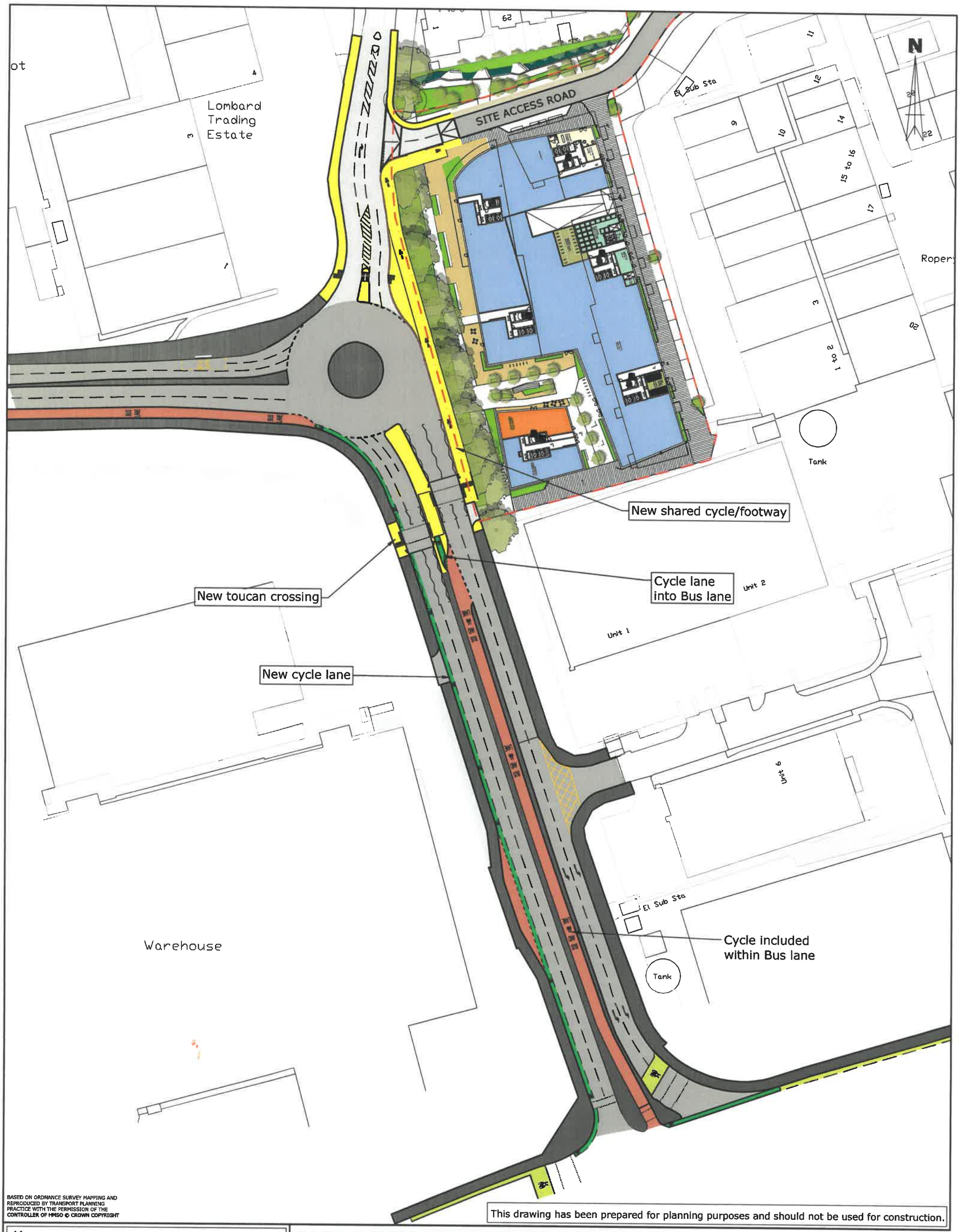
Appendix B
Drawings



Key

- Site boundary
- Cycle lane works
- Footway/cycle lane works
- carriageway works

CHARLTON RIVERSIDE, GREENWHICH

Highway works

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:1000 (0 10 20m)	15/10/18	LD	CW

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N

LOUVER
EXTRACT CARPARK

Large Car (2018)

STORAGE

Raised Planter

Private Garden

A008

A007

A002

A006

A003

A005

A004

LOGGIA

AMENITY

D001

D002

D003

D004

B009

+1.00m

-0.30m

BIN STOR

EXTRACT

Large Car (2018)

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T:\30000_Projects\30821 Charlton Riverside, Greenwich\ACAD\2017 scheme\232 - 235.dwg

Vehicle used

5.196

0.6983.035

Large Car (2018)	
Overall Length	5.196m
Overall Width	1.944m
Overall Body Height	1.524m
Min Body Ground Clearance	0.090m
Max Track Width	1.918m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	6.150m

CHARLTON RIVERSIDE, GREENWICH

Plot A
Car park access/egress
Swept path analysis of large car

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:250 (0 2.5 5m)	15/10/18	LD	CW

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30821/AC/232	-

N

EV Sub Sto

CONCIERGE
51579668.181300
51579668.181300

POLICE WELFARE
17.0 Sq. m
184 Sq.

WORKSPACE

Large Car (2018)

Large Car (2018)

Large Car (2018)

BIN HOLDING
79605123.597898
79605123.597898

GAS
5.5 Sq. m
60 Sq.

Cycle Store
66493267.726313
66493267.726313

SUBSTATION
25.0 Sq. m
269 Sq.

WATER
5.3 Sq. m
60 Sq.

Based on drawing number
10046-A-DRG-Z0-G100-2000-PL-RS. TPP REF - IN_158.

Vehicle used

5.196

0.8983.035

Large Car (2018)	
Overall Length	5.196m
Overall Width	1.944m
Overall Body Height	1.524m
Min Body Ground Clearance	0.090m
Max Track Width	1.918m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	6.150m

CHARLTON RIVERSIDE, GREENWICH

Plot B
Car park access/egress
Swept path analysis of large car

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:250 (0 2.5 5m)	15/10/18	LD	CW

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DRAWING NUMBER	REV
30821/AC/233	-

T:\30000_Projects\30821 Charlton Riverside, Greenwich\ACAD\2017 scheme\232 - 235.dwg

Based on drawing number
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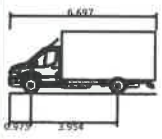
Vehicle used



Tranist Cab L4	
Overall Length	6.697m
Overall Width	2.507m
Overall Body Height	2.863m
Min Body Ground Clearance	0.233m
Max Track Width	1.949m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	7.000m

CHARLTON RIVERSIDE, GREENWICH

Plot A
3.5t LGV servicing (6.5m)

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:500 (0 5 10m)	15/10/18	LD	CW

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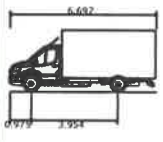
Vehicle used



Tranist Cab L4	
Overall Length	6.697m
Overall Width	2.507m
Overall Body Height	2.863m
Min Body Ground Clearance	0.233m
Max Track Width	1.949m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	7.000m

CHARLTON RIVERSIDE, GREENWICH

Plot B
3.5t LGV servicing (6.5m)

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:500 (0 5 10m)	15/10/18	LD	CW

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30821/AC/235	-

N

Sight line between HGVs

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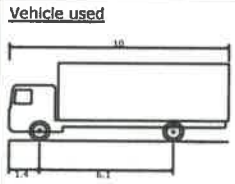
Vehicle used



FTA Design HG Rigid Vehicle (1998)	
Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.645m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock to Lock Time	3.00s
Kerb to Kerb Turning Radius	11.000m

CHARLTON RIVERSIDE, GREENWICH

Plot A
Swept path analysis of 10.0m Rigid HGV

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SCALE @ A3	DATE	DRAWN BY	CHECKED	DRAWING NUMBER	REV
1:500 (0 5 10m)	15/10/18	LD	CW	30821/AC/209	C


1 to 8
30
29
1
N
EL Sub Sta
9
10
Vehicle used
10
1.4
6.1
FTA Design HG Rigid Vehicle (1998)
Overall Length 10.000m
Overall Width 2.500m
Overall Body Height 3.645m
Min Body Ground Clearance 0.440m
Track Width 2.470m
Lock to Lock Time 3.00s
Kerb to Kerb Turning Radius 11.000m
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CHARLTON RIVERSIDE, GREENWICH
Plot B
Swept path analysis of 10.0m Rigid HGV
SCALE @ A3 1:500
0 5 10m
DATE 15/10/18
DRAWN BY LD
CHECKED CW
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REV C
T:\30000_Projects\30821 Charlton Riverside, Greenwich\ACAD\2017 scheme\209_C - 212_C.dwg

N

Sight line between HGVs

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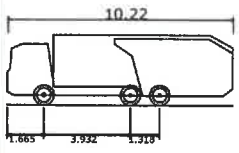
Vehicle used



Phoenix 2-20W (with Elite 2 6x2 RS chassis)	
Overall Length	10.220m
Overall Width	2.530m
Overall Body Height	3.211m
Min Body Ground Clearance	0.416m
Track Width	2.530m
Lock to Lock Time	4.00s
Kerb to Kerb Turning Radius	6.800m

CHARLTON RIVERSIDE, GREENWICH

Plot A
Swept path analysis of 10.2m refuse vehicle

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:500 (0 5 10m)	15/10/18	LD	CW

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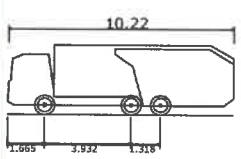
Vehicle used



Phoenix 2-20W (with Elite 2 6x2 RS chassis)	
Overall Length	10.220m
Overall Width	2.530m
Overall Body Height	3.211m
Min Body Ground Clearance	0.416m
Track Width	2.530m
Lock to Lock Time	4.00s
Kerb to Kerb Turning Radius	6.800m

