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Beaconsfield Road
Hayes

Construction Noise Management Plan
Report 24749.CNMP.01 Rev C

Colt Data Centre Services Ltd
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London EC2A 3EH

Report 24749.CNMP.01 Revision History			
First Issue Date: 31/10/2022			
A	**04/11/2022:** Updated start and end dates of construction activities	D	
B	**08/11/2022:** Updated start and end dates of construction activities	E	
C	**29/03/2023:** Removed completed construction activities from assessment, revised noise model and calculations for compliance with the ABC method detailed in BS5228:2009+A1:2014	F	

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List of Attachments

1.0 INTRODUCTION

KP Acoustics has been commissioned by Colt Data Centre Services Ltd to compile a noise management plan for the construction works at Beaconsfield Road, Hayes UB4 0SL.

This report presents all information gathered from relevant documentation and outlines steps that should be adopted regarding noise and vibration in order to maintain the amenity of all sensitive receivers adjacent to the site.

2.0 SITE DESCRIPTION & NOISE SURVEY

The site, as shown in Figure 2.1, is bounded by Beaconsfield Road and Hayes & Yeading Unit Football Club to the south, Yeading Brook and Doubledrive Limited to the east, Mak's MOT Centre to the north and various commercial buildings to the west.

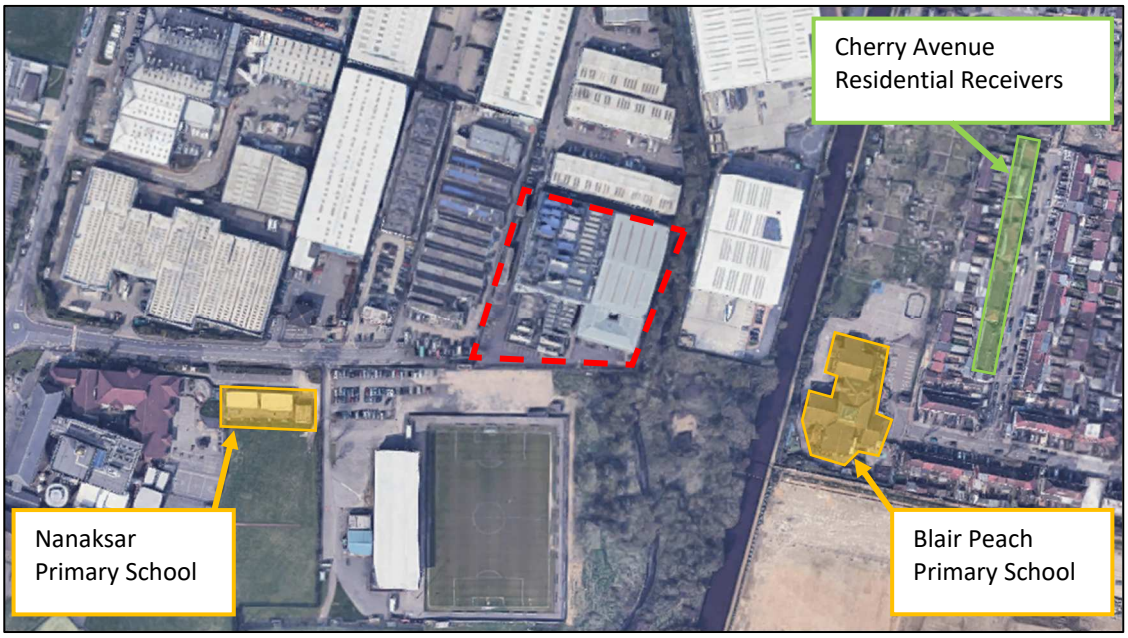


Figure 2.1. Site map (Image Source: Google Maps)

The closest residential receivers consist of the residential properties along Cherry Avenue, as shown in Figure 2.1 above. In addition to the nearest residential receivers, two nearby primary schools have been identified as noise-sensitive receivers, as shown in Figure 2.1 above. Predicted noise levels at all three receiver locations have been calculated.

