njd

Environmental Associates

Noise Assessment

Hebburn Metro Station

April 2021

Nexus Metro Flow

Noise Assessment

Hebburn Metro Station

Client: Nexus Metro Flow

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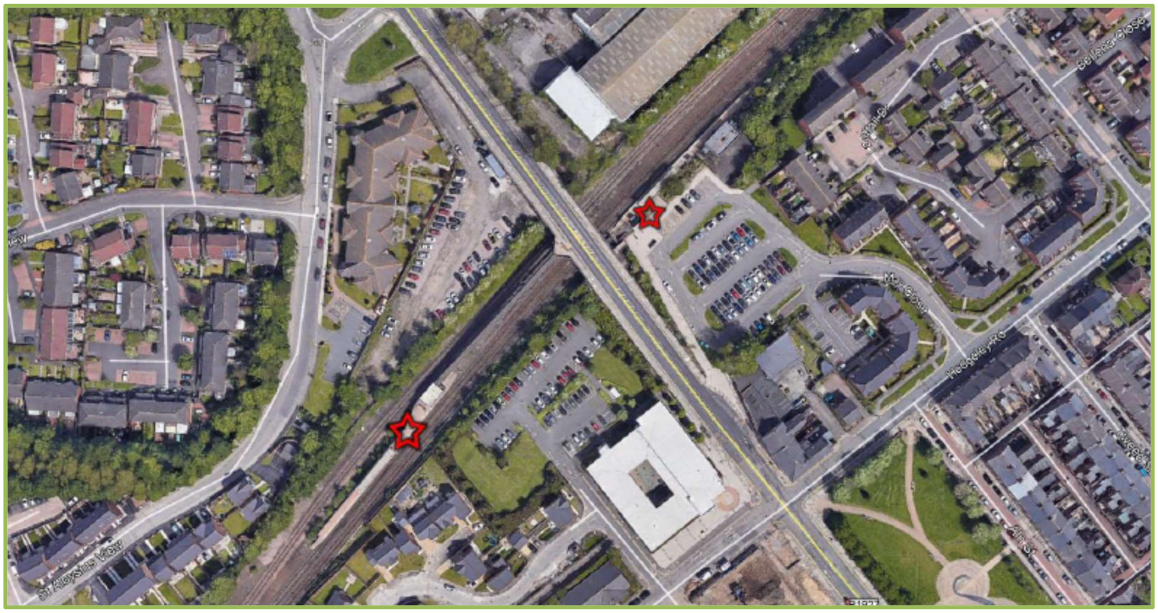
1 INTRODUCTION

1.1 Background

1.1.1 NJD Environmental Associates LTD was instructed by Nexus Metro Flow to undertake a noise assessment to inform a prior approval process for a replacement Metro station in Hebburn, South Tyneside. The site location is provided below in Drawing 1.



Drawing 1: Site Location, with existing platform 1 to the west and platform 2 to the east.

1.1.2 The proposed works form part of Nexus' Metro Flow Project, which involves the dualling of the three single track sections from Pelaw to Bede. The divested Network Rail track that runs alongside the Metro line in this location will be utilised and upgraded to create the dual tracked sections, creating the potential for more network capacity in the future. In order to accommodate freight traffic on the Metro system, track lowers are required in overbridge locations throughout the project area.

1.1.3 This includes Hebburn Metro Station, which has split platforms either side of Station Road bridge and, due to the proximity of the platforms, the track lowers will also result in the need to replace the present station.

1.1.4 Prior approval assessments have been prepared to consider two options as follows:

- Option A: Lowering of both platforms at Hebburn, which will necessitate the demolition of the current station buildings and their replacement with like-for-like facilities with lower platform heights to accommodate the track lowering works.
- Option B: Replace the present split platforms at Hebburn with a single 'island' platform in the location of the present Platform 1. Both of the existing platforms would be demolished and, as well as achieving a lower platform height to facilitate the track lowering works, the new consolidated station would provide an enhanced facility for Hebburn and the local area.

1.1.5 With regards to Option A, the noise of the proposed platforms and rail movements will replicate that of the current conditions, albeit 300 mm lower in height. On this basis, there is unlikely to be any increase in noise as a result of the proposals, and the amenity of nearby residents and the neighbourhood will be unaffected.