CHARLTON RIVERSIDE, GREENWICH

Plot B
Swept path analysis of 10.2m refuse vehicle

SCALE @ A3	DATE	DRAWN BY	CHECKED
1:500 (0 5 10m)	15/10/18	LD	CW

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30821/AC/212	C

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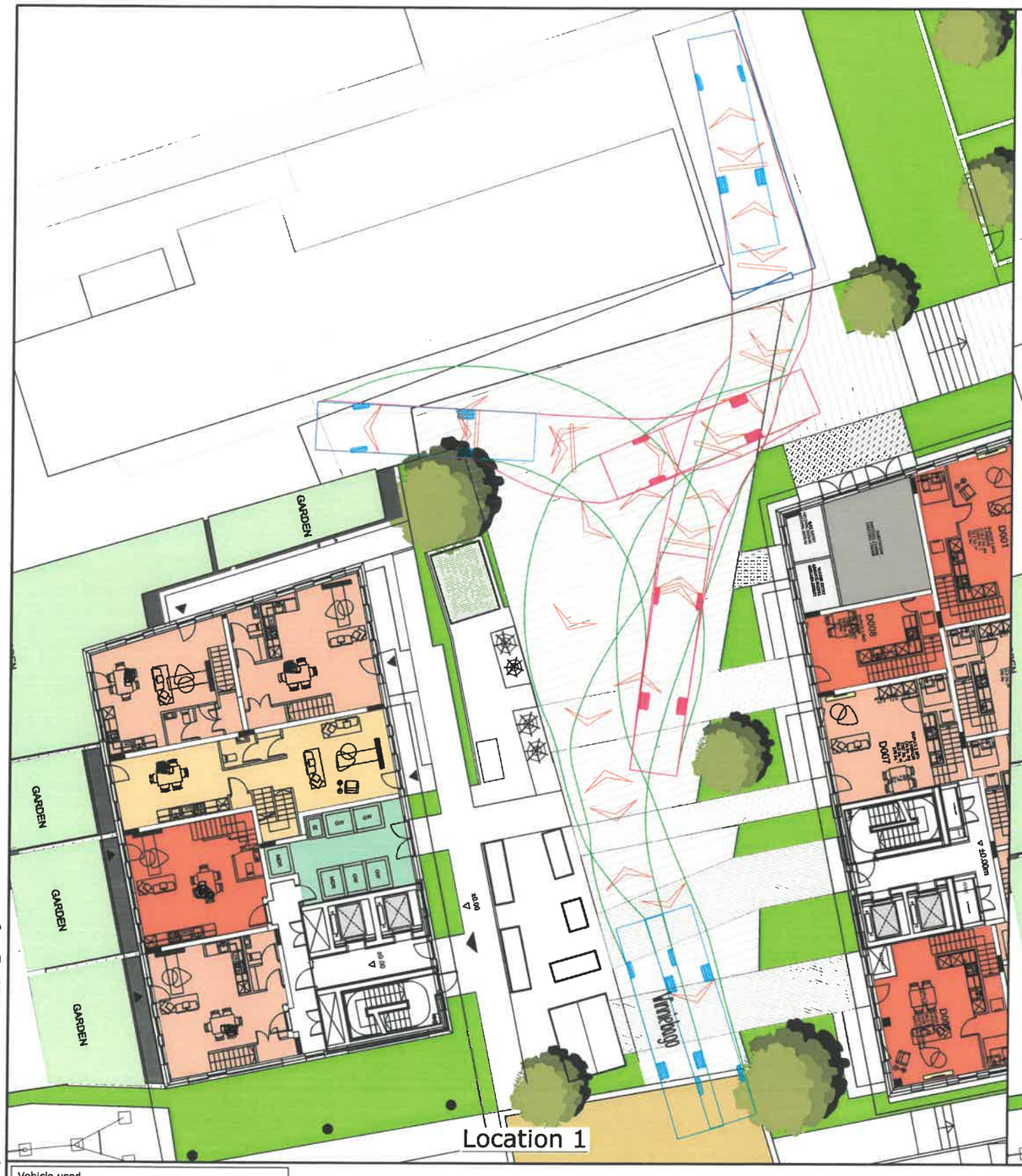
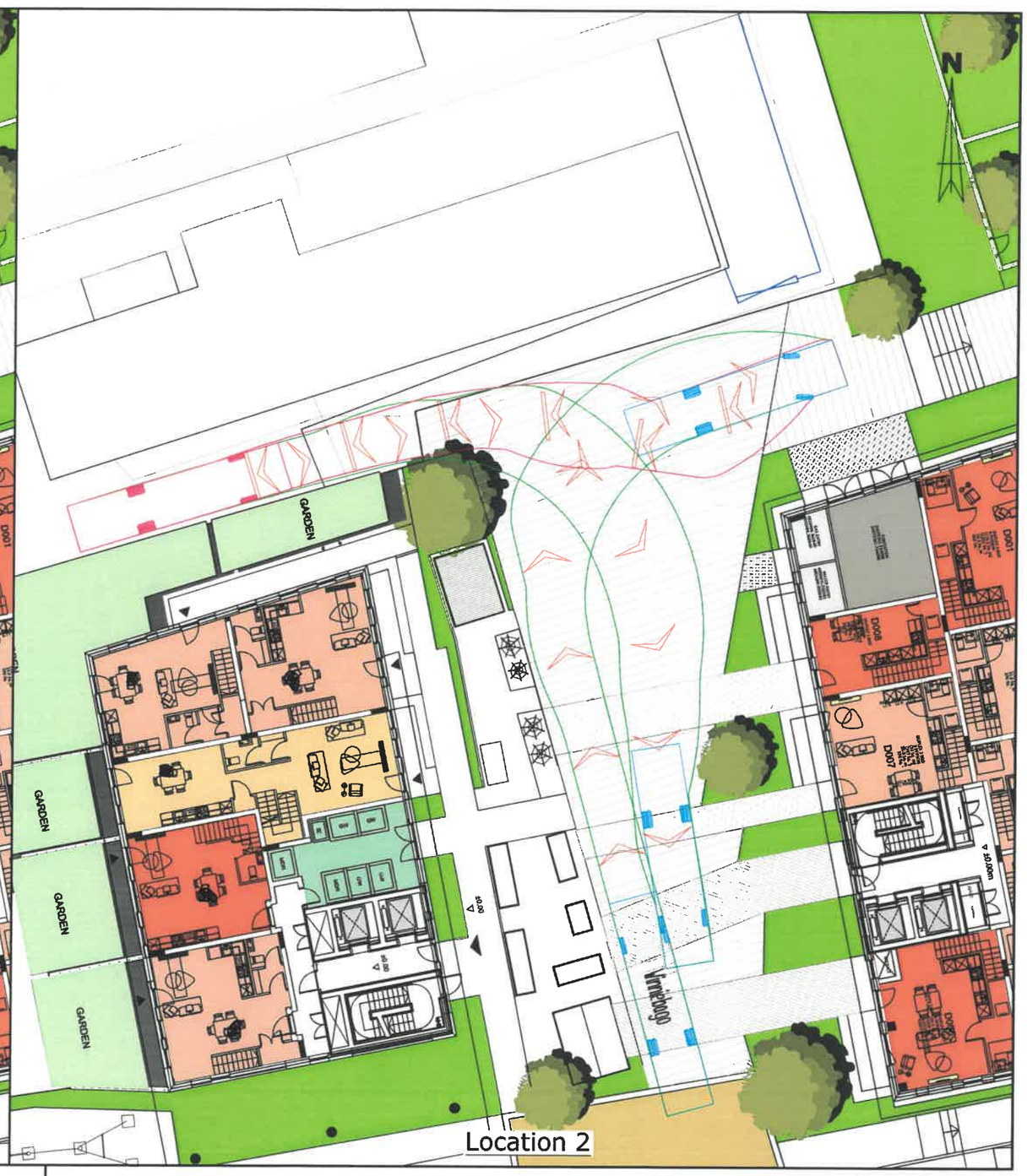
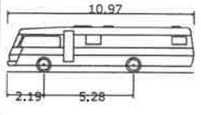




Vehicle used



Winnebago	
Overall Length	10.970m
Overall Width	2.400m
Overall Body Height	2.699m
Min Body Ground Clearance	0.370m
Track Width	2.400m
Lock to Lock Time	4.00s
Kerb to Kerb Turning Radius	12.200m

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CHARLTON RIVERSIDE, GREENWICH

Swept path analysis of an RV accessing Imex House

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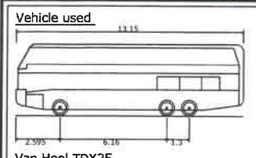
SCALE @ A3	DATE	DRAWN BY	CHECKED
1:250 (0 2.5 5m)	10/10/18	LD	CW

DRAWING NUMBER	REV
30821/AC/213	C

Vehicle used



Van Hool TDX25	
Overall Length	13.150m
Overall Width	2.550m
Overall Body Height	4.104m
Min Body Ground Clearance	0.343m
Track Width	2.550m
Lock to lock time	6.00s
Wall to Wall Turning Radius	11.065m

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CHARLTON RIVERSIDE, GREENWICH

Swept path analysis of a 13.1m coach

Imex House

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1:250 (0 2.5 5m)	10/10/18	LD	CW	30821/AC/231	A

N

ANCHOR AND HOPE LANE

24m

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CHARLTON RIVERSIDE, PHASE 1

Proposed future E - W route (24m corridor)

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SCALE @ A3	DATE	DRAWN BY	CHECKED	DRAWING NUMBER	REV
1:1000 (0 10 20m)	25/09/18	LD	CW	30821/AC/228	B

RAMBØLL

ENVIRONMENT
& HEALTH

APPENDIX 8.1A

Traffic Data

Link	Additional Cumulative Schemes October 2018	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	0	0
Anchor & Hope Lane North of Site Access	0	0
Anchor & Hope Lane South of Bugsby's Way	0	0
Bugby's Way West of Gallions Road	0	0
Bugby's Way East of Gallions Road	0	0
Charlton Church Lane North of Delafield Way	0	0
A206 East of Anchor & Hope Lane	574	52
A206 West of Anchor & Hope Lane	574	52
Site Access	0	0
Gallions Road	0	0

Link	Original Cumulative Schemes	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	0	0
Anchor & Hope Lane North of Site Access	0	0
Anchor & Hope Lane South of Bugsby's Way	1,606	17
Bugby's Way West of Gallions Road	1,606	17
Bugby's Way East of Gallions Road	1,606	17
Charlton Church Lane North of Delafield Way	193	3
A206 East of Anchor & Hope Lane	1,675	17
A206 West of Anchor & Hope Lane	568	8
Site Access	0	0
Gallions Road	0	0

Link	New Current Cumulative Schemes (Original Schemes + October 2018 Schemes)	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	0	0
Anchor & Hope Lane North of Site Access	0	0
Anchor & Hope Lane South of Bugsby's Way	1,606	17
Bugby's Way West of Gallions Road	1,606	17
Bugby's Way East of Gallions Road	1,606	17
Charlton Church Lane North of Delafield Way	193	3
A206 East of Anchor & Hope Lane	2,250	69
A206 West of Anchor & Hope Lane	1,142	60
Site Access	0	0
Gallions Road	0	0

Link	(3a) Future Baseline (Existing plus other cumulative schemes)	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	3,293	481
Anchor & Hope Lane North of Site Access	2,019	336
Anchor & Hope Lane South of Bugsby's Way	22,415	2,857
Bugby's Way West of Gallions Road	25,438	3,752
Bugby's Way East of Gallions Road	23,460	3,696
Charlton Church Lane North of Delafield Way	6,774	556
A206 East of Anchor & Hope Lane	41,202	6,034
A206 West of Anchor & Hope Lane	24,126	3,550
Site Access	1,385	148
Gallions Road	5,172	17

