



DKPartnership

post@dkpartnership.com : E

00 353 (0) 1-813-1930 : T
00 353 (0) 64-664-1686 : T

PROPOSED MIXED USE DEVELOPMENT at CLONGRIFFIN

NOISE ASSESSMENT

**AIR & RAIL TRAFFIC NOISE ASSESSMENT
PROJECT NOISE EMISSION ASSESSMENT**

**CLONGRIFFIN
DUBLIN 13**

GERARD GANNON PROPERTIES

DKP-K00-6070-2P
2019-08-09

Document control

Document ID : DK-K00 6070

Part 1 of 1

Description/party	Name	Issue :	1	2	3	4	5	6	7	8
Client	Gerard Gannon Properties		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Architects	CCK, Wilsons, Downey Architecture		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planning consultants	Downey Planning		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local authority	Dublin City Council		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural engineer	Moylan		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quantity surveyor	MMP		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Issue 1P Planning 2018-11-30

Issue 2P Planning 2019-08-09

ING Gerard (Craig) van Deventer CEng., BE(mech)., HDip CIOB, MCIBSE

M : [00] 353 (0)87 260 8080

E : gerard@dkpartnership.com70 Main Street, Applewood , Swords, Co.Dublin, Ireland
Reen Kenmare Co. Kerrypost@dkpartnership.com
www.dkpartnership.com

T : [00] 353 (0)1813 1930

T : [00] 353 (0)64664 1686



Contents

section		Page
1	Introduction	4
2	Executive summary	5
3	Approach, procedure and assessment criteria	7
4	Project geographical overview	8
5	Rail traffic noise assessment.....	10
6	Air traffic noise assessment.....	12
7	Plant / Plant room emissions	13
8	Mitigation measures	14
Appendixes		
A	Day time noise assessment data Dublin airport	15
B	Night time noise assessment data Dublin airport	16



1 Introduction

1.1 Report purpose.

This report gives information on the effects of the air and rail traffic noise impact on the proposed development and the noise emissions of the proposed development when fully operational.

1.1 Introduction.

DK partnership (DKP) have been commissioned by Gerard Gannon Properties to carry out a noise assessment for the proposed development at Clongriffin, Dublin 13.

1.2 Development details.

This report covers multiple mixed use apartment blocks located in Clongriffin, Dublin 13 and represents most of the remaining sites to be “filled-in” within the Clongriffin development.

This phase consists of 15 blocks with a total of 1950 residential units and +/- 22,727m² of commercial space. The 15 blocks are applied for in 3 no. separate planning packages, this report covers all of the blocks. The report therefore is applied in all of the 3 applications.

Table 1.1 below shows the details of the 3 no. planning applications.

Planning reference	Qty blocks	Block ID	No dwellings	Commercial space m2	Comments
SHD I	9	6, 8, 11, 17, 25, 26, 27, 28, 29	1030	2285	
SHD II	3	4, 5, 14	500	3125	
DCC I	3	3, 13, 15	420	17317	

Table 1.1

1.2 Rail traffic source.

The site is bound by farming land to the North, construction sites to the South, West and East with the eastern border separated by a twin Irish Rail railway track between Howth Junction and Portmarnock train stations.

1.3 Air traffic noise.

The site is partially within the Dublin Airport noise zone associated with the flight path with only the most Northern part of the proposed development actually within this noise zone.

2 Executive summary

2.1 Project general.

The assessed mixed use development at Clongriffin, Dublin 13" covers the total of 15 no. proposed apartment blocks mainly located in the remaining sites to be filled-in within the overall Clongriffin development. These blocks have been granted permission previously albeit the new proposed version in most cases proposes a different mix of residential units and quantum of commercial areas.

