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Pogmoor Crossroads

Noise and Vibration Assessment

Barnsley Metropolitan Borough Council

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1. Introduction

1.1 AECOM was commissioned to undertake a noise and vibration assessment for the proposed junction improvements to the existing traffic-light controlled junction at the Broadway/Pogmoor Road crossroads, to the east of the M1, junction 37. The scheme introduces a one-way gyratory, comprising of new carriageway through Penny Pie Park, realignment of Pogmoor Road and new junction layouts at the intersections of Pogmoor Road and Dodworth Road.

1.2 The objective of the assessment is to identify any effects upon noise and/or vibration sensitive receptors (NSRs) that are likely to arise from the construction and operation of the Scheme. This assessment has been prepared in accordance with the DMRB Volume 11, Section 3, Part 7 HD 213/11 Revision 1 (Ref 1). Consultation regarding the noise and vibration assessment methodology was undertaken with James Gardham, Environmental Health Officer (Pollution Control), Regulatory Services at BMBC, who confirmed the methodology was appropriate.

2. Policy & Legislation

National Policy

2.1 The following planning guidance and legislation have been taken into account in determining the assessment methodology, receptor selection and sensitivity, potential significant environmental effects, and mitigation:

- National Planning Policy Framework;
- Noise Policy Statement for England; and
- Web-based resource “Planning Practice Guidance on Noise” (PPG-N).

2.2 The aims in the National Planning Policy Framework (NPPF) (Ref 2) provide the guiding principles for the consideration of mitigating noise and vibration, within the context of sustainable development:

- avoid significant adverse impacts on health and quality of life from noise as a result of the new development;
- minimise and mitigate other adverse impacts on health and quality of life from noise from the new development; and
- contribute to improvements to health and quality of life through the effective management and control of noise, where possible.

2.3 The Explanatory Note to the Noise Policy Statement for England (NSPE) (Ref 3) informs the assessment methodology in terms of the guidance on *adverse impacts* and *significant adverse impacts* through the introduction of the following concepts:

- No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

2.4 The NPSE recognises that *‘it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations’*. The levels are likely to be different for different noise sources, for different receptors and at different times of the day, therefore the assessment methodology outlines the proposed LOAEL and SOAEL for each potential impact. The setting of these levels has been informed by the additional guidance in the Planning Practice Guidance on Noise (PPG-N) (Ref 4).

National Legislation

Environmental Noise (England) Regulations

2.5 The UK Government Environmental Noise (England) Regulations 2006 (Ref 5) (as amended 2008, 2009, 2010) were introduced in England to implement European Union, Assessment and Management of Noise Directive 2002/49/EC (known as the Environmental Noise Directive - END) (Ref 6). The aims of the END are to define a common approach in order to avoid, prevent or reduce the harmful effects of environmental noise. Under the END, strategic noise mapping of major roads, railways, airports and agglomerations has been completed across England, including the M1 and A628 in the vicinity of Barnsley. A number of ‘Noise Important Areas’ (NIAs - those areas most exposed to noise) were identified in the vicinity of the scheme, including along the A628 which lies within the 1km wider study area (NIA ID 10903).

2.6 Responsibility for assessing the potential for implementing cost effective noise mitigation measures within NIAs rests with either Highways England or the local Highways Authority, depending on who is responsible for the road. NIA ID 10903 has been identified as an area for which there is joint responsibility, due to the boundary of the NIA including both the M1 at Junction 37 and the A628.

Land Compensation Act 1973

2.7 In general noise and vibration are recognised as both a common law nuisance (either private or public) and a statutory nuisance. However, this does not apply to noise and vibration from road traffic. As a result, the UK Government Land Compensation Act 1973 (Ref 7) and the UK Government Noise Insulation Regulations 1975 (as amended 1988) (Ref 8) are used in respect of road traffic noise.

2.8 The Land Compensation Act 1973 Part I provides a means by which compensation can be paid to owners of land or property which has experienced a loss in value caused by the use of public works, such as new or altered roads. Noise and vibration are two of the factors which would be considered in any claims for compensation; however the claim should consider all changes and effects, including betterment.

Noise Insulation Regulations 1975 (as amended 1988)

2.9 The Noise Insulation Regulations 1975 (as amended 1988) were made under Part II of the Land Compensation Act 1973. Regulation 3 imposes a duty, and Regulation 4 a power, on the relevant Highway Authority to undertake or make a grant in respect of the cost of undertaking noise insulation work in eligible buildings affected by a new or altered highway. This is subject to meeting a range of criteria on road traffic noise levels as specified in the regulations. Regulation 5 also provides discretionary powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in eligible buildings with respect to construction noise.

Control of Pollution Act 1974

2.10 Under Section 60 of the UK Government Control of Pollution Act 1974 (CoPA) (Ref 9) the local authority can serve a notice specifying how construction works should be carried out, including working hours and noise/vibration limits. Breaching the terms of the notice is an offence.

2.11 Section 61 of the CoPA can be used by the contractor completing demolition or construction works to apply in advance to the local authority for 'prior consent'. Section 61 prior consent acts as a defence against a Section 60 notice. The application must detail how noise and vibration is to be managed on-site based on the principles of Best Practicable Means (BPM).

Local Policy

2.12 Barnsley Core Strategy, adopted in September 2011 (Ref 10), provides a spatial strategy for the future development of Barnsley up to the year 2026. The Core Strategy includes the following policy which is relevant to noise and vibration:

- CSP 40 Pollution Control and Protection

Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water and groundwater, noise, smell, dust, vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.

We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.

Developers will be expected to minimise the effects of any possible pollution and provide mitigation measures where appropriate.

3. Assessment Methodology

Study Area

3.1 The study area for the assessment of operational phase noise impacts, as defined by HD 213/11, is derived from the proposed scheme, the existing routes being bypassed or improved by the scheme, and all surrounding existing roads that are predicted to be subject to a change in traffic noise level as a result of the scheme of:

- 1 dB(A) or more in the short term (Do-Minimum opening year to Do-Something (DS)) opening year); or
- 3 dB or more in the long term (Do-Minimum opening year to Do-Something 15 years after opening), subject to a minimum change of 1 dB between the Do-Minimum and Do-Something 15 years after opening.

3.2 These roads are defined as affected routes and are identified by analysis of the traffic data. The identification of affected routes has considered all roads with 18 hour (06:00-00:00) weekday traffic flows above the 1,000 lower cut off of the Calculation of Road Traffic Noise (CRTN) prediction methodology (Ref 11) in all scenarios. However, an analysis of the traffic data for the scheme has concluded that there are no existing roads which meet the affected routes criteria.

3.3 Therefore, in the absence of affected routes, the wider study has been based on a maximum 1km from the carriageway edge of the scheme and the existing routes bypassed or improved by the scheme. Within this 1km study area, NSRs within 600m either side of both the scheme and existing routes bypassed or improved by the scheme have been subject to detailed traffic noise modelling. The 600m extent is subsequently referred to as the 600m calculation area.

3.4 For NSRs that are outside of the 600m calculation area, but within the 1km wider study area, a qualitative assessment of the traffic noise impacts has been carried out.

3.5 The 1km wider study area and NSRs within this area are shown in Figure 1. The 600m calculation area for the quantitative assessment of noise impacts is also shown on Figure 1.

3.6 The study area for construction phase impacts comprises of closest identifiedNSRs to the Scheme.

Construction Assessment

3.7 Details on construction plant and programme are currently unavailable at this stage and hence a qualitative assessment of the likely construction noise and vibration impacts has been undertaken. Taking into account the risk of potential adverse effects, appropriate mitigation has been recommended in Section 4.

3.8 The assessment has focussed on the guidance in BS 5228:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites' (Ref 12), considering proximity of receptors to the works, the potential works involved, potential working hours/duration, existing noise levels from the baseline measurement survey, and best practice mitigation measures.

Construction Noise

3.9 BS 5228 contains a number of example methodologies for identifying significant construction noise effects based on fixed thresholds or noise level changes. Taking into account this guidance the threshold values detailed in Table 1 have been adopted for this assessment to define the SOAEL and the LOAEL for residential receptors.

Table 1 Construction Noise SOAEL and LOAEL for Residential Receptors

Time of Day	SOAEL $L_{Aeq,T}$ dB (façade)	LOAEL $L_{Aeq,T}$ dB (façade)
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	75	65
Evenings (19:00 – 23:00 weekdays) and Weekends (13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays)	65	55
Night-time (23:00 – 07:00)	55	45

3.10 The criterion for the SOAEL at residential receptors corresponds to the threshold values for Category C in the BS 5228 example ABC method. Similarly, the criterion for the LOAEL corresponds to the threshold values for Category A in the BS 5228 example ABC method. In accordance with the NPPF and NPSE, it is

important to consider receptors that exceed the LOAEL and ensure adverse effects are mitigated and minimised.

3.11 The magnitude of the impact of construction noise on residential receptors has been classified in accordance with the descriptors in Table 2.

Table 2: Magnitude of Construction Noise Impacts

Magnitude of Impact	Daytime $L_{Aeq,T}$ dB (façade)	Evening / Weekend $L_{Aeq,T}$ dB (façade)	Night-time $L_{Aeq,T}$ dB (façade)
Major	> 80	> 70	> 60
Moderate	>75-80	>65-70	>55-60
Minor	>65-75	>55-65	>45-55
Negligible	≤ 65	≤ 55	≤ 45

When identifying potentially significant effects exceedances of the impact criteria and other project-specific factors, such as the existing ambient noise levels, the number of receptors affected, and the frequency and duration of the impact, will be taken into account. However, as noted earlier, details on construction plant and programme are currently unavailable and hence a qualitative assessment of the likely construction noise and vibration impacts and effects has been undertaken. Further consideration of the potential effects and identification of appropriate measures to minimise effects as far as practicable will be made once the main works contractor is engaged.

Construction vibration

3.12 The transmission of ground-borne vibration is highly dependent on the nature of the intervening ground between the source and receiver and the activities being undertaken. BS 5228 provides data on measured levels of vibration for various construction works, with particular emphasis on piling. Impacts are considered for both damage to buildings and annoyance to occupiers.

3.13 Table 3 details Peak Particle Velocity (PPV) vibration levels and provides a semantic scale for the description of demolition and construction vibration effects on human receptors, based on guidance contained in BS 5228.

3.14 For residential receptors within the vicinity of the junction the LOAEL has been defined as a PPV of 0.3mm/s (millimetres per second), this being the point at which construction vibration is likely to become perceptible. The SOAEL has been defined as a PPV of 1.0mm/s, this being the level at which construction vibration can be tolerated with prior warning.