2.1 Environmental Noise Survey

An environmental noise survey has been undertaken by RF Environmental (Reference: RFE-0351-21-03-03) to inform the planning application, to collect data representative of the levels expected on the site due to all nearby sources.

Continuous automated monitoring was undertaken at the site for the duration of the survey between 07:00 on 14/04/2021 and 07:00 on 17/04/2021.

Noise survey results are presented in Table 2.1 below.

Date	Measured Sound Levels, dB	
	Daytime (07:00 – 23:00) $LA_{eq,16hr}$	Night-time (23:00 – 07:00) $LA_{eq,8hr}$
Wed 14/04/21	51	52
Thurs 15/04/21	50	51
Fri 16/04/21	51	50

Table 2.1 Summary of unattended sound measurements, as provided by RF Environmental

Based on the above noise levels measured by RF Environmental, a guidance noise limit will be set in accordance with BS5228, as detailed in Section 4.5.

3.0 NOISE, VIBRATION AND DUST ELEMENTS

3.1 Noise

The effects of noise on all neighbouring premises can vary significantly and complicated to predict. In extreme cases they would be likely to include a sensation of loudness, potential interference with speech communication, disturbance of work or leisure, and disturbance of sleep. A complicating factor is that, in any neighbourhood, some individuals will be more sensitive to noise than others.

In order to assess instantaneous noise levels at any time, the instantaneous A-weighted sound pressure level, L_{pA} can be used. This will give an indication of the loudness and degree of speech interference from noise.

The most commonly used descriptor however, is the equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$. The time period involved should always be stated as the figure is a mathematical average of all individual contributions of various sources during the reference period T.

3.2 Vibration

The assessment of sensitivity to vibration at different times of the day is far more complex than sensitivity to noise. The sensitivity of the human frame to vibration varies according to the axis of vibration relative to the human body (e.g. x, y or z axis) and to the frequency of vibration. In general, except at very low frequencies, sensitivity is greater in the z axis (i.e.

head to foot). When setting vibration control targets it is reasonable to assume that people will normally be sitting or standing during the day and lying down during the night.

With an impulsive source of vibration, it is usual to measure the peak value attained from the beginning to the end of a drive. It is also usual to measure in terms of peak particle velocity (P.P.V) if the risk of damage to the building is the primary concern and there is also an interest in human reaction. If the concern is purely for human tolerance, then acceleration is the preferred parameter.

Vibrations, even of very low magnitude, may be perceptible to people and can interfere with the satisfactory conduct of certain delicate activities, e.g. operating theatres, use of very sensitive laboratory weighing equipment etc. Nuisance from vibration is frequently associated with the assumption that, if vibrations can be felt, then damage is consequently inevitable; however, considerably greater levels of vibration are required to cause damage to buildings and structures than to be perceived by the human body.

Vibrations from site activities to the neighbourhood may therefore cause anxiety as well as annoyance and can disturb sleep, work or leisure activities. As with noise, in any neighbourhood, some individuals will be more sensitive to vibration than others.

3.3 Dust

Dust from construction and demolition sites can have a negative effect on the amenity of neighbouring residents. As with noise and vibration, dust and other pollutants can have a range of effects, the severity of which can vary depending upon the on the recipient as referenced in the IAQM “Guidance on the assessment of dust from demolition and construction”.

As such, it is important that a number of mitigation measures are applied in order to minimise dust emissions from the site, in accordance with the Mayor’s SPG for Control of Dust and Emissions during Construction and Demolition. Furthermore, regular monitoring may be required in order to ensure that dust levels pose no threat to the amenity of nearby recipients.

4.0 CRITERIA FOR NOISE & VIBRATION

The following factors are typically used to assess the likelihood of disturbance caused by noise generating activities:

4.1 Site Location

The relative location of a site in relation to noise or vibration sensitive receivers will be a determining factor. The closer a site is to sensitive premises, the higher the likelihood of complaints due to noise and vibration emanating from the site.

