

Timber Products Facility
Unit 2 Earlsfield Park
Knowsley Lane
Huyton
L34 4AH

Planning Noise
Assessment Report

Project Reference: 93803 | Revision: 01 | Date: 6th January 2026
Revised Date: 8th January 2026

Document Information

Project Name : Timber Products Facility at Unit 2, Earlsfield Park, Huyton L34 4AH
Project Reference : 93803
Report Title : Planning Noise Assessment
Doc Reference : 93803/PNA
Date : 6th January 2026

	Name	Qualifications	Initials	Date
Prepared by:	Alfie Morgan	BSc(Hons), TechIOA	ADM	6 th January 2026
Reviewed and approved by:	Nigel Chandler	BSc(Hons), MIOA	NAC	7 th January 2026
For and on behalf of Noise Solutions Ltd				

Revision	Date	Description	Prepared	Reviewed/ Approved
01	08/01/2026	Updated layout drawings	ADM	NAC

Noise Solutions Ltd (NSL) disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence within the terms of the Contract with the Client and generally in accordance with the appropriate ACE Agreement and taking account of the manpower, resources, investigations and testing devoted to it by agreement with the Client. This report is confidential to the Client and NSL (Noise Solutions Ltd) accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

© Noise Solutions Ltd (NSL) 2026

Reg no. 3483481 Head office: Unit 5 Oriel Court, Omega Park, Alton, Hampshire, GU34 2YT
Manchester office: 17 King Street, Knutsford, WA16 6DW

Contents

1.0	Introduction	1
2.0	Details of development proposals.....	1
3.0	Nearest noise sensitive receptors	2
4.0	Noise policy	3
	National Planning Policy Framework	3
	Noise Policy Statement for England	4
	Planning Practice Guidance – Noise.....	5
5.0	Acoustic Standards and planning conditions	8
	Planning conditions	10
	Application of criteria	10
6.0	Assessment of delivery noise	11
	Delivery noise associated with the dispatch of completed products	11
	Delivery noise associated with arrival of materials to site.....	14
	Cumulative delivery impact.....	17
7.0	Noise from activities within the warehouse	17
8.0	Plant noise guidance	20
9.0	Discussion of results	20
	Operational noise.....	20
	Plant noise.....	20
10.0	Summary	20

Appendices

Appendix A	Acoustic terminology
Appendix B	Photograph of site showing areas of interest
Appendix C	Proposed development plans and elevations
Appendix D	Sound survey results from "AC103830-1R13"
Appendix E	Operational noise calculations
Appendix F	Assessment of noise breakout from warehouse

Executive Summary

Noise Solutions Limited has been commissioned to provide an assessment of likely noise impacts from a proposed timber products facility, at Unit 2 Earlsfield Park, Huyton.

The proposed use is Class B2: at present only B1, and B8 use classes are permitted at the site.

The assessment of operational noise from the proposed premises, including vehicles, loading and unloading, and activities within the warehouse, indicates that cumulative noise levels from all activities within the site will be below the representative background sound levels during the most sensitive hours of operation and would therefore meet the requirements set out in the relevant planning condition.

Plant noise limits have been given at the nearest noise-sensitive receptor, such that cumulative noise is no higher than the existing representative background sound level and would therefore meet the requirements outlined in condition 18.

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned to undertake a noise assessment relating to a proposed development at Unit 2, Earlsfield Park, Knowsley Lane, Huyton, L34 4AH.
- 1.2. The proposed development requires Class B2 usage. At present the site is only permitted for Classes B1, and B8 uses. This report presents the applicable policies and guidance, and a noise impact assessment to discharge noise-related conditions to support a planning application to enable Class B2 usage.
- 1.3. Assessments have been made of likely noise levels resulting from operations at the premises, including vehicle movements and loading/ unloading within the external yard, and noise breakout from the premises. Guidance has been given with regard to the maximum permissible plant sound levels at nearby noise-sensitive receptors.
- 1.4. To assist with the understanding of this report a brief glossary of acoustic terms can be found in **Appendix A**. A more in-depth glossary of acoustic terms can be assessed at the following web address <http://www.acoustic-glossary.co.uk/>.

2.0 Details of development proposals

- 2.1. It is proposed for a timber products facility to occupy the currently vacant Unit 2 at Earlsfield Park, Knowsley Lane, Huyton.
- 2.2. The proposed development comprises a ca. 4,750m² building with external yard and parking. It is understood that there will only be activity on site during the daytime (07:00 – 23:00). The proposed layout of the site is shown in **Appendix C**.
- 2.3. Condition 18 of application reference 20/00376/OUT states that *"The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13)"*.
- 2.4. Likely noise-emitting activities are understood to be as follows:
 - Loading events associated with the dispatch of completed timber products, including;
 - Four or five HGVs will depart from the site to deliver completed timber products between 07:00 – 08:00 daily,
 - Four or five HGVs will return to site following deliveries around 16:00 – 17:00 daily.
The vehicles will reverse up to dock levellers, which will seal the opening of the lorry

from the service yard. They will then be internally loaded via forklift for deliveries the next day.

- Loading events associated with material deliveries to the site, including;
 - 4no. HGV timber-sheet deliveries per week. These deliveries will be unloaded externally, with forklifts used to move the palletised materials inside;
 - additionally, 2no. Luton-type van deliveries will occur weekly.
- Breakout noise through the building structure due to manufacturing activities inside. These will be ongoing throughout the course of a workday and includes but not limited to; timber components being manufactured using a CNC cutter, router and sander; manual assembly; lacquering of products; and the packing and stacking of finished products.
- Noise from ventilation and similar plant. Full details of plant proposals are not known at this early stage and therefore guidance is provided to aid the selection of plant and any attenuation necessary.

3.0 Nearest noise sensitive receptors

- 3.1. The area surrounding the site is mixed residential and commercial in use. The site is bounded to the north by the M57 motorway, to the East by other commercial premises, to the south by Arley Drive, the sole access road to the site, and by a residential housing estate to the west.
- 3.2. Receptor R1 has been identified as 50 Henhouse Drive, approximately 68m from the closest façade of the development. The service yard where deliveries will occur is over 150m from this receptor and is screened from R1 by the commercial unit itself.
- 3.3. Receptor R2 has been identified as 64 Higherfield Crescent, approximately 84m from the closest façade of the development. The service yard where deliveries occur is over 150m from this receptor and is mostly screened from R2 by the commercial unit itself.
- 3.4. Receptor R3 has been identified as 133 Knowsley Lane, approximately 150m from the closest façade of the development. The service yard where deliveries will occur is over 170m from this receptor, which has full line of sight to the service yard.
- 3.5. **Appendix B** contains an aerial photograph showing the site and surrounding area.