3.15 At receptors above the SOAEL, further consideration of whether an effect is significant is undertaken using professional judgement, taking account of the duration and frequency of the effect, as well as the timing and duration of the effect.

3.16 In the absence of specific information on likely construction activities and plant, a qualitative assessment of potential effects at local receptors has been based upon professional judgement. This judgement considers whether the SOAEL or LOAEL are likely to be exceeded.

Table 3: Magnitude of Construction Vibration (PPV) Impacts

Peak Particle Velocity Level	Description	Magnitude of Impact
>= 10 mms^{-1}	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major
1.0 to < 10 mms^{-1}	It is likely that vibration of this level in residential environments	Moderate

	will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.	
0.3 to < 1 mms^{-1}	Vibration might be just perceptible in residential environments.	Minor
0.14 to < 0.3 mms^{-1}	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible

3.17 In addition to human annoyance, building structures may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause annoyance. Consequently, if vibration levels within buildings are controlled to those relating to annoyance (i.e. 1.0 mm/s), then it is highly unlikely that buildings will be damaged by construction vibration levels.

3.18 The criteria used in this assessment relate to the potential for cosmetic damage and structural damage. The principal concern is generally transient vibration, for example due to piling, or continuous vibration, for example due to earthworks compaction using vibratory rollers.

3.19 BS 7385-2: 1993 'Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration' (Ref 13) provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228. Guide values for transient vibration, above which cosmetic damage could occur, are given in Table 4.

Table 4: Transient Vibration Guide Values for Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4Hz to 15Hz	15Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mms^{-1} at 4Hz and above	Reinforced or framed structures Industrial and heavy commercial buildings
Unreinforced or light framed structures Residential or light commercial buildings	15 mms^{-1} at 4Hz increasing to 20 mms^{-1} at 15Hz	Unreinforced or light framed structures Residential or light commercial buildings
Reinforced or framed structures Industrial and heavy commercial buildings	50 mms^{-1} at 4Hz and above	Reinforced or framed structures Industrial and heavy commercial buildings

NOTE 1: Values referred to are at the base of the building.
NOTE 2: For un-reinforced or light framed structures and residential or light commercial buildings, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

3.20 BS 7385-2:1993 states that the probability of building damage tends to zero for transient vibration levels less than 12.5 mm/s PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value.

3.21 It is also noted that these values refer to the likelihood of cosmetic damage. ISO 4866:2010 (Ref 14) defines three different categories of building damage:

- cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions;
- minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block; and
- major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.

3.22 BS 7385-2:1993 states that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration level twice that of minor damage. Therefore, this guidance can be used to define the magnitude of impact identified in Table 5.

Table 5: Magnitude of Impact Construction Vibration Building Damage

Magnitude of Impact	Damage Risk	Continuous Vibration Level PPV mms^{-1}
Major	Major	30
Moderate	Minor	15
Minor	Cosmetic	6
Negligible	Negligible	<6

Operational Assessment

3.23 The general principle of DMRB is to allocate an assessment method according to risk. This process uses three levels of assessment:

- Scoping
- Simple; and
- Detailed.

The assessment presented here is based on the simple level approach and includes an assessment of the long term impact of the scheme. This is considered an appropriate and proportionate level of DMRB assessment to accompany a local highways authority planning application.

3.24 Noise from a flow of road traffic is generated by both the vehicle engines and the interaction of tyres with the road surface. The traffic noise level at a receptor, such as an observer at the roadside or residents within a property, is influenced by a number of factors including traffic flow, speed, composition (percentage of heavy goods vehicles (HGV)), gradient, type of road surface, distance from the road and the presence of any obstructions between the road and the receptor.

3.25 Noise from a stream of traffic is not constant, but to assess the noise impact a single figure estimate of the overall noise level is necessary. The index adopted by the Government in CRTN to assess traffic noise is $L_{A10,18h}$. This value is determined by taking the highest 10% of noise readings in each of the 18 one-hour periods between 06:00 and 00:00, and then calculating the arithmetic mean. As recorded in DMRB, a reasonably good correlation has been shown to exist between this index and the perception of traffic noise by residents over a wide range of noise exposures.

3.26 CRTN provides the standard methodology for predicting the $L_{A10,18h}$ road traffic noise level. Noise levels are predicted at a point measured 1m horizontally from the external façade of buildings.

3.27 DMRB also requires an assessment of night-time (i.e. between 23:00 and 07:00) traffic noise levels ($L_{night,outside}$). However, this parameter is not calculated by the standard CRTN methodology. DMRB refers to three methods for calculating night-time traffic noise levels developed by the Transport Research Laboratory (TRL). The most widely used is 'Method 3' which factors the L_{night} from the $L_{A10,18h}$, based on the typical diurnal pattern of traffic flows in the UK; this method has been used in this assessment.

3.28 The objective of the assessment, as set out in DMRB, is to gain an overall appreciation of the noise and vibration climate, both with (Do-Something) and without (Do-Minimum) the scheme, to identify where noise impacts occur and to determine where mitigation to reduce these impacts may be appropriate. These conditions have been assessed for the baseline year (2019 - the year of the scheme opening) and the future assessment year (2034 -15 years after the scheme opening).

3.29 Different façades of the same property can experience different changes in traffic noise level depending on their orientation to the noise source. DMRB requires that each of the above comparisons of traffic noise levels is based on the façade which experiences the least beneficial change, that is the largest increase, or, if all façades undergo a decrease, the smallest decrease.

3.30 DMRB provides two example classifications for the magnitude of the traffic noise impact of a proposed road scheme, as shown in Table 6. These relate to short-term changes in noise levels and long-term changes in noise levels. The classifications detailed in Table 6 have been used in the assessment of the scheme.

Table 6: Magnitude Criteria for Traffic Noise Impacts

Short Term Change		Long Term Change	
Noise Level Change (rounded to 0.1dB) LA10,18h dB	Magnitude of Impact	Noise Level Change (rounded to 0.1dB) LA10,18h dB	Magnitude of Impact
0	No change	0	No change
0.1 – 0.9	Negligible	0.1 – 2.9	Negligible
1 – 2.9	Minor	3 – 4.9	Minor
3 – 4.9	Moderate	5 – 9.9	Moderate
5+	Major	10 +	Major

3.31 The introduction of recent planning guidance (described above) has increased the focus on consideration of absolute noise levels as well as the change in noise levels due to a road scheme. The current version of DMRB only considers the change in noise level when determining the magnitude of impact of a road scheme. In light of the introduction of the National Planning Policy Framework and National Policy Statement for England a greater consideration of absolute noise levels is considered appropriate, including an acknowledgement that where existing traffic noise levels are high (above the SOAEL as defined below), even small changes in traffic noise in the short term (1 dB or more), may be significant.

3.32 With respect to absolute road traffic noise levels, for daytime, the SOAEL is set at 63 dB $L_{Aeq,16h}$ (free field). This is equivalent to 67.5 dB $L_{A10,18h}$ (façade), which is consistent with the daytime trigger level in the Noise Insulation Regulations. The LOAEL is set at 50 dB $L_{Aeq,16h}$ (free field), based on the information provided in the WHO Guidelines for Community Noise (Ref 15).

3.33 For night-time, the SOAEL is set at 55 dB $L_{Aeq,8h}$ (free field) for residential properties. This aligns with the interim night-time outdoor target level provided in the Night Noise Guidelines for Europe. The LOAEL is set at 40 dB $L_{Aeq,8h}$ (free field), which is explicitly defined as the LOAEL for transport noise in the WHO Night Noise Guidelines for Europe (Ref 16).

3.34 Vibration from traffic can be transmitted through the air or through the ground. Airborne vibration is produced by the engines and exhausts of road vehicles, with dominant frequencies typically in the range of 50 - 100 hertz (Hz). Ground borne vibration is produced by the interaction of the vehicle tyres and the road surface with dominant frequencies typically in the range of 8 - 20 Hz. The passage of vehicles over irregularities in the road surface can also be a source of ground borne vibration.

3.35 Traffic vibration can potentially affect buildings and disturb occupiers. DMRB reports that extensive research on a wide range of buildings has found no evidence of traffic induced ground borne vibration

being a source of significant damage to buildings and no evidence that exposure to airborne vibration has caused even minor damage.

3.36 Airborne vibration is noticed by occupiers more often than ground borne vibration, as it may result in detectable vibrations in building elements such as windows and doors.

3.37 DMRB states that perceptible vibration only occurs in rare cases and identifies that the normal use of a building, such as closing doors and operating domestic appliances, can generate similar levels of vibration to that from traffic in most circumstances.

3.38 It is a requirement of new highway constructions that the highway surface be smooth and free from any discontinuities. Paragraph A5.26 of DMRB states, in relation to ground borne vibration: “Such vibrations are unlikely to be important when considering disturbance from new roads and an assessment will only be necessary in exceptional circumstances”. Hence, no significant effects from traffic induced ground borne vibration due to the passage of vehicles over irregularities on the proposed scheme are anticipated and no further assessment is proposed.

3.39 At the simple assessment level, DMRB only requires an assessment of operational ground-borne traffic vibration if ground-borne vibration is identified as a potential problem on existing routes. As BMBC have confirmed that this is not the case, operational vibration impacts are not assessed further in this chapter.

Receptor Sensitivity

3.40 Table 7 details the sensitivity assigned to various receptors with regard to noise and vibration. Residential properties (including hotels), educational buildings, and medical facilities are generally ranked as of high sensitivity to noise and vibration impacts. Community facilities (such as places of worship) and designated sites are ranked as of medium sensitivity. Other land uses such as public rights of way and industrial/commercial uses are generally ranked as of low or negligible sensitivity.

Table 7: Sensitivity of receptors

Sensitivity/ value of resource/ receptor	Description	Examples of receptor usage
Very high	Receptors where noise or vibration will significantly affect the function of a receptor	Auditoria/ studios Specialist medical/teaching centres, or laboratories with highly sensitive equipment
High	Receptors where people or operations are particularly susceptible to noise or vibration. Sensitive ecological receptors known to be vulnerable to the effects of noise or vibration	Residential Quiet outdoor areas used for recreation Conference facilities Schools/ educational facilities in the daytime Hospitals/ residential care homes Libraries Ecologically sensitive areas for example Special Protection Areas (SPAs)
Medium	Receptors moderately sensitive to noise or vibration where it may cause some distraction or disturbance	Offices Restaurants/ retail Sports grounds when spectator or noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf)
Low	Receptors where distraction or disturbance of people from noise or vibration is minimal	Residences and other buildings not occupied during working hours Factories and working environments with existing high noise levels Sports grounds when spectator or noise is a normal part of the event

Assessing Significance of Effect

3.41 The significance of effect is a function of the value or sensitivity of the receptor and the magnitude of the impact, combined with professional judgement which takes into account a range of other factors including:

- the absolute noise levels, such as whether existing ambient levels are already very high or very low
- the number of affected receptors
- the duration of the impact
- for non-residential receptors; the nature, times of use and design of the receptor

3.42 Table 8 shows how significance of effect has been determined in this assessment, based on the predicted magnitude of impact and the sensitivity of receptors, after which the additional factors detailed above are applied to reach a conclusion on the significance of effect. This is based on Tables 2, 3, 5, 6 and 7 of this report.

