

9. Noise

Introduction

- 9.1 This chapter identifies the potential noise and vibration impact that the Proposed Development will have on existing sensitive receptors in close proximity to the Site during the construction and operational phases of the Proposed Development.
- 9.2 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources, such as road traffic or construction works, that interfere with normal activities, including conversation, sleep or recreation. Vibration can be defined as the transmission of energy through the ground or the air that can result in small movements of the transmitting medium, such as a building, which can cause discomfort or even damage to structures if the movements are large enough.
- 9.3 A glossary of acoustic terminology has been provided in Appendix 9.1 to assist the reader in the interpretation of technical terms and references.

Policy Context

National Policy

- 9.4 The aim of noise policy within England has been to protect individuals from excessive noise levels both in the workplace and within their homes. It has been recognised that severe annoyance in individuals due to noise can lead to sleep disturbance and adverse health effects. Steps have therefore been taken by European member states to reduce noise levels through the use of legislation and guidance to reduce overall ambient noise levels and maintain areas of existing 'tranquillity'.
- 9.5 The Department of the Environment, Food and Rural Affairs (DEFRA) is responsible for all aspects of noise policy in England; management and enforcement of noise policy is the joint responsibility of the Environment Agency (EA) and Local Planning Authorities.
- 9.6 The Department for Communities and Local Government (DCLG) is responsible for implementation of local and regional planning policy including Planning Policy Guidance Notes (PPG's) that set out the government's policies on different aspects of planning. The key planning policy guidance note relevant to noise is PPG 24⁶: Noise and Planning.

Regional

- 9.7 A Clear Vision for the South East: The South East Plan states that Local Plans should set out proposals to "improve air quality and noise reduction".
- 9.8 The West Sussex Structure Plan 2005 (Policy ERA5) states that Local plans will include policies to prevent sensitive development in areas subject to existing or potential poor air quality, or noise or smell pollution.

Local Policies

- 9.9 The Arun District Local Plan (Policy GEN32) relates to noise pollution:

⁶ Office of the Deputy Prime Minister, (1994) Planning and Noise PPG 24, HMSO, London

"Noise sensitive development will not be permitted if its users would be affected adversely by noise from existing or proposed noise-generating uses.

Development which is a potential source of significant noise pollution will not be permitted unless the Council is satisfied that appropriate measures have been included in the proposal to reduce noise pollution to acceptable levels. Details of such measures will be required as part of the planning application.

PPG24, Planning and Noise, gives advice on how the planning system can be used to reduce the impact of noise on people. A combination of noise reduction measures, including engineering, layout and administrative measures, may be utilised to protect sensitive areas from noise pollution. Noise levels will be measured against national standards established in policy guidance."

Assessment Methodology & Significance Criteria

- 9.10 The assessment of noise and vibration impacts is based upon the principles of a number of official guidance notes and British Standards which are described below. These are outlined in the following subsections.
- 9.11 The impact magnitude is determined on a scale ranging from no impact to substantial impact. The significance scale in respect of noise impacts is described below, with moderate significance being considered as the trigger for the requirement of detailed mitigation measures:
- No impact – no perceptible affect on noise levels;
 - Minor impact – barely perceptible adverse affect on noise levels;
 - Moderate impact – noticeable adverse affect on noise levels; and
 - Substantial impact – very noticeable adverse affect on noise levels.

Construction Noise

- 9.12 The assessment of construction noise impacts has been carried out with reference to Advisory Leaflet (AL) 72⁷ and British Standard 5228: Part 1⁸ which is summarised below.
- 9.13 The limits suggested in AL 72 are based on early research undertaken on social attitudes to noise, the results of which were presented in the Wilson Report⁹, recommendations were made as to acceptable levels of noise from construction and roads maintenance sites.
- 9.14 These figures were subsequently replicated in AL 72, which is now out of print. No alternative levels are suggested in BS 5228 and, therefore, in the

⁷ Department of Environment (DOE):1976: Advisory Leaflet (AL) 72: Control of noise on building sites. HMSO

⁸ British Standard (BS) 5228: Part 1: 1997: Noise and vibration control on construction and open sites. HMSO

⁹ HMSO: 1963: *Final report of the Wilson Committee on the problem of noise*. HMSO

absence of any further research to the contrary, these limits are still in regular use and have been applied in this instance. The limits as defined in AL 72, based on a permitted working day (typically between the hours of 07:00 to 19:00 hours) are:

- 70 dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise; and
- 75 dB (A) in urban areas near main roads and heavy industrial areas.

