

NOISE IMPACT ASSESSMENT

FOR

**GLEN ABBEY COMPLEX,
BELGARD ROAD,
COOKSTOWN INDUSTRIAL ESTATE,
DUBLIN 24, D24 W2XA**

FOR

SQUARE FOOT PROPERTY SERVICES LIMITED

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1. Proposed Development

Square Foot Property Services Limited, intend to apply to An Bord Pleanála for permission for a strategic housing development at this site located at the Glen Abbey Complex, Belgard Road, Cookstown Industrial Estate, Dublin 24, D24 W2XA on a site area of c.0.91ha. The development will consist of the following:

- Demolition of the existing single storey industrial and commercial office buildings totalling c.4,628sqm;
- Construction of a Build-to-Rent Housing Development comprising 170 no. apartment units and crèche arranged in 2 no. blocks across 4- 7 storeys over basement car park (total gross floor area c.13,880sqm excluding basement);
- The residential development consists of: 9 no. 1 bedroom/2 person studio apartments (c.37-38sqm each); 94 no. 1 bedroom/2 person apartments (c.45-58sqm each); 2 no. 2 bedroom/3 person apartments (c.69sqm each); 34 no. 2 bedroom/4 person apartments (c.73- 83sqm each); 24 no. 2 bedroom/4 person duplex apartments (c.93sqm each) and 7 no. 3 bedroom/5 person apartments (c.91-98sqm each) with north, south, east and west facing terraces/balconies throughout;
- Internal communal amenity spaces at ground and fourth floor levels comprising reception, gym, lounge, cinema/tv room, events rooms and ancillary areas (totalling c.508sqm);
- External communal open space including children's play areas and informal amenity spaces at ground floor level between Blocks A and B. Communal roof garden at fourth floor level. Total external communal open space c.1,005sqm; • Public open space at ground floor level to the east and south of Block B totalling c.1095sqm;
- 1 no. creche (c.163sqm) with associated outdoor play area at ground floor level (c.75sqm);
- 73 no. car parking spaces comprising 64 no. basement spaces, 4 no. accessible parking spaces and 5 no. visitor spaces at surface level;
- 354 no. bicycle spaces comprising 264 no. resident spaces at basement level and 90 no. visitor spaces at ground floor level;
- Reconfiguration/removal of existing car parking to the north of the site and access road resulting in a total of 28 no. car spaces serving the adjoining site;
- All associated plant including heating centres, gas room, water storage room, break tank room, comms room and bin storage at basement level, ESB substation and switch room at ground level and circulation spaces and stair and lift cores throughout;
- Vehicular/pedestrian access to the east from Belgard Road. Fire/emergency vehicle and pedestrian access to the south from Colbert's Fort;
- All associated site development and infrastructural works, services provision, foul and surface water drainage, extension to the foul network, access roads/footpaths, lighting, landscaping and boundary treatment works

2. Introduction

The purpose of this Noise Impact Assessment is to identify all potential noise sources associated with the construction and operational phases of the proposed development and to determine the extent of the potential noise impact on the closest receptors located in proximity to the development and to provide noise control and management solutions as part of the design of the development to ensure that the construction phase or operational phase of the development does not have an unacceptable noise or vibrational impact on any local third party property.

3. Executive Summary

Road traffic noise generated by cars, vans, buses and trucks dominate the noise climate along the eastern boundary of the subject site. Commercial units on the western site are mostly warehouses with some light manufacture and noise levels are not expected to be above traffic noise on eastern side. Mitigation measures described in section 4 will be sufficient to achieve acceptable levels in the apartments.

The monitoring of third-party buildings and property during the construction phase of the development, given their proximity to development works, will require noise and vibration monitoring systems to be installed at a number of locations to ensure that works can be effectively managed to ensure adverse impacts do not occur to third party properties.

This report includes a description of the existing ambient noise climate in the vicinity of the subject site, a description of how the proposed development may impact existing ambient noise levels and the mitigation measures that shall be implemented to control and minimise the impact that the development may have on ambient noise levels.

4. External & Internal Noise Mitigation Design Measures

To mitigate the traffic noise impacts and impact from the adjacent commercial units on the proposed residential units within the scheme, mitigation measures will be incorporated into the design of the proposed residential units (mitigation by design).