Table 8: Significance of Effect

Magnitude of impact	Value/ Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
Major	Very Large	Large	Moderate	Slight	Slight
Moderate	Large	Moderate	Moderate	Slight	Neutral
Minor	Moderate	Slight	Slight	Neutral	Neutral
Negligible	Slight	Slight	Slight	Neutral	Neutral
No Change	Neutral	Neutral	Neutral	Neutral	Neutral

3.43 Neutral and slight effects are considered to be not significant, whereas moderate, large and very large effects are considered to be significant.

Assessment Assumptions and Limitations

Construction

3.44 The absence of detailed construction plant, construction traffic routes and programme has resulted in a high level qualitative assessment of construction noise and vibration effects being undertaken. Therefore the impact magnitude and significance of effect levels assigned have been based upon professional judgement through consideration of the scheme proposed, the potential works required to construct the scheme and the nature of the existing environment.

3.45 With the exception of the existing playpark within Penny Pie Park, no demolition works are expected to occur. However, other construction operations associated with road schemes have been assessed. These include earthworks and construction of sub-surface pavement layers, drainage installation and surfacing. Earthworks and drainage operations are expected to occur simultaneously. Although such works are generally carried out during daytime hours, there is also the potential for night time works to occur, particularly where there is a need to tie in surfacing of new and existing carriageways.

Operation

3.46 In order to assess the effect of noise levels on the surrounding NSRs, a noise model has been developed using SoundPlan© v8.0 noise modelling software. The accuracy of the model has been assessed in part by comparing the predicted $L_{A10,18h}$ levels with the measured sound levels collected at the four monitoring locations which are discussed further in Section 5.

- Details of the model data sets are set out in Appendix A. Assumptions and limitations associated with this data is set out below: ground type and absorption - 1.0 for vegetated areas, 0.0 for road surfaces industrial areas and water bodies, 0.25 for suburban areas
- guidance regarding corrections for road surface type has been taken from CRTN and DMRB Annex 4. For Low Noise Surfacing, a correction factor of -3.5 dB for speeds at or above 75kph has been modelled as prescribed in Annex 4 of HD 213/11. For standard hot rolled asphalt the corresponding correction at speeds at or above 75kph is -0.5 dB. At speeds below 75kph the correction is -1 dB for all surfaces;
- building receptors have been identified by cross-referencing OS Mastermap building footprints with AddressBase Premium data. Building heights for residential receptors have been assigned according

to the number of floors within the building, which has been estimated from Ordnance Survey data. Building heights for non-residential receptors, and all other buildings, have been assigned using Ordnance Survey data; and

- façade noise levels have been calculated at the top floor for all residential and non-residential sensitive receptors within the 600m calculation area, except for few properties close to the scheme where it has been observed that no windows are present at the upper floors. .

4. Mitigation Measures

4.1 As set out in the previous section, the absence of detailed construction plant, construction traffic routes and programme has resulted in a high level qualitative assessment of construction noise and vibration effects being undertaken. These details, including measures to minimise construction noise and vibration, would be determined by the appointed contractor at the construction stage.

4.2 Best Practicable Means is expected to be applied by the contractor, so that noise and vibration levels resulting from the construction of the scheme are minimised as far as reasonably practicable. Examples of 'Best Practicable Means' include:

- Monitor existing ambient noise levels prior to works commencing ;
- Review of construction programme and methodology to consider low noise/low vibration methods (including non-vibratory compaction plant and low vibration piling methods, where required);
- Optimal location of equipment on site to minimise noise disturbance;
- Provision of acoustic enclosures around static plant, where necessary;
- Use of less intrusive alarms, such as broadband vehicle reversing warnings;
- Local screening of equipment and employment of perimeter hoarding;
- Agree Section 61 'Prior Consent' with Local Authority prior to works commencing;
- Communicate details of any noisy works or those likely to cause vibration to neighbours prior to works commencing; and
- Monitor noise/vibration levels where required.

4.3 With regard to the operation of the scheme, its alignment results in road traffic moving closer to a number of residential properties within the study area and hence significant adverse effects are likely to occur without noise mitigation measures.

4.4 Following discussions with BMBC, a number of noise barriers have been incorporated into the noise model to avoid these significant adverse noise effects as far as is practicable. These measures, shown in Figure 1, include a 1.5m high noise barrier of approximately 300m along the northern boundary of Penny Pie Park, which is proposed to take the form of a stone gabion wall. 2.4m high noise barriers are also proposed along the eastern boundary of Penny Pie Park, which will replace close boarded fences which currently exist along approximately half of this length. However, it is recommended that further clarification is sought from the appointed contractor for the scheme to confirm that the construction of the proposed barriers along the eastern perimeter is feasible. In the event that it is not feasible to install the proposed noise barriers along the eastern boundary of the park, the existing close boarded fences will be retained; however, these are unlikely to provide any noticeable noise reduction to residential properties in their vicinity.

4.5 Due to the urban nature of the scheme, the installation of noise barriers is not feasible at all locations where significant adverse effects are likely to occur and hence other measures, such as the offer of noise insulation to residential properties, would need to be considered. These measures are discussed further in section 6, as appropriate.

5. Baseline Conditions

5.1 The existing noise climate in the vicinity of the proposed scheme is dominated by road traffic noise from Pogmoor Road and Dodworth Road. Other noise sources include noise associated with general urban activities.

5.2 There is one Noise Important Area (NIA) in the vicinity of the proposed scheme. The NIA is located on the Dodworth Road (A628) and is the main road which travels east – west through the scheme area (NIA Ref: 10903).

5.3 Potentially sensitive receptors are defined in DMRB as dwellings, hospitals, schools, community facilities, designated areas (e.g. Areas of Outstanding Natural Beauty (AONB), National Parks, Special Area of Conservations (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Scheduled Monuments (SM)) and public rights of way (see Table 7).

5.4 The area around the junction is predominantly residential in nature and is considered to be of high sensitivity area. A number of other sensitive non-residential receptors are located within 600m of the junction, including Horizon Community College, IBIS hotel, Barnsley Muslim Community Centre, Moorlands College, Woodlands Medical Centre. In the wider area, there are approximately six primary schools, three places of worship, four medical centres and two community halls. There are no SSSI designated sites close to the existing A628 which fall within the 1km study area.

Noise Monitoring Locations

5.5 Noise levels have been monitored at four positions around the scheme that are most affected by existing environmental noise.

5.6 The four monitoring locations were identified by AECOM and BMBC due to their proximity to existing NSRs and exposure to existing road traffic noise from roads along the proposed scheme.

5.7 To define baseline noise conditions, unattended noise measurements at two locations were undertaken between the 5 April and 12 April 2018. An additional two attended 3 hour measurements were undertaken on Wednesday 18 April 2018. All measurement locations are described in Table 9 below and photographs of each location and a map showing the monitoring locations are included in Appendix B and in Figure 1.

5.8 Descriptions of any dominant or secondary noise sources have also been included within Table 9.

Table 9: Monitoring Locations

Location	Details	Dominant Noise Sources	Secondary Noise Sources	Measurement Format
ML1	241 Dodworth Road Rear garden	Road traffic noise from Dodworth Road	Pogmoor Road, activity on Penny Pie Park	Unattended
ML2	25 St Martins Close	Road traffic noise from Pogmoor Road	Dodworth Road, Intermittent Train Pass-bys	Unattended
ML3	Pogmoor Road	Road traffic noise from Pogmoor Road and Dodworth Road	Activity on Penny Pie Park	Attended
ML4	Dodworth Road	Road traffic noise from Pogmoor Road and Dodworth Road	Activity on Penny Pie Park	Attended

Noise Survey Instrumentation

5.9 Information relating to the noise survey instrumentation used can be found in Appendix C.

Meteorological Conditions

5.10 A weather station (located at ML1) was used to collect information relating to the prevailing wind conditions throughout the survey period. The data were collected in 1-hour intervals. Information on wind direction, wind speeds (Average and Max) as well as ambient temperature and precipitation are presented in the Table 10 below.

Table 10: Meteorological Conditions

Date (2018)	Time Period (T)	Temperature (°C)*	Wind Direction (Degrees from north)	Wind Speed (Average) m/s*	Wind Speed (Max) m/s*	Precipitation (mm)
Thursday 5 April	14:00 – 23:00	7.2 – 13.5	292	0.2 – 0.4	1.3 – 2.3	0.0
	23:00 – 07:00	3.1 – 6.5	292	0.2 – 0.5	1.5 – 2.4	0.0
Friday 6 April	07:00 – 23:00	3.6 – 13.6	211	0.2 – 0.8	1.7 – 4.2	0.0
	23:00 – 07:00	7.3 – 10.4	125	0.0 – 0.2	0.3 – 1.8	0.0
Saturday 7 April	07:00 – 23:00	8.1 – 12.4	168	0.0 – 0.2	0.3 – 1.4	0.6
	23:00 – 07:00	4.2 - 8.5	227	0.0	0.2 – 0.9	0.0
Sunday 8 April	07:00 – 23:00	5.3 – 12.4	170	0.0 – 0.2	0.2 – 1.2	0.0
	23:00 – 07:00	0.7 – 4.6	-	0.0	0.2 – 0.3	0.0
Monday 9 April	07:00 – 23:00	1.5 – 13.3	128	0.0 – 0.5	0.2 – 2.6	3.1
	23:00 – 07:00	5.6 – 6.3	63	0.2 – 0.3	1.3 – 2.4	12.5
Tuesday 10 April	07:00 – 23:00	5.7 – 7.2	58	0.1 – 0.5	0.7 – 2.5	10.2
	23:00 – 07:00	5.8 – 7.3	79	0.0 – 0.2	1.0 – 2.1	0.7
Wednesday 11 April	07:00 – 23:00	4.9 – 5.9	57	0.2 – 0.4	1.4 – 2.7	1.4
	23:00 – 07:00	4.6 – 5.0	65	0.1 – 0.3	1.3 – 1.9	1.9
Thursday 12 April	07:00 – 15:00	4.8 – 5.2	61	0.2 – 0.3	1.7 – 2.3	0.8

5.11 Throughout the survey period, meteorological conditions were generally within the limits specified in the relevant standards for acceptable noise measurements, with the exception of Monday 9 April (night-time) and Tuesday 10 April where fairly high levels of precipitation were noted. However, noise levels over these periods do not vary significantly from data collected during other periods of the survey and should therefore be considered as representative.