4.0 Noise policy

National Planning Policy Framework

- 4.1. A new edition of the NPPF was published in December 2024 and came into effect immediately, with corrections issued in February 2025. The original National Planning Policy Framework (NPPF¹) was published in March 2012, with subsequent revisions made periodically - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The December 2024 revised edition contains no new directions or guidance with respect to noise. The paragraph references quoted below relate to the December 2024/February 2025 edition.
- 4.2. Paragraph 187 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*
- 4.3. The NPPF goes on to state in Paragraph 198:
- "planning policies and decisions should ...*
- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development, - and avoid noise giving rise to significant adverse impacts on health and quality of life;*
 - b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason ...*
- 4.4. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE²).
- 4.5. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission be determined in accordance with the development plan unless material considerations indicate otherwise."*
- 4.6. Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed"*.

¹ National Planning Policy Framework, DCLG, March 2012

² Noise Policy Statement for England, DEFRA, March 2010

4.7. Paragraph 87 of the NPF states:

"Planning policies and decisions should recognise and address the specific locational requirements of different sectors. This includes making provision for:

- a) clusters or networks of knowledge and data-driven, creative or high technology industries; and for new, expanded or upgraded facilities and infrastructure that are needed to support the growth of these industries (including data centres and grid connections);*
- b) storage and distribution operations at a variety of scales and in suitably accessible locations that allow for the efficient and reliable handling of goods, especially where this is needed to support the supply chain, transport innovation and decarbonisation; and*
- c) the expansion or modernisation of other industries of local, regional or national importance to support economic growth and resilience".*

4.8. Paragraph 124 states that *"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land".*

Noise Policy Statement for England

4.9. The Noise Policy Statement for England (NPSE³), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are: *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- avoid significant adverse effects on health and quality of life;*
- mitigate and minimise adverse effects on health and quality of life; and*
- where possible, contribute to the improvement of health and quality of life."*

4.10. The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and quality of life occur.

³ Noise Policy Statement for England, Defra, March 2010

- 4.11. The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the NPSE). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case: *"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."*
- 4.12. Importantly, the NPSE goes on to state that: "This does not mean that such adverse effects cannot occur."
- 4.13. The NPSE does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that: *"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*
- 4.14. It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

Planning Practice Guidance – Noise

- 4.15. An updated Planning Practice Guidance (PPG⁴) for noise was published on 22 July 2019 and provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:
- Whether or not a significant adverse effect is occurring or likely to occur;
 - Whether or not an adverse effect is occurring or likely to occur; and
 - Whether or not a good standard of amenity can be achieved.
- 4.16. This guidance introduced the concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). NOAEL differs from NOEL in that it represents a situation where the acoustic character of an area can be slightly affected (but not such that there is a perceived change in the quality of life). UAEL represents a situation where noise is 'very disruptive' and should be 'prevented' (as opposed to SOAEL, which represents a situation where noise is 'disruptive', and should be 'avoided').

⁴ Planning Practice Guidance – Noise, <https://www.gov.uk/guidance/noise--2>, 22 July 2019

- 4.17. As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.
- 4.18. The LOAEL is described in PPG⁵ as the level above which *"noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard"*.
- 4.19. PPG identifies the SOAEL as the level above which *"noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present."*
- 4.20. In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG⁶ acknowledges that *"...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation."*
- 4.21. The relevant guidance in the PPG in relation to the adverse effect levels is summarized in Table 1.

Table 1 PPG Noise effects table

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not Intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and Intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up	Observed Adverse Effect	Mitigate and reduce

⁵ Paragraph: 005 Reference ID: 30-005-20190722

⁶ Paragraph: 006 Reference ID: 30-006-20190722

Response	Examples of Outcomes	Increasing Effect Level	Action
	volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.		to a minimum
Significant Observed Adverse Effect Level			
Present and Disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very Disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

4.22. The Planning Practice Guidance⁷ states the following in relation to mitigation measures:

"For noise sensitive developments, mitigation measures can include avoiding noisy locations in the first place; designing the development to reduce the impact of noise from adjoining activities or the local environment; incorporating noise barriers; and optimising the sound insulation provided by the building envelope."

4.23. In addition, the Guide notes that it may also be relevant to consider⁸:

"... whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living

⁷ Paragraph: 010 Reference ID: 30-010-20190722

⁸ Paragraph: 006 Reference ID: 30-006-20190722

conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations”.

5.0 Acoustic Standards and planning conditions

BS 4142:2014 + A1:2019 Methods for Rating and Measuring Industrial and Commercial Sound

- 5.1. BS 4142:2014+A1:2019 describes a method for rating and assessing sound of an industrial or commercial nature, which includes:
- 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.
- 5.2. Therefore, for the first time in the UK, noise associated with store deliveries (i.e. sound from loading and unloading of goods) has a recognised and approved assessment methodology as this type of noise was not included in the scope of previous versions of BS 4142.
- 5.3. The industrial or commercial sound is assessed outside a dwelling or premises used for residential purposes, upon which sound is incident.
- 5.4. The procedure contained in BS4142:2014 + A1:2019 is to quantify the “specific sound level”, which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15-minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.
- 5.5. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.
- 5.6. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: “Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.”

- 5.7. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible."
- 5.8. The background sound level should be established in terms of the L_{A90} noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. This should not normally be less than 15-minute intervals. The standard states that: "A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."
- 5.9. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:

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

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

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

The standard goes on to note that: "Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

- 5.10. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making

assessments and arriving at decisions, therefore, it is essential to place the sound in context."

- 5.11. BS 4142:2014 + A1:2019 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

Planning conditions

- 5.12. Planning permission for the change of use has been granted by Knowsley Metropolitan Borough Council, subject to conditions.
- 5.13. Condition 18 of application reference 20/00376/OUT states the following.

"The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13) and as measured at the following times:

- LAeq (1 hour) between 0700-2300

- LAeq (15 mins) between 2300-0700

Noise limits are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006"

Application of criteria

- 5.14. Based on guidance within BS 4142:2014+A1:2019, and planning condition 18, the following noise limits have been set at nearby receptors.

Table 2 Maximum commercial noise rating level at receptors

Period	Maximum Rating level, L_{Ar} , dB from commercial noise at nearby residential receptors
Daytime (07:00 – 23:00)	52

- 5.15. The above level of 52dB is based on the lowest measured weekday background sound pressure level from Ensaf Consultants' report⁹ titled "AC103830-1R13" at NMP3, for which the following was noted.

"NMP3: Located in an existing hedgerow to the north of existing receptors off Knowsley Lane and Lyme Close. The microphone of the sound level meter was positioned at a height of 1.5m above ground level and in free-field conditions. The noise climate at this location was dominated by road traffic sound."