Link	(3a) New Future Baseline (Existing plus other cumulative schemes)	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	3,293	481
Anchor & Hope Lane North of Site Access	2,019	336
Anchor & Hope Lane South of Bugsby's Way	22,415	2,857
Bugby's Way West of Gallions Road	25,438	3,752
Bugby's Way East of Gallions Road	23,460	3,696
Charlton Church Lane North of Delafield Way	6,774	556
A206 East of Anchor & Hope Lane	41,777	6,086
A206 West of Anchor & Hope Lane	24,700	3,602
Site Access	1,385	148
Gallions Road	5,172	17

Link	(4.) Cumulative Traffic Flows (Existing minus current Site operation+proposed development + other cumulative schemes)	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	3,796	415
Anchor & Hope Lane North of Site Access	1,983	330
Anchor & Hope Lane South of Bugsby's Way	22,658	2,821
Bugby's Way West of Gallions Road	25,690	3,724
Bugby's Way East of Gallions Road	23,731	3,669
Charlton Church Lane North of Delafield Way	6,822	548
A206 East of Anchor & Hope Lane	41,445	6,004
A206 West of Anchor & Hope Lane	24,134	3,548
Site Access	1,852	77
Gallions Road	5,181	16

Link	(4.) New Cumulative Traffic Flows (Existing minus current Site operation+proposed development + other cumulative schemes)	
	24 hour AADT	
	All Motor Vehicles	HGVs (>3.5tonnes incl. buses and coaches)
Anchor & Hope Lane North of Bugsby's Way	3,796	415
Anchor & Hope Lane North of Site Access	1,983	330
Anchor & Hope Lane South of Bugsby's Way	22,658	2,821
Bugby's Way West of Gallions Road	25,690	3,724
Bugby's Way East of Gallions Road	23,731	3,669
Charlton Church Lane North of Delafield Way	6,822	548
A206 East of Anchor & Hope Lane	42,019	6,056
A206 West of Anchor & Hope Lane	24,708	3,600
Site Access	1,852	77
Gallions Road	5,181	16

RAMBOLL

ENVIRONMENT
& HEALTH

APPENDIX 9.1A

Site Suitability Update

TECHNICAL APPENDIX 9.4: SITE SUITABILITY UPDATE

The likely effect of noise sources within the study area at the location of the proposed residential units within the proposed development has been assessed in line with the guidance provided within Professional Practice Guidance (ProPG) on Planning & Noise developed by the Institute of Acoustics and BS8233[1].

ProPG considers new residential development that will be exposed predominantly to airborne noise from transport sources. The preparation of this guidance was overseen by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), together with practitioners from a planning and local authority background.

This guidance has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England. It takes into account the guidance on the control and mitigation of noise detailed in the National Planning Policy Framework (NPPF) and the Noise Policy Statement for England (NPSE) and presents them in one overall document. It also provides further clarification and guidance for appropriate noise levels and suitable design, such as proposing suitable maximum noise levels in bedrooms at night.

Figure 1 below summarises the assessment methodology which has been used to assess site suitability.

[1] Institute of Acoustics, 2017. Planning & Noise: Professional Practice Guidance on Planning & Noise

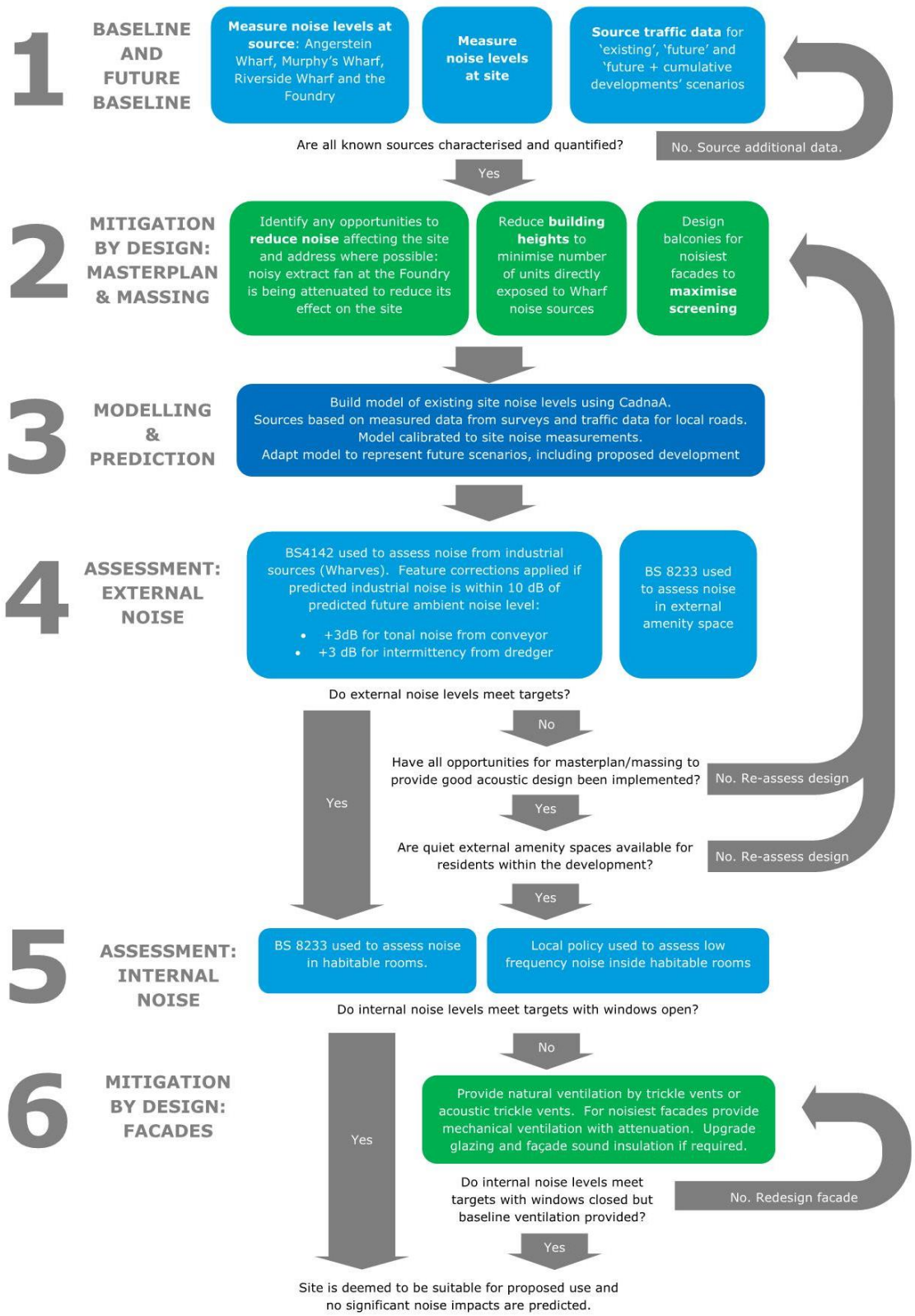

Figure 1: Site Suitability Assessment Methodology Flowchart

Further details of each aspect of the assessment are provided in the following sections.

1.1 Noise Criteria

Industrial Noise Affecting the Site

Suitable criteria for determining the impact of the Safeguarded Wharves and the Stone Foundries on the site are based on the guidance in BS 4142: 2014[2].

The basis of BS 4142: 2014 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background Sound Level: LA90,T – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels (dB);
- Specific Sound Level: LAeq,Tr – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T;
- Residual Sound Level: LAeq,T – the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- Rating Level: LAr,Tr – the specific sound level plus any adjustment made for the characteristic features of the noise.

The background level and the rating levels are compared and the standard states that:

"Typically, the greater the difference, the greater the magnitude of impact.

A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.

A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context."

The lower the rating level is to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon the context.

The standard specifies the specific sound level as an LAeq with a one-hour assessment period during the day (07:00-23:00 hours) and a fifteen-minute assessment period at night (23:00-07:00 hours).

Ambient Noise in External Amenity Spaces

The noise levels in external amenity areas have been assessed against the guidance contained in BS 8233:2014. The adopted significance threshold for noise in external amenity spaces is the 55 dB LAeq,18hr 'upper limit' from BS 8233.

ProPG Stage 2: Element 3 – External Amenity Area Noise Assessment, states the following:

"3(v) Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

- a relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or

[2] British Standards Institution, 2014. British Standard 4142:2014 Method for Rating and Assessing Industrial and Commercial Sound. BSI.

- a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance)."

Internal Ambient Noise Levels

The internal ambient noise levels have been assessed against the guidance within BS 8233: 2014. BS 8233:2014 recommends that for resting/sleeping conditions in living rooms and bedrooms, the internal noise levels should not exceed 35 dB LAeq,16hour and 30 dB LAeq,8hour for daytime and night time respectively.

These internal daytime and night-time ambient noise level criteria have been adopted as the significance thresholds for this assessment.

Tonal Noise Inside Dwellings

It is understood that RBG local policy is that tonal noise from industrial noise sources should not exceed 50 dB Leq,63Hz(oct) inside dwellings.

This has been adopted as the significance criterion for tonal noise inside dwellings.

1.2 Baseline and Future Baseline

Noise measurements were undertaken to quantify the noise climate at the site and the noise produced by the adjacent Stone Foundries site and the nearby safeguarded wharf (Riverside Wharf) as described in Technical Appendix 9.2: Baseline Noise Survey.

Following this survey through consultation with the wharf operators, additional noise data was gathered on the contribution of noise from the more distant safeguarded wharfs (Murphy's and Angerstein's Wharfs). Further noise surveys were undertaken at these sites, as described in Technical Appendix 9.2: Baseline Noise Survey.

1.3 Mitigation by Design – Masterplan and Massing

Following the baseline noise survey in June 2016, the noise of a single extract fan at the Stone Foundries site was found to dominate the noise climate on the eastern elevations of the proposed development. Following discussions with the Ramboll Acoustic Consultant and the Stone Foundries, it is understood that the Applicant is in the process of assisting with the provision of attenuation of this fan in order to reduce its noise impact on the proposed development. This potential reduction has not been taken into account in this assessment in order to present a worst case view but is expected to be in place by commencement of construction of the proposed development and can therefore be factored into the detailed design of façades and ventilation strategies.

The November 2016 proposed development included tall buildings which did not benefit from any noise screening from the intervening buildings between the site and Angerstein's and Murphy's Wharves. Following discussions between the Ramboll Acoustic Consultant, Architect and the Applicant, it was agreed that a better acoustic design could be achieved with a lower-rise development. This would ensure that the maximum number of residents would benefit from the screening of intervening properties. This approach has been taken in response to a number of planning issues and is incorporated into the revised design.

The design of the balconies for the noisy façade s was discussed between the Acoustic Consultant and the Architect. Two different balcony designs were developed which would enable those elevations which are exposed to the highest noise levels to achieve the best practicable reduction in noise, by recessing the balconies within the building façades. Once the above mitigation had been designed into the scheme, the noise impacts could be predicted.

1.4 Modelling and Prediction

Noise levels at the site have been predicted the Cadna/A suite of noise modelling software. This software utilises standard acoustic principles in conjunction with approved prediction methodologies and is an industry method for predicting and assessing the impact of noise from a variety of sources.