9.15 Given the urban setting of the Site adjacent to busy roads, it is proposed to assess the construction works against a noise level criterion of 75 dB(A). However, Arun District Council (ADC) is the statutory enforcing authority for noise nuisance at the location of the Proposed Development and therefore has powers to limit noise and vibration levels further through enforcing legislation such as the Control of Pollution Act; (1974) and Environmental Protection Act; (1990) where considered appropriate.

9.16 In the unlikely event that night-time works are required, separate limits and operating procedures will apply and should be agreed in advance with ADC.

9.17 BS 5228 Part 1 sets out the methodology to predict likely noise levels from construction works. These predictions are based on detailed information on the type and number of plant being used, their location and the length of time they are in operation.

9.18 At this stage, full details of the proposed construction regime are not available. However, an estimate of the likely effects of noise from the construction phase has been made for the noise-sensitive receptors identified close to the Site. The predictions are based on experience from similar schemes elsewhere and the methodology contained within BS 5228, in terms of the Equivalent Continuous Sound Level, LAeq, over a 10-hour working day.

9.19 Based on the guidance contained within AL 72 the assessment criteria presented in Table 9.1 have been adopted in order to assess the impact of noise associated with the construction of the Proposed Development.

Table 9.1 - Construction Noise Assessment Criteria

Predicted Façade Noise Level, dB(A)	Magnitude of Impact
<50	No impact
50 - 55	Negligible impact
55 - 65	Minor impact
65 - 75	Moderate impact
>75	Substantial Impact

9.20 It is considered that the significance of construction noise impacts will be moderate if the AL 72 noise limit is just achieved and non-compliance with the limits would be considered to be of major significance. However, it is considered that if construction noise levels at receptors are 10 dB(A) or more lower than the AL 72 noise limits, that the significance of impacts would be minor.

Vibration

9.21 Construction vibration may be impulsive, such as that due to hammer-driven piling, transient such as that due to vehicle movements along a railway or continuous, such as that due to vibratory driven piling. The primary cause of community concern in relation to vibration generally

- relates to building damage from both construction and operational sources of vibration, although the human body can perceive vibration at levels which are substantially lower than those required to cause building damage.
- 9.22 With respect to human exposure to vibration in buildings, BS 6472: 1992: Guide to evaluation of human exposure to vibration in buildings, provides guidance relating to the probability with which various degrees of adverse comment are likely.
- 9.23 BS 6472 presents threshold curves that define the lowest perceptible levels of vibration and multiplying factors that correspond to 'satisfactory magnitudes of building vibration to keep human response (annoyance, complaint) to acceptable levels'. Thresholds are given in both the vertical and horizontal axes. In practice, during the daytime, vertical axis vibration normally determines respect to human response.
- 9.24 There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS 5228: Part 4, which relates to specific types of piling only. Therefore, it is not possible to accurately predict levels of vibration during this phase of the development. However, a generic assessment of the likely impact of construction vibration can be undertaken based on distances at which certain activities give rise to a just perceptible level of vibration, the duration of the event and the proximity of sensitive receptors to the Site.
- 9.25 Following the criteria set out in BS 6472 and the guidance presented in BS 5228, for residential dwellings and offices, Table 9.2 details the vibration levels at which varying degrees of adverse comment may be expected, provided that the vibration frequency is greater than 8Hz and presents the assessment criteria that have been used to determine the magnitude of impact.

Table 9.2 - Impact Scale for Construction Vibration and Assessment Criteria

Subjective Response	Impact Significance
Imperceptible	No impact
Barely perceptible	Negligible impact
Noticeable	Minor impact
Easily noticeable	Moderate impact
Adversely affect activity	Substantial impact

Road Traffic Noise

- 9.26 Predictions of changes in traffic noise levels for this assessment have been carried out according to the methodology contained within the Calculation of Road Traffic Noise (CRTN)¹⁰. The calculation method uses a number of input variables including traffic flow volume, average vehicle speed, percentage of heavy goods vehicles (HGVs), type of road, site geometry and the presence of noise barriers or acoustically absorbent ground to predict the $L_{A10,18hr}$ noise level for any receptor point at a given distance from the road.
- 9.27 The procedure for assessing the impact of changes in road traffic noise levels resulting from the Proposed Development have been undertaken in

¹⁰ Department of Environment: 1988: Calculation of Road Traffic Noise. HMSO

accordance with the principles of the Design Manual for Roads and Bridges (DMRB)¹¹. Although DMRB strictly applies to new road schemes, the assessment scenarios used can also be applied to the assessment of changes in road traffic noise on existing roads.