4.2 Duration of Site Operations

In general, the longer the duration of all on-site operations, the more likely it is that noise from the site will potentially be an issue. In this respect, good public relations are very important. Local residents may be willing to accept a new status of noise and vibration if they know and understand the source and the duration of all operations. It is then important that site operations are carried out according to a stated schedule.

4.3 Hours of Work

For any noise sensitive premises some periods of the day will be more sensitive than others. For example, levels of noise that would be intruding within a dwelling during the day would not be an issue during the night. For dwellings, times of site operation outside normal weekday working hours will need special consideration.

Noise control targets for the evening period in such cases will need to be stricter than those for the daytime and, when noise limits are set, the evening limit may have to be as low as 10 dB(A) below the daytime limit. Very strict noise control targets should be applied to any site which is to operate at night.

4.4 Attitude to the Site Operator

It is well established that “one’s music is somebody else’s noise” and vice-versa. People's attitudes to noise are always influenced by their attitudes to the noise source itself.

Noise and vibration generated from a site will tend to be accepted more willingly by local residents if they consider that the site operator is adopting best practicable means to avoid unnecessary noise.

4.5 Guidance Noise Limits

In many cases the identification of a particular noise source will affect people's judgement and appreciation of the signal itself. For example, the presence of a high-amplitude impulsive noise, accompanied by a vibration sensation would render the overall assessment slightly more onerous as "penalties" would need to be employed. These would comprise weightings to signals (e.g. 5dB(A) to a highly tonal, or intermittent noise source).

With regards to noise levels, BS5228: 2009+A1:2014 *"Code of Practice for noise and vibration control on construction and open sites"* provides the ABC method shown below in Figure 4.1.

E.3.2 Example method 1 – The ABC method

Table E.1 shows an example of the threshold of significant effect at dwellings when the total noise level, rounded to the nearest decibel, exceeds the listed value. The table can be used as follows: for the appropriate period (night, evening/weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB. This is then compared with the total noise level, including construction. If the total noise level exceeds the appropriate category value, then a significant effect is deemed to occur.

Table E.1 **Example threshold of significant effect at dwellings**

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23.00–07.00)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (07.00–19.00) and Saturdays (07.00–13.00)	65	70	75

NOTE 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.

NOTE 3 Applied to residential receptors only.

[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

[B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

[C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

[D] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

Figure 4.1 The ABC method

Based on the ABC method outlined above, and the measured noise levels as shown in Table 2.1 above, the daily noise limit from all on-site operations should therefore not exceed 65dB(A) at the closest noise sensitive receiver.

4.6 Guidance Vibration Limits

This section presents an assessment of the potential risk regarding vibration generated by the construction works detailed in this document, and the associated adverse effects on the surrounding area.

According to BS 7385 Part 2 for residential or light commercial buildings, the threshold for the onset of potential cosmetic damage (i.e. formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces) to buildings varies with frequency. This ranges from a PPV of 15 mm/s at 4Hz, rising to 20mm/s at 15 Hz, and to 50 mm/s at and above 40Hz for transient vibration. BS 7385: Part 2 also states that the probability of building damage tends towards zero at 12.5 mm/s peak component particle velocity.

Line (see Figure 4.1)	Type of Building	Peak component particle velocity in frequency range of predominant pulse	
		4Hz to 15Hz	15Hz and above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50mm/s at 4Hz and above	
2	Unreinforced or light framed structures. Residential or light commercial type buildings	15mm/s at 4Hz increasing to 20mm/s at 15Hz	20mm/s at 15Hz increasing to 50mm/s at 40Hz and above
Note 1: Values referred to are at the base of the building			
Note 2: For Line 2, at frequencies below 4Hz, a maximum displacement of 0.6mm (zero to peak) should not be exceeded			

Table 4.1 Transient Vibration Guide Values for Cosmetic Damage (from BS 7385: Part 2:1993)