- 5.16. This is robustly representative of receptors R1, and R2, as both of these receptors are considerably closer to the M57 motorway than the measurement position, and existing environmental noise levels at both receptors are likely much higher than at the measurement position.
- 5.17. Being along Knowsley Lane, this position is likely an accurate representation of anticipated background sound levels at receptor R3.

6.0 Assessment of delivery noise

Delivery noise associated with the dispatch of completed products

- 6.1. Four or five HGVs will depart from the site to deliver completed timber products between 07:00 08:00 daily. Four or five HGVs will return to site following deliveries around 16:00 – 17:00 daily. The vehicles will reverse up to dock levellers, which will seal the opening of the trailer.
- 6.2. NSL has previously measured the sound pressure levels associated with lorry movements at a number of sites. The measurements included all aspects of the delivery including, but not limited to, the arrival, unloading and the departure of the lorry. The sound pressure levels were normalised to a distance of 10m from the vehicle and have been converted to Sound Exposure Levels (SEL) for ease of comparison/calculation.
- 6.3. Table 3 details typical source noise levels used within the assessment, with the data presented in terms of the SEL.

Table 3 Reference noise data for receipt and despatch activities (at 10m)

Noise Source	SEL, dB(A)	Applicable BS4142:2014 acoustic feature
Vehicle arrival / pass-by	66	+3 intermittency
Manoeuvring	65	+3 intermittency
Door open/close	60	+6 impulsivity

⁹ Ensaf Consultants report titled "Noise Impact Assessment for ION Property Developments LTD at Knowsley Lane, Huyton AC103830-1R13" Dated 17/11/2020

Noise Source	SEL, dB(A)	Applicable BS4142:2014 acoustic feature
Materials handling	51	+6 impulsivity
Engine starts and departs	66	+3 intermittency

- 6.4. The information contained in Table 3 was used to model a source noise level based on the number of activity events over the required assessment period using the following equation:

$$L_{Aeq,T} = SEL + 10 \cdot \log\left(\frac{1}{T}\right) + 10 \cdot \log(N) \quad (\text{Equation 1})$$

Where:

SEL is the L_{Aeq} over a one second period, and represents the noise energy from an event (e.g. cage movement) compressed into one second;

T is the reference time period in seconds; and

N is the number of movements in the time period, T.

- 6.5. For delivery events associated with the dispatch of completed products, there may be up to five deliveries to or despatches from the premises in any one hour during the daytime and no delivery activities associated with the site shall occur during the night-time period.

Table 4 Distances to facades of nearest houses

Item	Distance to R1, m	Distance to R2, m	Distance to R3, m
Lorry arrives and turns (Arley Drive)	150	130	110
Lorry reverses and manoeuvres into loading bay	160	185	205
Door open / close	135	165	205
Cage/pallet movement (internally, central location within trailer assumed)	122	153	202
Engine starts and lorry departs*	135	130	110

**For robustness of the assessment this has been taken as the closest point that the delivery vehicle will be to a given receptor*

- 6.6. The noise level at each of the identified receptors due to dispatch delivery activities has been predicted. Full calculations are shown in [Appendix E](#) and are summarised in Table 5.

Table 5 Predicted noise levels due to vehicle movements

Receptor	Predicted rating levels at nearest noise-sensitive receptors	
	Daytime $L_{A,1hr}$, dB	Range of L_{Amax} , dB
R1	22	24-38
R2	23	22-39
R3	29	32-50

- 6.7. The highest anticipated L_{Amax} at the most affected residential receptor is 50dBA. This represents the expected loudest 1/8th of a second during an hour-long period where 5 delivery events

occur. While there is no acoustic criterion for daytime $L_{A_{fmax}}$ levels, comparing this to the lowest measured weekday $L_{A_{eq,1hour}}$ at NMP3 from the report titled "AC103830-1R13" of 54dBA shows that the loudest occurrence during a delivery event would barely be audible over the residual environment at the worst-case noise sensitive receptor, during the quietest time of the day.

- 6.8. Table 6 below presents the initial assessment of the likely noise impact due to deliveries in accordance with the BS 4142:2014 methodology. Rating levels are inclusive of the BS 4142 feature corrections noted in Table 3. "Pass/fail" relates to compliance with the criterion in Planning Condition 18.

Table 6 Delivery noise impact assessment

Receptor	Period	Predicted rating level at receptor, $L_{A_{r,Tr}}$ (dB)	Criteria (dB)	Excess of rating level over Criteria (dB)	Pass/ Fail
R1	Daytime	22	52	-30	Pass
R2	Daytime	23	52	-29	Pass
R3	Daytime	29	52	-23	Pass

- 6.9. Table 7 below presents a BS 4142:2014 assessment of the noise at the most affected residential receptor and adds context about the likely impact of the deliveries.

Table 7 BS 4142:2014 assessment of dispatch related delivery noise at the most affected residential receptor

Results	07.00 – 23.00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 52\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{A_{eq,T}} = 26\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	+3dB	9.2	See calculation
Rating Level	29dB		
Excess of Rating Level over background sound level	(29-52) dB = -23dB		

Results	07.00 – 23.00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Context	The rating $L_{Aeq,1hour}$ of 29dB, at the worst-case noise sensitive receptor is 23dB below the lowest daytime background sound level. This means that any noise from delivery events would be completely inaudible over the residual noise environment.		
Assessment of impact:	No impact		

- 6.10. The assessment and context show that noise from dispatch related deliveries alone would be below the background sound level to the extent it would be subjectively inaudible at all nearby noise-sensitive receptors, and would fall under “no impact” using the methodology described in BS 4142:2014+A1:2019.

Delivery noise associated with arrival of materials to site

- 6.11. Material deliveries to site will consist of 6no. timber-sheet deliveries per week, with 4no. from HGVs, and 2no. from Luton-type vans. These deliveries will be unloaded externally, with forklifts used to move the palletised materials inside;
- 6.12. NSL has previously measured the sound pressure levels associated with deliveries involving forklifts moving palletised materials from a lorry. The measurements included all aspects of the delivery including, but not limited to, the arrival, unloading of the lorry using a forklift, and the departure of the lorry. The sound pressure levels were normalised to a distance of 10m from the vehicle and have been converted to Sound Exposure Levels (SEL) for ease of comparison/calculation. These have been summarised in Table 8 below.