2.2 Analysis conducted.

Analysis type A **Noise assessment from rail traffic.**
 Analysis type B **Noise impact assessment from air traffic.**
 Analysis type C **Predicted operational noise emissions from proposed development.**

2.3 Guideline / standards applied.

British Standard BS 8233 Sound insulation and noise reduction for buildings.
 World Health Organisation. (WHO)

2.4 Noise emissions assessment summary.

From the air traffic noise assessment section we note that the Northern half of the development would be exposed to continuous equivalent noise sound levels of ;

Day time exposure : 58dB L_{Aeq16}
 Night time exposure : 47dB L_{Aeq8}

From the train traffic noise assessment section we note that the blocks in line of sight (reducing with distance) in the development would be exposed to continuous equivalent noise sound levels of ;

Day time exposure : 66dB L_{Aeq16}
 Night time exposure : 53dB L_{Aeq8}

From the plant noise assessment section we note that any noise mitigation requirement is executed at/in the plant room and any secondary mitigation is not anticipated.

2.5 Internal room maximum noise level targets.

To determine the extent of any mitigation measures we need to establish maximum recommended internal room noise levels.

Both BS 8233 and the world Health Organisation have published noise level data on habitable rooms in different environment which would be as follows ;

Room type	Very good / Country	Good / Suburban	Reasonable / Urban	City centre
Bed room	25	30	35	40
Living room	30	35	40	45

Table 2.1 (8.1)

2.6 Proposed development maximum internal room noise level targets.

For the proposed development we target the very good to good standards ;

Bedrooms 25-30dB and
 Living rooms 30-35dB

2.7 Recommended mitigation measures facades.

The table below are the recommendations to mitigate against noise ingress into internal residential units in the proposed development based on the noise assessments executed in this report.

The following noise reduction (NR) / noise reduction measures

	External walls	Windows	Ventilation terminals
Facades within 30m railway track	NR 54 dB	NR 44 dB	No terminals facing track
Facades in direct line of sight railway track	NR 48 dB	NR 41 dB	No terminals facing track
All facades	NR 45 dB	NR 38 dB	NR 30 dB

Table 2.2 (8.2).

2.8 Recommended mitigation measures plant rooms / plant spaces.

All plant rooms or plant enclosed in rooms are to be acoustically treated to ensure that any noise emissions emanating from any part of the plant room to have a maximum noise level of :

Day time $\leq 63 \text{ dB}_{\text{Lden}}$ (7.00-23.00) or Night time $\leq 48 \text{ dB}_{\text{Lnight}}$ (23.00-7.00).

All plant spaces / plant on open spaces (roof) can only have a maximum height of 1.5m and must to fully screened (4 sides) with a 2m high acoustic plant screen to allow for maximum noise levels of :

Day time $\leq 65 \text{ dB}_{\text{Lden}}$ (7.00-23.00) or night time $\leq 50 \text{ dB}_{\text{Lnight}}$ (23.00-7.00).

2.9 Completeness of construction.

We note that completeness of any noise reduction construction element is of great importance. An external wall with a 50dB NR rating with a 1% opening / air gap will have its NR rating dropped to 20 dB.

3 Approach and methodology

3.1 General approach.

The following assessments have been carried out in this report.

Section 5 – Rail traffic noise assessment.

The impact of the measured noise emissions of the existing twin railway track on the proposed development.

Section 6 – Air traffic noise assessment.

The impact of the measured noise emissions together with the Dublin Airport available noise emissions data on the proposed development.

Section 7 – Predicted noise emissions of proposed.

The predicted operational noise emissions of the individual blocks of the proposed development.

Section 8 – Mitigation measures.

3.2 Existing buildings and overall site plan.

The proposed development is part of the overall Clongriffin master plan with this phase merely representing a repeat planning application as the effected blocks had previously been applied for and granted permission.

Most of the development has been constructed or is under construction and this new phase covering the 15 blocks are the remainder of the blocks/buildings to be considered for construction albeit with slight variations on the previous planning permission generally consisting of increased number residential units and reduced quantum of commercial areas.

3.3 Assessment criteria / guidelines.

The following guideline / standards have been applied :

- **British Standard BS 8233 Sound insulation and noise reduction for buildings.**

BS 8233 contains guidance on the minimum recommended levels of noise reduction from external sources and general guidance on maximum habitable room noise standards.