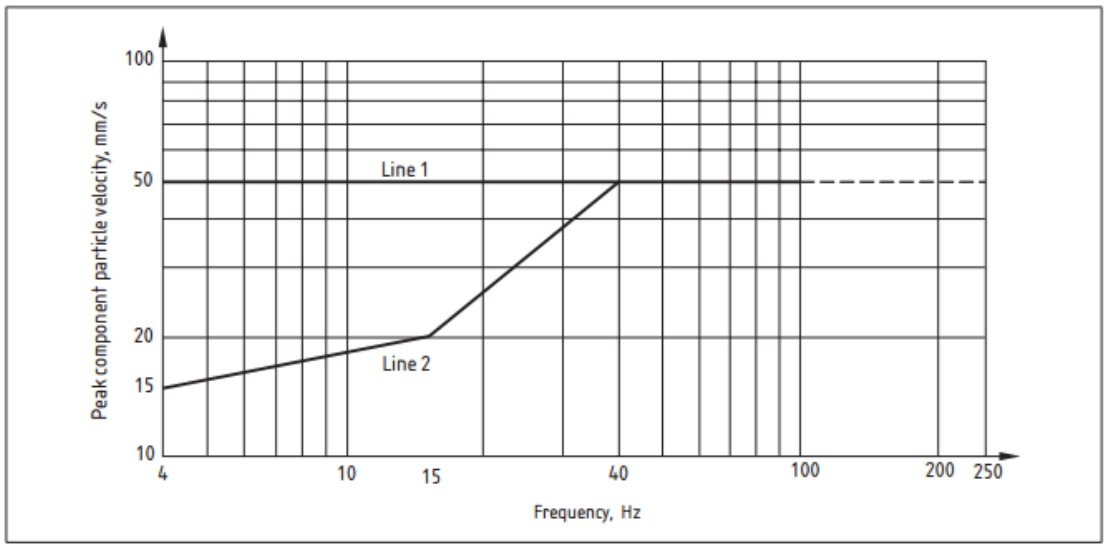


Figure 4.1 Summary of Damage Thresholds for Transient Vibration on Domestic Structures Subjective Response

According to guidance provided in BS 5228 Part 2, the threshold of vibration perceptible to humans lies around 0.14 to 0.3 mm/s. The Standard also indicates that a PPVs of around 1 mm/s in residential environments, as a first estimate, are likely to cause complaints, but can be tolerable provided prior warning and explanation of the works is given to residents; whilst

vibration magnitudes of around 10 mm/s are likely to be intolerable for more than a very brief exposure to this level.

On consideration of the above, a two-stage criterion is recommended:

- 5 mm/s p.p.v. 'soft' limit; when exceeded, the contractor should temporarily halt works. Works should only be resumed after consultation with the local residents, and with extreme caution
- 10 mm/s p.p.v. 'hard' limit; when exceeded, the contractor should stop work. Works should only continue after a thorough structural examination of the adjacent property, subsequent consultation with the local residents, and then with extreme caution. Should significant damage be identified, alternative methods of land remediation operations should be adopted.

5.0 WORK PROGRAMME AND EQUIPMENT

It is understood that a typical working day would span from 8:00 to 18:00 from Monday to Friday and 8:00 to 13:00 on Saturdays.

A schedule of works for each phase as well as the associated activities, equipment and operational on-time for each activity is summarised in Appendix A.

For the purposes of noise modelling, the key activities have been divided into two different phases. A noise model has been produced for each phase to predict noise levels at the nearest receivers, as shown in Appendix B.

The approximate start and end date of each phase is shown in Table 5.1, along with the predicted daily airborne noise level as an $L_{Aeq,\ 10\ hr\ level}$ at the nearest noise sensitive façades based on the results of the noise modelling. Table 5.2 summarises the key activities, the start and end date of the activities, and the assigned phase of the activities.