The noise model considers the baseline and cumulative 2023 traffic flows[3] (including background traffic growth in proximity to the site) within the study area, based on traffic flow data provided by the Applicant's Transport Consultant, as detailed in the Road Traffic Noise section. Traffic flows for each link under each considered scenario are presented in full in Technical Appendix 9.5.

The site was assumed to comprise acoustically reflecting '50% hard ground'. All buildings were assumed as acoustically reflecting. The model was set to consider three-orders of reflection and to assume light downwind propagation in all directions. This is considered to represent a typical worst case in terms of noise propagation from the roads within the study area.

The following noise sources were incorporated into the model:

- Plant noise from the Stone Foundries;
- Operational noise from Riverside Wharf and Angerstein and Murphy's safeguarded wharves to the northeast and northwest of the site in accordance with the measurements presented in Technical Appendix 9.2;
- Docking and unloading noise from dredger ships at Murphy's Wharf in accordance with the measurements presented in Technical Appendix 9.2; and
- Traffic links surrounding the site as per the traffic flows shown in Technical Appendix 9.5.

1.5 Assessment: External Noise

Industrial Noise

BS 4142 has been used to assess noise from industrial sources (i.e., Riverside, Angerstein and Murphy's Wharves, Stone Foundries). The outcome of the noise model shows that that the predicted industrial noise is within 10 dB of predicted future ambient noise level (i.e. potentially audible). Therefore, the following feature corrections were applied to the noise model:

- +3 dB for tonal noise from dredger activities; and
- +3 dB for intermittency from dredger activities.

The predicted noise levels from the industrial noise sources including these feature corrections can be seen in Figure 2 and Figure 3. The figures also show the measured background noise levels (LA90) at certain locations as described in Technical Appendix 9.2.

[3] The opening year has been revised from 2023 as presented in the 2017 ES, to 2024. Given the background traffic levels have remained stable for the past few years, no background growth factor was being applied for future baseline forecasts, as agreed with RBG and TfL for the assessment. Therefore the revised opening date of 2024 would, under this agreed methodology for future forecasts, result in the same assessment baseline traffic. Thus the operational traffic flows used within the 2017 ES remain robust and valid for the purposes of assessment within this appendix and Chapter 9: Noise and Vibration.

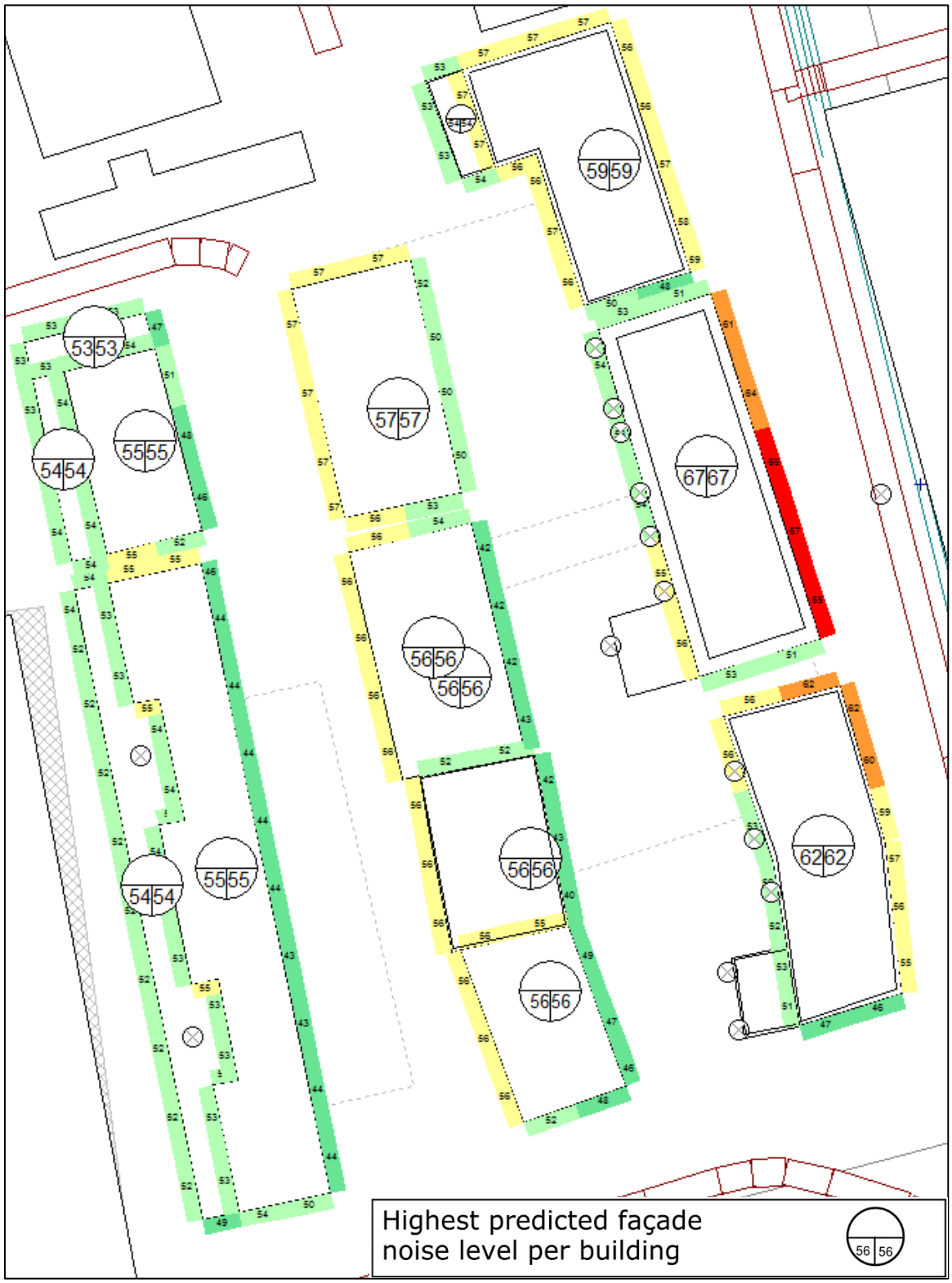

Figure 2: Predicted Noise Levels from Industrial Noise Sources (Safeguarded Wharves) – Plot A

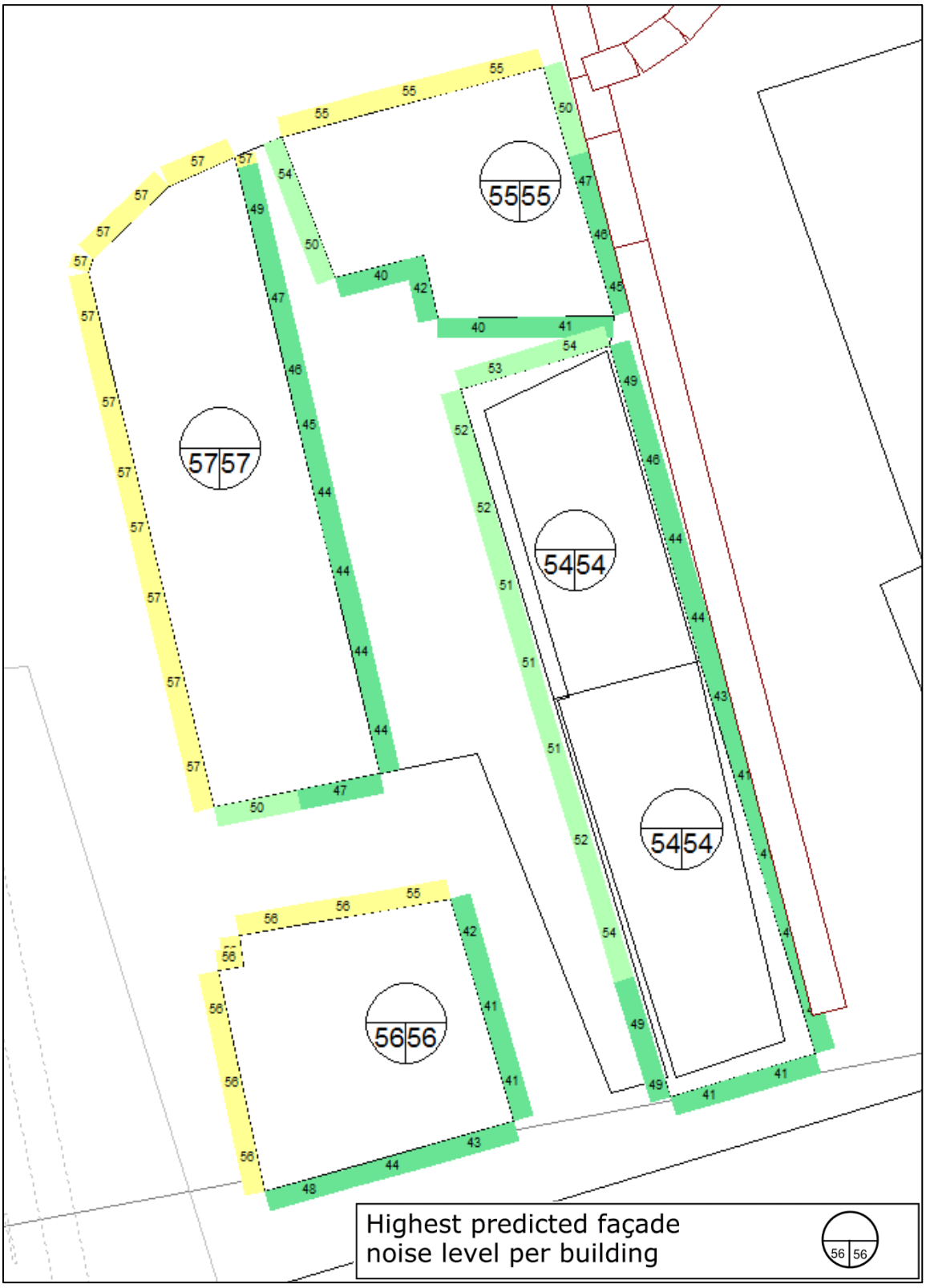

Figure 3: Predicted Noise Levels from Industrial Noise Sources (Safeguarded Wharves) – Plot B

As stated within Technical Appendix 9.2, the night-time background noise levels across the site are around 48 dB along Anchor and Hope Lane and around 53 dB near the western façades of

plot A. The difference between the rating level and the background noise level is shown in Table 1.

Table 1 Difference Between Rating Level and Background Noise Level

Building	Worst case Rating level, i.e. most exposed façade (dB)	Background noise levels during night-time (dB)	Difference*
Building A	59	53	+6dB
Building B	67	53	+14dB
Building C	62	53	+9dB
Building D	57	48	+9dB
Building E	56	48	+8dB
Building F	56	48	+8dB
Building G	55	48	+7dB
Building H	55	48	+7dB
Building J	44	50	+6dB
Building K+L	54	48	+6dB
Building M+N	57	50	+7dB
Building O	56	48	+8dB

* According to BS 4142:2014, a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context. Therefore, such differences are highlighted in red.