We note that Part E of the building regulations only refers to noise reduction measures of interior generated noise levels.

- **British Standard BS 4142:1997 'Method for Rating industrial noise affecting mixed residential and industrial areas'.**

- **World health Organisation.**

The WHO (World Health Organisation) Guidelines on good sleeping conditions.

3.4 Noise measurement.

The measurements have been performed using a Bruel & Kjaer Type 2260 sound level meter and Bruel & Kjaer 4231 sound level calibrator.

4 Geographical overview

4.1 Project site map.

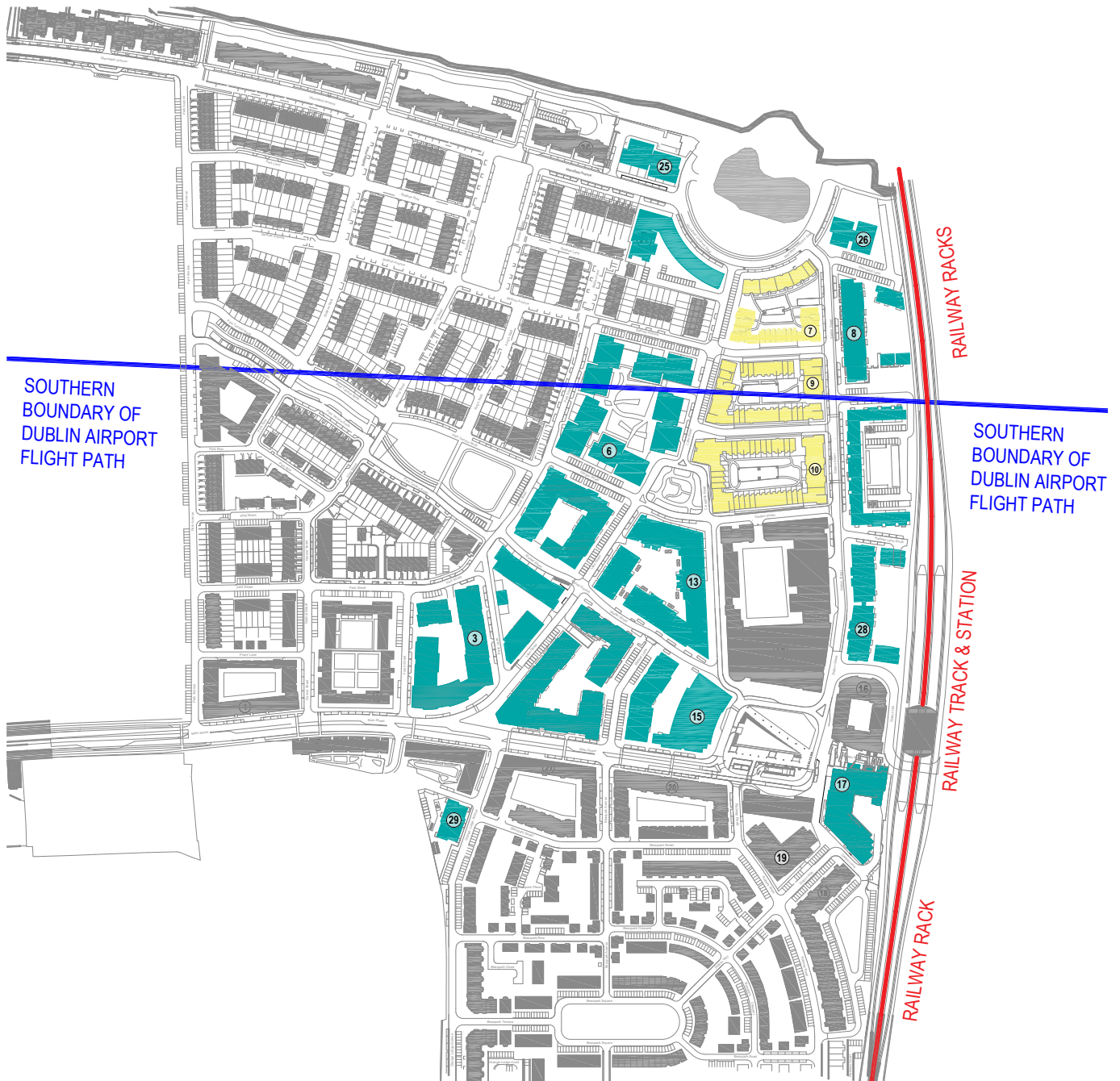


ILLUSTRATION 4.1

OVERALL SITE LAYOUT WITH 15 NO BLOCKS FOR PLANNING HIGHLIGHTED IN GREEN

NB : Blocks 7,9 and 10 (yellow) are shown on the map for reference however they are currently not within the remit of Gerard Gannon Properties.



5 Rail traffic noise impact

5.1 Survey details.

Rail traffic noise survey was performed on September 22nd 2018.

The survey was carried out in accordance to the measurement method laid down in BS4142.

Measurements were performed in one location at 12m from the railway track representing the closest location to the rail way tracks of any building in the proposed development which we deem to be good representative noise levels to be applied at the facades of blocks 8, block 11, block 26, block 28 and block 17.

During the measurement period there was no goods trains passing the development hence the goods train noise levels of an other project using identical track distance was used for this report.

5.2 Survey results.

For each noise event the sound exposure level (L_{AE}) was measured and recorded.

The summarised results of the sound exposure levels for train movements survey is shown in table 5.1 below. The results below represent the maximum recorded levels.

Type	Sound exposure Level (L_{AE}) dB	Maximum Noise Level ($L_{A_{Smax}}$) dB
Dart	97	90
Intercity	87	80
Goods *	98	101

Table 5.1 * not measured at this site.

5.3 Day time and night time train services.

The Irish Rail time tables give details of the daily intercity and dart services which are generally the same from Monday to Friday with the weekend days covering a few less train movements.