- 9.28 The impact of any change in noise level identified has been assessed by drawing upon the findings of the Institute of Acoustics/Institute of Environmental Management and Assessment (IOA/IEMA) Draft Guidelines for Noise Impact Assessment¹² that provide examples of how to categorise the significance of a basic noise change, such as that from road traffic. The guidelines are a summary of existing guidance from a number of sources, all of which originate from historical data gathered on the response of people to changes in noise levels.
- 9.29 The results of the research suggest that for very abrupt changes in noise level (such as the immediate increase upon the opening of a new road to traffic), a 1 dB rise can be adopted as indicating a potentially significant noise. However, for less abrupt changes in noise of a similar type, such as the gradual increase in noise on an existing road associated with a new residential development, 3 dB is generally considered to be the smallest change in noise that is readily perceptible. A 10 dB change in noise represents a perceived doubling or halving of the noise level.
- 9.30 The guidelines state that the assessor should set assessment criteria appropriate for the assessment being undertaken. To this end, the assessment criteria presented in Table 9.3 have been adopted to assess the impact of any changes in road traffic noise levels as a direct result of the Proposed Development.

Table 9.3: Road traffic noise criteria

Change in Noise Level dB(A)	Impact
<1	No impact
1 – 3	Negligible
3 – 6	Minor
6 – 10	Moderate
>10	Substantial

Building Services Plant

- 9.31 For a development of this type, the potential impact from building services plant should be considered and, therefore, an appropriate limit for noise emissions from such plant has been determined to ensure that any resultant noise will not adversely affect the noise environment for occupants of existing dwellings in the vicinity of the Site.
- 9.32 The limits have been set in accordance with the principles of BS 4142⁸, which sets out a method to assess whether noise from factories, industrial

¹¹ DETR, Highways Agency, Scottish and Welsh Offices (2001 as updated) Design Manual for Roads and Bridges Volume 11; Environmental Assessment. Section 3: Part 7 – Traffic Noise and Vibration August 1994. HMSO

¹² Institute of Acoustics / Institute of Environmental Management and Assessment Working Party: 2002: Guidelines for Noise Impact Assessment. IOA/IEMA

⁸ British Standard 4142: 1997, Method for rating industrial noise affecting mixed residential and industrial areas, HMSO

premises or fixed installations are likely to give rise to complaints from noise-sensitive receptors in the vicinity. The procedure contained in BS 4142 for assessing the likelihood of complaint is to compare the measured or predicted noise level from the source in question, outside the dwelling, the $L_{Aeq,T}$ 'specific' noise level, with the $L_{A90,T}$ 'background' noise level.

- 9.33 Where the noise contains a 'distinguishable discrete continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps) or if the noise is irregular enough to attract attention' then a correction of +5 dB is added to the specific noise level to obtain the $L_{A,Tr}$ 'rating' noise level.
- 9.34 The likelihood of the noise giving rise to complaints is assessed by subtracting the background noise level from the rating noise level. BS 4142 states 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance. A difference of minus 10 dB is a positive indication that complaints are unlikely.'
- 9.35 The daytime assessment is carried out for a 1-hour reference period and the night-time for a 5-minute reference period. The periods associated with day or night are not defined within BS 4142, but it states that night should cover the times when the general adult population are preparing for sleep or are actually sleeping. For the purpose of this study, the periods presented in PPG 24 are considered to be the most appropriate and, as such, daytime is defined as 07:00 to 23:00 hours and night-time 23:00 to 07:00 hours.
- 9.36 When assessing new developments, the opportunity exists to minimise noise impacts, so far as is reasonably practicable, by setting a rating noise level from building services plant that is at least 10 dB(A) below the existing background noise level. This serves to prevent any creep in background noise levels and also provides a positive indication that complaints are unlikely.
- 9.37 Therefore, based on the guidance contained within BS 4142 and consultation with ADC, the assessment criteria presented in Table 9.4 have been adopted in order to assess the impact of noise associated with the operation of the Proposed Development, such as loading and unloading activities, and noise from fixed external or building services plant.

Table 9.4 - Industrial Noise Assessment Criteria

Excess of Rating Noise Level above Background Noise Level, dB	Magnitude of Impact
-10	No impact
-10 to 0	Negligible impact
0 to +5	Minor impact
+5 to +10	Moderate impact
+10	Substantial impact

- 9.38 It is considered that with new operations and items of new plant, that the opportunity exists to minimise noise impacts so far as reasonably practicable. As such, it is considered that noise from the operation of the Proposed Development should give rise to impacts of no more than minor significance, striving where possible to result impacts of no significance.

Baseline Conditions

- 9.39 The Site, currently in agricultural arable use, lies to the east of Shripney Road and north of the Southern Cross Industrial Estate. Immediately to the north of the Site is farmland beyond which there are a number of residential

dwellings that are part of the hamlet of Shripney. A railway track lies approximately 150 m to the east of the Site with Oldlands Farm Cottages and farmland between the track and the Site boundary. To the southwest of the Site is a caravan park that is surrounded by residential, industrial and retail units. To the west, beyond Shripney Road there is another caravan Park and farmland beyond.