Phase	Start Date	End Date	Predicted Daily Airborne Noise Level $LA_{eq,\ 10\ hr\ level}$		
			Nanaksar Primary School	Blair Peach Primary School	Cherry Avenue Receivers
1	Jan 23	Aug 23	65	65	54
2	Sep 23	Aug 24	64	64	53

Table 5.1 Phase start and end dates with predicted daily airborne noise levels at nearest noise sensitive façades

Activity	Start Date	End Date	Phase(s)
Excavations / Reduce dig	Jan 23	May 23	1
Installation of Roads/ Below ground infrastructure	Jan 23	Jul 23	1
Piling	Jan 23	Apr 23	1
Pile cropping	Feb 23	May 23	1
Pile cap installation	Feb 23	Jul 23	1
Detail reduced level dig	Feb 23	Aug 23	1
Steel erection	Apr 23	Nov 23	1 and 2
Cutting steel reinforcement / mesh using a grinder	Jan 23	Dec 23	1 and 2
Casting slabs	Apr 23	Nov 23	1 and 2
Deliveries Various – Steel, Scaffold etc.	Jan 23	Dec 23	1 and 2
Install of curtain walling	Jun 23	Dec 23	1 and 2
Install of cladding panels	Jun 23	Dec 23	1 and 2
Installation of preassembled plant	Sep 23	Feb 24	2
M&E install and internal fitout	Jun 23	Aug 24	1 and 2
Soft landscaping	Nov 23	Apr 24	2

Table 5.2 Site activities with start dates, end dates and assigned phases

In order to achieve the predicted daily airborne noise levels shown in Table 5.1, the on-time hours for each piece of equipment must not exceed the amount of time shown in Table 5.3 for each working day.

Activity	Equipment	Maximum on-time per day
Excavations / Reduce dig	4 excavators	8 hours
	2 dumpers	8 hours
	Muck away trucks	8 hours
	Compressor	8 hours
	Breaker	6 hours
Installation of Roads/ Below ground infrastructure	Road roller	6 hours
	Excavator	8 hours
	Dumper	8 hours
	Motor grader	6 hours
Piling	3 Piling rigs	6 hours
	2 excavators	8 hours
	Static agitator	6 hours
	Pump	6 hours
	Cherry picker	6 hours
	Jet wash	6 hours

	Dumper	8 hours
	Material removal	N/A
	Concrete trucks	8 hours
Pile cropping	3No Excavators (pile cropper and pecker attachment).	8 hours
Pile cap installation	Concrete pump	6 hours
	Concrete trucks	8 hours
	Agitator	6 hours
	Angle grinder (cutting of reinforcement)	6 hours
	Excavators	8 hours
Detail reduced level dig	3No Excavators	8 hours
	Dumpers	8 hours
	Material removal Muck away trucks	8 hours
Steel erection	4No Mobile Cranes	8 hours
	Hand tools	6 hours
	Cherry pickers	6 hours
	Angle Grinder	6 hours
	Welder Generator Set x4	6 hours
	Circular Saw	6 hours
Cutting steel reinforcement / mesh using a grinder	Angle grinder	6 hours
Casting slabs	Reinforcement	N/A
	Waterproofing	N/A
	Concrete pump	6 hours
	Concrete trucks	8 hours
Deliveries Various – Steel, Scaffold etc.	Flatbed trucks	8 hours
	Articulated lorries	8 hours
	Ridged lorries	8 hours
Install of curtain walling	Mobile cranes	8 hours
	MEWPs	6 hours
Install of cladding panels	Mobile cranes	8 hours
	MEWPs	6 hours
	Impact drivers	6 hours
Installation of preassembled plant	Mobile cranes	8 hours
	SDS drills	6 hours
M&E install and internal fitout	Hand tools	6 hours
	MEWPs	6 hours
	Impact drivers	6 hours
	Drills	6 hours
	Circular saws and jig saws	6 hours
Soft landscaping	Excavators	8 hours

	Dumpers	8 hours
	Hand tools	6 hours

Table 5.3 Maximum on-time per day for each piece of equipment

6.0 NOISE, VIBRATION AND DUST MANAGEMENT PLAN

6.1 Site Personnel

All operatives on site should be trained to ensure that noise minimisation and best practicable means (BPM) are implemented at all times. Works should be checked regularly by Site Engineers to ensure that BPM are being undertaken and where necessary corrective actions implemented.