1.1.6 Option B presents a scenario where a number of noise sources will be relocated and could have the potential to affect the acoustic character of the areas in question.

1.1.7 A noise report has therefore been prepared with measurements taken of noise sources relating to existing operations, calculations performed using noise modelling software, and the results interpreted in accordance with the relevant standards.

2 ASSESSMENT METHODOLOGY

2.1 General Permitted Development (England) Order 2015

2.1.1 This Prior Approval Assessment has been prepared in the context of the requirements of Part 18 Class A of Schedule 2 of the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended) ('the GPDO').

2.1.2 In this regard, a review of South Tyneside Council's planning register confirms that a Certificate of Lawful Proposed Use or Development was issued by the Council to Nexus in December 2020 (ref. ST/0476/20/CLP) in respect of the Metro railway between Pelaw and Jarrow.

2.1.3 On the basis that the prior approval of South Tyneside Council is required for the works comprising the development of a new Metro station at Hebburn, the test for that prior approval is:

'A.2 The prior approval referred to in paragraph A.1 is not to be refused by the appropriate authority nor are conditions to be imposed unless they are satisfied that—

(a)the development (other than the provision of or works carried out to a dam) ought to be and could reasonably be carried out elsewhere on the land; or

(b)the design or external appearance of any building, bridge, aqueduct, pier or dam would injure the amenity of the neighbourhood and is reasonably capable of modification to avoid such injury.'

2.1.4 With reference to the above requirements, the IEMA guidelines (as outlined in this Section) have been adopted for assessing the potential impact associated with any changes to noise levels resulting from the development of Hebburn station.

2.2 National Planning Policy Framework (NPPF)

2.2.1 The revised NPPF, issued in February 2019, provides the following with regards to noise:

"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

and c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

2.3 BS8233:2014 and WHO 1999 Guidance Levels

2.3.1 BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' provides guidance for the control of noise in and around buildings. It applies to the design of new buildings, or refurbished buildings undergoing a change of use.

2.3.2 BS8233 refers to the World Health Organisation research and recommendations when defining acceptable and upper guidance noise levels within gardens during the day, and within habitable rooms in dwellings during the day and night-time periods as follows:

Table 1: Summary of BS8233 guidance noise levels

Activity	Location	0700 to 2300h	2300 to 0700h
Resting	Living room	35dB LAeq,16h	-
Relaxing	Gardens	55dB LAeq,16h	-
Dining	Dining room	40dB LAeq,16h	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16h	30dB LAeq,8h 45dB LAmax

2.3.3 The above levels have been adopted for the purpose of this assessment.

2.4 Department of Transport 'Calculation of Railway Noise' (CRN) 1995

2.4.1 The CRN outlines a methodology for the calculation of railway noise levels, which has been adopted as part of this assessment. The methodology involves evaluating railway noise in terms of the LAeq, separated into day and night-time values. These LAeq values can be calculated from the results of a noise survey assessing the 'Single Event Level' (SEL) of passing trains in accordance with the following formula:

- LAeq (T) = SEL Average + 10 log N - 10 log T
  - where LAeq (T) = LAeq over time period T
  - SEL Average = Average 'Single Event Level'
  - N = Number of train passes in time period
  - T = Time period in seconds

2.4.2 The resultant noise level is then calculated to a standardised distance of 25m from the track, with this level then adopted for use in the noise modelling exercise.

2.5 IEMA Guidelines for Environmental Noise Impact Assessment (2014)

2.5.1 The IEMA guidelines were introduced in 2014 and are intended to be applied to development of any scale, and include important principles for effective integration into the environmental impact assessment (EIA) process and other assessments.

2.5.2 The Guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects may occur. The guidelines set out key principles for noise impact assessment relevant to all types of project regardless of size.

2.5.3 The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed. The guidance recognizes that the effect associated with a noise impact will be dependent on a number of factors including, but not limited to, the sensitivity of the receptor, frequency and duration of the noise source and time of day.

2.5.4 The Guidelines accept that a simple change in noise levels using a single noise indicator may fail to adequately reveal the actual noise impact of the proposal.