Table 8 Reference noise data for delivery events including a forklift

Noise Source	SEL, dB(A)	Applicable BS4142:2014 acoustic feature
Lorry arrival	68	+3 intermittency
Forklift manoeuvring/ handling	72	+6 impulsivity
Lorry departure	75	+3 intermittency

- 6.13. The information contained Table 8 was used to model a source noise level based on the number of activity events over the required assessment period using the following equation:

$$L_{Aeq,T} = SEL + 10 \cdot \log\left(\frac{1}{T}\right) + 10 \cdot \log(N) \quad (\text{Equation 1})$$

Where:

SEL is the L_{Aeq} over a one second period, and represents the noise energy from an event (e.g. forklift movement) compressed into one second;

T is the reference time period in seconds; and

N is the number of movements in the time period, T.

- 6.14. For delivery events associated with the arrival of materials to site, there is expected to be up to 6no. deliveries per week, only 4 of which will be via HGV. There are 2no. available delivery bays available to take in materials, and for a robust assessment noise levels have been calculated as if two delivery events occur within the same hour, even though this is highly unlikely to occur.
- 6.15. It has been robustly anticipated that as many as 20 forklift pallet movements could occur during a single delivery event.

Item	Distance to R1, m	Distance to R2, m	Distance to R3, m
Lorry arrives and turns (Arley Drive)	150	130	110
Forklift manoeuvring	150	161	170
Engine starts and lorry departs*	150	130	110

**For robustness of the assessment this has been taken as the closest point that the delivery vehicle will be to a given receptor*

- 6.16. The anticipated rating level associated with material deliveries to the site has been predicted. Table 9 outlines results at the nearby residential receptors.

Table 9 Anticipated noise levels at receptors from material delivery arrivals

Receptor	Predicted rating levels at nearest noise-sensitive receptors	
	Daytime $L_{Ar,1hr}$, dB	Highest L_{Amax} , dB
R1	27	35
R2	27	35
R3	34	44

- 6.17. The highest anticipated L_{Amax} at the most affected residential receptor is 44dBA. This represents the expected loudest 1/8th of a second during an hour-long period where 2 material delivery events occur. While there is no acoustic criterion for daytime L_{Amax} levels, comparing this to the lowest measured weekday $L_{Aeq,1hour}$ at NMP3 from the report titled "AC103830-1R13" of 52dBA shows that the loudest occurrence during a delivery event would be indistinguishable over the residual environment at the worst-case noise sensitive receptor.
- 6.18. Table 10 below presents the initial assessment of the likely noise impact due to deliveries in accordance with the BS 4142:2014 methodology. Rating levels are inclusive of the BS 4142 feature corrections noted in Table 8.

Table 10 Delivery noise impact assessment

Receptor	Period	Predicted rating level at receptor, $L_{A,r,Tr}$ (dB)	Criteria (dB)	Excess of rating level over Criteria (dB)	Pass/ Fail
R1	Daytime	27	52	-25	Pass
R2	Daytime	27	52	-25	Pass
R3	Daytime	34	52	-18	Pass

- 6.19. Table 11 below presents a BS 4142:2014 assessment of the noise at the most affected residential receptor and adds context about the likely impact of the deliveries.

Table 11 BS 4142:2014 assessment of material delivery noise at the most affected residential receptor

Results	07.00 – 23.00 hrs	Relevant Clauses of BS 4142:2014	Commentary
Background Sound level	$L_{A90} = 52\text{dB}$	8.1, 8.2	Lowest measured daytime background sound level.
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level Manual handling (MH) Forklift (F)	(MH) $L_{Aeq,T} = 20\text{dB}$ (F) $L_{Aeq,T} = 28\text{dB}$	7.3.6	Calculations presented in Appendix F (worst-case tabulated)
Acoustic Feature Correction	(MH) +3dB (F) +6dB	9.2	See calculation
Rating Level (each)	(MH) = 23dB (F) = 34dB		
Cumulative Rating Level	34dB		
Excess of Rating Level over background sound level	(34-52) dB = -18dB		
Context	The rating $L_{Aeq,1\text{hour}}$ of 34dB, at the worst-case noise sensitive receptor is 18dB below the lowest daytime background sound level. This means that any noise from delivery events would be completely inaudible over the residual noise environment.		
Assessment of impact:	No impact		

- 6.20. The assessment and context show that noise from material arrival related deliveries alone would be subjectively inaudible at all nearby noise-sensitive receptors, therefore it would fall under "no impact" using the methodology described in BS 4142:2014+A1:2019.

Cumulative delivery impact

- 6.21. Although it is highly unlikely that both types of deliveries for the site would occur simultaneously, Table 12 below outlines the predicted noise impact if such an event were to occur.

Table 12 Predicted cumulative delivery noise levels

Receptor	Predicted rating levels at nearest noise-sensitive receptors		
	Dispatch events $L_{Ar,1hr}$, dB	Delivery events $L_{Ar,1hr}$, dB	Events combined $L_{Ar,1hr}$, dB
R1	22	27	28
R2	23	27	28
R3	29	34	35

- 6.22. As shown in the above table, noise levels associated with deliveries during the very worst-case scenario would result in levels significantly below the lowest daytime background sound level and would be subjectively inaudible at the nearest noise sensitive receptors.
- 6.23. As the standard advises, the estimated impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:
- The assessments are undertaken at a single residential window. The impact on all other residential windows will be lower due to distance losses and noise screening provided by the building structure.
- 6.24. Where possible uncertainty in this assessment has been minimised by taking the following steps:
- Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.

7.0 Noise from activities within the warehouse

- 7.1. Based on noise at work assessments at similar wood product manufacturing facilities, a robust reverberant internal level near machinery within the warehouse would be between 85-90dB L_{Aeq} . This has been corrected to an overall sound power level of 100dB, to calculate the impact of noise breakout at the nearest receptors.
- 7.2. The airborne sound insulation of the external building façade has been calculated using Insul modelling software. There are three different build-ups. These are as follows;

- The first façade build up consists of an outer layer, cavity with mineral infill, and inner layer. This build up is found at elevations below 9m, except for corners of the building. This has a sound insulation value of 45dB R_w .
 - Outer façade: 0.50mm galvanized steel cladding (Tata Steel HPS200 Ultra)
 - Cavity: 200mm Airgap, 75mm fibreglass mineral infill, with 1.45mm thick steel frames.
 - Inner facing: 12.5mm plasterboard
- The second façade build up is nearly identical to the first, however it does not include an inner layer. It is found at the top of the warehouse façade for the 3m below the roof. This has a sound insulation value of 42dB R_w .
 - Outer façade: 0.50mm galvanized steel cladding (Tata Steel HPS200 Ultra)
 - Cavity: 200mm Airgap, 75mm fibreglass mineral infill, with 1.45mm thick steel frames.
 - Inner facing: plastered facing
- The third façade build up consists of generic cladding. This is found in the corners of the warehouse and has a sound insulation value of 25dB R_w .
- There will also be roller shutter doors. This has approximately the same sound insulation as the generic cladding, 25dB R_w .