Monitoring Results

5.12 Full details of the noise monitoring results, including the recorded intervals and summaries, are provided in Appendix C.

5.13 Tables 11 and 12 present the daily values for the two unattended monitoring locations, Table 13 presents the values derived from the attended daytime measurements.

Table 11: $L_{A10,\,18hr}$ and L_{night} values for ML1 (Dodworth Road)

Date	$L_{A10,18hr}$ (dB) (06:00 – 00:00)	L_{night} (dB) (23:00 – 07:00)
Thursday 5 April	-	47.6
Friday 6 April	53.7	46.8
Saturday 7 April	51.4	46.8
Sunday 8 April	51.0	47.4
Monday 9 April	52.4	49.4

Tuesday 10 April	52.3	48.0
Wednesday 11 April	51.8	48.8
Thursday 12 April*	-	-

*Insufficient data was collected on this day to produce value

Table 12: $L_{A10, 18hr}$ and L_{night} values for ML2 (St Martins Close)

Date	$L_{A10,18hr}$ (dB) (06:00 – 00:00)	L_{night} (dB) (23:00 – 07:00)
Thursday 5 April	-	50.0
Friday 6 April	51.9	49.6
Saturday 7 April	50.0	45.9
Sunday 8 April	49.7	48.3
Monday 9 April	49.8	50.4
Tuesday 10 April	48.4	49.8
Wednesday 11 April	49.0	49.9
Thursday 12 April*	-	-

*Insufficient data was collected on this day to produce value

Table 13: $L_{A10,18hr}$ and L_{night} values for ML3 and ML4

Date	Measurement Location	$L_{A10,18hr}$ (dB)* (06:00 – 00:00)	L_{night} (dB) ** (23:00 – 07:00)
Thursday 5 April	ML3 (Pogmoor Road)	69.2	58.5
Friday 6 April	ML4 (Dodworth Road)	73.4	62.3

*Value derived using $L10_{,3hr}$ to $L10_{,18hr}$ correction stated within CRTN

**Value derived using $L10_{,18hr}$ to L_{night} correction stated within the DEFRA document '*Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indicies for Road Noise Mapping*'

5.14 The $L_{A10\ 18hr}$ baseline levels have been used to validate the noise modelling undertaken to derive the impacts of the scheme. Noise levels at the monitoring locations have been calculated using SoundPlan v8.0 noise modelling software and comparisons made with measured levels in Table 14 below.

Table 14: Comparison between modelled and measured $L_{A10,18hr}$ (dB) levels at monitoring locations

Monitoring location	Modelled $L_{A10,18hr}$ (dB) (06:00 – 00:00)	Measured $L_{A10,18hr}$ (dB) (06:00 – 00:00)
ML1	51.8	51.0-53.7
ML2	55.4	48.4-51.9
ML3	71.1	69.2
ML4	70.3	73.4

5.15 The $L_{A10,18h}$ levels derived from the measurements at ML1, ML3 and ML4 correlate well with the noise model predictions, being within approximately 3dB(A) of the calculated levels. However, the $L_{A10,18h}$ measurements undertaken at ML2 (St Martins Close) are on average 5.0 dB(A) lower than the calculated $L_{A10,18h}$ level at this location. This disparity is likely to have been caused by localised screening within the vicinity of the property, which has not been included in the model. However, although the disparity between the measured and calculated level at ML2 is greater than that observed at other measurement locations, it is considered that there is a satisfactory level of agreement between the measured and modelled results and the model can be used to calculate the effects of the scheme.

5.16 In addition to calculating baseline road traffic noise levels at the 4 monitoring locations, $L_{A10,18h}$ and L_{night} levels have also been predicted at all sensitive receptors within the 600m calculation area without the scheme, in both the opening year (2019) and the future assessment year (2034). The results are summarised in Table 15. These levels have been used to provide an understanding of how the noise environment may change over time without the scheme in place.

Table 15: Long term Change in Predicted Do-Minimum Traffic Noise Levels (DM2019 to DM2034)

Change in noise level		Daytime		Night-time
		Number of Residential Buildings	Number of Other Sensitive Receptors	Number of Residential Buildings
Increase in noise level Daytime $L_{A10,18h}$ dB Night-time $L_{night,outside}$ dB	0.1 - 2.9	470	3	144
	3.0 - 4.9	0	0	0
	5.0 - 9.9	0	0	0
	≥10	0	0	0
No change	0	323	0	67
Decrease in noise level Daytime $L_{A10,18h}$ dB Night-time $L_{night,outside}$ dB	0.1 - 2.9	1360	2	162
	3.0 - 4.9	0	0	0
	5.0 - 9.9	0	0	0
	≥10	0	0	0

5.17 An estimated total of 2153 residential buildings are located with the 600m noise calculation area. However, only 373 properties meet the DMRB criterion of 55 dB $L_{night,outside}$ at one or more scenarios in the night-time traffic noise assessment.

5.18 A total of five non-residential noise sensitive buildings are located within the 600m noise calculation area, consisting of IBIS hotel, Moorlands College, Horizon Community College, Barnsley Muslim Community Centre and Woodlands Drive Medical Centre.

5.19 The noise changes from the DM 2019 to DM 2034 are presented as a noise difference plot in Figure 2. The map is based on free field noise levels at first floor level, 4m above ground. It should be noted that the noise difference plots are based on a 10m x 10m grid and are provided for illustration purposes only.

5.20 In the long term, without the scheme being implemented, a majority of the residential dwellings are predicted to experience a negligible decrease in noise both during the day and night. These decreases are predicted to occur on a number of routes within the study area, particularly Pogmoor Road and the section of Dodworth Road between the M1 J37 and Pogmoor Road junction. These decreases are likely to result from the existing Pogmoor Road/Dodworth Road junction remaining in its current form. As this junction is expected to reach capacity in 2019, the available traffic data indicates that traffic redistributes onto other roads in the longer term in order to avoid the junction.

5.21 There is a small proportion of residential properties which are predicted to experience either no change or an increase in daytime and night-time noise level in the long term without the scheme being implemented. These increases are predicted to occur at residential and non-residential properties on Dodworth Road to the east of the Dodworth Road/Pogmoor Road junction and at residential properties along existing routes in the wider area, and are as a result of both traffic growth on these routes over the 15 year period and redistributed traffic described in the previous paragraph.

6. Assessment of effects

Construction

6.1 Finalised details of the construction works required for the scheme are not currently available. However, there is the potential for an increase in ambient noise levels resulting in adverse noise impacts at the closest NSRs to the works, in particular if night time works are required.

6.2 The potentially worst affected NSRs to construction noise are residential properties situated to the west, south and north of Penny Pie Park. Given the distance from residential properties to the main works, professional judgement would indicate that the impact magnitude would be unlikely to regularly exceed the moderate classification (if at all) as set out in Table 2, during the daytime. However, it would be more likely for the moderate or major classifications to be met or exceeded if the works were undertaken at night, particularly for those properties located to the north-west, south-west and south-east of the scheme where surfacing tie-ins to existing roads will be required.

6.3 Vibration impacts of a moderate or major impact magnitude at nearby residential receptors might only be expected to occur if works such as vibratory compaction of earthworks or road pavement layers were required in close proximity. Given the distance of most of the residential properties to earthworks and road pavement construction operations, professional judgement would indicate that the impact magnitude would be unlikely to be exceed the moderate classifications as set out in Table 3. However, there is higher possibility for impacts of this magnitude to affect residential properties closest to the scheme at its north-west and south-east extents.

6.4 Although it can be concluded that there is the potential for moderate adverse impacts due to construction noise and vibration, the exact significance, duration and frequency of any adverse noise or vibration effect resulting from the construction works will be highly dependent upon the methods, timing and duration of the works required. Further consideration of the potential effects and identification of appropriate measures to minimise effects as far as practicable will be made once the main works contractor is engaged.

Operation

6.5 Noise modelling has been undertaken for the Do-Minimum and Do-Something in both the opening year of the scheme (2019) and in the future assessment year (2034).

6.6 The short term changes in predicted daytime road traffic noise levels in 2019 between the Do-Minimum and Do-Something scenarios, at both residential and non-residential sensitive receptors within the 600m noise calculation study area, are summarised in Table 16.

Table 16: Short term Change in Daytime and Night-time Noise impacts with the scheme (DM2019 to DM2034)

Change in noise level		Daytime	
		Number of Residential Buildings	Number of Other Sensitive Receptors
Increase in noise level Daytime $L_{A10,18h}$ dB Night-time $L_{night,outside}$ dB	0.1 – 0.9	1658	4
	1.0 – 2.9	404	1
	3.0 - 4.9	18	0
	≥5	2	0
No change	0	38	0

Decrease in noise level Daytime $L_{A10,18h}$ dB Night-time $L_{night,outside}$ dB	0.1 – 0.9	33	0
	1.0 – 2.9	0	0
	3.0 - 4.9	0	0
	≥5	0	0

6.7 The long term changes in predicted daytime and night-time road traffic noise levels Do-Minimum scenario in 2019 and Do-Something scenario in 2034, at both residential and non-residential sensitive receptors within the 600m noise calculation study area, are summarised in Table 17.

Table 17: Long term Daytime and Night-time Noise impacts with the Proposed Scheme (DS2034-DM2019)

Change in noise level		Daytime		Night-time
		Number of Residential Buildings	Number of Other Sensitive Receptors	Number of Residential Buildings
Increase in noise level Daytime $L_{A10,18h}$ dB Night-time $L_{night,outside}$ dB	0.1 - 2.9	2063	5	337
	3.0 - 4.9	20	0	3
	5.0 - 9.9	2	0	1
	≥10	0	0	0
No change	0	40	0	22
Decrease in noise level Daytime $L_{A10,18h}$ dB Night-time $L_{night,outside}$ dB	0.1 - 2.9	28	0	10
	3.0 - 4.9	0	0	0
	5.0 - 9.9	0	0	0
	≥10	0	0	0

6.8 An estimated total of 2153 residential buildings are located within the 600m noise prediction area. However, only In the night-time only 373properties meet the DMRB criterion of 55 dB $L_{night,outside}$ at one or more facades in one or more scenarios for inclusion in the night-time assessment.