Goods trains are not a regular service on this track however the station master at Drogheda train station indicated that three goods trains use the track regularly but do not use a particular time table.

The goods trains generally are loaded going South and are empty going North.

Period (hrs)	Day time 7.00 – 23.00	Night time 23.00 – 7.00
Dart	51	6
Intercity	16	1
Goods *	8	2

Table 5.2

5.4 Calculated equivalent continuous A weighted sound level.

Based on the measured average sound exposure results from table 5.1 and train movements as set out in table 5.2 we have calculated the day time equivalent continuous A-weighted sound levels over 16 hours (day time) and 8 hours (night time).

Location	Equivalent Continuous A –Weighted Sound Level	Equivalent Continuous A –Weighted Sound Level
12m from the track	Day time 66 (L_{AEQ-16})	Night time 53 (L_{AEQ-8})

Table 5.3

5.5 Rail traffic Noise Criterion.

Where a residential area is affected by noise of adjacent new or existing active railway tracks it is in first instance useful to use the railway noise criterion table to give a high level indication on the type of mitigation to be considered assessment if any actions are to be undertaken.

The table below (table 5.4) represents the railway track noise criterion categories A, B, C and D.

Railway traffic	"Cat "A" < 55	"Cat "B" 55-66	"Cat "C" 66-72	"Cat "D" >72
7.00 – 23.00 (day)	"Cat "A" < 45	"Cat "B" 45-59	"Cat "C" 59-66	"Cat "D" >66
23.00 – 7.00 (night)				

Table 5.4

5.6 Rail traffic noise criterion categories.

The rail way noise criterion categories relate to the following initial assessment strategies.

Railway traffic	Action.
Cat "A"	Noise need not to be considered
Cat "B"	Noise impact need to be considered
Cat "C"	Noise impact mitigation need to be considered
Cat "D"	Unless quieter sites are not available residential use should not be considered

Table 5.5

5.7 Mitigation measures.

Based on the calculation results and applying the noise criterion tables mitigation measures for noise reduction are recommended. Category "B".