On the basis of the above results and in line with the guidance presented in BS 4142, significant impacts could occur at the most exposed façades of Building B as a result of industrial noise affecting the amended proposed development. However, with the provision of design mitigation discussed below, it is possible to reduce the magnitude of effects.

For Building B, the dominant industrial noise source is the extract fan at the Stone Foundries, which is subject to a plan to provide attenuation. This could be secured by planning condition. With the provision of a suitably specified attenuator it is considered that the Rating level affecting these locations would fall below the significance threshold.

On this basis, **no significant effects** are predicted as a result of industrial noise levels affecting the site.

Ambient Noise in External Amenity Areas

The proposed landscape masterplan showing the location of the proposed amenity spaces can be found in ES Addendum Chapter 4A: The Proposed Development.

The external amenity areas on the balconies and roof tops have been predicted and are outlined in Table 2. They are numbered according to building, façade direction (east, west etc), position (as shown in Figure 4 and Figure 5) and storey level. For example. B1 west 2.0G would be building B, point 1, west façade, level 2.

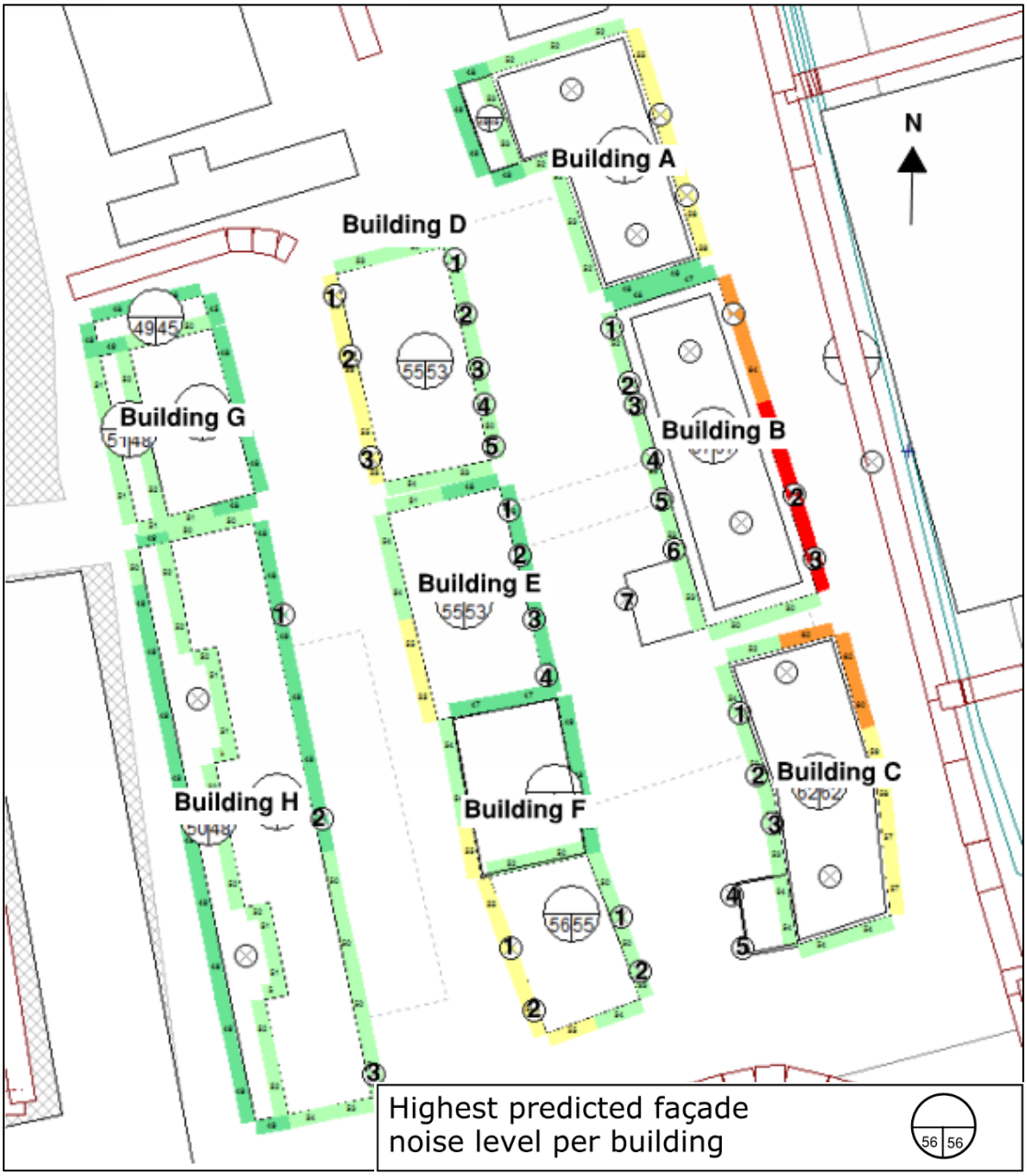

Figure 4: Plot A - Predicted Noise Levels at External Amenity Spaces

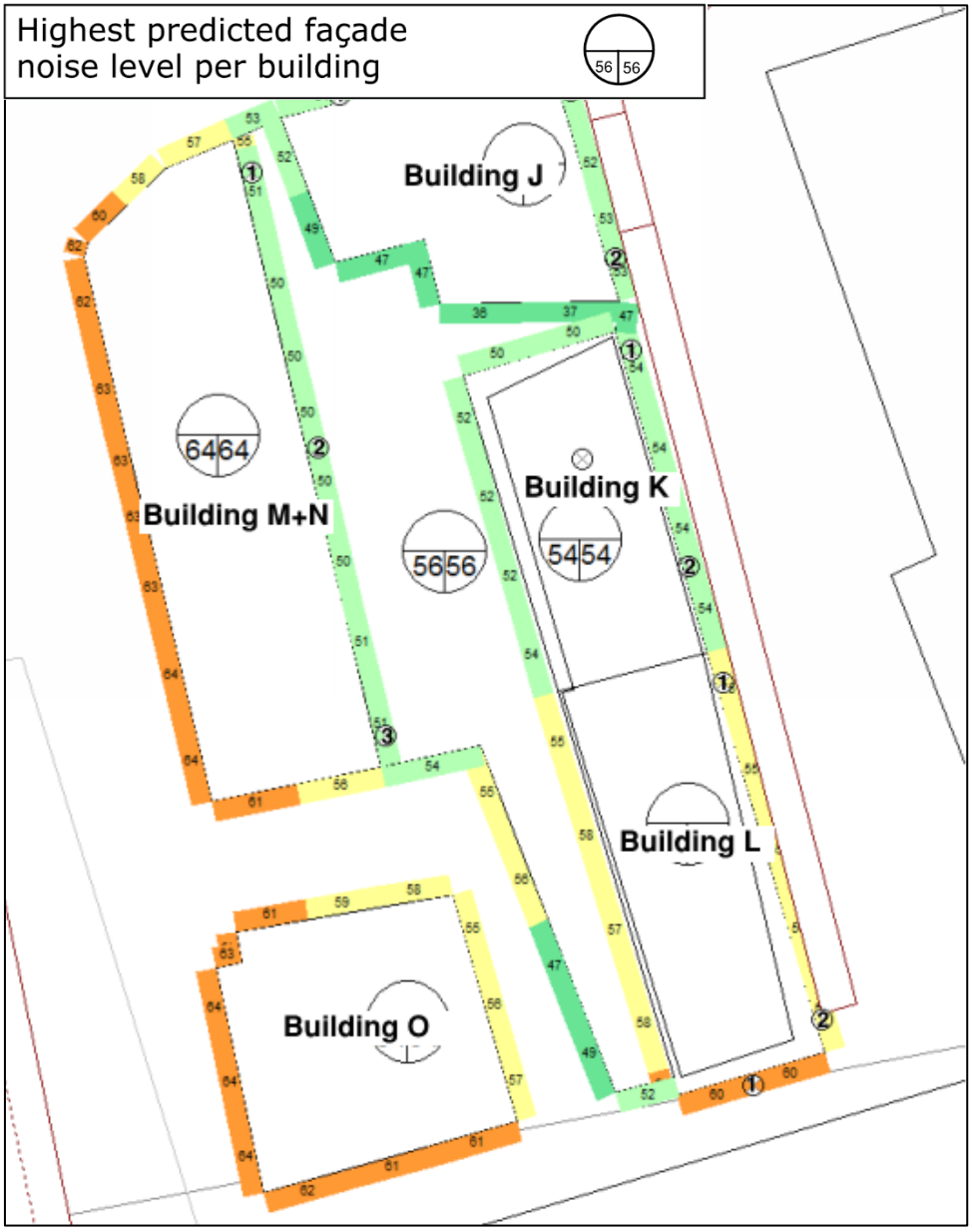

Figure 5: Plot B - Predicted Noise Levels at External Amenity Spaces

Table 2 Predicted Balcony, Podiums, Rooftop Amenity Spaces Noise Levels

Building	Sound Pressure Level / dBA	Building	Sound Pressure Level / dBA	Building	Sound Pressure Level / dBA	Building	Sound Pressure Level / dBA
A rooftop	48.1	C5 west 1.OG	48.3	F1 east 1.OG	44.2	M1 east 1.OG	41.6
A rooftop	49.8	C5 west 2.OG	50.6	F1 east 2.OG	47	M1 east 2.OG	45
B rooftop	48.3	C5 west 3.OG	51.9	F1 east 3.OG	48.1	M1 east 3.OG	48.3
B rooftop	48.2	C5 west 4.OG	52.5	F1 east 4.OG	48.5	M1 east 4.OG	49.3
B2 east 1.OG	60.3	C5 west 5.OG	52.9	F1 east 5.OG	48.6	M1 east 5.OG	49.9
B2 east 2.OG	60.1	C5 west 6.OG	53.1	F1 east 6.OG	48.6	M1 east 6.OG	50.2
B2 east 3.OG	59.6	C5 west 7.OG	53.2	F1 east 7.OG	48.7	M1 east 7.OG	50.4
B2 east 4.OG	59	C5 west 8.OG	53.4	F1 east 8.OG	48.9	M1 east 8.OG	50.6
B2 east 5.OG	58.4	C5 west 9.OG	53.6	F1 east 9.OG	49.3	M1 east 9.OG	50.9
B2 east 6.OG	57.6	C5 west EG	43.8	F1 east EG	39.6	M1 east EG	38.9
B2 east 7.OG	56.9	D1 east 1.OG	41.3	F1 west 1.OG	47.6	M2 east 1.OG	43
B2 east 8.OG	56.2	D1 east 2.OG	43.4	F1 west 2.OG	49.1	M2 east 2.OG	44.6
B2 east 9.OG	55.6	D1 east 3.OG	47.2	F1 west 3.OG	50.9	M2 east 3.OG	46.8
B2 east EG	60.3	D1 east 4.OG	47.5	F1 west 4.OG	52.2	M2 east 4.OG	47.7
B2 west 1.OG	41.5	D1 east 5.OG	47.6	F1 west 5.OG	53.3	M2 east 5.OG	48.2
B2 west 2.OG	44.3	D1 east 6.OG	47.7	F1 west 6.OG	54	M2 east 6.OG	48.5
B2 west 3.OG	47.5	D1 east 7.OG	47.9	F1 west 7.OG	54.4	M2 east 7.OG	48.6
B2 west 4.OG	48.2	D1 east 8.OG	48.2	F1 west 8.OG	54.6	M2 east 8.OG	48.8
B2 west 5.OG	48.5	D1 east 9.OG	48.9	F1 west 9.OG	54.8	M2 east 9.OG	49.2
B2 west 6.OG	48.9	D1 east EG	38.5	F1 west EG	45.1	M2 east EG	39.5
B2 west 7.OG	49.3	D1 west 1.OG	47.4	F2 east 1.OG	46.9	M3 east 1.OG	45.2
B2 west 8.OG	50.1	D1 west 2.OG	48	F2 east 2.OG	49.3	M3 east 2.OG	47.2
B2 west 9.OG	51.6	D1 west 3.OG	49.6	F2 east 3.OG	50.6	M3 east 3.OG	49
B2 west EG	37.2	D1 west 4.OG	51.4	F2 east 4.OG	51.1	M3 east 4.OG	49.7
B3 east 1.OG	59	D1 west 5.OG	52.9	F2 east 5.OG	51.3	M3 east 5.OG	50
B3 east 2.OG	58.8	D1 west 6.OG	53.6	F2 east 6.OG	51.4	M3 east 6.OG	50.2
B3 east 3.OG	58.5	D1 west 7.OG	54	F2 east 7.OG	51.5	M3 east 7.OG	50.3
B3 east 4.OG	58	D1 west 8.OG	54.2	F2 east 8.OG	51.5	M3 east 8.OG	50.4
B3 east 5.OG	57.5	D1 west 9.OG	54.4	F2 east 9.OG	51.7	M3 east 9.OG	50.7
B3 east 6.OG	56.9	D1 west EG	44.9	F2 east EG	42.1	M3 east EG	37
B3 east 7.OG	56.3	D2 east 1.OG	41.5	F2 west 1.OG	49.9		
B3 east 8.OG	55.7	D2 east 2.OG	43.1	F2 west 2.OG	51		
B3 east 9.OG	55.2	D2 east 3.OG	45.3	F2 west 3.OG	52.3		

B3 east EG	58.9	D2 east 4.OG	45.9	F2 west 4.OG	53.2		
B3 west 1.OG	41.7	D2 east 5.OG	46.3	F2 west 5.OG	54		
B3 west 2.OG	44.5	D2 east 6.OG	46.5	F2 west 6.OG	54.6		
B3 west 3.OG	47.3	D2 east 7.OG	46.7	F2 west 7.OG	54.9		
B3 west 4.OG	48	D2 east 8.OG	46.9	F2 west 8.OG	55.1		
B3 west 5.OG	48.5	D2 east 9.OG	47.8	F2 west 9.OG	55.3		
B3 west 6.OG	48.8	D2 east EG	38.9	F2 west EG	48.4		
B3 west 7.OG	49.3	D2 west 1.OG	44.9	H rooftop	49.5		
B3 west 8.OG	50.1	D2 west 2.OG	46.7	H rooftop	49.5		