6.9 A total of five non-residential noise sensitive buildings are located within the 600m noise calculation area, consisting of IBIS hotel, Moorlands College, Horizon Community College, Barnsley Muslim Community Centre and Woodlands Drive Medical Centre.

6.10 The noise changes due to the scheme in the short term (Do Minimum 2019 to Do Something 2019) and long-term (Do Minimum 2019 to Do Something 2034) are presented as noise difference contour plots in Figures 3 and 4 respectively. These maps are based on free-field traffic noise levels at first floor level. These plots are based on a 10m x 10m grid and are provided for illustration purposes only.

6.11 In the short term, 2082 residential properties are expected to experience an increase in noise level due to the scheme. Of these, two of these are expected to experience a major increase in noise level and hence a major adverse impact, with the maximum increase being +5.7dB(A), with 18 expected to experience a moderate increase and hence a moderate adverse impact. The remaining 2062 expected to experience a minor or negligible increase in noise, resulting in minor or negligible impacts respectively. Those experiencing major increases are located to the western extent of Grosvenor Walk and on Broadway at the south east corner of the junction with Dodworth Road. The moderate increases are located at properties on Grosvenor Walk, Whitehill Avenue and Dodworth Road in the vicinity of the south west

extent of the new gyratory. The major and moderate increases at Grosvenor Walk are attributable to traffic moving closer to these properties as a result of the scheme, with the proposed noise barrier providing limited noise reduction due to its limited height. The noise increase at the property on Broadway is attributable to the horizontal alignment of the south west extent of Pogmoor Road/Dodworth Road junction moving closer to the property. The moderate increases at properties in Whitehill Avenue are likely to be attributable to the front of these houses having a greater angle of view of the northern section of Pogmoor Road due to its realignment in the northwest of the Penny Pie Park.

6.12 68 residential properties experience either no change or negligible decreases in noise level in the short term due to the proposed scheme. Those predicted to experience a negligible decrease in noise level will experience a negligible beneficial impact due to the scheme. A number of these decreases are at properties on Pogmoor Road, which benefit from the current alignment of Pogmoor Road moving further away. The remainder of these decreases are at properties located away from the immediate vicinity of the junction, such as Hunters Rise, Winter Road and Marys Place and are attributable to changes in traffic flows on these routes.

6.13 All non-residential sensitive receptors within the 600m calculation area are expected to experience an increase in noise in the short-term due to the proposed scheme. A minor adverse magnitude of impact is likely to occur at the Horizon Community College, with the remaining receptors likely to experience negligible adverse magnitude of impacts. The predicted minor increase in daytime noise level at the Horizon Community College results from the southern extent of the new gyratory moving traffic closer to the college.

6.14 All residential and non-residential receptors are considered to have high sensitivity. Taking into account both the magnitude of the impacts likely to occur at receptors and their sensitivity, the proposed scheme is likely to result in a large adverse effect at 2 residential properties and a moderate adverse effect at 18 properties in the short term during the day-time. A slight adverse effect at all other residential and non-residential receptors is likely to result in the short term during the daytime. Therefore, significant adverse effects due to road traffic noise in the day time from the proposed scheme in the short term are likely to occur at 20 residential properties.

6.15 In the long term, the vast majority of residential buildings are expected to experience an increase in traffic noise level due to the proposed scheme, during both the day and night. Of these, t properties are predicted to experience a moderate increase in noise in the daytime with one of these also experiencing a moderate increase in the night-time, resulting in moderate adverse impacts at these properties. 20 of these residential properties are predicted to experience a minor increase in noise during the daytime with 3 of these predicted to experience a minor increase in noise during the night-time, resulting in minor adverse impacts at these properties.

6.16 Those experiencing moderate increases in the daytime in the long term are located to the western extent of Grosvenor Walk and on Broadway at the south east corner of the junction with Dodworth Road. The residential property on Broadway also experiences a moderate increase in the night-time in the long term. As in the short-term, the moderate increase at Grosvenor Walk is attributable to the road noise moving closer to these properties as a result of the scheme, with the proposed noise barrier providing limited noise reduction due to its limited height. The increase at the property on Broadway is attributable to the horizontal alignment of the south west extent of Pogmoor Road/Dodworth Road junction moving closer to the property.

6.17 In contrast, a small number of properties are expected to experience a negligible decrease in traffic noise levels during the day and night due to the proposed scheme and hence a negligible beneficial impact. As in the short term, a number of these decreases are at properties on Pogmoor Road, which benefit from the current alignment of Pogmoor Road moving further away. The remainder of these decreases are at properties located away from the immediate vicinity of the junction, such as Hunters Rise, Winter Road and Marys Place and are attributable to changes in traffic flows on these routes.

6.18 All non-residential sensitive receptors within the 600m calculation area are expected to experience a negligible increase in noise in the long term due to the proposed scheme.

6.19 All residential receptors and non-residential receptors are considered to have high sensitivity. Taking into account both the magnitude of the impacts likely to occur at receptors and their sensitivity, the proposed

scheme is likely to result in a moderate adverse effect at 2 properties in the long term during the day time and 1 residential property during the night-time. The scheme is likely to result in slight adverse effect at all remaining residential properties and all non-residential receptors in the long term during the day and night time. Therefore, significant adverse effects due to road traffic noise during the daytime and night-time from the scheme in the long term are likely to occur.

6.20 Table 18 details the number of residential buildings within the 600m calculation area at which one or more facades are predicted to be above the daytime or night-time SOAEL for Do-Minimum or Do-Something scenarios.

Table 18: Number of residential buildings above SOAEL

Scenario	Daytime	Night-time
DM 2019	380	368
DM 2034	370	352
DS 2019	378	364
DS 2034	377	362

6.21 Table 19 details the number of residential buildings within the 600m calculation area at which the road traffic noise levels without the scheme in place are predicted to be above the daytime or night-time SOAEL and are also predicted to experience at least a 1dB(A) increase as a result of the scheme. These properties are also shown in Figure 5.

Table 19: Number of residential buildings above SOAEL in Do Minimum scenarios and experience at least dB(A) increase due to scheme

Scenario	Properties exceeding SOAEL in Do-Min and change of at least 1dB(A) due to scheme – Daytime	Properties exceeding SOAEL in Do-Min and change of at least 1dB(A) due to scheme – Night-time
DS 2019 – DM 2019	56	32
DS 2034 – DM 2034	27	22

6.22 The scheme results in a maximum of 378 properties exceeding the day-time SOAEL, with slightly fewer exceeding the night-time SOAEL. Although exceeding the SOAEL level is significant in noise policy terms, the scheme results in a slight reduction in residential properties exceeding the SOAEL levels during day and night. However, the assessment has identified that a number of properties which are already exposed to a SOAEL without the scheme are expected to experience at least a 1dB(A) increase as a result of the scheme in place. The maximum number of properties likely to experience these conditions is 56 during the day in the opening year. All but one of these residential properties are situated within the NIA along Dodworth Road.

6.23 In this assessment, a minor impact at residential properties ito results in a slight adverse effect and consequently, would not be considered significant. However, when taking into account that this minor impact is predicted to occur at 56 properties already exposed to high absolute levels, it is concluded that significant adverse effects are likely to occur at these residential properties as a result of the scheme.

6.24 Due to their location, installing roadside barriers along Dodworth Road and Pogmoor Road to avoid the significant adverse effects at these residential properties is not feasible. However, the significant adverse effects may be avoided through the implementation of a noise insulation scheme to the affected facades of the properties in line with the Noise Insulation Regulations (NIR) package of measures. This is supplementary to any duty or power afforded to Barnsley Metropolitan Borough Council to provide noise

insulation to eligible buildings under the NIR, with respect to a change in noise levels due to the operation of new or altered highways or additional carriageways. This assessment does not remove the need to assess eligibility for noise insulation measures under the NIR and therefore a separate NIR assessment should be undertaken as required by the legislation. On the assumption that residents accept the offer of noise insulation, the classification of effects would reduce to not significant.

7. Summary and Conclusions

7.1 The noise and vibration assessment carried out for the scheme has identified a number of likely significant adverse effects are likely to occur once the scheme is operational, both in the short and long term. These are summarised below.

7.2 The absence of detailed construction information for the scheme has resulted in a qualitative construction assessment being undertaken. This has concluded that there is the potential for significant adverse effects at properties due to noise and vibration from the construction of the scheme, the exact significance, duration and frequency of any adverse noise or vibration effect resulting from the construction works will be highly dependent upon the methods, timing and duration of the works required. Further consideration of the potential effects and identification of appropriate measures to minimise effects as far as practicable will be made once the main works contractor is engaged.

7.3 Mitigation, in the form of noise barriers, has been proposed along the north and eastern boundaries of the park to avoid a number of significant adverse effects that were likely to otherwise occur. However, despite this mitigation, likely significant adverse effects as a result of the scheme have been identified at a number of properties along Grosvenor Walk.

7.4 Significant adverse effects are also likely at properties along Whitehill Avenue due to the scheme; however, due to their location, installing noise barriers to avoid this significant adverse effect is not feasible.

7.5 Significant adverse effects are also likely at a number of properties along Dodworth Road and Pogmoor Road, where there are existing high noise levels which are increased due to the scheme. However, the significant adverse effects may be avoided through the implementation of a noise insulation scheme to the affected facades of the properties in line with the Noise Insulation Regulations (NIR) package of measures, assuming residents accept the offer of such measures.