The nearest existing noise-sensitive receptors considered as part of this assessment are listed below.

1. The hamlet of Shripney to the North of the Site.
2. Oldlands Farm cottages, less than 20 m East of the Site.
3. Caravan Park to the West.

The area to the south of the Site is commercial and light industrial use and therefore not considered sensitive to the development proposals, except during construction.

- 9.40 The existing noise conditions across the Site and existing sensitive receptors in the vicinity have been determined by a series of environmental noise measurements. All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring in accordance with the principles of BS 7445⁹ and following the guidance given in BS 4142.
- 9.41 The noise parameters of $L_{Aeq,T}$, $L_{A90,T}$, $L_{A10,T}$, $L_{AFmax,T}$ and $L_{ASmax,T}$ were recorded during the measurement period at each position. All measurements were undertaken between 1.2 and 1.5 metres above local ground level and under free-field conditions, where conditions permitted.
- 9.42 All acoustic measurement equipment used during the noise surveys conformed to Type 1 specification of British Standard 61672¹⁰. A full inventory of this equipment is shown in Table 9.5.

Table 9.5: Inventory of acoustic measurement equipment

Item	Make & Model	Serial Number
Sound Level Meters	Solo Master	11294, 60582
Microphones	MCE 212 ½"	45142, 33607
Preamplifiers	PRE 21W ½"	12027, 10327
Calibrator	CAL 21	51030943

- 9.43 The noise measurement equipment used during the surveys was calibrated at the start and checked at the end of each measurement period. The calibrator used had itself been calibrated by a UKAS accredited calibration laboratory within the twelve months preceding the measurements. No significant drift in calibration was found to have occurred on either sound level meter. The microphones were fitted with protective windshields for the measurement duration. Weather conditions for the duration of the survey were cold and dry with a light breeze of less than 5 m/s.

⁹ British Standard 61672: 2003: Electroacoustics Sound level meters, Part 1 Specifications, HMSO

¹⁰ British Standard 61672: 2003: Electroacoustics Sound level meters. Part 1 Specifications, HMSO

9.44 A series of environmental noise measurements have been undertaken both during and outside of on Wednesday 7th November 2007 and Thursday 8th November 2007. The measurement positions were selected whilst on site in order to determine representative ambient noise levels at the nearest existing noise-sensitive receptors in the vicinity of the Site and for the Proposed Development itself.

9.45 The noise measurement positions, together with National Grid References (NGRs) for each position are described below and identified in Figure 9.1:

- Position 1 – Adjacent to Oldlands Farm Cottages, approximate grid reference SU 94384, 01416. Measurements were undertaken at this location in order to determine the potential noise impact of the Proposed Development on Oldlands Farm Cottages. The main sources of noise were from local and distant road traffic. The noise from trains passing at the nearby train track was fairly quiet;
- Position 2 – Western site boundary, approximate grid reference SU 94071, 01546. Measurements were undertaken approximately 6 m from the nearside kerb of Shripney Road in order to determine representative daytime noise levels for the existing caravan park on the opposite side of the road. The dominant noise source at this location is road traffic from Shripney Road;
- Position 3 – Shripney Road, approximate grid reference SU 94040, 01184. Night-time measurements were undertaken at this location in order to determine the potential noise impacts on the nearest sensitive receptors to the southwest from the Proposed Development. The noise environment was dominated by local traffic. Fan noise from nearby industrial units was audible; and
- Position 4 – Shripney Road, approximate grid reference SU 93858, 01856. Night-time measurements only were undertaken at this location in order to determine the potential noise impacts on the nearest sensitive receptors to the northwest from the Proposed Development. This location was quiet with occasional vehicle movements and the sound of a garden water feature.

9.46 A summary of the recorded measurement results at each position described above is presented in Table 9.6 for both daytime and night-time periods, as defined in PPG 24.

Table 9.6: Summary of baseline environmental noise measurement results

Position	Start Date and Time	Noise Level, dB			
		L _{Aeq,T}	L _{AFmax,T}	L _{A90,T}	L _{A10,T}
1	Daytime	52	86	43	55
	Night-time	44	65	28	49
2	Daytime	67	95	54	72
3	Night-time	62	85	35	61
4	Night-time	59	82	27	57

Identification & Evaluation of Key Impacts

9.47 The following key impacts have been identified and assessed:

- construction noise;
- construction vibration;

- construction road traffic;
- operational road traffic; and
- operational impacts – loading and unloading operations.