Employees must show consideration to the sensitive receptors, including residential neighbours, and must not generate unnecessary noise when walking to and from the site, or when leaving and arriving at work.

6.2 Recommended Noise Control Measures

- A 2m high perimeter hoarding surrounding the construction site has been considered in the noise map calculations. The barrier does not require any particular acoustic treatment, but should be sufficiently heavy (standard construction site perimeter hoarding) and without gaps that could undermine its noise protecting function.
- Choice of methodology/technique for operations (including site layout) will be considered in order to eliminate or reduce emissions at sensitive locations
- Fixed items of construction plant will be electrically powered in preference to diesel or petrol driven
- If any specialised fabrication is required, this will be undertaken off-site if possible
- Noisy plant will be kept as far away as possible from sensitive areas
- Each item of plant used will comply with the noise limits quoted in the relevant European Commission Directive 2000/14/EC/United Kingdom Statutory Instrument (SI) 2001/1701 [3] where reasonably available
- Equipment will be well-maintained and will be used in the mode of operation that minimises noise and shut down when not in use
- Vehicles shall not wait or queue on the public highway with engines running (unless the engine is required to power the operation of the vehicle e.g. concrete wagon)

- Where possible deliveries will be arranged on a just-in-time basis in order to prevent vehicles queuing outside site
- All materials will be handled in a manner that minimises noise
- As a proactive approach to controlling noisy site operations, it would be recommended that noise monitoring is undertaken throughout the works to alert site staff when noise emissions criteria are being approached in order to reduce operations accordingly
- The Best Practicable Means (BPM) (as defined in Section 72 of the Control of Pollution Act 1974) should be used to reduce noise and vibration levels at all times
- Where practicable the control measures set out in BS 5228:2009 + A1:2014 Part 1, Section 8 should also be implemented
- Adhere to maximum on-time hours per day for each activity, as shown in Table 5.3

6.3 General Dust Control Measures

General advice for all construction and demolition sites, as recommended within the Mayor's SPG for Control of Dust and Emissions during Construction and Demolition include the following:

- Dust generated by the construction process will be suppressed via a fine directional spray jet of water aimed at the source, and any material to be transported to be wetted down prior to transit
- Skips and powder containers to be covered when not in use
- Cutting equipment to be used with water suppressant and/or suitable extract system
- No burning of waste wood or other materials on site
- The stockpiling of dust generating materials on site will be minimised
- Wet brushing techniques will be used for cleaning
- Regular checks for visual observation of dust and soiling within 50m of site
- Screening to be erected surrounding site boundaries where possible

Regular monitoring may be necessary during the construction operations on site, in order to ensure that measured pollutants do not exceed safe levels, in positions agreed with the Local Authority. Furthermore, according to IAQM guidelines, it would be necessary to inspect the

area in the local vicinity of the construction works to ensure that surfaces are not soiled by dust emissions from the site, with suitable cleaning offered if necessary. In order to minimise this, it would be recommended that screens are erected around the site boundaries as appropriate.

7.0 CONCLUSION

KP Acoustics has been commissioned to undertake an assessment of noise levels from all proposed site operations at Beaconsfield Road, Hayes UB4 0SL in order to provide initial advice on the control of noise, vibration and dust on site.

Information on good practice steps have been provided, while a realistic approach has been adopted regarding the maximum noise and vibration levels which should be met on site.

Guidelines provided within this report are provided to ensure that any disturbance caused by noise or vibration will be minimised as much as is practically possible.