8. References

Ref 1 Highways Agency (2011) Design Manual for Road and Bridges Volume 11 Section 3 Part 7 HD213/11 (Revision 1) Traffic Noise and Vibration

Ref 2 Department for Communities and Local Government (2018) National Planning Policy Framework

Ref 3 Department for Environment, Food & Rural Affairs (2010) Noise Policy Statement for England (NPSE)

Ref 4 Department for Communities and Local Government (DCLG) (2014) Planning Practice Guidance

Ref 5 The Environmental Noise (England) Regulations (2006) Statutory Instrument No. 2238 (as amended 2008, 2009, 2010)

Ref 6 The European Parliament and Council of the European Union (2002) Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise – Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise

Ref 7 HM Government (1973) Land Compensation Act 1973

Ref 8 The Noise Insulation Regulations (1975), Statutory Instrument No. 1763 (as amended 1988)

Ref 9 Her Majesty's Stationery Office (1974) Control of Pollution Act 1974

Ref 10 Barnsley Metropolitan Borough Council (2000), Unitary Development Plan

Ref 11 Department of Transport/Welsh Office (1998) Calculation of Road Traffic Noise (CRTN)

Ref 12 British Standards Institute (2014) BS 5228-1:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites. Part 1: Noise

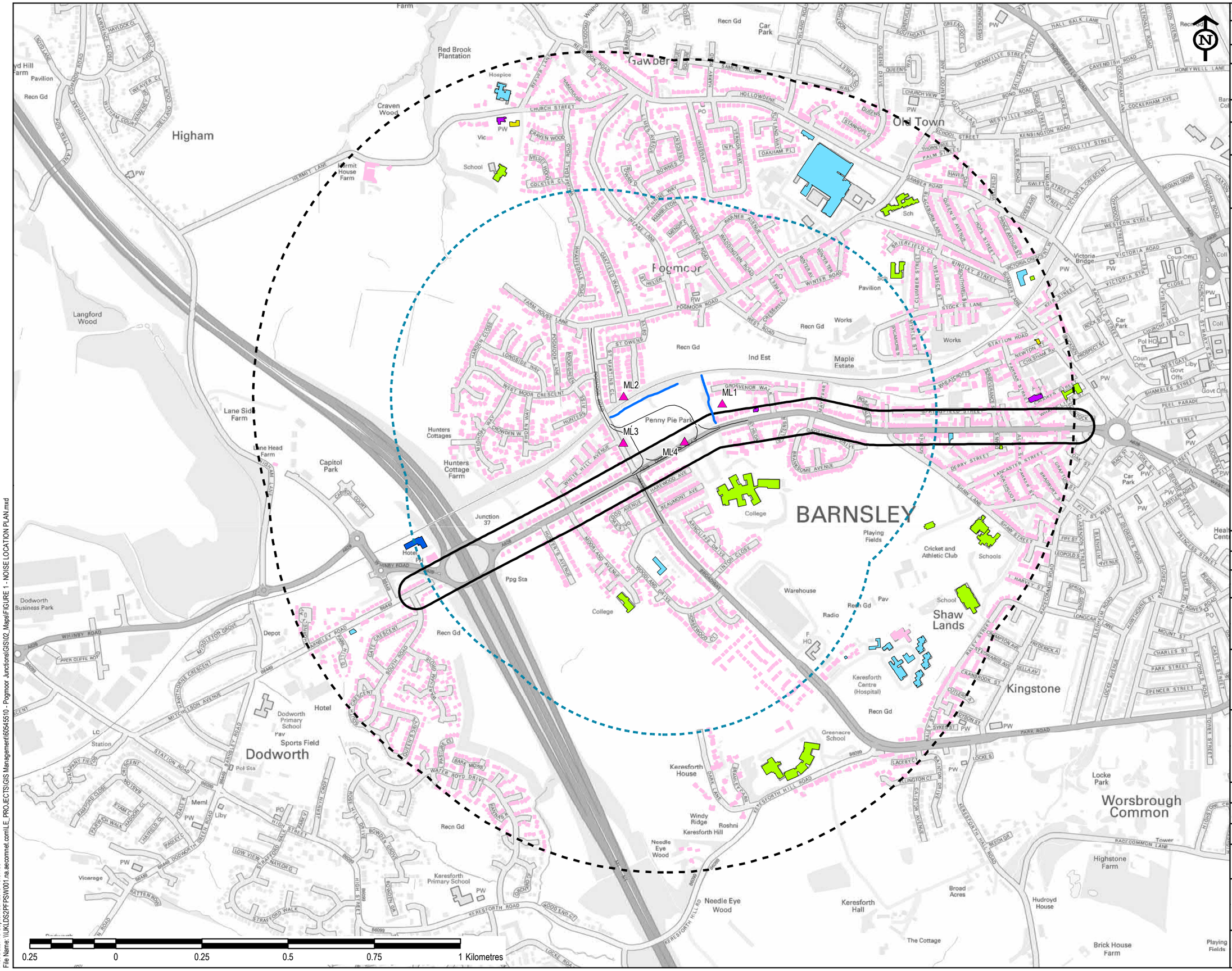
Ref 13 British Standards Institute (1993) BS 7385-2 – Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration

Ref 14 International Standards Organisation (2010) ISO 4866:2010 – Vibration of Fixed Structures – Guidelines for the Measurement of Vibrations and Evaluation of Their Effects on Structures

Ref 15 World Health Organisation (1999) Guidelines for Community Noise.

Ref 16 World Health Organisation (2009) Night Noise Guidelines for Europe

Figures



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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ORDNANCE SURVEY 0100031673

KEY:

- 1km Noise Study Area
- 600m Calculation Area
- Noise Important Area
- Proposed Scheme Extent
- Noise Barrier
- Noise Monitoring Location
- Residential Building
- Place of Worship
- Medical Facility
- Educational Facility
- Community Facility
- Hotel

FIRST ISSUE	AG / PL	07.09.18	P01
Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client:
Barnsley Metropolitan Borough Council
36 Wellington Street
Barnsley
S70 1WA

Project Title: POGMOOR CROSSROADS

Drawing Title: FIGURE 1
NOISE LOCATION PLAN

Designed	Drawn	Checked	Approved	Date
PL	AG	PL	NT	13/09/2018

Internal Project No.: 60545510
Suitability: Draft for comment
Scale @ A3: 1:10,000

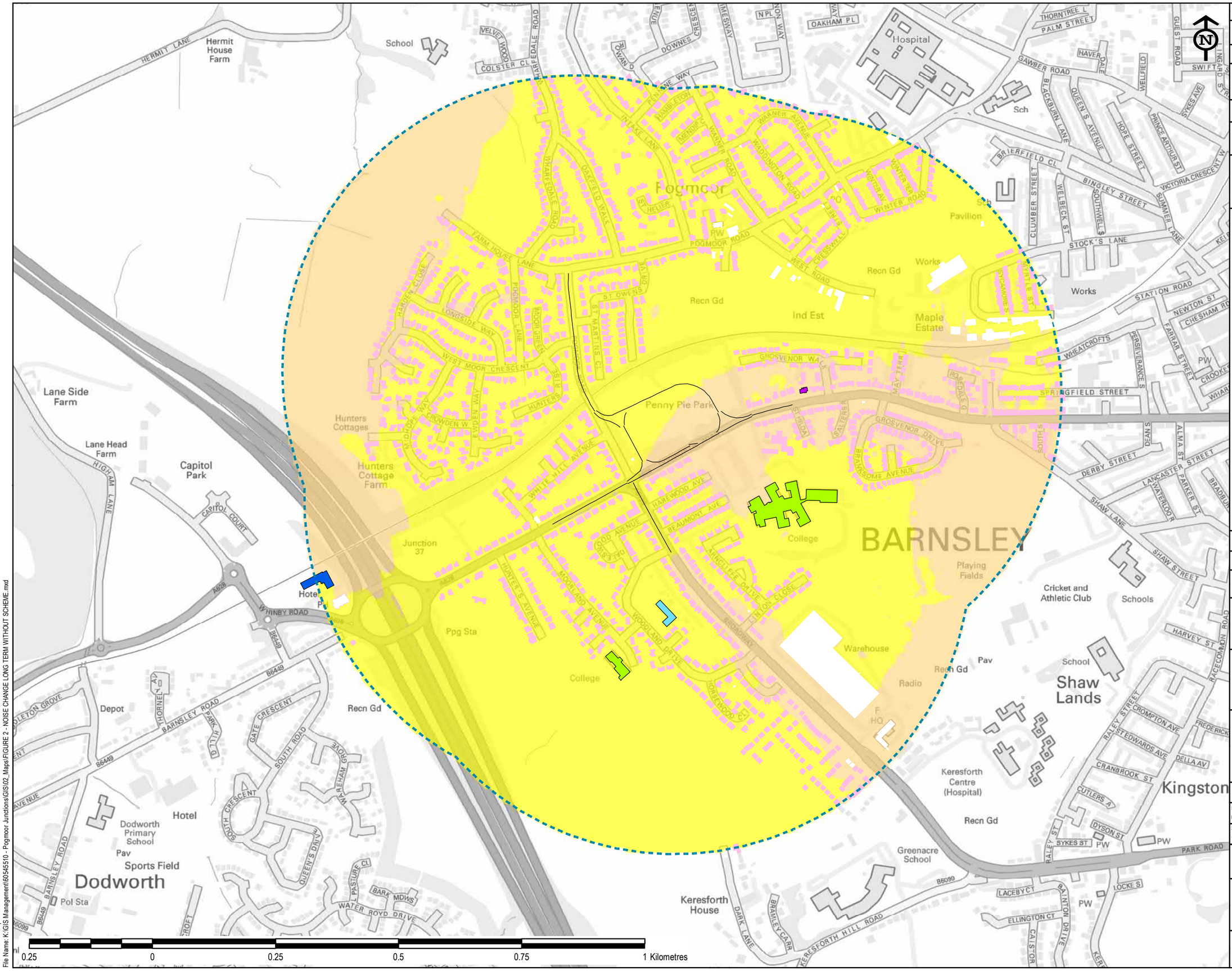
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Drawing Number: FIGURE 1
Rev: P01

Plot Date: 13 September 2018 16:37:09
File Name: \\UKLDS2PFPSW001.na.aecomnet.com\LE_PROJECTS\GIS Management\60545510 - Pogmoor Junctions\GIS\02_Maps\FIGURE 1 - NOISE LOCATION PLAN.mxd



KEY:

- 600m Calculation Area
- Proposed Scheme Extent
- Residential Building
- Place of Worship
- Medical Facility
- Educational Facility
- Hotel

Change in LA10, 18hr at 4m (free field)

- < -9.9
- >= -9.9 < -4.9
- >= -4.9 < -2.9
- >= -2.9 < 0.0
- >= 0.0 < 3.0
- >= 3.0 < 5.0
- >= 5.0 < 10.0
- >= 10

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Purpose of issue: FOR INFORMATION

Client:
Barnsley Metropolitan Borough Council
36 Wellington Street
Barnsley
S70 1WA

Project Title: POGMOOR CROSSROADS

Drawing Title: FIGURE 2
NOISE CHANGE OVER LONG TERM WITHOUT SCHEME (DM2034-DM2019)

Designed	Drawn	Checked	Approved	Date
PL	AG	PL	NT	13/09/2018

Internal Project No.: 60545510
Suitability: Draft for comment
Scale @ A3: 1:7,000