External noise can enter rooms within dwellings through windows, ventilators, walls, roof and doors. In most cases, however, windows provide the main path and therefore, mitigation by design has focussed on this building element to ensure that the insulation is adequate.

All residential units with facades facing towards the Belgard Road shall have acoustically rated high performing double pane window sets (inclusive of glazing, frames, seals and openable elements) to prevent the breakthrough of external noise

All window sets should be tested for sound insulation in accordance with BS EN ISO 140 and BS EN ISO 717. Given that there is an existing industrial facility located adjacent to the western site boundary and to ensure that any future industrial activity does not have an adverse noise impact on the eastern facades of the apartment buildings, all windows facing towards the facility shall have acoustically rated high performing double/ triple pane to prevent the breakthrough of external noise.

Table 1. Window Sound Insulation performance requirements

Room	Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Living	29	31	38	43	44	54
Bedroom	31	33	40	45	46	56

Table 2. Ventilation Sound Insulation performance requirements

Room	Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Living	35	36	36	44	44	50
Bedroom	47	45	38	46	51	51

All residential units shall be constructed to ensure that they comply with Department of the Environment, Building Regulations 2014, Technical Guidance Document E – Sound. Table 6 provides detail on the recommended sound insulation values that shall be achieved to ensure acoustic privacy between adjoining residential units.

Table 6 DOE Sound insulation values for internal party walls / floors

Dwellings	Airborne Sound Insulation D_{nTw} (dB)	Impact Sound Insulation L_{nTw} (dB)
Floors and Stairs	53	58
Walls	53	N/A

5. Operation Noise Impact Assessment

Residential

The noise impact of the residential aspect of the development on the receiving environment will be slight and will be limited to internal vehicle movements entering and exiting the basement car-park, and residents using the internal courtyard amenity area which will be

screened by the apartment block structures the and the public plaza which will be screened from the residential aspect by the retail units buildings.

There will not be an adverse noise impact on the adjacent houses located south of the subject development site.

In conclusion, it is predicted that the operational phase of the proposed development will not have an adverse noise impact on the receiving environment or on any existing third-party property.

Plant Noise

Basement – plantroom in the basement will include gas boilers, CHP unit and associated pump sets serving the central system. Break out noise through the ventilation grilles will be negligible.

Roof plant – number of heat pumps will be serving the development. Proposed unit is Mitsubishi CAHV-P500YA-HPB(-BS) with noise rating of 79dB. Break out noise to the apartments and neighboring properties will be managed by acoustic barriers.

Apartments- each apartment has a centrally located internal extract fan. Proposed model is Aereco V4A Premium which has sound pressure level of 34 dB(A) (Lp @ 160 m³ /h (r = 2m)). Break out noise through wall grille will be negligible.

Creche

The Creche is an integral aspect of the development which will serve the residents of the development. The operational hours will be expected to be from 7am — 7pm Monday to Friday.

Children will typically not be outside playing before 9am and as such there will be no early morning noise impacts associated with the creche. The sound of children playing in any environment is not regarded as a noise but as a natural aspect of life in any residential area or development and it is predicted that the operation of the creche will not adversely impact other units or residential apartments.

6. Construction Phase Noise & Vibration Assessment

This section of the Noise Impact Assessment (NIA) relates to the environmental monitoring, assessment and management aspects of the demolition phase and construction phase associated with the subject site.

The purpose of this section is to detail the environmental monitoring, assessment, management and working criteria for assessing and controlling the construction related impacts of noise and vibration, on local receptors for the duration of the construction phase of the development project and to allow the development to be appropriately managed to minimise the potential for structural damage, noise nuisance to third party properties.

This document specifies a range of appropriate noise and vibration control and mitigation measures which shall be implemented from the outset of site works in order to achieve compliance with appropriate limit values and to minimise the impact of works on the closest receptors to the site and to comply with the relevant Planning Conditions as may be granted for the development. This section of the NIA shall form the basis of the Environmental Construction Management Plan for the subject development.