See section 8 for details.

6 Air traffic noise impact

6.1 Survey details.

Air traffic noise survey was performed September 21st 2018.

The survey was carried out in accordance to the measurement method laid down in BS4142.

Measurements were performed in one location at Block 36 Marrsfield Avenue below the Dublin Airport flight path in the proposed development which we deem to be good representative noise levels to be applied at the facades of all blocks.

6.2 Survey results.

For each noise event the sound exposure level (L_{AE}) was measured and recorded.

The summarised results of the sound exposure levels for airplane movements survey is shown in table 6.1 below. The results below represent the maximum recorded levels.

Type	Sound exposure Level (L_{AE}) dB											
Unknown	74	67	73	72	74	69	68	72	73	71	67	71

Table 6.1

We note that the range of sound exposure levels was from 67 to 72dB L_{AE} with an average of 71 dB L_{AE} .

6.3 Day time and night time flight path use.

The Dublin Airport time tables gives details of the daily take-offs and landings which are generally the same throughout the week.

The flight path is not used permanently but is used when the wind is at a certain direction.

Dublin Airport indicated that in 2017 the flight path was used for 132 days of the year.

Period (hrs)	Take-offs	Landings
7.00 – 23.00 (day)	252	253
23.00 – 7.00 (night)	36	12

Table 6.2

6.4 Calculated equivalent continuous A weighted sound level.

Based on the measured average sound exposure results from table 6.1 and train movements as set out in table 6.2 we have calculated the day time equivalent continuous A-weighted sound levels over 16 hours (day time) and 8 hours (night time).

Under the assumptions it has been presumed that 70% of the total landings/take-offs have used the flight path over Clongriffin.

Location	Equivalent Continuous A –Weighted Sound Level	Equivalent Continuous A –Weighted Sound Level
Block 36	Day time 58 (L_{AEQ-16})	Night time 47 (L_{AEQ-8})

Table 5.3

Dublin Airport have also produced measured noise criteria (Appendix A and B) which indicate that during day time the north of the development site only would be exposed to between 55 and 59 dB L_{den} and at night the exposure is outside the 50 to 54 dB L_{night} range which would be inline with the measured data.

6.5 Air traffic Noise Criterion.

Where a residential area is affected by noise of an active flight path it is in first instance useful to use the air traffic noise criterion table to give a high level indication on the type of mitigation to be considered assessment if any actions are to be undertaken.

The table below (table 6.4) represents the air traffic noise criterion categories A, B, C and D.

Air traffic				
7.00 – 23.00 (day)	"Cat "A" < 57	"Cat "B" 57-66	"Cat "C" 66-72	"Cat "D" >72
23.00 – 7.00 (night)	"Cat "A" < 48	"Cat "B" 48-57	"Cat "C" 57-66	"Cat "D" >66

Table 6.4

6.6 Air traffic noise criterion categories.

The air traffic noise criterion categories relate to the following initial assessment strategies.

Air traffic	Action.
Cat "A"	Noise need not to be considered
Cat "B"	Noise impact need to be considered
Cat "C"	Noise impact mitigation need to be considered
Cat "D"	Unless quieter sites are not available residential use should not be considered

Table 6.5

6.7 Mitigation measures.

Based on the calculation results and applying the noise criterion tables mitigation measures for noise reduction are recommended. Category "B".

See section 8 for details.

7 Site operational noise impact

7.1 Anticipated proposed development operational noise emissions.

The development consists of mainly residential units and where indicated commercial areas generally at ground floor level.

All installations and equipment in the residential units are located within each of the relevant residential unit hence there are no accountable noise emissions from residential units.

Commercial units however may have, in certain circumstances, the requirement for external cooling and/or air handling equipment.

For this purpose dedicated plant space either in a dedicated plant room at ground floor / basement level will be provided or in the form of a dedicated space at roof level.