2.5.5 Absolute levels such as those set out in WHO Guidelines are also considered and the Guidelines suggest that a change in noise levels in an area where the existing levels are above WHO Guidelines should be considered as having more of an adverse effect than a change in noise levels in an area where existing levels are well below.

2.5.6 The Guidelines stop short of providing specific assessment criteria which developments should achieve, but instead suggests that the methodology adopted should be selected on a site-by-site basis regarding relevant national and local standards. The Guidelines contain effect descriptors for changes in noise levels and for noise effect levels. These are summarized below:

Table 2: IEMA Impact from the Change in Sound Levels

Long-term Impact Classification	Short-term impact classification	Sound Level Change LpT
Negligible	Negligible	> 0 dB and < 1 dB
	Minor	> 1 dB and < 3 dB
Minor	Moderate	> 3 dB and < 5 dB
Moderate	Major	> 5 dB and < 10 dB
Major		> 10 dB

3 NOISE SURVEY

3.1 Introduction

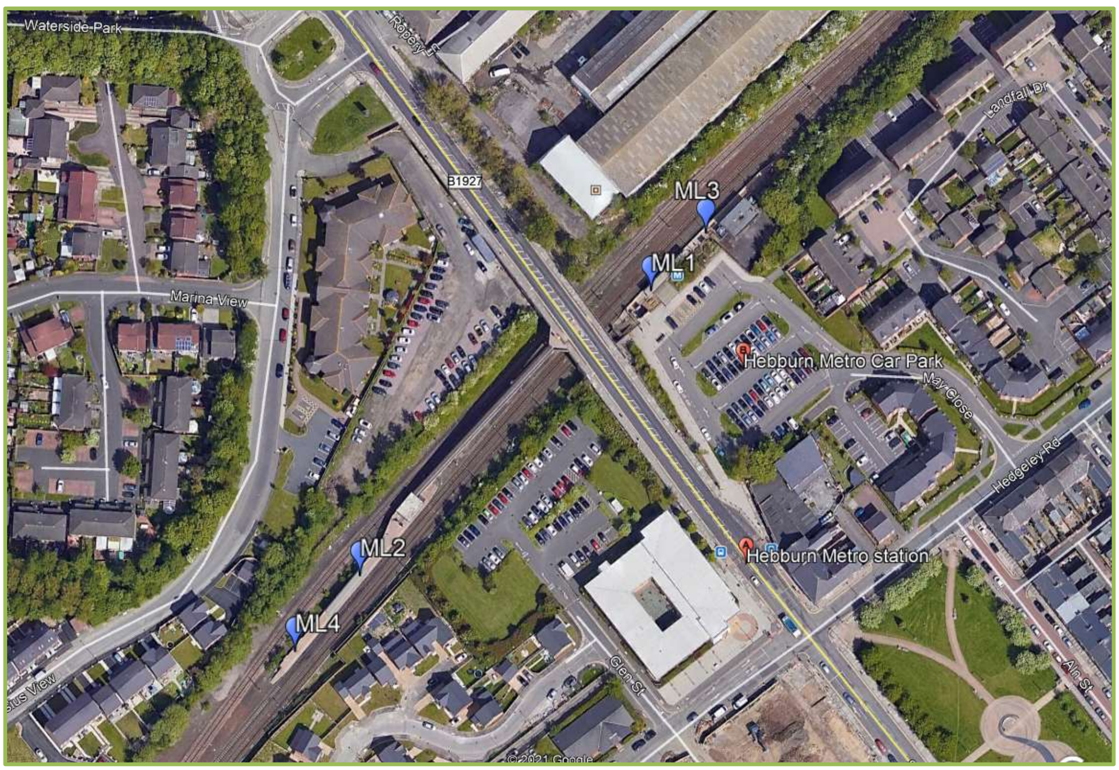
3.1.1 In April 2021, noise measurements were taken in the vicinity of the development site, in order to quantify noise from sources associated with the operation of the existing Metro platforms.

3.1.2 Measurements were taken using an Acoem 01dB Fusion sound level meter. The Class 1 instrument logged 1/3 octave levels throughout the measurements, in addition to audio recordings to aid subsequent analysis. The instrument was calibrated before and after the measurements to a reference level of 94dB, with no notable drift observed.