7. Environmental Receptors and Proposed Monitoring Locations

The closest receptors located in proximity to the development site which have the highest potential to be impacted by demolition and construction works are identified as follows:

- Colberts Fort housing estate adjacent from south of the site
- Multiple warehouses adjoining the western site boundary.
- Office building adjacent north of the site.
- Small commercial units adjacent the eastern site boundary.

The monitoring of third-party buildings and property, given their proximity to development works, will require noise and vibration monitors to be installed at a number of locations to ensure that works can be effectively managed to ensure adverse impacts do not occur to third party properties. The receptor properties and the proposed noise and vibration monitoring locations are shown below in Figure 3.

8. Construction Works Description

The site will involve the following phases:

- Installation Of Site Hoardings and site offices
- Stripping out of existing building
- Demolition Of the existing building structures
- Site enabling works
- Site excavation to basement level
- Piling works,
- Construction of the sub and super structures
- Fit Out
- Landscaping works

9. Project Environmental Monitoring & Management Requirements

The Environmental Construction Management Plan (ECMP) will consider the following guidance documents which detail Best Practice methods for noise and vibration control and management on construction sites.

BS 5228 - 1:2009+A1:2014 Code of practice for noise and vibration control on open sites: Part 1 Noise; and BS 5228 — 2:2009+A1 2014 Code of practice for noise and vibration control on open sites: Part 2 Vibration

The following monitoring instrumentation shall be installed prior to the commencement of any site works:

Noise Monitoring

Installation of continuous data logging live Noise Monitoring Systems with remote login and data download and text/email alert functionality.

It is proposed that web based live continuous noise monitoring systems shall be installed at the closest receptors to the development site which shall record the continuous measurements of key noise parameters including L_{Aeq} and LAF_{max} , L_{A90} , L_{A10} .

The noise monitoring systems shall be capable of sending email and text alerts of exceedances of the specified noise limit criteria which will allow the Construction Manager or a delegate take immediate action to control a subject noise source / activity.

10. Vibration Monitoring

Installation of continuous data logging live Vibration Monitoring Systems with remote login and data download and text/email alert functionality.

It is proposed that web based live continuous vibration monitoring systems shall be installed at the closest receptors to the development site which shall record the continuous measurements of structural vibration parameters including PPV (mm/sec) and Frequencies as Hz.

The vibration monitoring systems shall be capable of sending email and text alerts of exceedances of the specified vibration limit criteria which will allow the Construction Manager or a delegate take immediate action to control a vibration causing activity.

The Environmental Construction Management Plan shall detail a range of Best Practice noise and vibration control and mitigation measures that shall be implemented during the construction phase of the development project as detailed below.

11. Proposed Noise & Vibration Limit Criteria

The construction noise limits, which are presented in Table 5 represent a reasonable compromise between the practical limitations in a construction project, and the need to ensure an acceptable noise level for the nearby residents and other sensitive receptors including amenity space. Table 3 specifies the recommended Project Noise Limit Criteria in accordance with BS 5228 — 1:2009+A1 2014 Code of practice for noise and vibration control on open sites: Part 1 Noise. Noise limit criteria are based on the noise measured at the facade of each receptor location.

Table 3 BSS228—2014-Part 1 Construction Phase Noise Limit Criteria

Location / Day	Assessment Period	External Noise Limit Criteria
All Receptors Monday to Friday Morning	07:00hrs – 08:00hrs	70 dB(A), L _{Aeq, 1hr}
All Receptors Monday to Friday Daytime	08:00hrs – 18:00hrs	75dB(A), L _{Aeq, 10hr}
All Receptors Monday to Friday Early Evening	18:00 – 19:00hrs	70 dB(A), L _{Aeq, 1hr}
All Receptors Monday to Friday Late Evening	19:00hrs – 22:00hrs	65 dB(A), L _{Aeq, 3hr}
All Receptors Monday to Friday Nighttime	22:00hrs – 07:00hrs	55 dB(A), L _{Aeq, 1hr}
All Receptors Saturday Morning	07:00hrs – 08:00hrs	70 dB(A), L _{Aeq, 1hr}
All Receptors Saturday Daytime	08:00hrs – 13:00hrs	75dB(A), L _{Aeq, 5hr}
All Receptors Saturday Midday	13:00 – 14:00hrs	70 dB(A), L _{Aeq, 1hr}
All Receptors Saturday Afternoon-Evening	14:00 – 22:00hrs	65 dB(A), L _{Aeq, 3hr}
All Receptors Saturday Nighttime	22:00hrs – 07:00hrs	55 dB(A), L _{Aeq, 1hr}
All Receptors Sundays and Public Holidays Daytime	07:00hrs – 21:00hrs	65 dB(A), L _{Aeq, 1hr}
All Receptors Sundays and Public Holidays Nighttime	21:00 – 07:00hrs	55 dB(A), L _{Aeq, 1hr}

