the Assessment Category threshold level during any period.

***British Standard 5228-2:2009+A1:2014 Code of Practice for noise and vibration control on construction and open Sites – Part 2: Vibration***

BS5228-2 indicates that vibration can have disturbing effects on the surrounding neighbourhood; especially where particularly sensitive operations may be taking place. The significance of vibration levels which may be experienced adjacent to a Site is dependent upon the nature of the source.

It is not possible to mitigate vibration emissions from an open Site. It is important therefore to examine the proposed working method to ascertain what, if any, operations would be likely to cause unacceptable levels of vibration at nearby sensitive locations. It is possible that these operations could be modified to reduce their vibration impacts.

BS5228-2 indicates that the threshold of perception is generally accepted to be between a peak particle velocity (PPV) of 0.14 and 0.3mm/sec. In an urban situation it is unlikely that such vibration levels would be noticed. BS5228-2 also indicates that it is likely that vibration of 1.0 mm/s in residential environments will cause complaint, but can be tolerated if prior warning and explanation have been given to residents. The standard also indicates that 10 mm/s is likely to be intolerable for any more than a very brief exposure to this level.

It is not possible to establish exact vibration damage thresholds that may be applied in all situations. The likelihood of vibration induced damage or nuisance will depend upon the nature of the source, the characteristics of the intervening solid and drift geology and the response pattern of the structures around the Site. Most of these variables are too complex to quantify accurately and thresholds of damage, or nuisance, are therefore conservative estimates based on a knowledge of engineering.

Where ground vibration is of a relatively continuous nature, there is a greater likelihood of structural damage occurring, compared to transient vibration; for example, that caused by transiting vehicles.

BS5228-2 suggests that the onset of cosmetic damage is 15mm/sec (15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz for residential or light commercial type buildings).

The adverse residual impacts are assessed against the categories set out in Table 4.

<b>Table 4: Construction Vibration Assessment Significance Criteria</b>	
<b>Magnitude of Impact</b>	<b>Criteria for Assessing Construction Vibration impact</b>
Large	> 10mm per sec. Vibration likely to be intolerable for more than brief exposure. Approaching the level at which cosmetic damage may occur in light structures.
Medium	5mm - 10mm per second. Tolerance less likely even with prior warning and explanation.

Small	1mm – 5mm per second. Complaints are likely, but can be tolerated if prior warning and explanation given.
Negligible	<1mm per second. Below level at which complaints are likely.

## **Appendix B**

### **Noise monitoring Results**

**Appendix A**  
**Noise Monitoring Results**

<b>Monitoring Location 1 – North-western corner of site, approximately 20m from A40</b>						
<b>Time</b>	<b>L<sub>Aeq</sub> (dB)</b>	<b>L<sub>A min</sub> (dB)</b>	<b>L<sub>A max</sub> (dB)</b>	<b>L<sub>A90</sub> (dB)</b>	<b>L<sub>A10</sub> (dB)</b>	<b>Comments</b>
<b>11/11/2021 – Daytime (12:30-23:00)</b>						
1300-1400	61.9	42.9	69.7	53.8	65.0	Constant traffic on A40, some cars pass on Heol Goi, little noise from elsewhere, slip road noise not discernible from noise of A40 and audible noise from the depot
1400-1500	61.9	44.8	69.9	53.5	64.8	
1500-1600	62.6	44.8	70.4	56.4	65.3	
1600-1700	62.3	43.4	69.2	55.7	65.0	
1700-1800	61.5	45.5	73.3	54.0	64.3	
1800-1900	60.1	43.7	76.9	50.4	63.2	
1900-2000	58.9	42.3	77.4	48.7	62.2	
2000-2100	58.0	40.3	67.8	47.5	61.9	
2100-2200	57.6	42.9	67.8	47.4	61.4	
2200-2300	58.1	43.0	72.1	47.9	62.2	
<b>11-12/11/2021 Night-time (2300-0700)</b>						
2300-2315	57.9	43.5	69.3	46.6	62.7	Unattended
2315-2330	58.4	43.4	71.3	47.4	62.2	
2330-2345	58.0	41.9	69.0	47.9	62.1	
2345-0000	54.6	41.7	66.8	44.5	58.9	
0000-0015	57.5	42.2	69.7	46.1	61.7	
0015-0030	58.0	43.3	70.9	47.2	62.1	
0030-0045	58.2	44.1	75.7	48.0	62.1	
0045-0100	56.9	42.4	71.5	46.0	61.1	
0100-0115	56.8	43.9	68.3	47.1	61.0	
0115-0130	57.0	42.4	69.0	45.4	61.6	
0130-0145	57.6	41.3	71.0	44.4	62.5	
0145-0200	57.5	43.4	69.3	46.5	61.9	
0200-0215	56.6	42.8	67.6	45.7	60.5	
0215-0230	53.9	41.1	68.4	43.9	57.1	
0230-0245	55.7	41.1	69.2	44.7	59.4	
0245-0300	54.4	38.9	69.0	42.0	58.8	
0300-0315	59.1	46.3	70.4	50.9	62.7	
0315-0330	57.2	42.5	70.4	46.0	61.1	
0330-0345	54.5	38.4	69.0	41.7	58.2	
0345-0400	55.5	39.7	70.2	45.0	58.1	
0400-0415	58.6	42.3	72.1	46.6	62.7	
0415-0430	54.6	33.7	68.7	37.2	58.3	
0430-0445	55.8	31.4	68.5	36.9	60.2	
0445-0500	56.8	34.5	70.4	39.6	61.5	
0500-0515	55.4	36.9	68.4	41.3	59.7	
0515-0530	58.3	34.9	71.1	40.8	63.1	
0530-0545	56.8	36.5	71.1	40.3	61.8	
0545-0600	58.9	39.5	68.9	44.0	63.6	
0600-0615	58.9	40.2	70.0	44.4	63.1	
0615-0630	59.7	42.5	69.7	45.6	64.3	
0630-0645	61.8	43.3	71.0	49.1	65.9	
0645-0700	61.8	47.2	70.2	52.0	65.5	
<b>12/11/2021 – Daytime (07:00-10:00)</b>						
0700-0800	63.8	45.0	86.1	53.8	66.6	Noise from A40. No audible noise from Wynnstay
0800-0900	64.5	48.4	72.0	57.0	67.4	
0900-1000	64.7	47.3	72.3	57.1	67.7	