7.3. The table below outlines the sound reduction index of each build up.

Table 13 Sound reduction index of façade build-ups

Build-up no.	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz							
	63	125	250	500	1k	2k	4k	8k
1	11	19	38	47	48	61	63	63
2	11	18	37	46	47	62	63	63
3	20	15	17	23	18	25	40	46
4	20	15	17	23	18	25	40	46

- 7.4. The predicted noise levels at the nearest receptors have been calculated and summarised in [Appendix F](#).
- 7.5. In order to determine the exact performance of a given section of the warehouse, an average sound reduction index for the given façade must be calculated. Table 14 below outlines the surface area of each composition for a given façade.

Table 14 Surface area of wall compositions

Wall composition	Surface Area m ²			
	Clamping area	CNC Area west wall	CNC Area south wall	Delivery areas
Build-up 1	495	144	243	413
Build-up 2	252	96	136	244
Build-up 3+4	72	72	63	136
Total wall area	819	312	442	793

- 7.6. Based on the surface areas in the above table, the composite sound reduction index for each façade has been calculated, the results are shown in Table 15 below.

Table 15 Composite sound reduction index for each façade

Façade	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz							
	63	125	250	500	1k	2k	4k	8k
Clamping area	12	18	36	45	45	58	61	62
CNC area west wall	13	18	33	41	41	53	58	59
CNC area south wall	12	18	35	43	43	56	60	61
Delivery areas	13	18	34	43	43	55	59	60

- 7.7. Based on the composite sound reduction indexes calculated above, Table 16 below presents the initial assessment of the likely noise impact due to internal activities in accordance with the BS 4142:2014 methodology. Rating levels are inclusive of a 5dB feature correction. This partly for impulsive noise (e.g. bangs and clatters) and also tonality (for example of tool operation) that may be just perceptible at the receptors.

Table 16 BS 4142:2014 noise impact assessment - commercial unit noise breakout

Receptor	Period	Predicted rating level at receptor, L _{Ar,Tr} (dB)	Representative background sound level, L _{A90} (dB)	Excess of rating over background (dB)	Pass/ Fail
R1	Day	47	52	-5	Pass
R2	Day	46	52	-6	Pass
R3	Day	38	52	-14	Pass

- 7.8. This assessment shows that the rating level at the receptors is, at worst, 5dB below the existing lowest daytime background sound level, and passes the requirements of condition 18. Further, when context is taken into account, there will be low likelihood of adverse noise impact using the methodology described in BS 4142:2014+A1:2019.

8.0 Plant noise guidance

- 8.1. Noise from any proposed plant, when assessed as a rating level according to methodology within BS 4142:2014 should not exceed the limits shown in Table 17 at the nearest residential receptors. This limit would mean that the combined rating level of operational noise and plant noise would comply with the criterion in Planning Condition 18.

Table 17 Proposed plant noise emissions level limits at noise sensitive residential receptors

Receptor	Period	Maximum plant rating level, dB L _{Ar,Tr} 1m from receptive window
R1-R3	Daytime (07.00 – 23.00 hours)	47

- 8.2. Plant is yet to be selected at this stage. Once plant has been selected NSL will update this section to provide a full noise impact assessment of the proposed equipment. This will take into account the distance between the plant and the nearest noise sensitive receptors. These levels will include any penalties as described in BS 4142:2014, applied for the possible presence of Tonality, Impulsivity, or Intermittency.
- 8.3. Noise from any proposed plant shall be suitably attenuated so that the cumulative rating level is equal to, or below the level described in Table 17.

9.0 Discussion of results

Operational noise

- 9.1. The BS 4142 assessment indicates that noise from activities at the site, including vehicles, loading and unloading, basic vehicle maintenance and activities within the warehouse, will have no worse than a low impact at any time of operation.

Plant noise

- 9.2. When plant is selected based on the guidance levels outlined within this report, noise from the proposed plant will meet the local authority's usual criteria.

10.0 Summary

- 10.1. Noise Solutions Ltd (NSL) has been commissioned to provide an assessment of noise relating to a proposed development at Unit 2, Earlsfield Park, Knowsley Lane, Huyton, L34 4AH.
- 10.2. As per Condition 18 of application reference 20/00376/OUT states that *"The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background*

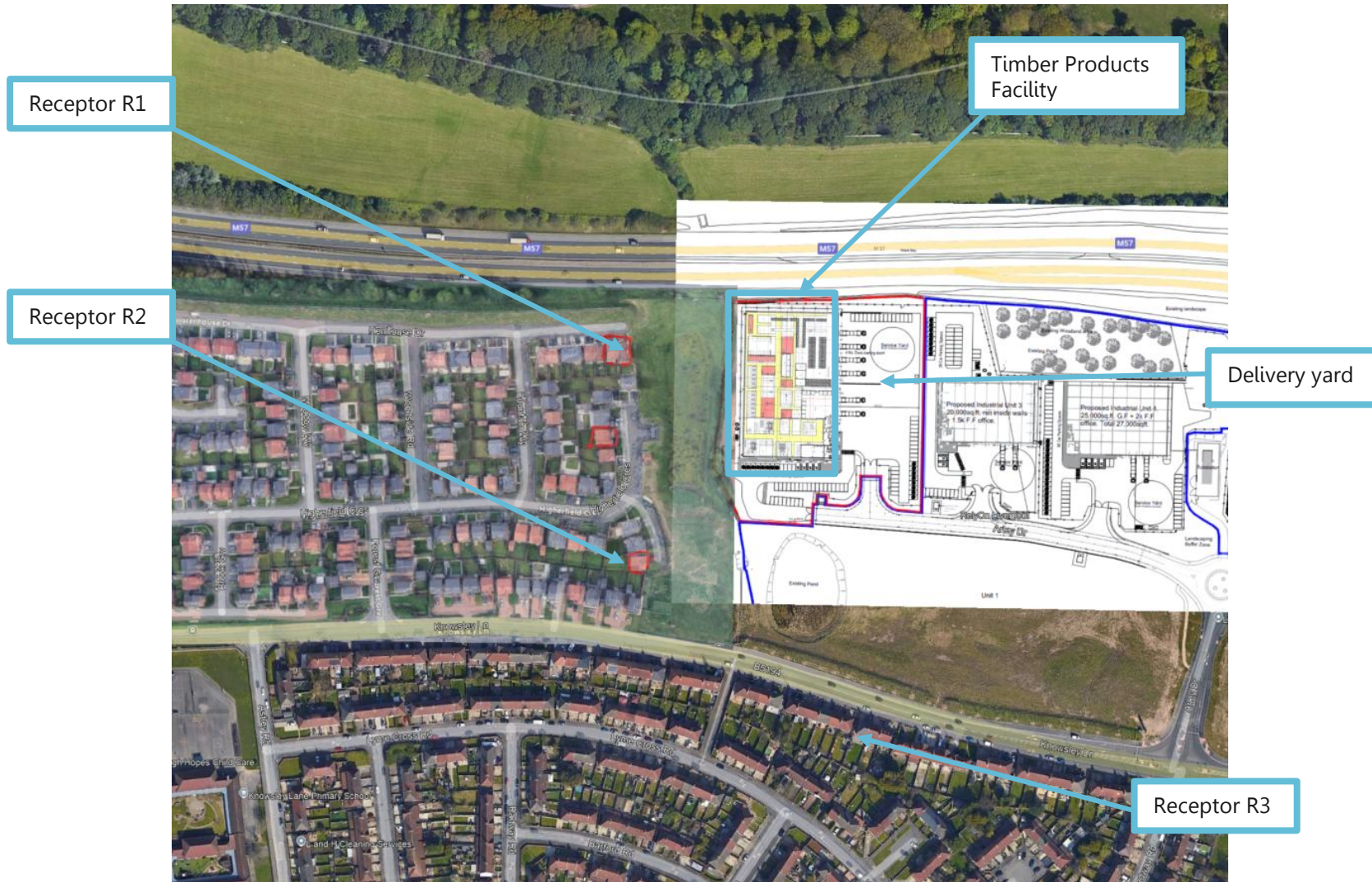
noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13)".