It is proposed that the limit criteria will be implemented for all buildings based on British Standard BS 7385-21993 and with regard to a building condition survey prior to the commencement of works,

Table 4 Transient vibration guide values for cosmetic damage as set out in BS 7385-21993

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4-15Hz	15Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50mm/s at 4Hz and above	50mm/s at 4Hz and above
Unreinforced or light framed structures Residential or light rail commercial buildings	15mm/s at 4Hz and increasing to 20mm/s at 15Hz	20mm/s at 15Hz and increasing to 50mm/s at 40Hz and above

Table 4 shows limits above which cosmetic damage could occur for transient vibration. Minor damage is possible at vibration magnitudes which are greater than twice those shown in Table 4, and major damage to a building structure would only generally occur at values greater than four times the tabulated values.

The values in Table 3 only relate to transient vibration. If there is a continuous vibration, e.g. from the operation of a sonic pile driver, the guide values shown in Table 3 will be reduced by

up to 50%. This guidance is reproduced from BS 5228-2:2009+A1.'2014 Code of practice for Noise and Vibration Control on Construction and Open Sites: Part 2 — Vibration, and BS 7385-2:1993 — Evaluation and Measurement for Vibration in Buildings: Part 2 — Guide to damage levels from ground borne vibration.

With consideration of the above a proposed vibration limit value of 7.5mm/sec (PPV) is recommended to be implemented for all properties in the vicinity of the development sites. (Subject to building condition survey results) and with an amber alert of 5mm/sec at all buildings.

12. Proposed Noise & Vibration Control 8: Mitigation Measures

This section of the Noise Impact Assessment details the noise and vibration mitigation measures that shall be implemented during the course of demolition and construction works to minimise the impact of works on adjacent and adjoining receptor buildings.

13. Noise Control & Management

Site design / Pre-Works Set Up

Prior to the commencement of demolition / construction activities, a solid 3m high boundary perimeter hoarding shall be erected.

Work compounds shall be laid out so that access and loading areas are located away from residential receptors located to the south of the site, by locating noisy operations well away from receptors and using on-site structures and materials to screen noise where practicable and necessary.

Advance notice shall be given to all stakeholders prior to the commencement of demolition, excavation and piling works detailing the nature of the works and the expected duration of the works relative to the location of the receptor and should also include reference to all measures implemented to reduce the noise impact from works.

Installation of noise and vibration monitoring systems at third party properties.

Demolition / Construction Works Noise Mitigation & Control Measures

This section details the noise control and mitigation measures to be implemented and enforced for the duration of demolition and construction works.

All plant used on the project shall be operated in compliance with the noise limits quoted in the relevant European Commission Directive 2000/14/EC [8.]. No. 632 of 2001] as amended by 8.]. 191 of 2006 and all subsequent amendments thereof, and will adopt the recommendations set out in BS 5228 — 1:2009+A1 2014 Code of practice for noise and vibration control on open sites: Part1 Noise with regard to noise mitigation options.

Tools, plant or equipment which involve percussive processes such as rock breaking will not be operated before 08.00hrs. Mobile 3m noise screens shall be used to enclose all pneumatic breaking and piling activities to control noise at source.

Noisy stationary equipment shall be sited away from sensitive site boundaries as far as practicable. Where reasonably practicable, noisy plant or activities shall be replaced by less noisy alternatives if noise limit breaches and/or complaints occur for extended periods.

Proper use of plant with respect to minimising noise emissions and regular maintenance will be required.

All vehicles and mechanical plant will be fitted with effective exhaust silencers and will be maintained in good efficient order.