B3 west 9.OG	51.5	D2 west 3.OG	50	H1 east 1.OG	44.3		
B3 west EG	37.2	D2 west 4.OG	51	H1 east 2.OG	46.3		
B4 west 1.OG	42.7	D2 west 5.OG	52.5	H1 east 3.OG	48.7		
B4 west 2.OG	45.4	D2 west 6.OG	53.4	H1 east EG	41.4		
B4 west 3.OG	47.7	D2 west 7.OG	53.9	H2 east	43		
B4 west 4.OG	48.8	D2 west 8.OG	54.1	H3 east 1.OG	47.7		
B4 west 5.OG	49.2	D2 west 9.OG	54.3	H3 east 2.OG	49.5		
B4 west 6.OG	49.5	D2 west EG	43	H3 east 3.OG	51.3		
B4 west 7.OG	49.9	D3 east 1.OG	41.6	H3 east EG	43.5		
B4 west 8.OG	50.7	D3 east 2.OG	43.3	J1 east 1.OG	47.9		
B4 west 9.OG	51.9	D3 east 3.OG	45.2	J1 east 2.OG	50		
B4 west EG	38.9	D3 east 4.OG	45.9	J1 east 3.OG	51.6		
B5 west 1.OG	42	D3 east 5.OG	46.3	J1 east 4.OG	52.4		
B5 west 2.OG	45.3	D3 east 6.OG	46.5	J1 east EG	45.7		
B5 west 3.OG	47.3	D3 east 7.OG	46.7	J2 east 1.OG	48.5		
B5 west 4.OG	48.5	D3 east 8.OG	46.9	J2 east 2.OG	50.5		
B5 west 5.OG	49	D3 east 9.OG	47.7	J2 east 3.OG	51.8		
B5 west 6.OG	49.4	D3 east EG	38.9	J2 east 4.OG	52.5		
B5 west 7.OG	49.9	D3 west 1.OG	44.7	J2 east EG	46.3		
B5 west 8.OG	51.4	D3 west 2.OG	47.7	J1 north 1.OG	51		
B5 west 9.OG	52.4	D3 west 3.OG	49.7	J1 north 2.OG	51.2		
B5 west EG	35.9	D3 west 4.OG	51.1	J1 north 3.OG	52.2		
B6 west 1.OG	40.6	D3 west 5.OG	52.7	J1 north 4.OG	53.2		
B6 west 2.OG	45.8	D3 west 6.OG	53.6	J1 north EG	50.7		
B6 west 3.OG	47.7	D3 west 7.OG	54	K rooftop	49.3		
B6 west 4.OG	48.7	D3 west 8.OG	54.3	K1 east 1.OG	49		
B6 west 5.OG	49.2	D3 west 9.OG	54.5	K1 east 2.OG	50.9		

B6 west 6.OG	49.7	D3 west EG	41.5	K1 east 3.OG	52.1		
B6 west 7.OG	50.6	D4 east 1.OG	41.7	K1 east 4.OG	52.6		
B6 west 8.OG	51.3	D4 east 2.OG	43.4	K1 east 5.OG	53.3		
B6 west 9.OG	52.7	D4 east 3.OG	45.2	K1 east 6.OG	53.4		
B6 west EG	33.9	D4 east 4.OG	45.9	K1 east 7.OG	53.6		
B7 west 1.OG	44	D4 east 5.OG	46.3	K1 east 8.OG	53.7		
B7 west EG	40.3	D4 east 6.OG	46.5	K1 east 9.OG	53.8		
C rooftop	48.2	D4 east 7.OG	46.7	K1 east EG	46.7		
C rooftop	48.7	D4 east 8.OG	47	K2 east 1.OG	50.3		
C1 west 1.OG	45.4	D4 east 9.OG	47.6	K2 east 2.OG	52		
C1 west 2.OG	47.3	D4 east EG	39	K2 east 3.OG	52.9		
C1 west 3.OG	48.8	D5 east 1.OG	41.8	K2 east 4.OG	53.3		
C1 west 4.OG	49.8	D5 east 2.OG	43.6	K2 east 5.OG	53.5		
C1 west 5.OG	50.4	D5 east 3.OG	45.4	K2 east 6.OG	53.6		
C1 west 6.OG	51	D5 east 4.OG	46.2	K2 east 7.OG	53.6		
C1 west 7.OG	51.6	D5 east 5.OG	46.5	K2 east 8.OG	53.6		
C1 west 8.OG	52.4	D5 east 6.OG	46.7	K2 east 9.OG	53.6		
C1 west 9.OG	53.3	D5 east 7.OG	47	K2 east EG	48.3		
C1 west EG	41.1	D5 east 8.OG	47.2	K1 south 1.OG	55.2		
C2 west 1.OG	45.6	D5 east 9.OG	47.8	K1 south 10.OG	59.7		
C2 west 2.OG	47.6	D5 east EG	39.2	K1 south 2.OG	58.1		
C2 west 3.OG	49.2	E1 east 1.OG	41.9	K1 south 3.OG	59		
C2 west 4.OG	50	E1 east 2.OG	43.8	K1 south 4.OG	59.4		
C2 west 5.OG	50.6	E1 east 3.OG	45.5	K1 south 5.OG	59.6		
C2 west 6.OG	51	E1 east 4.OG	46.2	K1 south 6.OG	59.7		
C2 west 7.OG	51.3	E1 east 5.OG	46.6	K1 south 7.OG	59.7		
C2 west 8.OG	52.1	E1 east 6.OG	46.9	K1 south 8.OG	59.7		
C2 west 9.OG	52.6	E1 east EG	39.1	K1 south 9.OG	59.7		
C2 west EG	39.7	E2 east 1.OG	42	K1 south EG	49		
C3 west 1.OG	46	E2 east 2.OG	44.1	L1 east 1.OG	51.1		
C3 west 2.OG	47.9	E2 east 3.OG	45.6	L1 east 2.OG	52.6		
C3 west 3.OG	49.5	E2 east 4.OG	46.4	L1 east 3.OG	53.4		
C3 west 4.OG	50.4	E2 east 5.OG	46.7	L1 east 4.OG	53.8		
C3 west 5.OG	50.9	E2 east 6.OG	47	L1 east 5.OG	53.9		
C3 west 6.OG	51.2	E2 east EG	39.1	L1 east 6.OG	54		
C3 west 7.OG	51.5	E3 east 1.OG	41.8	L1 east 7.OG	54		

C3 west 8.OG	52.1	E3 east 2.OG	44	L1 east 8.OG	54		
C3 west 9.OG	52.4	E3 east 3.OG	45.5	L1 east 9.OG	54		
C3 west EG	37.5	E3 east 4.OG	46.2	L1 east EG	49.4		
C4 west 1.OG	47.7	E3 east 5.OG	46.5	L2 east 1.OG	51.8		
C4 west 2.OG	50	E3 east 6.OG	46.8	L2 east 2.OG	54.9		
C4 west 3.OG	51.4	E3 east EG	38.9	L2 east 3.OG	55.8		
C4 west 4.OG	52.1	E4 east 1.OG	37.7	L2 east 4.OG	56		
C4 west 5.OG	52.5	E4 east 2.OG	39.7	L2 east 5.OG	56.1		
C4 west 6.OG	52.7	E4 east 3.OG	41.1	L2 east 6.OG	56.1		
C4 west 7.OG	52.9	E4 east 4.OG	42.1	L2 east 7.OG	56.1		
C4 west 8.OG	53.1	E4 east 5.OG	42.4	L2 east 8.OG	56.1		
C4 west 9.OG	53.4	E4 east 6.OG	42.7	L2 east 9.OG	56.1		
C4 west EG	42.3	E4 east EG	35.5	L2 east EG	44.2		

Winter Gardens/ Loggias

Winter gardens are proposed for Building O and loggias are proposed for building A / G / H, east façade of buildings B and C and west façade of building M+N. It is assumed that winter gardens comprise a fully single glazed façade and that loggias are balconies inset within the façade. The levels at the loggias are equivalent to the façade levels as given in Table 3.