- 10.3. Survey results within the referenced report were used to undertake an assessment of the likely noise impact from activities at the premises. For the purposes of the assessment, the methodology used in BS 4142:2014 +A1:2019 was utilised. Reference noise measurements of similar activities at other sites were used in the assessment.
- 10.4. Noise from activities at the premises are predicted to be no louder than the existing background sound level outlined in Ensaf Consultants' report, and thus satisfying condition 18.
- 10.5. Plant noise limits have been given such that the rating level from plant will be no higher than the existing background sound level at the nearest residential premises.
- 10.6. Based on the findings of this assessment, noise should not be grounds for refusal of planning permission for the proposed development.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Photograph of site showing areas of interest



External Materials:

- Roof: Kingspan K1000RW composite system (or similar approved) - Colour: Gosswater Grey BS 10425. Rooflights - 10% to warehouse area (Currently shown indicative).
- Walls: Vertical cladding - Twin skin system covered with profiled trapezoidal galvanneal steel cladding, HPS200 Ultra colour - Swire Grey RAL 9005 20.
- Walls: Horizontal cladding - Twin skin system covered with profiled trapezoidal galvanneal steel cladding, HPS200 Ultra from Taka Steel Colour - Malthouse RAL 980 70 10.
- Composite corner feature panels: Kingspan K1000MR - Mono - rb (or similar approved) composite panels laid horizontally at various lengths, SL Forte finish, colour - Cream RAL 1015, Malthouse RAL 980 70 10.
- Office corner panels: Kingspan K1000MR - Mono - rb (or similar approved) composite panels laid horizontally, SL Forte finish, colour - Cream RAL 1015, Malthouse RAL 980 70 10.
- All finishing to be contrasting black RAL 9005.
- Doors / windows / Curtain walling - Polyester power coated frames, colour - RAL 7022. Solar reflective glazing.
- Fire exit doors, steel door sets, colour - RAL 7022.
- Level entry & dock doors, prefinished colour - RAL 7022.
- Office brickwork to be flat red brick, Reference Bristol red.
- Low level walls, retaining walls & walls to loading dock - Pre cast concrete.

Colours & finishes to be agreed with Local Authority

1 North Elevation Finishes
1: 200

2 East elevation Finishes
1: 200

3 South Elevation Finishes
1: 200

4 West Elevation Finishes
1: 200

Revisions

Rev	Date	Description
A	05/11/23	Fig adjust for composite panels adjacent dock loading

BUILDING MANAGEMENT SERVICES LTD
Hutterfield Road
Slough, West Yorkshire
YO8 9BW
TELEPHONE: 01452 (01452) 371616
FAX No: 01452 376717
email: info@bmsltd.com