Where noisy plant is required to operate in works areas next to sensitive buildings acoustic low noise plant options will be used wherever practicable.

Dumpers and any plant used for moving materials around the site will have high performance exhaust silencers.

Selected use of rubber-tyred 360 excavators over steel track equipment where practicable.

The use of inherently quiet plant is required where appropriate — all compressors and generators will be “sound reduced” or “super silent” models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers.

All compressors, generators and pumps shall be silenced models fitted with properly lined and sealed acoustic covers or enclosures, which will be kept closed whenever the machines are in use.

All pneumatic percussive tools such as pneumatic hammers shall be fitted with dampers, mufflers or silencers of the type recommended by the manufacturer. Fixed items of plant shall be electrically powered in preference to being diesel or petrol driven.

Vehicles and mechanical plant utilised on site for any activity associated with the works shall be fitted with effective exhaust silencers and shall be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable.

All plant, equipment, and noise control measures applied, shall be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable.

Any plant, equipment or items fitted with noise control equipment found to be defective in shall not be operated until repaired / replaced.

Machines in intermittent use shall be shut down in the intervening periods between works or throttled down to a minimum during periods when not in use. Static noise emitting equipment operating continuously shall be housed within suitable acoustic enclosure, where appropriate.

All excavator mounted pneumatic breakers used for demolition and ground-breaking activities shall be fitted with effective dampeners and /or enclosed within a noise adsorbing blanket structure to minimise noise emissions.

Site activities such as piling, concrete cutting and rock breaking shall be staggered when working in proximity to any receptor. This proposed method of working will provide effective noise management of site activities to ensure that any receptor is not exposed to unacceptably high levels of noise over extended periods.

Piling activities which involve the mechanical shaking of the piling rig to remove soil from the auger shall not be permitted. An alternative method to removing debris from the piling rig auger shall be developed.

Excessive revving of all vehicles shall be avoided.

Unnecessary dropping of heavy items onto ground surfaces shall be banned.

The use of an excavator bucket to break up slabs of concrete or tarmacadam shall not be permitted.

The dragging of materials such as steel covers, plant or excavated materials along ground surfaces shall not be permitted.

The use of acoustic screens to attenuate noise at source shall be implemented as deemed necessary.

Plant Reversing Alarms: High frequency “beeping” reversing alarms of all plant vehicles shall not be permitted. Only broadband reversing alarms that comply with safety regulations shall be permitted.

The demolition and construction contractors shall be informed of the live continuous noise monitoring systems and their mode of operation and shall be included on the text / email alert list to ensure that noise generated by their activities are appropriately managed.

A nominated person from the Contractor team will be appointed to liaise with local residents and businesses regarding noise nuisance events.

The Developer shall appoint an independent Consultant to install all monitoring systems and to conduct Noise and Vibration Audits to ensure that all noise and vibration control and mitigation measures are being implemented throughout the demolition and construction phases of the development.

14. Vibration Control & Management

This section details the vibration control and mitigation measures that may be implemented as required during the demolition and construction phases of the project.

Demolition / Construction Works Vibration Mitigation & Control Measures In the event of an exceedance of a vibration trigger or limit value the following procedure shall occur:

Review the construction activities in the vicinity to determine the cause.

Where activities outside the control of the Contractor may have had an influence, these shall be identified.

Identify and agree appropriate engineering controls and management procedures to reduce vibration levels resulting from the works activities identified as the cause of the trigger level being reached.

Breaking out concrete elements using low vibration tools.

Choosing alternative, lower-impact equipment or methods wherever possible.

Routing, operating or locating high vibration sources as far away from sensitive areas as possible.

Sequencing operations so that vibration causing activities do not occur simultaneously.

Equipment shall be routinely maintained.

A nominated person from the Contractor team will be appointed to liaise with local residents and businesses regarding vibrational nuisance events.

15. Conclusions

This noise impact assessment report has considered both the inward noise impact associated with external noise sources including road traffic and the outward noise impact including

construction noise on the receiving environment and the operational noise that various aspects of the development will have on each other.

It is concluded that provided that all aspects of noise control by design and mitigation are implemented, the proposed development will not have an adverse impact on the receiving environment and that all residential units will be constructed to achieve appropriate sound insulation.