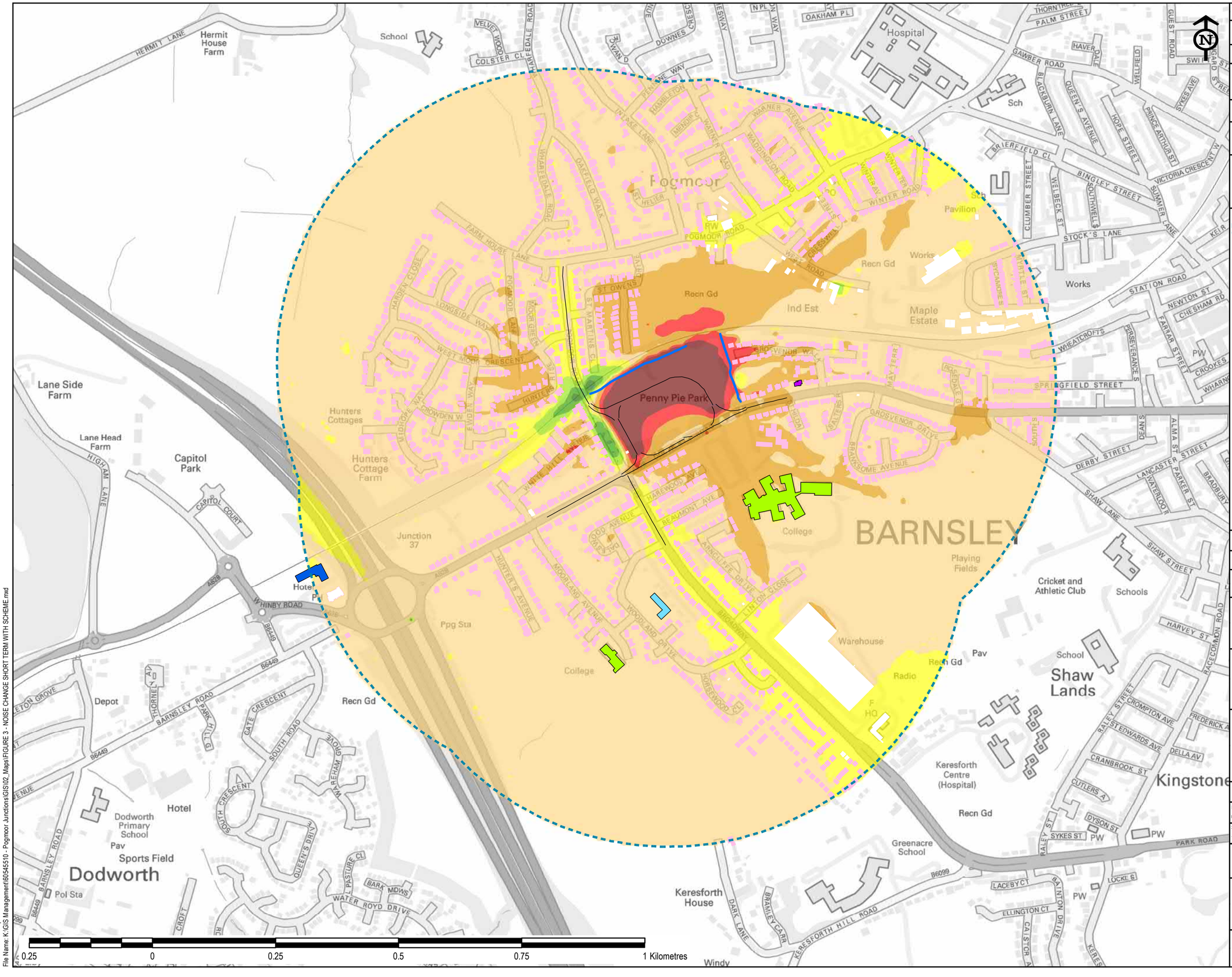
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Drawing Number: FIGURE 2
Rev: P01

Plot Date: 13 September 2018 16:08:45
File Name: K:\GIS Management\60545510 - Pogmoor Junctions\GIS\02_Maps\FIGURE 2 - NOISE CHANGE LONG TERM WITHOUT SCHEME.mxd



Plot Date: 13 September 2018 17:09:19
File Name: K:\GIS Management\60545510 - Pogmoor Junctions\GIS\02_Maps\FIGURE 3 - NOISE CHANGE SHORT TERM WITH SCHEME.mxd

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ORDNANCE SURVEY 010003173

KEY:

- 600m Calculation area
- Proposed Scheme Links
- Noise Barrier
- Residential Building
- Place of Worship
- Medical Facility
- Educational Facility
- Hotel

Change in LA10, 18hr at 4m (free field)

- < -5.0
- >= -5.0 < -3.0
- >= -3.0 < -1.0
- >= -1.0 < 0.0
- >= 0.0 < 1.0
- >= 1.0 < 3.0
- >= 3.0 < 5.0
- >= 5

FIRST ISSUE	AG / PL	07.09.18		P01
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Purpose of issue: FOR INFORMATION

Client:
Barnsley Metropolitan Borough Council
36 Wellington Street
Barnsley
S70 1WA

Project Title: POGMOOR CROSSROADS

Drawing Title: FIGURE 3
NOISE CHANGE OVER SHORT TERM WITH SCHEME (DS2019-DM2019)

Designed	Drawn	Checked	Approved	Date
PL	AG	PL	NT	13/09/2018

Internal Project No.	Suitability
60545510	Draft for comment

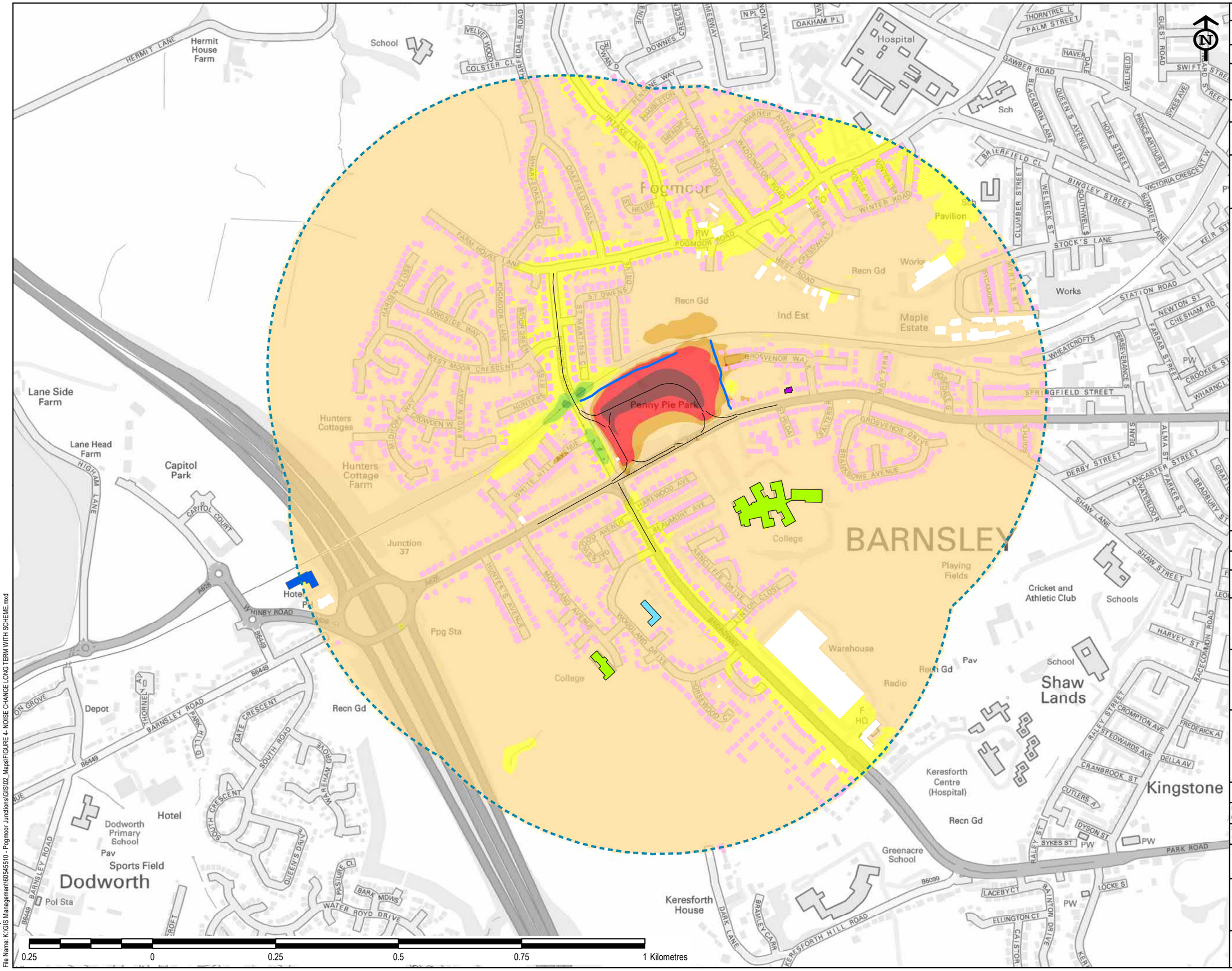
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Drawing Number	Rev
FIGURE 3	P01



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KEY:

- 600m Calculation Area
- Proposed Scheme Links
- Noise Barrier
- Residential Building
- Place of Worship
- Medical Facility
- Educational Facility
- Hotel

Change in LA10, 18hr at 4m (free field)

- < -10.0
- >= -10.0 < -5.0
- >= -5.0 < -3.0
- >= -3.0 < 0.0
- >= 0.0 < 3.0
- >= 3.0 < 5.0
- >= 5.0 < 10.0
- >= 10.0

FIRST ISSUE	By AG / Check PL	07.09.18	P01
Revision Details		Date	Suffix

Purpose of issue: FOR INFORMATION

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Barnsley Metropolitan Borough Council
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Barnsley
S70 1WA

Project Title: POGMOOR CROSSROADS

Drawing Title: FIGURE 4
NOISE CHANGE OVER LONG TERM WITH SCHEME (DS2034-DM2019)

Designed	Drawn	Checked	Approved	Date
PL	AG	PL	NT	13/09/2018

Internal Project No.: 60545510
Suitability: Draft for comment
Scale @ A3: 1:7,000