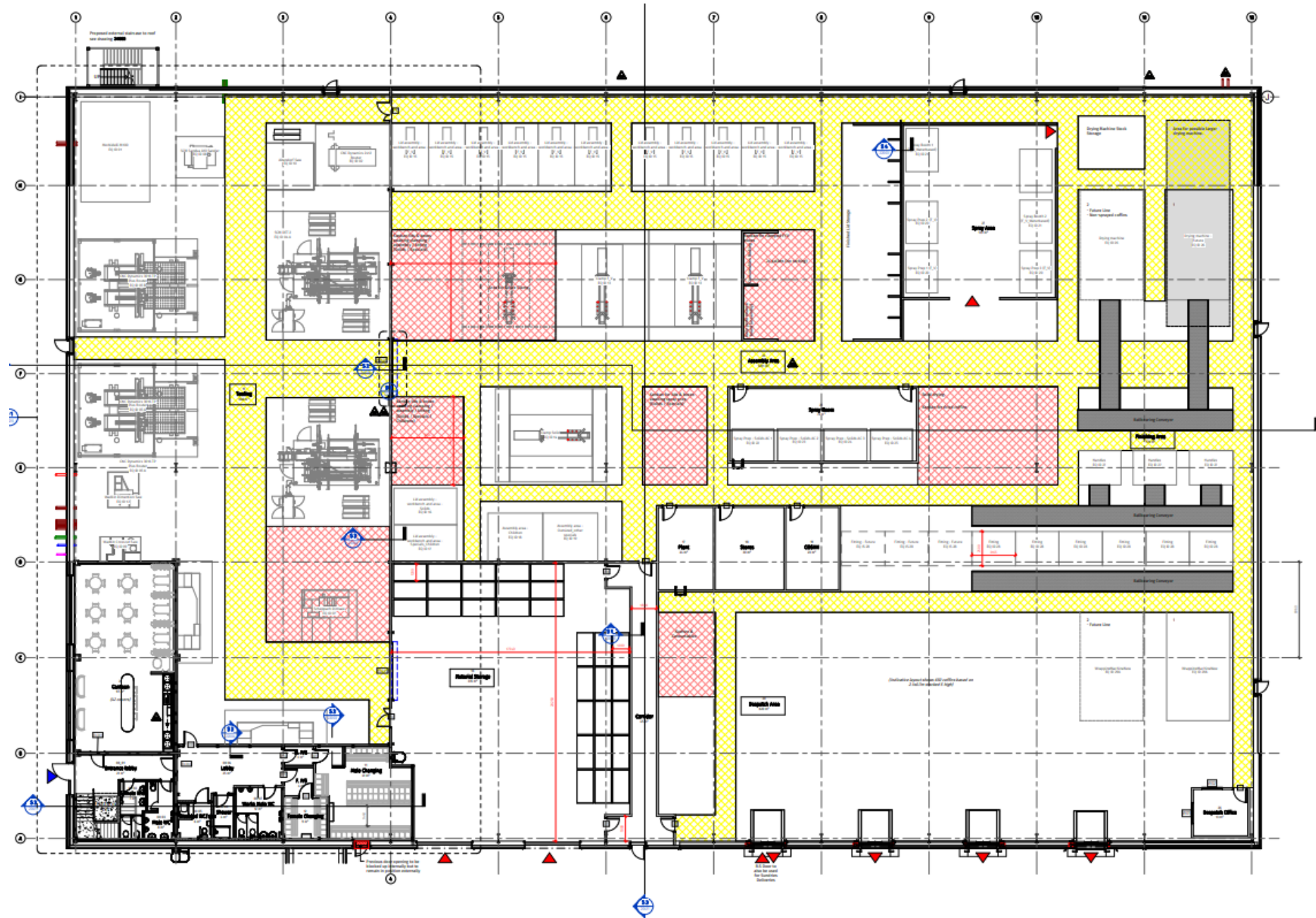
Building Management Services

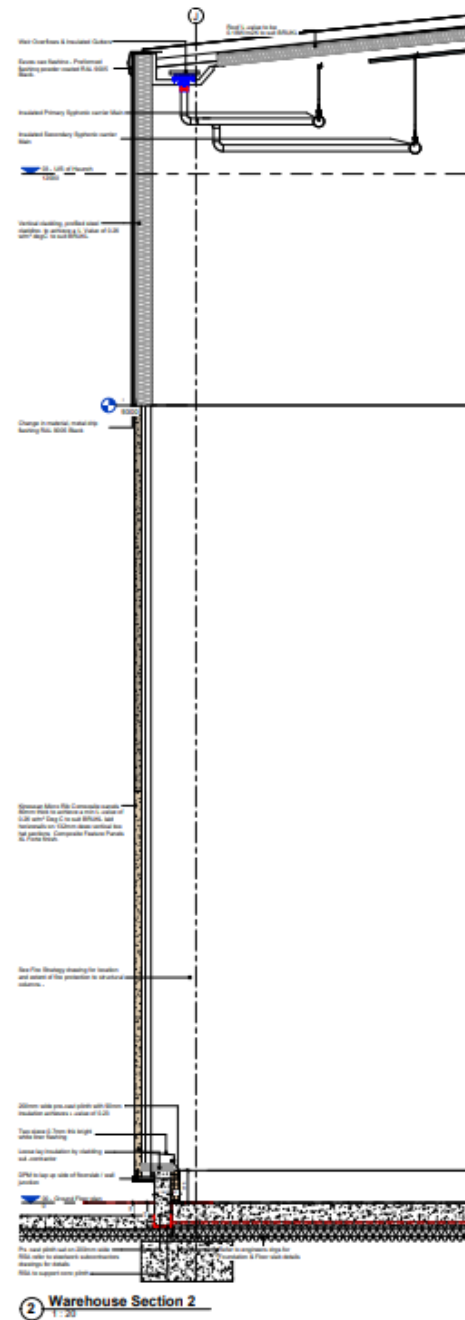
Client: CDP Limited

Project: Unit 2 - Industrial Development
Earlsfield Park,
Knowsley Lane,
Knowsley.

Sheet: Unit 2 - External finishes.

Drawn: JT Date: NOV23
Rev: 1: 200
Rev: Construction
Drawing No: -M3167-201 Rev A





Appendix D Sound survey results from "AC103830-1R13"

Table 6: Summary of Measured Ambient and Background Sound Levels

Date	Period	Range of Measured Sound Pressure Level, $L_{Aeq,T}$ (dB)	Range of Measured Background Sound Level, $L_{A90,T}$ (dB)
Thursday 31 st August 2017	Daytime (14:00 – 23:00)	59.0 – 64.3	56.2 – 62.7
	Night-time (23:00 – 07:00)	54.0 – 64.8	49.4 – 62.2
Friday 1 st September 2017	Daytime (07:00 – 23:00)	59.3 – 64.3	56.7 – 64.2
	Night-time (23:00 – 07:00)	52.8 – 60.1	49.4 – 57.0
Saturday 2 nd September 2017	Daytime (07:00 – 23:00)	52.7 – 61.6	50.7 – 56.6
	Night-time (23:00 – 07:00)	47.5 – 53.1	44.5 – 50.6
Sunday 3 rd September 2017	Daytime (07:00 – 23:00)	50.1 – 58.3	48.0 – 57.4
	Night-time (23:00 – 07:00)	43.9 – 56.1	39.8 – 54.3
Monday 4 th September 2017	Daytime (07:00 – 12:00)	53.5 – 57.4	51.5 – 56.3

Appendix E Operational noise calculations

Product despatch noise

To Receptor R1

Activity	Measured noise levels		Distance Correction		Correction for no. of occurrences		Screening correction, dB	Resultant SEL at receptor (dB)	BS4142 feature corr'n (dB)	SEL + feature (dB)	L _{Afmax} (dB)
	SEL @ 10m	L _{Afmax} @10m	m	dB	No.	Corr'n (dB)					
Lorry arrives and turns, all forwards	69	61	150	-24	1	0	0	45	3	48	38
Lorry reverses and manoeuvres into bay	65	58	160	-22	1	0	-10	33	3	36	24
Door open / close	60	68	135	-22	2	3	-10	31	6	37	35
Materials handling	51	59	122	-22	10	10	-10	29	6	35	27
Engine starts, lorry leaves	74	71	135	-22	1	0	-10	42	3	45	38
SEL								47	SEL + Feature	50	
L_{Aeq, 1 hr} (1 lorry)								12	L_{Aeq, 1 hr} (1 lorry)	15	
L_{Aeq, 1 hr} (5 lorries)								19	L_{Aeq, 1 hr} (5 lorries)	22	24-38
L_{Aeq, 16 hr} (10 lorries)									13		

To Receptor R2

[illegible]