Table 3 Noise levels incident on loggias and winter balconies

Location	Highest façade noise level / dBA
Building A – east facade	59
Building B – east facade	67
Building C – east facade	60
Buildings G / H	54
Building M+N – west facade	64
Building O	64

Winter gardens and loggias provide screening that typically gives a reduction in noise level of -5 to -15 dB compared to the free-field levels. On this basis all proposed winter gardens and loggias are predicted to be exposed to noise levels below the ambient noise significance threshold.

Summary of External Ambient Noise Level Assessment

The results show that the noise levels in most of proposed balconies, podiums and roof terraces would fall below the adopted criteria for ambient noise levels in amenity areas. The ambient noise levels that exceed the criteria are summarised in Table 4 and described below.

Table 4 Exceedances of External Noise Levels at Balcony, Podiums, Rooftop Amenity Spaces

Building	Location of exceedances
Building A	No exceedances
Building B	On balconies to the east of the building, which are areas that are near the Stone Foundries. No exceedances on podium level.
Building C	No exceedances

Building D, E, F, G, H, J	No exceedances
Building K+L	Some exceedances to the balconies to the south and east façade of the building, near Anchor and Hope Lane South of Bugsby's Way
Building M+N	No exceedances. Loggias to be incorporated to west façade
Building O	Exceedances to the external amenity space (communal balcony) overlooking Anchor and Hope Lane South of Bugsby's Way.

Whilst a percentage of 10 % of individual balconies, or roof terraces may experience ambient noise levels which exceed the ambient noise significance threshold, all residents of the amended proposed development would have access to a variety of external amenity spaces which would be exposed to noise levels below the significance threshold. Therefore, **no significant effects** are predicted as a result of ambient noise in external amenity areas.

1.6 Assessment: Internal Noise Levels

For the purpose of this assessment, the night-time noise levels have been used to assess compliance with BS 8233 criteria. This is because during the night-time, the noise from the industrial sources at the wharfs will be constant and the noise criteria for bedrooms is lower than during the daytime (30 dB vs 35 dB LAeq). As such, night time is considered to be the worst-case scenario and any mitigation required to achieve the night time noise criteria will, by default, also achieve the daytime noise level criteria.

Figures 8 to 11 show the predicted façade incident noise levels for the amended proposed development during night time, including contributions from all noise sources.