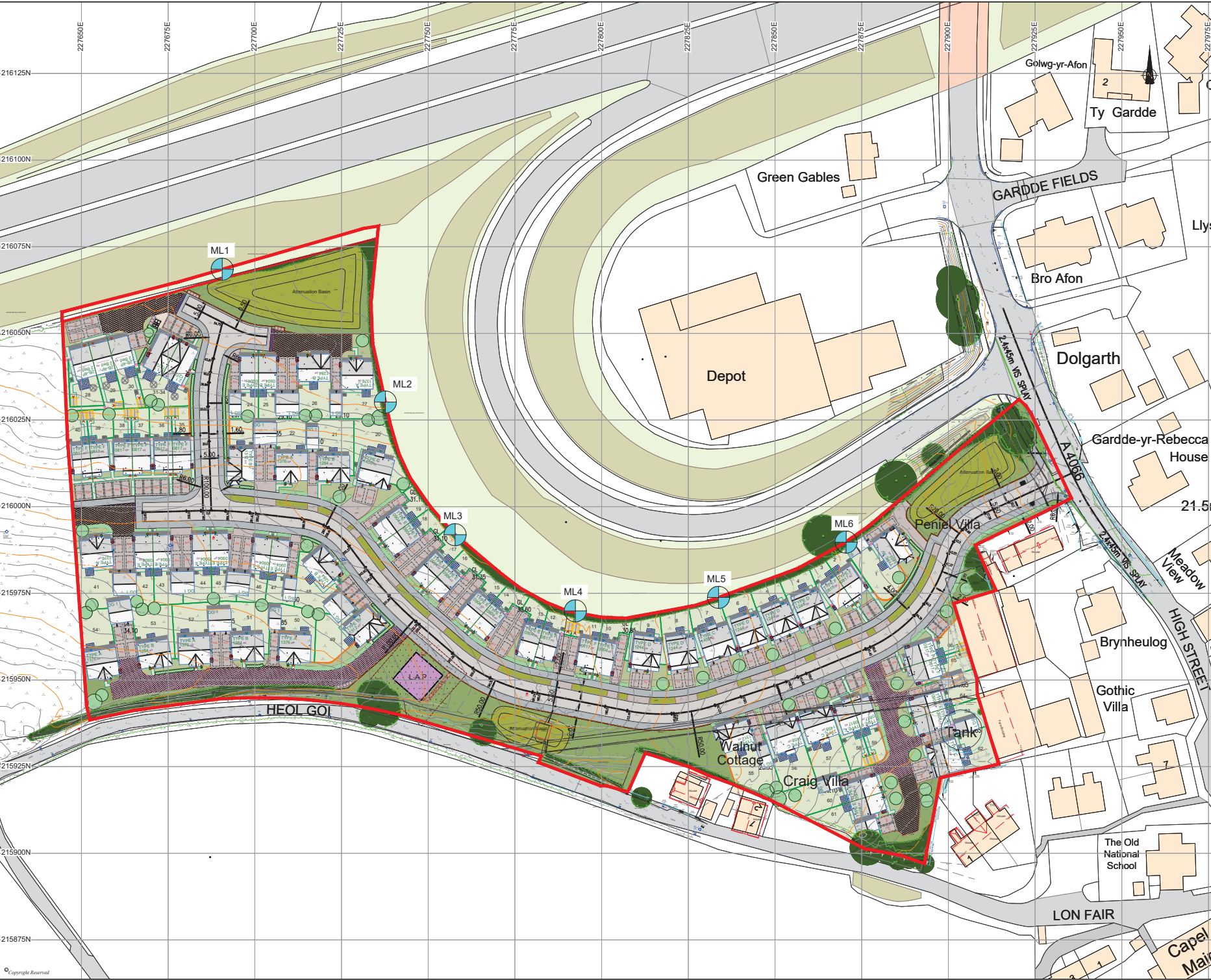
<b>Monitoring Location 2 – Eastern site boundary, approximately 65m from Wynnstay</b>						
<b>Time</b>	<b>L<sub>Aeq</sub> (dB)</b>	<b>L<sub>A min</sub> (dB)</b>	<b>L<sub>A max</sub> (dB)</b>	<b>L<sub>A90</sub> (dB)</b>	<b>L<sub>A10</sub> (dB)</b>	<b>Comments</b>
<b>11/11/2021 –Daytime (15 minute measurements)</b>						
12:43-12:59	58.2	47.2	65.5	53.1	60.7	Noise from A40. No audible noise from Wynnstay
<b>Monitoring Location 3 – Eastern site boundary, approximately 65m from Wynnstay</b>						
<b>Time</b>	<b>L<sub>Aeq</sub> (dB)</b>	<b>L<sub>A min</sub> (dB)</b>	<b>L<sub>A max</sub> (dB)</b>	<b>L<sub>A90</sub> (dB)</b>	<b>L<sub>A10</sub> (dB)</b>	<b>Comments</b>
<b>11/11/2021 –Daytime (15 minute measurements)</b>						
13:00-13:15	55.5	40.6	69.4	48.3	58.3	Noise from A40. No audible noise from Wynnstay
<b>Monitoring Location 4 – Eastern site boundary, approximately 60m from Wynnstay</b>						
<b>Time</b>	<b>L<sub>Aeq</sub> (dB)</b>	<b>L<sub>A min</sub> (dB)</b>	<b>L<sub>A max</sub> (dB)</b>	<b>L<sub>A90</sub> (dB)</b>	<b>L<sub>A10</sub> (dB)</b>	<b>Comments</b>
<b>11/11/2021 –Daytime (15 minute measurements)</b>						
13:16-13:33	52.2	43.0	62.5	45.8	55.4	Noise from A40. No audible noise from Wynnstay
<b>Monitoring Location 5 – Eastern site boundary, approximately 45m from Wynnstay</b>						
<b>Time</b>	<b>L<sub>Aeq</sub> (dB)</b>	<b>L<sub>A min</sub> (dB)</b>	<b>L<sub>A max</sub> (dB)</b>	<b>L<sub>A90</sub> (dB)</b>	<b>L<sub>A10</sub> (dB)</b>	<b>Comments</b>
<b>11/11/2021 –Daytime (15 minute measurements)</b>						
13:34-13:49	52.8	41.5	67.2	44.7	54.9	Noise from A40. No audible noise from Wynnstay
<b>Monitoring Location 6 – Eastern site boundary, approximately 35m from Wynnstay</b>						
<b>Time</b>	<b>L<sub>Aeq</sub> (dB)</b>	<b>L<sub>A min</sub> (dB)</b>	<b>L<sub>A max</sub> (dB)</b>	<b>L<sub>A90</sub> (dB)</b>	<b>L<sub>A10</sub> (dB)</b>	<b>Comments</b>
<b>11/11/2021 –Daytime (15 minute measurements)</b>						
13:52-14:07	50.8	41.2	62.4	44.1	54.3	Noise from A40. No audible noise from Wynnstay