All plant rooms are to be acoustically treated to ensure that any noise emissions emanating from permanent openings in plant spaces to be $\leq 63 \text{ dB}_{\text{Lden}} (7.00-23.00)$ or $\leq 48 \text{ dB}_{\text{Lnight}} (23.00-7.00)$. Roof top equipment can only have a maximum height of 1.5m and must to fully screened (4 sides) with a 2m high acoustic plant screen to allow maximum noise levels at 1m from the screen of $\leq 65 \text{ dB}_{\text{Lden}} (7.00-23.00)$ or $\leq 50 \text{ dB}_{\text{Lnight}} (23.00-7.00)$.

7.2 Typical plant/equipment and acoustic treated plant rooms noise emission data.

For each noise event the sound exposure level (L_{AE}) was measured and recorded.

The summarised results of the sound exposure levels for airplane movements survey is shown in table 7.1 below. The results below represent the maximum recorded levels.

(m)	dB	dB	dB	dB	dB (day)	dB (day)	dB (night)	dB (night)	dB	dB L_{AE}
	Air handler	Kitchen extract	AC condenser	AC condenser	Treated plant space	Treated roof space	Treated plant space	Treated roof space	Train	Train
0	82	92	68	70	63	65	48	50	97	66
1	74	84	60	62	55	57	40	42	89	58
5	60	70	46	48	41	43	26	28	75	44
10	54	64	40	42	35	37	20	22	69	38
15	50	60	36	38	31	33	16	18	65	34
20	48	58	34	36	29	31	14	16	63	32
25	46	56	32	34	27	29	12	14	61	30
30	44	54	30	32	25	27	10	12	59	28
35	43	53	29	31	24	26	9	11	58	27
40	42	52	28	30	23	25	8	10	57	26
45	41	51	27	29	22	24	7	9	56	25
50	40	50	26	28	21	23	6	8	55	24
55	39	49	25	27	20	22	5	7	54	23
60	38	48	24	26	19	21	4	6	53	22
65	38	48	24	26	19	21	4	6	53	22
70	37	47	23	25	18	20	3	5	52	21
75	36	46	22	24	17	19	2	4	51	20

Table 7.1

To establish air borne noise line source reduction over distance the following equation was applied.

$$L_r = L_w \cdot 20 \log_{10} \cdot \text{distance} - 10.9$$

8.1 Recommended maximum internal noise levels.

To determine the extent of any mitigation measures we need to establish what the internal criterion of acceptable noise levels are.

Both BS 8233 and the world Health Organisation have published noise level data on habitable rooms in different environments as illustrated below ;

Room type	Very good / Country	Good / Suburban	Reasonable / Urban	City centre
Bed room	25	30	35	40
Living room	30	35	40	45

Table 8.1

For the proposed development we target the very good to good standard, Bedrooms 25-30dB and living rooms 30-35dB

8.2 Noise reduction requirement.

If any perceived noise levels at the façade of habitable rooms are in excess of the minimum targeted maximum internal room noise levels the facade must at least be capable to reduce the noise levels to equal or below the target levels.

From the air traffic noise assessment section we note that the Northern half of the development would be exposed to continuous equivalent noise sound levels of ;

Day time exposure : 58dB $L_{A_{EQ16}}$

Night time exposure : 47dB $L_{A_{EQ8}}$

From the train traffic noise assessment section we note that the blocks in line of sight (reducing with distance) in the development would be exposed to continuous equivalent noise sound levels of ;

Day time exposure : 66dB $L_{A_{EQ16}}$

Night time exposure : 53dB $L_{A_{EQ8}}$

From the plant noise assessment section we note that any noise mitigation requirement is executed at/in the plant room and any secondary mitigation is not anticipated.

Based on the noise assessments we note that noise reduction over the facade is a requirement.

8.3 Recommended mitigation measures.

The table below are the recommendations to mitigate against noise ingress into internal residential units in the proposed development based on the aforementioned noise assessments.