Prediction of Impact Magnitude

Construction Impacts

- 9.48 An estimate of the likely effects of noise from the construction works has been made for the noise-sensitive receptors located closest to the site. The assessment positions are presented in Figure 9.2.
- 9.49 The construction programme will consist of two stages as detailed below:
- Stage 1 - ASDA Store and 1,100 sqm of speculative business units completion in 2011
 - Stage 2 - 19,500 sqm Business Park phased over a 14 year period with full operation by 2025
- 9.50 The predictions are in terms of the $L_{Aeq,T}$ over the core working day. Typical worst-case assumptions have been applied, although the construction techniques are not anticipated to be significantly different than for any other major development.
- 9.51 For the purposes of the assessment, the construction works have been divided into the following phases:
- Site preparation & enabling works: It is assumed that site preparation and formation of roads will be undertaken during these phases. It is assumed that tracked excavators, tracked loaders, dozers but no piling will be used during this stage of the works;
 - Foundations: It is assumed that the formation of foundations will be undertaken during this phase which will include all concreting operations;
 - Building erection: This phase of the works is assumed to involve the casting of concrete floor slabs 'in-situ', brickwork/blockwork, scaffold erection and roofing, etc. It is assumed that any concreting works will require the use of a concrete pump, concrete truck mixers, compressors and poker vibrators. It is also assumed that a mobile crane will be used as support plant; and
 - Roads.
- 9.52 The predictions will be based on source noise data for the items of plant that are likely to be present at the site such as that presented in BS 5228 and the Defra update of noise database for prediction of noise on construction and open sites. The assumed plant list and noise data is summarised in Appendix 9.3.
- 9.53 The predicted noise levels at the nearest sensitive receptor are shown in Table 9.7. The predictions assume that there will be no attenuation of sound due to ground absorption.
- 9.54 The noise levels are presented as a worst-case scenario when construction activities are closest to the site boundary. The predictions also consider a receiver height of 1.5 m that is representative of ground level and therefore will experience a good degree of attenuation from the site hoarding.

Table 9.7: Predicted existing façade construction noise levels, $L_{Aeq,T}$ dB

Receptor	Site preparation & Enabling Works	*Foundations	Building Erection	Roads
1	37	49	62	61
2	34	43	40	39
3	20	30	26	39

- 9.55 Comparison of the predicted construction noise levels above with the assessment criteria presented in Table 9.1 indicates that the potential impact on the nearest sensitive receptors will be negligible except at receptor 1. Predicted impacts on receptor 1 will be minor during building erection and the construction of roads.

Construction Vibration

- 9.56 Table 9.8 below details the distances at which certain activities give rise to a just perceptible level of vibration; these figures are based on historical field measurements.

Table 9.8 - Distances at which Vibration may just be Perceptible

Construction activities	Distance from activity when vibration may just be perceptible, metres
Excavation	15
Heavy Vehicles (e.g. dump trucks)	10
Hydraulic Breaker	20
Auger Piling (e.g. CFA Piling)	20

- 9.57 On the basis of the above and given that the nearest sensitive receptor to the construction works is at least 30 metres away during both phases of the construction period, it is considered highly unlikely that vibration from the construction works will be perceptible at any receptor off-site. Given that vibration levels are predicted to be imperceptible, it is considered that there will be no impact due to construction vibration.

Construction Road Traffic

- 9.58 There will be a small increase in traffic flows during Phase I of the construction period. The highest increase in traffic flow is predicted during the daily commute of site workers and small delivery vans which will represent an additional 100 movements during peak AM and PM periods. The highest increases in HGV movements will occur during activity specific operations such as concreting and the delivery of materials to the site.
- 9.59 Whilst these identified increases will result in higher concentrations of vehicular movements, the percentage increase is less than 5% of existing flows. This is equivalent to an increase in noise level of less than 1 dB (A) which, when compared with the assessment criteria presented in Table 9.3 will not give rise to any adverse impact.
- 9.60 The above assessment is also representative of the Phase II construction.

Operational Road Traffic

- 9.61 Traffic flow data provided by Cottee Transport Planning has been used as the basis of the road traffic noise assessment. The data provided was in terms of 2-way 18-hour flows for the year of opening (2011) and year of completion (2025), both with and without the development. The percentage

of heavy goods vehicles (%HGV) and average speed data was also provided.

- 9.62 Traffic noise predictions have been undertaken in accordance with CRTN, allowing predicted noise levels for the assessment years to be compared both with and without the development and the impact of any changes in level assessed.

- 9.63 The figures presented in Table 9.9 below set out the predicted change in road traffic noise levels for all of the roads considered in the Cottee Transport Planning traffic assessment for the scenarios discussed above.