## **DRAWINGS**

DO NOT SCALE FROM THIS DRAWING

NOTES:  
DS DATA & SITE LAYOUT PROVIDED BY CLIENT. TAKEN FROM  
JOB NO. 2128 DWG NO. SP-01 REV 01 DATED SEPT 21.



KEY  
 ML1 MONITORING LOCATION  
 SITE BOUNDARY

B	ML7 REMOVED, NEW LAYOUT ADDED	01/01	01	01
A	CONSTRUCTION ISSUE	01/01	01	01

CLIENT: **OBSIDIAN, DEVELOPMENTS**

PROJECT: **ST. CLEAR, CAMARTHEN**

DRAWING TITLE: **NOISE MONITORING LOCATION PLAN**

DRG No.	CA12170-001	REV	B
DRG SIZE	A1	SCALE	1:500
DRAWN BY	DG	CHECKED BY	RP
		DATE	NOV 2021

**wardell armstrong**

BIRMINGHAM  GLASGOW  
 BOSTON  LEEDS  
 BRISTOL  LONDON  
 CARDIFF  MANCHESTER  
 CHESTER  NEWCASTLE  
 COVENTRY  SHEFFIELD  
 DUBLIN  SOUTHAMPTON  
 EDINBURGH  STURBOURNE  
 EXETER  TOTTENHAM  
 GLoucester  WARRINGTON  
 HULL  WOLVERHAMPTON  
 IPSWICH  YORK