The following noise reduction / noise reduction measures

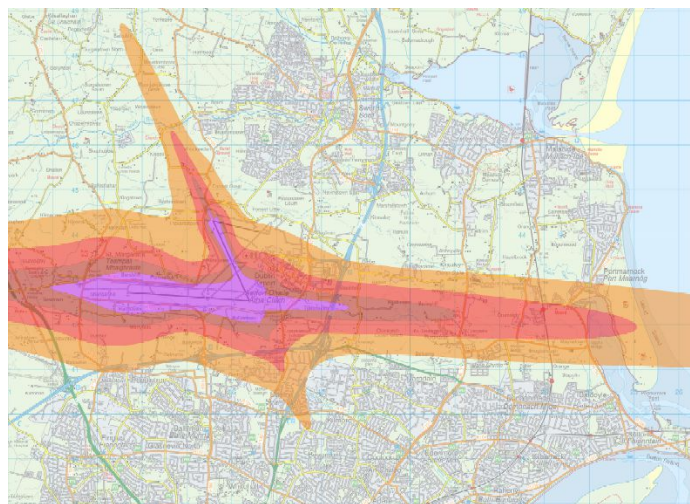
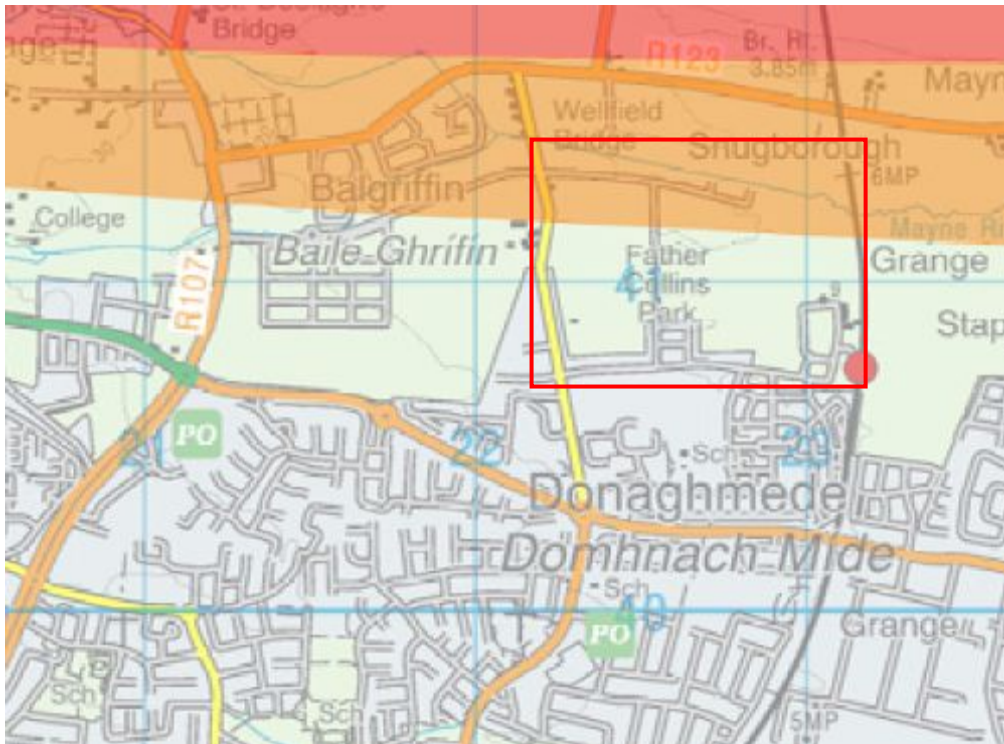
	External walls	Windows	Ventilation terminals
Facades within 30m railway track	NR 54 dB	NR 44 dB	No terminals facing track
Facades in direct line of sight railway track	NR 48 dB	NR 41 dB	No terminals facing track
All facades	NR 45 dB	NR 38 dB	NR 30 dB

Table 8.2.

Completeness : We note that completeness of any noise reduction construction element is of great importance. An external wall with a 50dB NR rating with a 1% opening / air gap will have its NR rating dropped to 20 dB.