3.1.3 The sound level meter and field calibrator both hold valid calibration certificates traceable to national standards. All calibration certificates can be made available upon request.

3.2 Monitoring Location

3.2.1 Measurements were taken at the location shown in Drawing 2 below.



Drawing 2: Noise monitoring location

3.2.2 The monitoring locations were as follows:

- **ML1 - 4**: Spot measurements taken from the respective platforms. The measurements were conducted for the purpose of deriving sound power levels associated with Tannoys/speakers and Metro door beepers/alarms.
  - The measurements were conducted during the following dates and times:
    - 1244h to 1304h on the 12th April 2021.

3.2.3 Throughout the survey weather conditions were dry, with winds between 1 to 2m/s.

3.3 Analysis of Spot Measurements

3.3.1 The spot measurement process was conducted with two measurements at each platform; one in reverberant conditions (i.e. ML1 and ML2; under the canopy/roof of the platform shelter) and the other in free-field conditions (i.e. ML3 and ML4; away from the canopy/roof of the platform shelter further down the platform).

3.3.2 As the trains became visible the noise meter was started, with data logged and the audio recorded throughout. The locations were selected to be directly opposing a cluster of two speakers that were either mounted under the station roof (in the case of ML1 and ML2) or on a lamppost (in the case of ML3 and ML4).

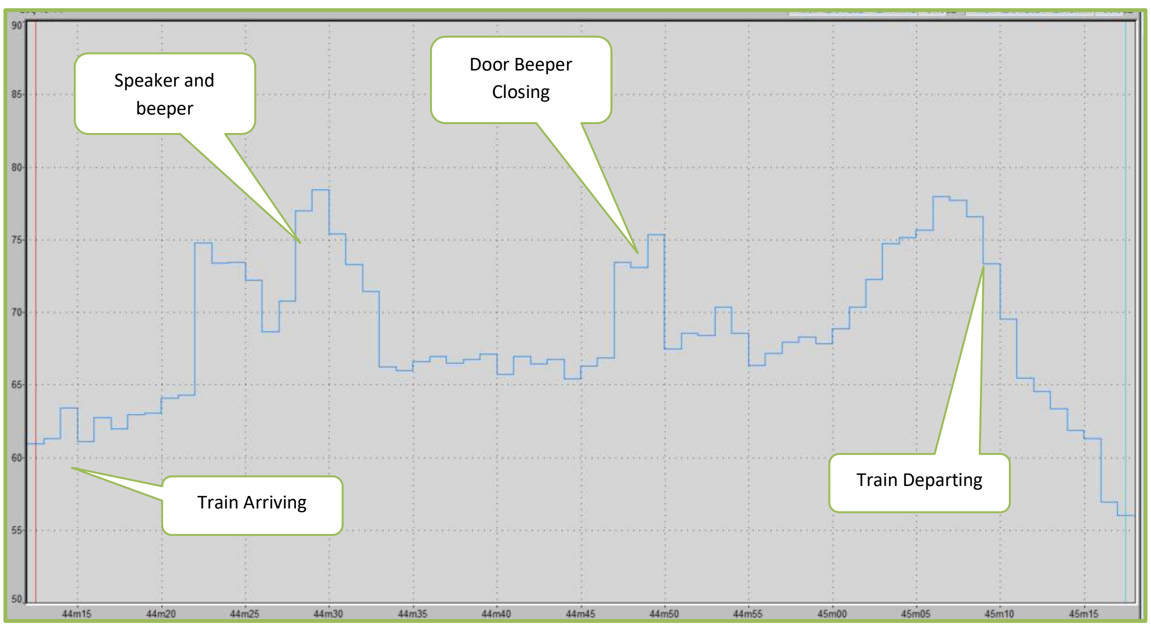
3.3.3 The technician held the sound level meter at arm's length towards the speaker as the train approached and took distance measurements from the source to the microphone using a laser measure.

3.3.4 A general sequence of event was observed to occur as follows:

- Train approaches;
- Announcement over the Tannoys;
- Train arrives and idles;
- Beeper sounds as doors are opening;
- Passengers disembark;
- Second announcement over the Tannoys;
- Passengers board;
- Beepers sound as doors are closing;
- Train Departs.