Appendix A – Beaconsfield Road, Hayes

Site Phasing, Operations and Equipment Work Programme

Construction Activity	Anticipated Start Date	Anticipated End Date	Phase(s)	Equipment Used	BS5228 Reference	Maximum on-time per day	Working Location
Excavations / Reduce dig	Jan 23	May 23	1	4 excavators	C.4.10	8 hours	Building footprint
				2 dumpers	C.4.3	8 hours	
				Muck away trucks	C.6.14	8 hours	
				Compressor	N/A	8 hours	
				Breaker	C.1.9	6 hours	
Installation of Roads/ Below ground infrastructure	Jan 23	Jul 23	1	Road roller	C.2.38	6 hours	Ring road around new buildings
				Excavator	C.4.10	8 hours	
				Dumper	C.4.3	8 hours	
				Motor gene	C.6.31	6 hours	
Piling	Jan 23	Apr 23	1	3 Piling rigs	C.3.21	6 hours	Building footprint
				2 excavators	C.4.10	8 hours	
				Static agitator	N/A	6 hours	
				Pump	C.3.25	6 hours	
				Cherry picker	C.4.57	6 hours	
				Jet wash	N/A	6 hours	
				Dumper	C.4.3	8 hours	
				Material removal	N/A	N/A	
				Concrete trucks	C.6.14	8 hours	
Pile cropping	Feb 23	May 23	1	3No Excavators (pile cropper and pecker attachment)	C.4.10	8 hours	Building footprint
Pile cap installation	Feb 23	Jul 23	1	Concrete pump	C.3.25	6 hours	Building footprint
				Concrete trucks	C.6.14	8 hours	
				Agitator	N/A	6 hours	
				Angle grinder (cutting of reinforcement)	C.4.93	6 hours	
				Excavators	C.4.10	8 hours	
Detail reduced level dig	Feb 23	Aug 23	1	3No Excavators	C.4.10	8 hours	Throughout site area
				Dumpers	C.4.3	8 hours	
				Material removal Muck away trucks	C.6.14	8 hours	
Steel erection	Apr 23	Nov 23	1 and 2	4No Mobile Cranes	C.4.50	8 hours	Building footprint (INC return visit for Roof gantry)
				Hand tools	N/A	6 hours	
				Cherry pickers	C.4.57	6 hours	
				Angle Grinder	C.4.93	6 hours	
				Welder Generator Set x4	C.3.33	6 hours	
				Circular Saw	C.4.72	6 hours	
Cutting steel reinforcement / mesh using a grinder	Jan 23	Dec 23	1 and 2	Angle grinder	C.4.93	6 hours	Building footprint
Casting slabs	Apr 23	Nov 23	1 and 2	Reinforcement	N/A	N/A	Building footprint