To Receptor R3

Activity	Measured noise levels		Distance Correction		Correction for no. of occurrences		Screening correction, dB	Resultant SEL at receptor (dB)	BS4142 feature corr'n (dB)	SEL + feature (dB)	L _{Afmax} (dB)
	SEL @ 10m	L _{Afmax} @10m	m	dB	No.	Corr'n (dB)					
Lorry arrives and turns, all forwards	69	61	110	-21	1	0	0	49	3	52	40
Lorry reverses and manoeuvres into bay	65	58	205	-26	1	0	0	38	3	41	32
Door open / close	60	68	205	-26	2	3	0	37	6	43	41
Materials handling	51	59	202	-26	10	10	0	35	6	41	32
Engine starts, lorry leaves	74	71	110	-21	1	0	0	53	3	56	50
SEL								54	SEL + Feature	57	
L_{Aeq}, 1 hr (1 lorry)								19	L_{Aeq}, 1 hr (1 lorry)	22	
L_{Aeq}, 1 hr (5 lorries)								26	L_{Aeq}, 1 hr (5 lorries)	29	32-50
L_{Aeq}, 16 hr (10 lorries)									20		

Material delivery noise

		Receptor		
		R1	R3	R4
Vehicles on access road				
Arrival - Pass-by	dB SEL at 10m	68	68	68
Distance to receptor	m	150	130	110
Distance correction	dB	-24	-22	-21
SEL at Receptor	Each arrival, dB	44	46	47
Activities				
Vehicle arrives at loading area				
Arrival	dB SEL at 10m	68	68	68
Distance to receptor	m	150	161	170
Distance correction	dB	-24	-24	-25
Screening correction	dB	-10	-10	0
SEL at Receptor	Each activity, dB	34	34	43
Loading/unloading - fork lift movements				
Each movement	dB SEL at 10m	72	72	72
Distance to receptor	m	150	161	170
Distance correction	dB	-24	-24	-25
Screening correction	dB	-10	-10	0
Number of movements per receipt or delivery	20	13	13	13
SEL at Receptor	Each activity, dB	51	51	60
Vehicle starts and departs loading area				
Departure	dB SEL at 10m	75	75	75
Distance to receptor	m	150	161	170
Distance correction	dB	-24	-24	-25
Screening correction	dB	-10	-10	0
SEL at Receptor	Each activity, dB	41	41	50
Vehicles on access road				

		Receptor		
		R1	R3	R4
Arrival - Pass-by	dB SEL at 10m	68	68	68
Distance to receptor	m	150	130	110
Distance correction	dB	-24	-22	-21
SEL at Receptor	Each arrival, dB	44	46	47
Receipt / despatch - manual handling only	Combined SEL	48	50	53
Receipt / despatch - forklift	Combined SEL	53	53	61
Daytime				
Number of activities in any hour	2	3	3	3
Time correction		-36	-36	-36
Receipt / despatch - manual handling only	L _{Aeq} 1hour	15	16	20
	BS 4142 Correction, Intermittency	3	3	3
	Manual handling rating level	18	19	23
Receipt / despatch - forklift	L _{Aeq} 1hour	20	20	28
	BS 4142 Correction, Impulsivity	6	6	6
	Forklift rating level	26	26	34
	CUMULATIVE RATING LEVELS	27	27	34
Receipt / despatch - manual handling only	Highest L _A Max at 10m	68	68	68
Receipt / despatch - forklift	Highest L _A Max at 10m	69	69	69
Distance correction		-24	-24	-25
Screening correction		-10	-10	0
Receipt / despatch - manual handling only	Highest L _A Max at receptor	34	34	43
Receipt / despatch - forklift	Highest L _A Max at receptor	35	35	44

Appendix F Assessment of noise breakout from warehouse

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Clamping area									
Total source sound power level L_w	101	89	90	94	94	94	94	89	100
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	248.4	248.4	397.4	397.4	397.4	496.8	496.8	496.8	
Krev	-18	-18	-20	-20	-20	-21	-21	-21	
Reverberant pressure level L_p	83	71	70	74	73	73	73	68	79
Façade SRI	12	18	36	45	45	58	61	62	n/a
Sound pressure level 1m from façade	85	66	48	43	42	28	26	20	59
Level at R1	67	48	29	25	24	10	8	2	41
Level at R2	64	45	26	22	21	7	5	-1	38
Level at R3 (-15dB screening correction)	43	24	5	1	0	-14	16	-22	17

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
CNC area west wall									
Total source sound power level Lw	101	89	90	94	94	94	94	89	100
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	164.1	164.1	262.6	262.6	262.6	328.2	328.2	328.2	
Krev	-16	-16	-19	-19	-19	-20	-20	-20	
Reverberant pressure level Lp	85	72	72	75	75	74	75	70	81
Façade SRI	13	18	33	41	41	53	58	59	n/a
Sound pressure level 1m from façade	82	65	50	45	45	32	28	21	58
Level at R1	60	43	27	23	23	10	6	-1	35
Level at R2	59	42	26	22	22	9	5	-2	34
Level at R3 (-5dB screening correction)	48	31	15	11	11	-2	-6	-13	23

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
CNC area south wall									
Total source sound power level L_w	101	89	90	94	94	94	94	89	100
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	164.1	164.1	262.6	262.6	262.6	328.2	328.2	328.2	
Krev	-16	-16	-19	-19	-19	-20	-20	-20	
Reverberant pressure level L_p	85	72	72	75	75	74	75	70	81
Façade SRI	12	18	35	43	43	56	60	61	n/a
Sound pressure level 1m from façade	85	67	49	45	44	31	28	21	59
Level at R1 (-15dB screening correction)	47	29	12	7	7	-7	-10	-16	22
Level at R2	62	44	27	22	22	8	5	-1	37
Level at R3	57	39	22	17	17	3	0	-6	32

Description	Sound reduction index, dB, at 1/1 octave band centre frequencies, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Delivery areas									
Total source sound power level L_w	101	89	90	94	94	94	94	89	100
Surface absorption coefficient (Hard room)	0.05	0.05	0.08	0.08	0.08	0.1	0.1	0.1	n/a
Total absorption	248.4	248.4	397.4	397.4	397.4	496.8	496.8	496.8	
Krev	-18	-18	-20	-20	-20	-21	-21	-21	
Reverberant pressure level L_p	83	71	70	74	73	73	73	68	79
Façade SRI	13	18	34	43	43	55	59	60	n/a
Sound pressure level 1m from façade	85	67	51	46	46	32	29	23	60
Level at R1 (-15dB screening correction)	45	28	11	6	6	-8	-11	-17	20
Level at R2 (-15dB screening correction)	44	27	10	5	5	-9	-12	-18	19
Level at R3	57	40	23	18	18	4	1	-5	32

Resultant cumulative levels at receptors

Façade	Resultant sound pressure level at receptor L _p , dB		
	R1	R2	R3
Clamping area	41	38	17
CNC area west	35	34	23
CNC area south	22	37	32
Delivery areas	20	19	32
BS 4142 Feature correction	+5	+5	+5
Cumulative rating level	47	46	41