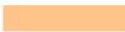
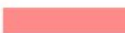


APPENDIX A MEASURED NOISE DATA DUBLIN AIRPORT

Day time equivalent continuous noise level (dB L_{den})



LEGEND:

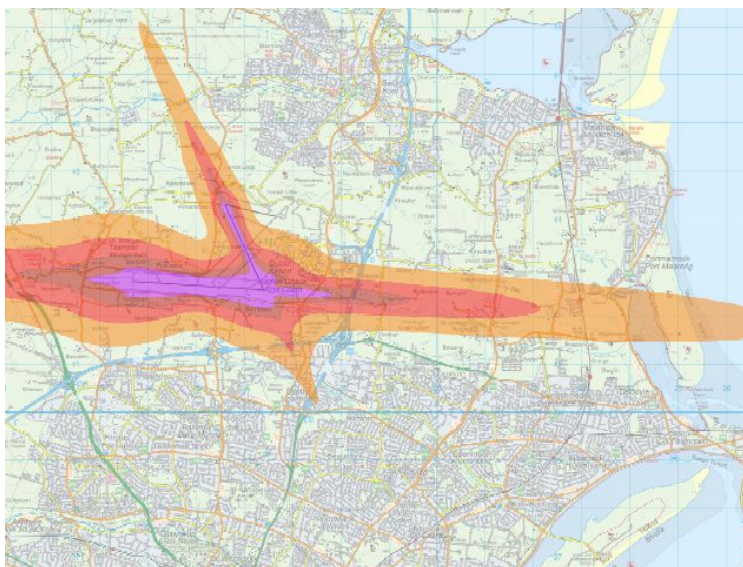
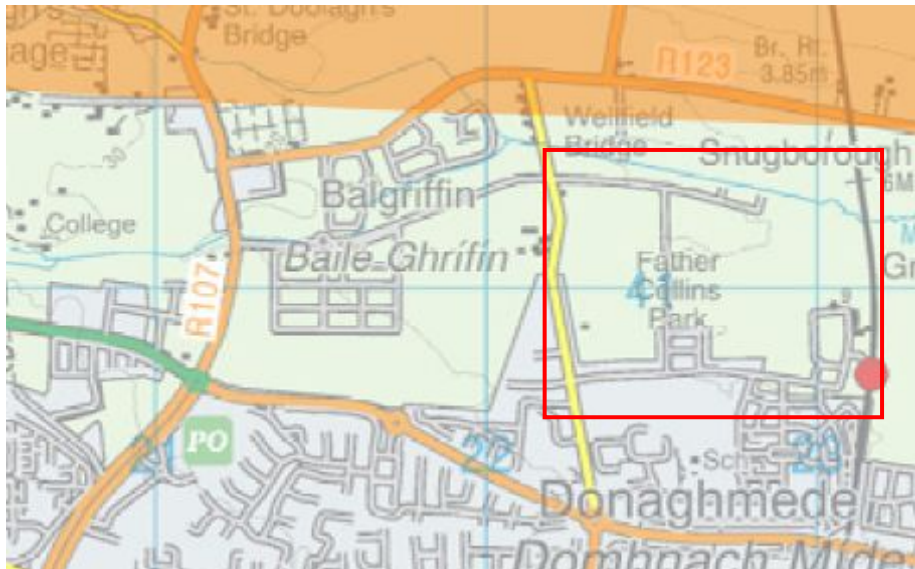
Noise Contours,

-  55 to 59 dB L_{den}
-  60 to 64 dB L_{den}
-  65 to 69 dB L_{den}
-  Greater than or equal to 70 dB L_{den}



APPENDIX B MEASURED NOISE DATA DUBLIN AIRPORT

Night time equivalent continuous noise level (dB L_{night})



LEGEND:

- Noise Contours,
- 50 to 54 dB L_{night}
 - 55 to 59 dB L_{night}
 - 60 to 64 dB L_{night}
 - Greater than or equal to 65 dB L_{night}