Table 9.9: Predicted Changes in Road Traffic Noise Levels as a Result of Proposed Development in 2011 and 2025, dB

Road Links	Predicted Change in Road Traffic Noise Level, LA10,1hour	
	Future Base (2011) with Development Only	Future Base (2025) with Development Only
1 – A29 (South of Steyning Way	0.7	0.3
2 – Rowan Way (East of WRR)	0.3	0.5
3 – Rowan Way (West of WRR)	0.1	0.2
4 – Steyning Way	0.0	0.0
5 – A29 (North of Steyning Way)	1.2	1.5
6 – A29 (North of ERR)	0.5	0.8

- 9.64 The largest predicted increases of 1.2 and 1.5 dB in traffic noise levels will occur on the A29 (North of Steyning Way) in both 2011 and 2025 respectively. The nearest sensitive receptors to this location are occupants of the caravan park to the west which is considered to be of high sensitivity. Comparison with the assessment criteria adopted, indicates that a change in noise level of between 1 and 3 dB(A) constitutes a negligible impact.

- 9.65 All remaining roads will experience increases of < 1 dB(A) which when compared with the criteria adopted for this assessment is of no impact.

Operation Impacts – Loading and Unloading Operations (ASDA)

- 9.66 It is understood that HGV's servicing the ASDA store will be loaded in docking bays, with levellers and inflatable curtains to reduce noise breakout which eliminates the need for reach stackers to undertake unloading activities externally.

- 9.67 These bays will be located on the eastern edge of the building and therefore screened from all existing sensitive receptors, even the closest receptor at Oldlands Farm.

- 9.68 Given the above and the separation distance between the proposed operational areas and noise-sensitive receptors, it is considered that noise from the above sources is unlikely to be perceptible at noise-sensitive receptors off site.

- 9.69 As such, the most significant source of operational noise in respect of potential off-site impacts is likely to be due to vehicular movements within the business park and any associated building services plant. The proposed development will incorporate external building services plant such as heat rejection plant (chillers/condenser units), supply and extract fans.

Operation Impacts – Building Services Plant

- 9.70 Best practice dictates items of building services plant associated with all new developments should be designed to give a cumulative noise rating level ($L_{A_{r,Tr}}$) of 10 dB below the current prevailing background level (L_{A90}) at a distance of 1m from the nearest residential facades.
- 9.71 Accurate assessment of the building services plant cannot be undertaken as the relevant data, such as specification of plant, location, fixings and operation are not generally available at this stage in the masterplan process.
- 9.72 However, in order to meet this requirement, the plant noise criteria set out in Table 9.10 below have been proposed, based on the average background noise levels undertaken at the time of the measurement survey. The sensitive locations relate to the measurement locations presented in Figure 9.1.

Table 9.10: Proposed Target Noise Criteria, dB $L_{A_{r,Tr}}$

Location	Daytime (07:00-23:00 hrs)	Night-time (23:00-07:00 hrs)*
1	33	30
2	44	30
3	44	30
4	44	30

* Note that for the purposes of BS 4142 rating noise levels and background noise levels below 30 fall outside the scope of the guidance and therefore 30 dB is the floor at which rating noise levels have been set at night.

- 9.73 Note that the above limits apply to the total noise emission level from all building services plant. Individual plant items may need to be designed to a lower limit such that the overall total achieves the stated criteria above.
- 9.74 Compliance with the above limiting noise levels for building services plant would result in no adverse impact occurring and subsequently no requirement for any mitigation measured to be considered.

Deliveries and waste disposal from Commercial Sectors

- 9.75 Noise from night-time deliveries and vehicle movements associated with the proposed commercial elements of the proposed development have the potential to give rise to significant impacts if not adequately controlled.
- 9.76 The operations of the future occupants of the proposed development are not known at this stage, therefore there is no accurate way of determining the significance of this potential impact. However, in order to minimise disturbance recommendations to mitigate against the potential for adverse impact are discussed in section 10.

Assessment of Impact Significance

- 9.77 The significance of the environmental impact is determined by the interaction of magnitude and sensitivity, whereby the impacts can be positive or negative. The impact significance matrix is set out in Table 9.11.

Table 9.11: Impact Significance Matrix

Magnitude	Sensitivity		
	High	Moderate	Low
Substantial	Major	Major - Moderate	Moderate - Minor
	Adverse / Beneficial	Adverse / Beneficial	Adverse / Beneficial
Moderate	Major - Moderate	Moderate - Minor	Minor
	Adverse / Beneficial	Adverse / Beneficial	Adverse / Beneficial
Minor	Moderate - Minor	Minor	Minor - Negligible
	Adverse / Beneficial	Adverse / Beneficial	Adverse / Beneficial
Negligible	Negligible	Negligible	Negligible

- 9.78 Based on the above matrix, all identified adverse impacts (road traffic and construction noise only) are of negligible significance.