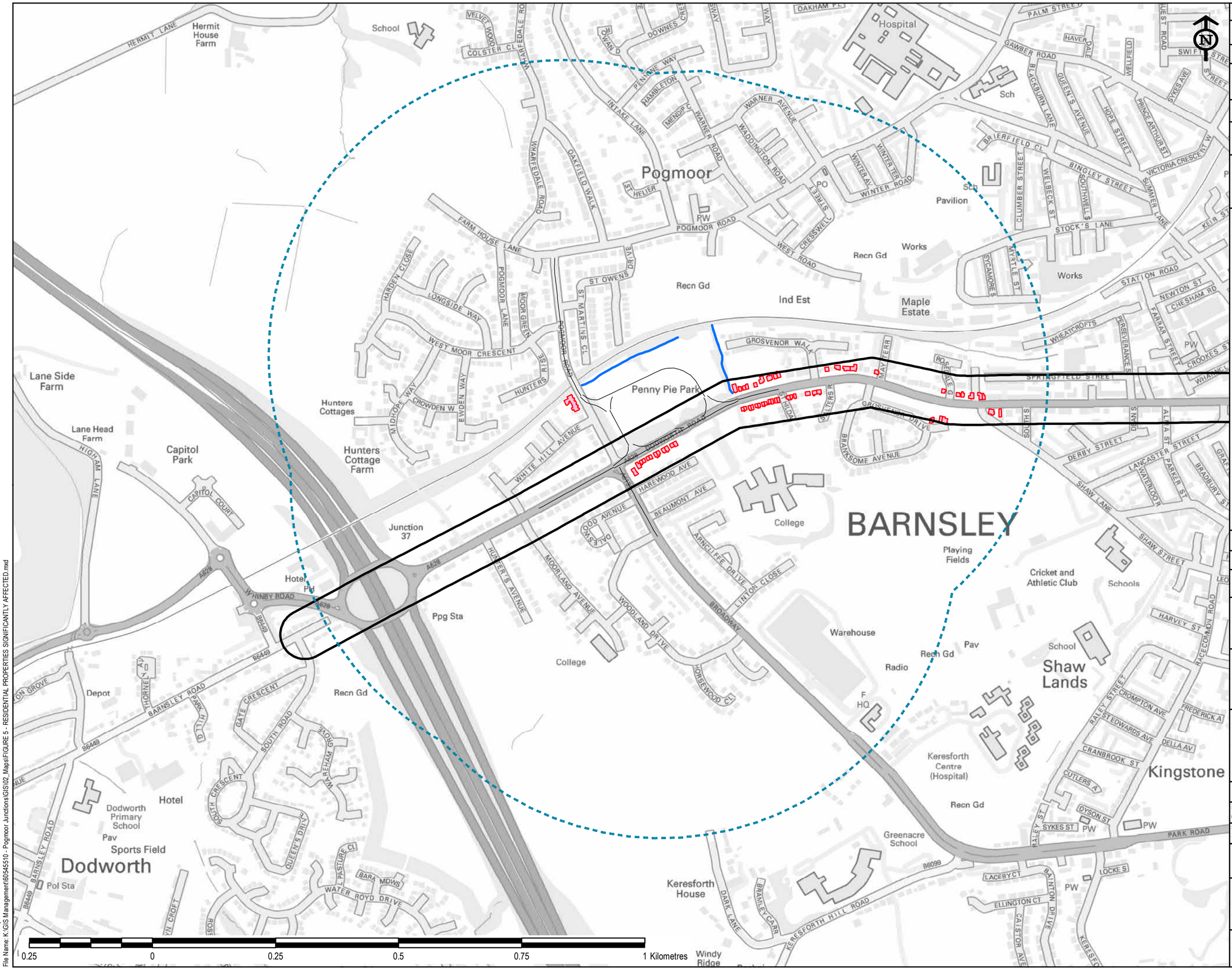
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File Name: K:\GIS Management\60545510 - Pogmoor Junctions\GIS\02_Maps\FIGURE 4- NOISE CHANGE LONG TERM WITH SCHEME.mxd



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KEY:

- 600m Calculation
- Noise Important
- Proposed Scheme Links
- Noise Barrier
- Residential properties – SOAEL +1dB(A) or more change

FIRST ISSUE	AG / PL	07.09.18	P01
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Purpose of issue: FOR INFORMATION

Client:
Barnsley Metropolitan Borough Council
36 Wellington Street
Barnsley
S70 1WA

Project Title: POGMOOR CROSSROADS

Drawing Title: FIGURE 5
RESIDENTIAL PROPERTIES - EXISTING NOISE LEVELS ABOVE SOAEL WITH INCREASE OF 1dB(A) DUE TO SCHEME

Designed	Drawn	Checked	Approved	Date
PL	AG	PL	NT	13/09/2018

Internal Project No.	Suitability
60545510	Draft for comment

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Drawing Number: FIGURE 5
Rev: P01

Plot Date: 13 September 2018 16:25:37
File Name: K:\GIS Management\60545510 - Pogmoor Junctions\GIS\02_Maps\FIGURE 5 - RESIDENTIAL PROPERTIES SIGNIFICANTLY AFFECTED.mxd

Appendix A Noise Model data inputs

- OS Mastermap and AddressBase Plus: downloaded from emapsite 13/06/18.
- 3D Scheme design received 18/06/18: file '3d CAD.dwg'
- Existing wider area ground heights: LIDAR data downloaded from http://environment.data.gov.uk/ds/survey/index.jsp#/survey. Converted to 1 m contours in the wider area by the GIS Team.
- Road surfacing on existing roads under responsibility of BMBC and scheme confirmed as hot rolled asphalt. Surface type on existing strategic roads within model area (M1 and junction 37 slip roads) supplied by Highways England (HE) which confirmed low noise surfacing on all strategic road links. Low noise surfacing assumed for all Strategic Roads in future year in line with current HE maintenance policy
- Traffic data: provided by the Traffic Team 12/07/18 (2019 data) 19/07/18 (2034 data).

Appendix B Baseline Monitoring Photographs

ML1 –Dodworth Road (Unattended)





ML2 – St Martins Close (Unattended)





ML3 – Pogmoor Road (Attended)





ML4 – Dodworth Road (Attended)





Appendix C Baseline Sound Monitoring

Tables B.1 and B.2 present daily overview of the unattended baseline sound monitoring where the values have been derived from the 1-hour interval data. The L_{A10} and L_{A90} presented values are based upon the highest 10th percentile or lowest 10th percentile of the 1-hour intervals within each time period respectively. During the night-time period (that are eight 1-hour intervals) the L_n values are an average of the two highest (L_{A10}) or lowest (L_{A90}) values during that time period.

As a result, the L_{A10} values are more representative of the loudest time periods of the night-time, typically between 23:00 – 00:00 and 06:00 – 07:00 hours, and may be showing a greater difference between the L_{night} ($L_{Aeq,8hr}$) and the $L_{A10,8hr}$ than what is typical.

Table B.1: Daily Overview of Noise Monitoring Results at ML1 – Dodworth Road

Date (2018)	Time Period	$L_{Aeq,T}$ dB	Highest $L_{Amax,T}$ dB	Highest 10th Percentile $L_{A10,T}$ dB	Lowest 10th Percentile $L_{A90,T}$ dB
Thursday 5 April	15:00 – 23:00*	49.2	89.9	51.8	41.5
	23:00 – 07:00	47.6	72.6	54.8	34.3
Friday 6 April	07:00 – 23:00	52.5	78.3	55.7	43.7
	23:00 – 07:00	46.8	78.2	53.4	31.3
Saturday 7 April	07:00 – 23:00	49.5	80.2	53.4	40.1
	23:00 – 07:00	46.8	74.0	54.8	30.3
Sunday 8 April	07:00 – 23:00	49.4	82.1	53.0	36.8
	23:00 – 07:00	47.4	78.4	54.9	29.9
Monday 9 April	07:00 – 23:00	50.6	84.0	54.3	43.2
	23:00 – 07:00	49.4	67.6	56.0	39.0
Tuesday 10 April	07:00 – 23:00	50.3	75.4	54.2	38.7
	23:00 – 07:00	48.0	68.9	55.6	25.9
Wednesday 11 April	07:00 – 23:00	50.1	74.5	53.3	40.5
	23:00 – 07:00	48.8	68.3	56.5	29.4
Thursday 12 April	07:00 – 16:00*	50.4	77.0	53.4	44.7

Table B.2: Daily Overview of Noise Monitoring Results at ML2 – St Martins Close

Date (2018)	Time Period	LAeq,T dB	Highest LAmax,T dB	Highest 10th Percentile LA10,T dB	Lowest 10th Percentile LA90,TdB
Thursday 5 April	16:00 – 23:00*	55.5	88.6	50.0	42.2
	23:00 – 07:00	50.0	85.1	52.2	35.3
Friday 6 April	07:00 – 23:00	56.2	88.8	54.3	43.7
	23:00 – 07:00	49.6	87.1	53.0	30.0
Saturday 7 April	07:00 – 23:00	54.0	88.2	54.2	37.6
	23:00 – 07:00	45.9	83.6	50.7	27.8
Sunday 8 April	07:00 – 23:00	53.0	86.6	53.6	37.1
	23:00 – 07:00	48.3	82.3	53.3	30.7
Monday 9 April	07:00 – 23:00	55.6	91.0	53.1	40.4
	23:00 – 07:00	50.4	86.6	49.4	34.8
Tuesday 10 April	07:00 – 23:00	56.3	88.4	51.7	35.3
	23:00 – 07:00	49.8	86.9	47.9	24.3
Wednesday 11 April	07:00 – 23:00	55.2	86.5	52.0	39.3
	23:00 – 07:00	49.9	86.1	49.8	26.9
Thursday 12 April	07:00 – 15:00*	55.3	86.1	49.8	27.0

Table B.3: Attended Noise Monitoring Results at ML3 Pogmoor Road

Date	Start Time	$L_{Aeq,1hr}$ dB	$L_{Amax,T}$ dB	$L_{A10,1hr}$ dB	$L_{A90,1hr}$dB
Wednesday 14th June 2017	10:00	66.6	83.1	70.4	54.8
	11:08	66.6	84.4	70.3	54.8
	12:08	66.8	98.2	69.8	54.6

Table M.4: Attended Noise Monitoring Results at ML4 Dodworth Road

Date	Start Time	$L_{Aeq,1hr}$ dB	$L_{Amax,T}$ dB	$L_{A10,1hr}$ dB	$L_{A90,1hr}$dB
Wednesday 14th June 2017	10:00	71.2	84.6	74.8	59.9
	11:00	70.6	88.9	74.3	57
	12:00	72.8	102.5	74.1	56.8