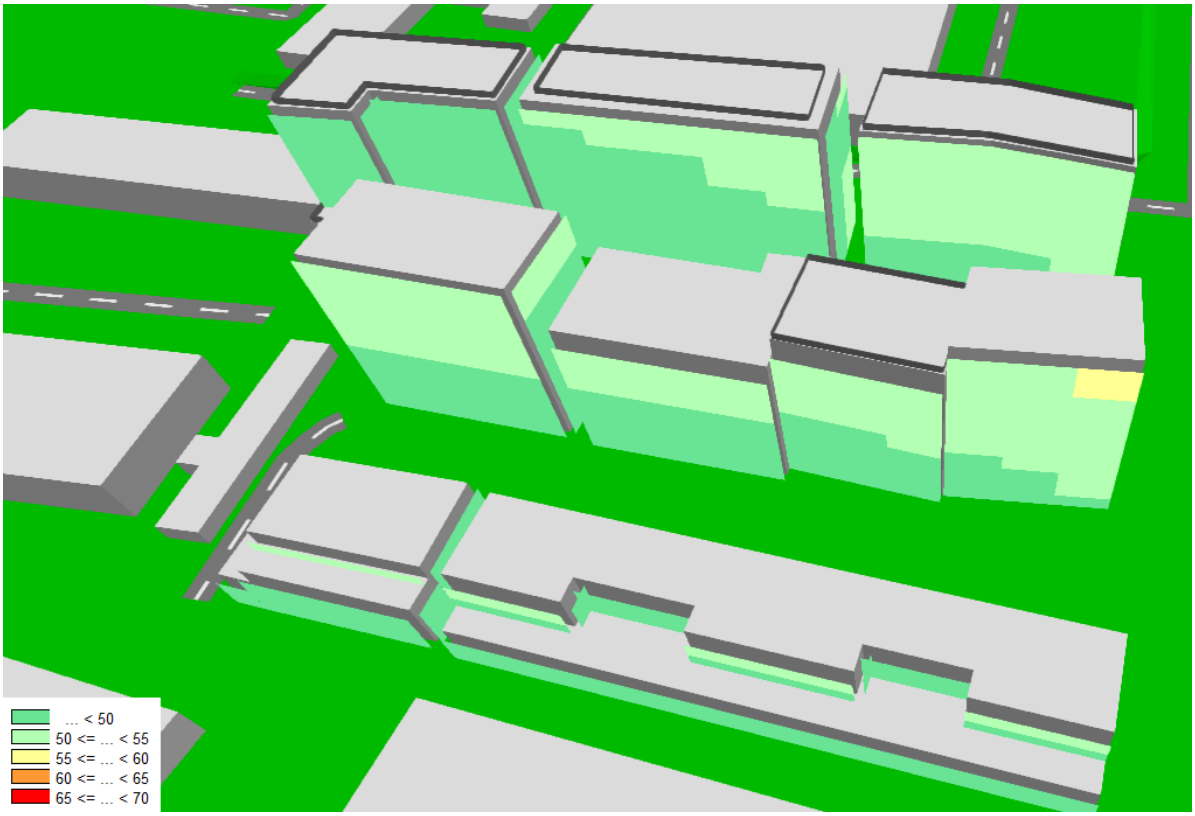

Figure 6: Predicted Façade Incident Noise Levels – Plot A – Southwest View

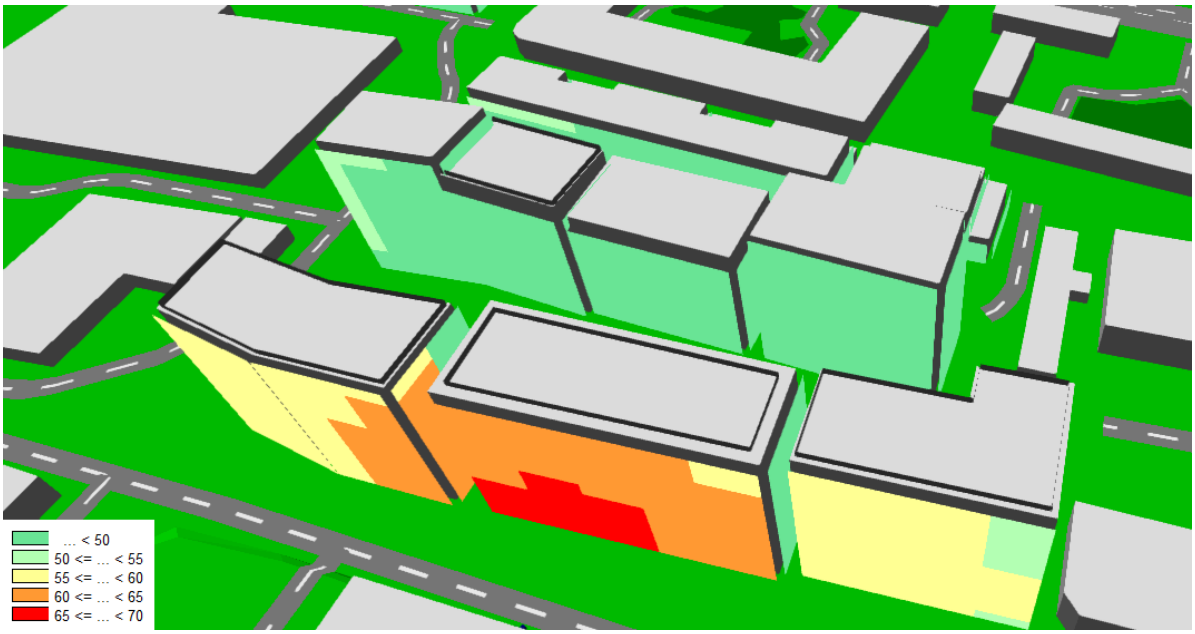

Figure 7: Predicted Façade Incident Noise Levels – Plot A – Northeast View

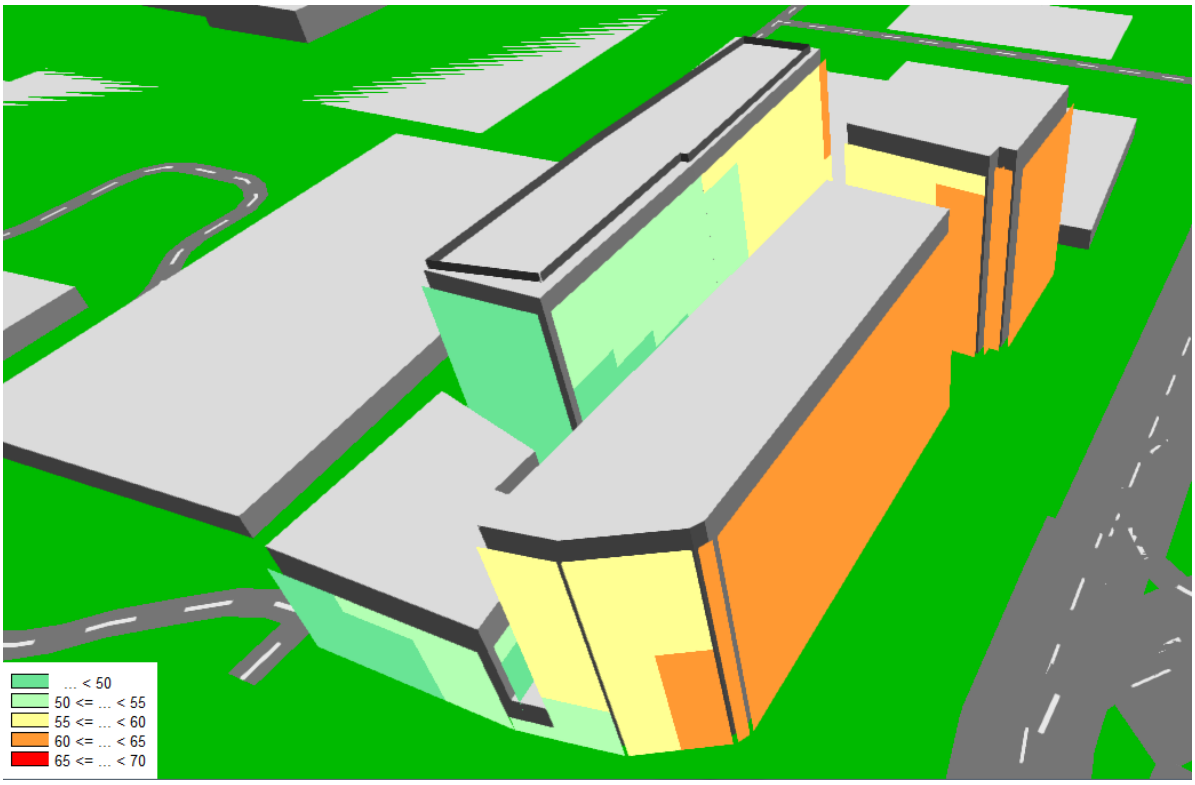

Figure 8: Predicted Façade Incident Noise Levels – Plot B – Northwest View

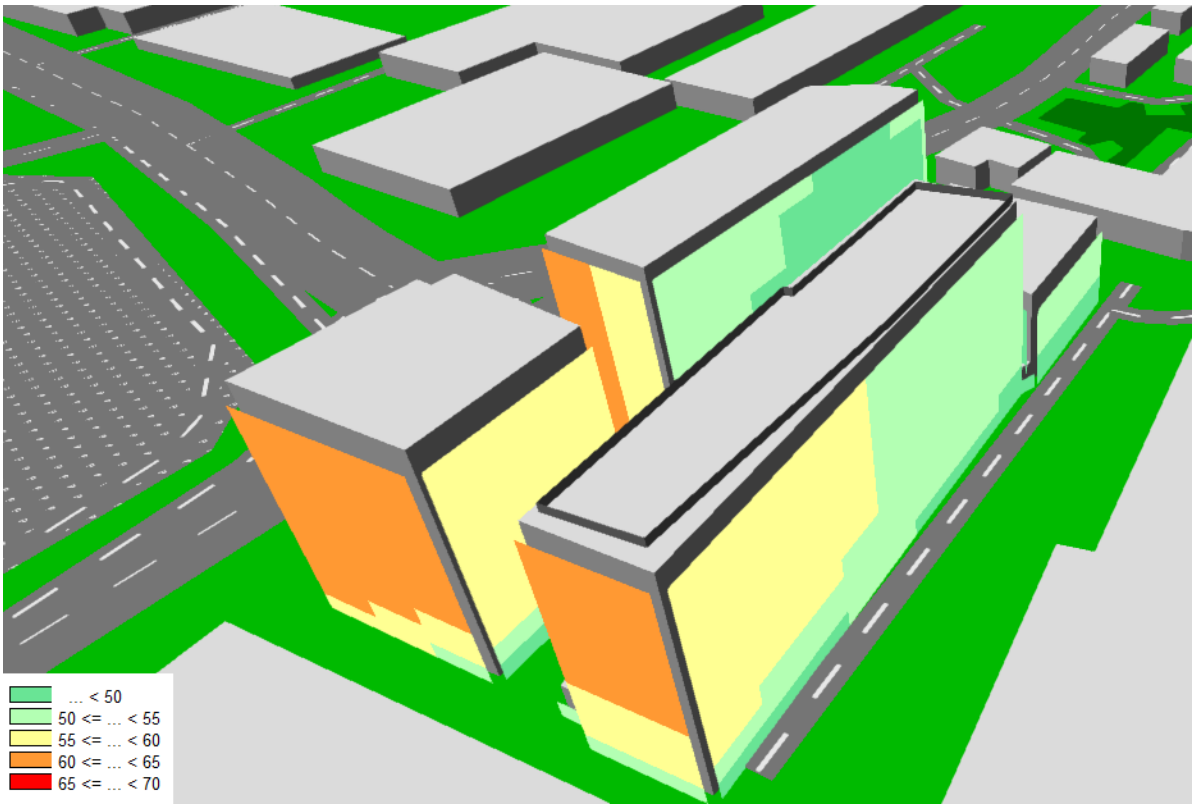

Figure 9: Predicted Façade Incident Noise Levels – Plot B – Southeast View

Tonal Noise Affecting the Proposed Development

Tonal noise levels from the dredgers have been calculated and the noise model shows that the worst case predicted Leq, 63 Hz noise level predicted across the amended proposed development is 69 dB Leq, 63 Hz at the top of building G. Mitigation for such exceedances is provided below.

1.7 Mitigation by Design: Façades

In order to achieve the required level of sound reduction for each façade, the ventilation strategy, glazing and cladding have been designed to achieve the appropriate minimum performance standards for internal noise levels and internal tonal noise.

Table 5 outlines the potential ventilation strategy and glazing performance standards which would be suitable to achieve the required level of attenuation. The specific design strategy for each element is subject to coordination with non-acoustic design elements which will be undertaken during the detailed design.

Table 5 Recommendations for sound insulation performance of building façade

Required reduction in noise level (outside to inside)	Typical glazing sound insulation performance $R_w + C_{tr}$	Potential ventilation strategy
<20	27 dB	Standard trickle vents
20 – 30	27 - 37 dB	Acoustic trickle vents typically $D_{ne,w}$ 39-45 dB
30 – 40	35 - 45 dB	Mechanical whole-house ventilation

The external cladding and any internal wall linings will also be designed to ensure the glazing sound insulation is not undermined. This typically requires a sound insulation performance at least 10 dB better than the glazing sound insulation performance. The exact build-ups and products to be used to meet the acoustic criteria will be developed during the detailed design.

Based on the results of the modelling, and calculations of noise break-in to bedrooms, the appropriate façade design strategy has been applied to each elevation of the proposed development as shown in Figures 10 and 11. The mark ups are in accordance with the colours in Table 6 and the strategies apply to apartments at all levels, unless otherwise stated.

Figure 10: Sound Insulation Requirements for Plot A of the Site

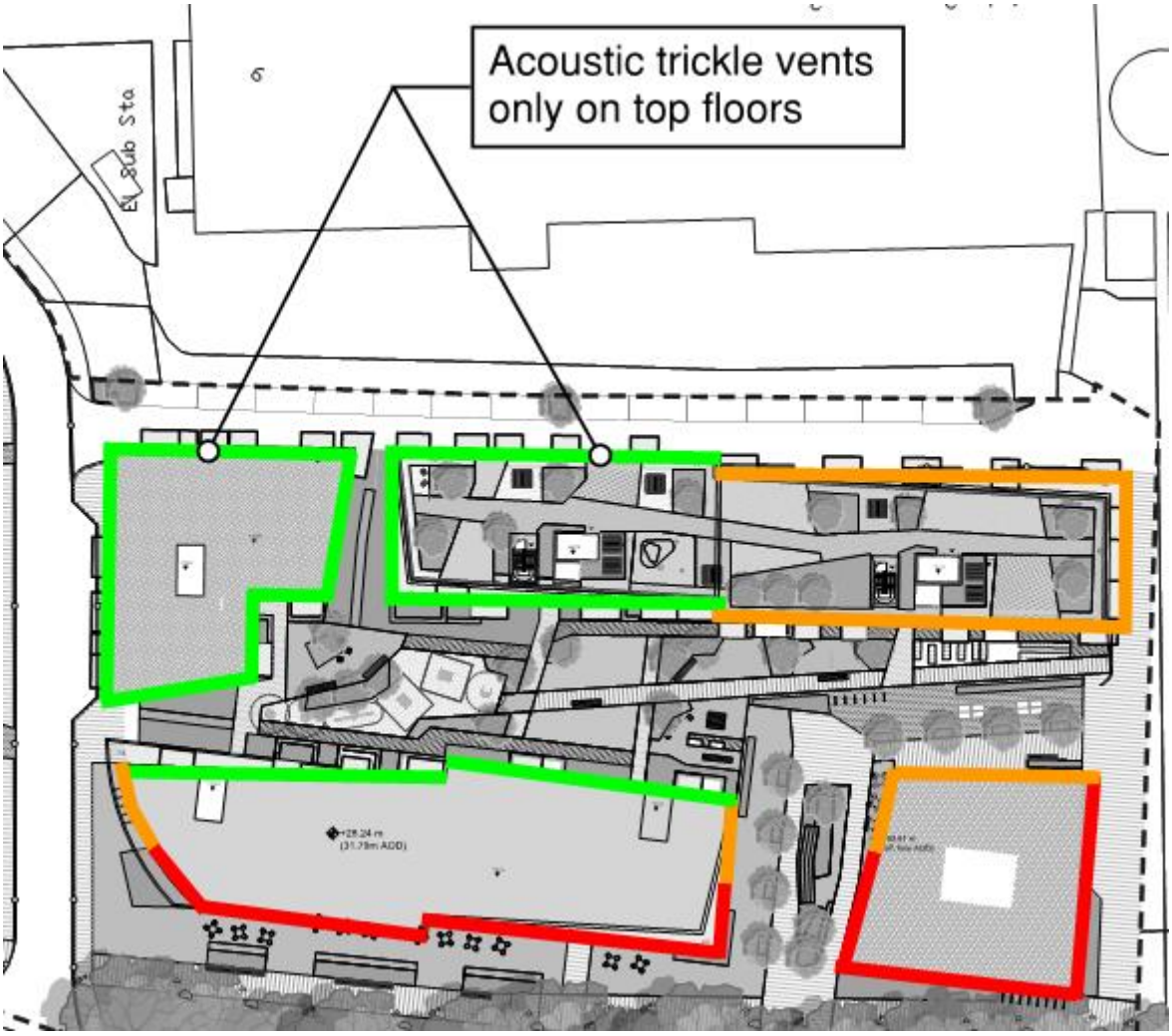

Figure 11 Sound Insulation Requirements for Plot B of the Site

With the application of a façade strategy similar to that shown in Figure 10 and 11, the internal ambient noise levels are predicted to fall below the adopted significance threshold. On this basis no significant effects are predicted in terms of internal noise levels within proposed dwellings.

Internal Tonal Noise Levels

In order for internal tonal noise levels from the dredgers to meet the adopted significance threshold of Leq,63Hz(oct), it has been calculated that the façade of the amended proposed development would need to provide an outside to inside level difference of at least 30 dB at 63 Hz.

A range of glazing options exist which are capable of meeting both this tonal noise reduction requirement and the overall Rw + Ctr requirements set out in Table 4. For example, acoustic laminate double glazing (8/20/12.8A) is capable of achieving Rw + Ctr 37 dB and has an octave band sound reduction of 35 dB at 63Hz. With this glazing and an acoustic trickle vent rated Dne,w 43 dB that has an octave band sound reduction of 33 dB at 63Hz, the calculated internal noise level in the worst-affected bedroom during night time is 24 dB and 46 dB at 63 Hz, which are both below the significance threshold. These strategies are capable of being secured by planning condition.

With the adoption of appropriate glazing and ventilation strategies to be developed during the detailed design, the internal ambient and tonal noise levels are predicted to be below the adopted significance threshold; therefore, no significant effects are predicted.