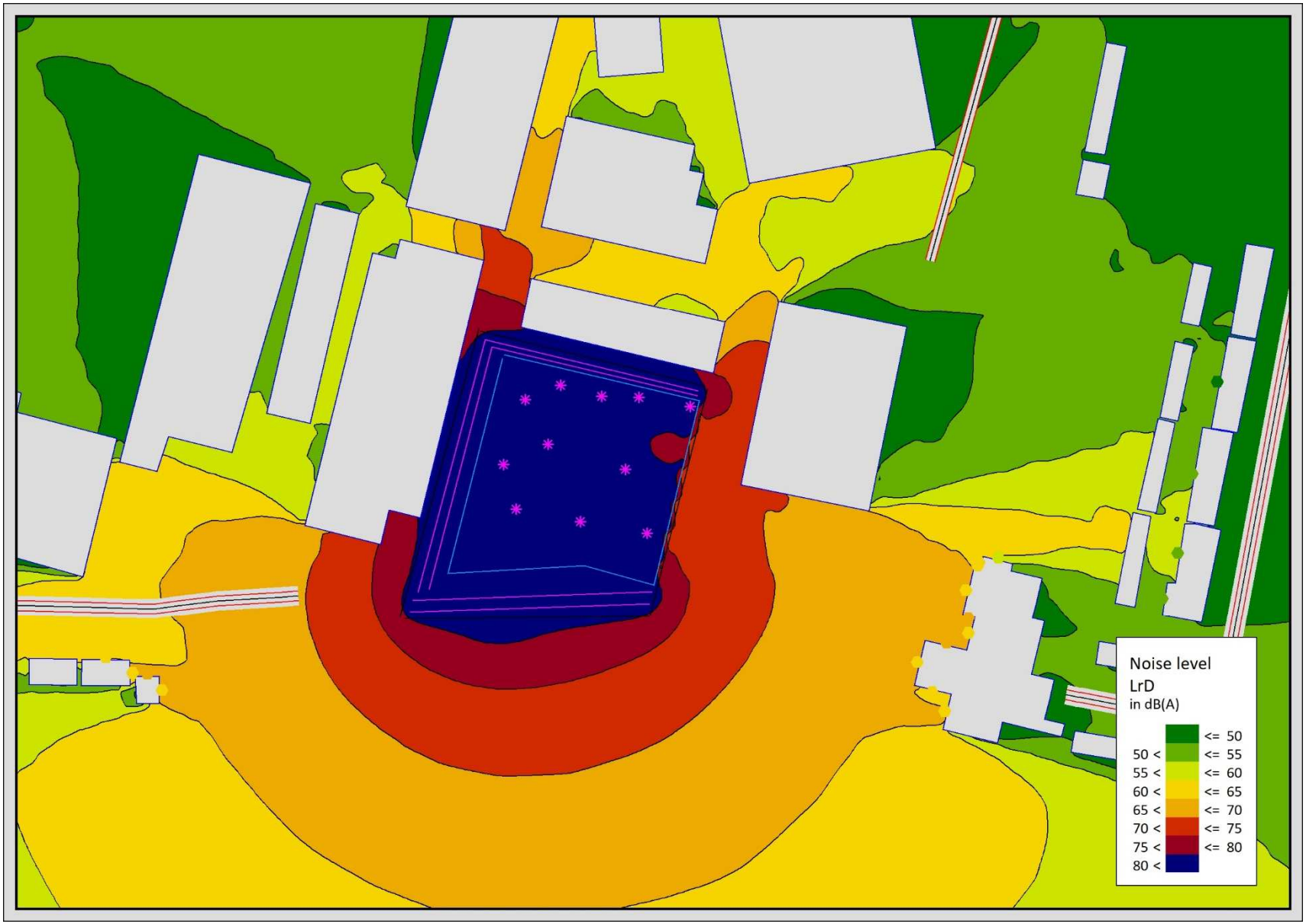
Appendix A – Beaconsfield Road, Hayes

Site Phasing, Operations and Equipment Work Programme

				Waterproofing	N/A	N/A	
				Concrete pump	C.3.25	6 hours	
				Concrete trucks	C.6.14	8 hours	
Deliveries Various – Steel, Scaffold etc.	Jan 23	Aug 24	1 and 2	Flatbed trucks	C.6.14	8 hours	Offloading within site boundary, at unloading areas.
				Articulated lorries	C.2.34	8 hours	
				Ridged lorries	C.2.34	8 hours	
Install of curtain walling	Jun 23	Dec 23	1 and 2	Mobile cranes	C.4.50	8 hours	Façade of new buildings
				MEWPs	C.4.57	6 hours	
Install of cladding panels	Jun 23	Dec 23	1 and 2	Mobile cranes	C.4.50	8 hours	Façade of new buildings
				MEWPs	C.4.57	6 hours	
				Impact drivers	N/A	6 hours	
Installation of preassembled plant	Sep 23	Feb 24	2	Mobile cranes	C.4.50	8 hours	All internal floors and generator.
				SDS drills	N/A	6 hours	
M&E install and internal fitout	Jun 23	Aug 24	1 and 2	Hand tools	N/A	6 hours	All internal floors
				MEWPs	C.4.57	6 hours	
				Impact drivers	N/A	6 hours	
				Drills	N/A	6 hours	
				Circular saws and jig saws	C.4.72	6 hours	
Soft landscaping	Nov 23	Apr 24	2	Excavators	C.4.10	8 hours	Perimeter of site, Areas around new buildings
				Dumpers	C.4.3	8 hours	
				Hand tools	N/A	6 hours	

Appendix B – Beaconsfield Road, Hayes

Phase 1 Noise Model



Appendix B – Beaconsfield Road, Hayes

Phase 2 Noise Model