Mitigation Measures

Construction Noise

- 9.79 Best practice measures to control construction noise will be incorporated within a Construction Environmental Management Plan (CEMP) and/or detailed method statements.
- the predictions assume a 2.4 metre high hoarding will be erected around the entire perimeter of the construction site to screen noise from low level sources at street level receptors;
 - although precise needs and intentions in respect of noise control cannot be specified until detailed construction planning and phasing programmes are complete, the proposals in respect of noise mitigation will be in accordance with BS 5228 and will therefore comprise the following:
 - temporary screening or enclosures for static noisy plant will be erected to reduce noise emissions and where possible, 'silenced' plant and equipment will be used;
 - where vehicles are left standing for a significant period of time, engines will be switched off;
 - acoustic enclosures will be fitted where possible to suppress noisy equipment;
 - plant will operate at low speeds, where possible, and incorporate automatic low speed idling;
 - where possible, electrically driven equipment will be selected in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
 - all plant will be properly maintained (greased, blown silencers replaced, saws kept sharpened, teeth set and blades flat, worn bearings replaced, etc);
 - plant will be certified to meet any relevant EC Directive standards;
 - measures will be implemented to ensure that HGV's are scheduled in advance and will only arrive and depart from Site during the core working day to avoid congestion on the road; and

- all contractors will be made familiar with the guidance in BS 5228 (Parts 1 and 2), in particular the requirement to implement best practicable means. This will form a prerequisite of their appointment.

Deliveries and waste disposal from Commercial Sectors

9.80 It is recommended that the following restrictions are imposed on the future operation of the commercial elements of the proposed development:

- Night-time vehicle movements, and vehicle loading and unloading activities should be avoided so far as is reasonably practicable; and
- Reversing beepers on vehicles should be disengaged or a white noise / active level system fitted.

Cumulative Effects

9.81 There are currently other Outline Applications for residential development in the area of the proposed development. These will be significant residential developments and will lead to further demands on the capacity of the local road network. These developments are.

- Land North of Bersted, East of A259 Chichester Road and North of Rowan Way, Bersted, Bognor Regis (Reference BE/45/04). Outline Application for residential development comprising 650 residential dwellings, formal and informal public open space, including sports pitches, community facilities and associated works. Construction of the western section of the Bognor Regis North Relief Road between the A259 Chichester Road and Rowan Way;
- Land to the North of Felpham, Bognor Regis (Reference FP/92/04). Outline Application for residential development and associated uses forming part of Policy Site 6. Construction of the Bognor Regis Northern Relief Road from A259 at Felpham to A29; and
- The consented Western and Eastern Relief Roads (RR) for Bognor Regis.

The figures presented in Table 9.12 below set out the predicted change in road traffic noise levels for all of the roads considered in the Cottee Transport Planning traffic assessment for the scenarios discussed above.

Table 9.12: Predicted Changes in Road Traffic Noise Levels as a Result of other consented developments in 2025, dB

Road Links	Predicted Change in Road Traffic Noise Level, LA10,1hour Future Base (2025) with Development + RR
1 - A29 (South of Steyning Way	0.7
2 - Rowan Way (East of WRR)	2.8
3 - Rowan Way (West of WRR)	-1.0
4 - Steyning Way	0.1
5 - A29 (North of Steyning Way)	4.4
6 - A29 (North of ERR)	1.8

9.82 The largest increases in road traffic noise of 2.8 dB and 4.4 dB are predicted on Rowan Way (East of WRR) and the A29 (North of Steyning Way).

9.83 Comparison with the assessment criteria adopted for this assessment indicates that a change in noise level of between 1 and 3 dB(A) is

negligible in terms of its impact. A change of between 3 dB and 6 dB constitutes a minor impact.

- 9.84 The nearest sensitive receptors to this location are occupants of the caravan park to the west and dwellings to the north which are of high sensitivity. Comparison with the impact significance matrix in Table 9.11 above classifies the significance of these impacts as negligible for Rowan Way and moderate – minor adverse on the A29 (North of Styening Way).

Residual Effects

- 9.85 With the implementation of the recommended mitigation measures there will be no residual impacts, except for the future cumulative road traffic noise impacts.

Summary

- 9.86 The potential noise and vibration impact of the Proposed Development on existing sensitive receptors in the vicinity of the Site has been assessed during both the construction and operational phases.
- 9.87 The significance of potential impacts on the nearest sensitive receptors during construction works are negligible.
- 9.88 Accurate assessment of the building services plant cannot be undertaken as the relevant data, such as specification of plant, location, fixings and operation are not generally available at this stage in the masterplan process. However, in order to ensure that no adverse impacts are experienced by nearby residents, plant noise criteria have been recommended. These levels are based on the existing average background noise level as measured at the time of the survey.
- 9.89 Recommendations have also been made to control the potential noise impact from noise due to night-time deliveries and vehicle movements associated with the proposed commercial elements of the proposed development.
- 9.90 The cumulative impacts of a number of other consented residential schemes, including the proposed relief roads have also been assessed for the opening year of 2025.
- 9.91 Comparison of all identified impacts with the significance matrix presented in Table 9.11 defines the significance of these impacts as negligible.
- 9.92 With the implementation of the recommended mitigation measures there will be no residual impacts, except for the future cumulative road traffic noise impacts.

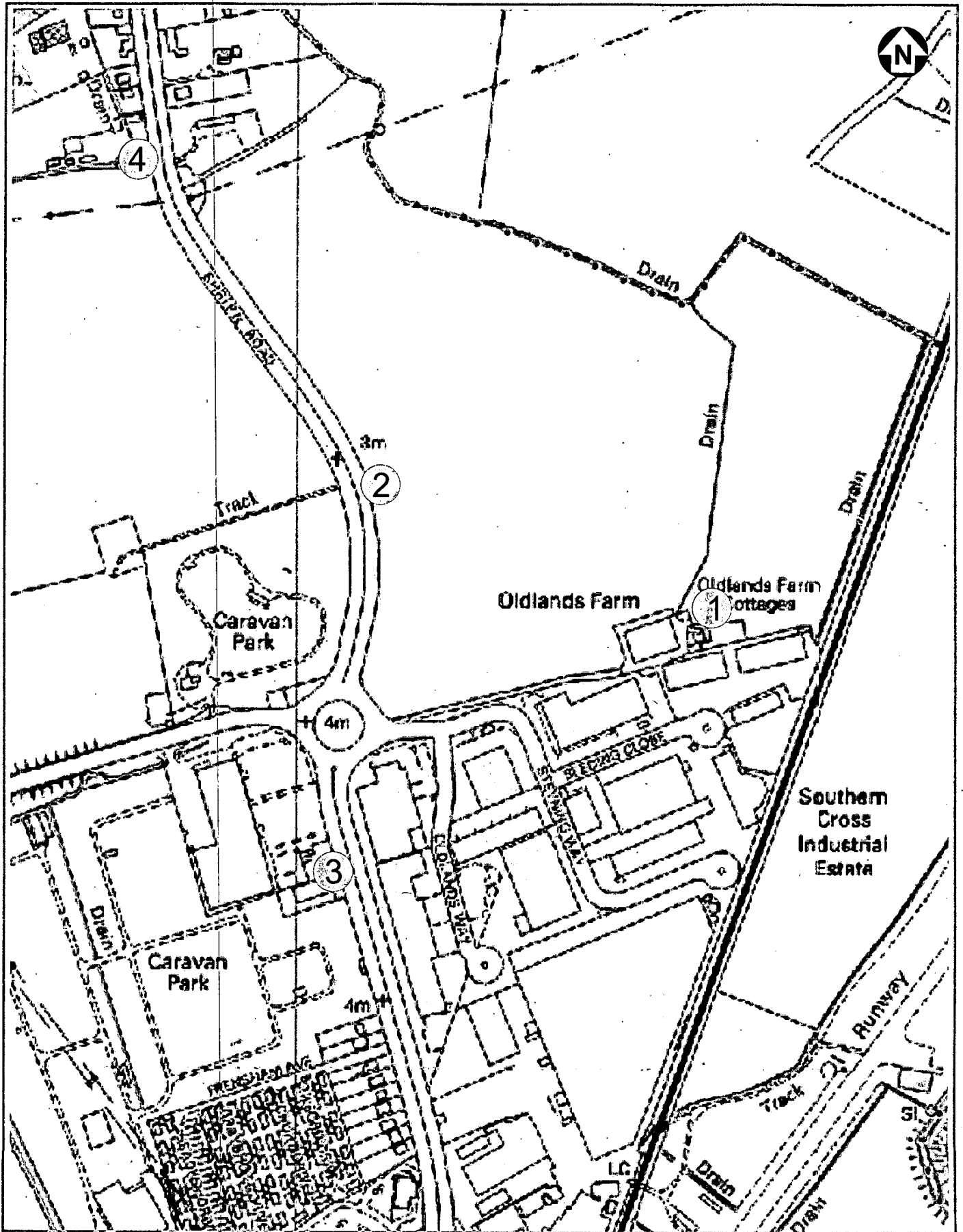


Figure:	9.1		
Title:	Noise Measurement Positions		
Project:	Oldlands Farm		
Date:	20/12/07	Scale:	NTS