3.3.5 Graphs 1 to 5 show the time history log of the events and associated observations. As shown in the Graphs, it was found that on a number of occasions the Tannoy announcements and door beeper noises could potentially correspond and make the isolation of individual sources more difficult.

Graph 1: Time history log of the four measurements; with ML1 to the left and ML4 to the right.



Graph 2: Time history log from ML1 under the canopy/shelter at Platform 2. Graph shows series of events observed; with speakers and beepers found to sound at the same time during the measurement.

Graph 3: Time history log from ML2 under the canopy/shelter at Platform 1. Graph shows series of events observed; during this measurement (although not apparent at the time or recording), a high level of residual noise from the engine was subsequently found to mask noise from the Tannoy and beepers.

Graph 4: Time history log from ML3, in free field conditions away from the canopy/shelter at Platform 2. Graph shows series of events observed; as per ML1, the initial speakers and beepers were found to sound at the same time during the measurement.

Graph 5: Time history log from ML4, in free field conditions away from the canopy/shelter at Platform 1. Graph shows series of events observed, with all event clearly defined from each other and minimal residual noise.

3.3.6 As identified in the Graphs above, difficulties were found when trying to isolate noise from the different sources.

3.3.7 The reverberant locations, as expected, were generally subject to higher noise levels due partly to reflections, and partly (in the case on ML2) due to higher engine noise that masked the other sources.

3.3.8 The free field locations were generally quieter and the discreet events could be more easily separated and isolated. ML4 in particular provided well defined events, with low residual noise and minimal overlapping or masking of sources.

3.3.9 The results are summarised in the Table below, with the full results shown at Appendix 1.

Table 3: Summary of measured noise levels (dBA)

Location	Description of Event	Distance from Source	Conditions	LAeq
ML1	Tannoy Announcement, then beepers sounding	2m	Reverberant	76
ML1	Door Beepers Opening	1m	Reverberant	72
ML3	Tannoy Announcement, then beepers sounding	2.3m	Free Field	73
ML3	Door Beepers Closing	1m	Free Field	69
ML4	Door Beepers Opening	1m	Free Field	71
ML4	Door Beepers Closing	1m	Free Field	69
ML4	Tannoy Announcement	2.3m	Free Field	65

3.3.10 Due to the quality of the data from ML4, this has been selected for the purpose of deriving sound power levels for the noise modelling assessment. The reverberant conditions experienced at ML1 and ML2 (due to reflections from the rear wall and canopy structures) are replicated in the noise models through accurate reproduction of the structures and associated surfaces being programmed to be fully reflective. Specifics relating to the programming of models are discussed in Section 4.

3.4 CRN Assessment

3.4.1 Railway noise is evaluated in terms of the 'equivalent continuous noise level', LAeq and can be evaluated for separate day and night LAeq values. These LAeq values can be calculated from the results of the noise survey using the formula:

- LAeq (T) = SEL Average + 10 log N - 10 log T
    - where LAeq (T) = LAeq over time period T
    - SEL Average = Average 'Single Event Level'
    - N = Number of train passes in time period T
    - T = Time period in seconds

3.4.2 NJD Environmental Associates Ltd archive data from a nearby site (Former Ashworth Fraser site, to the north-east of Platform 2) has been adopted and reanalysed in order to determine representative SEL data for use in the CRN assessment. The monitoring location is shown in Drawing 3 below.

Drawing 3: ML5, an archive measurement from a location to the north-east of Platform 2.

3.4.3 The measurement was conducted between 1100h on the 18th July, to 1100h on the 19th July 2018 at a position 8m from the nearside Nexus 'In' Line.

3.4.4 The results from the analysis found an average SEL of 87.7dB from the nearside Metro 'in' line (8m) and an average SEL of 93.2dB from the freight line (4m). Using this information, the equivalent continuous noise level can be derived for different scenarios based on the number of train movements and the reference period in which the associated movements take place.

3.4.5 Following discussions with the operator, information has been provided with regards to train movements as follows:

- 'JAW 1' (Freight line) has a maximum of 2 passes each day – inbound at approx. 0630 – Outbound at approx. 1900hrs
- The Nexus 'in' line (Towards South Shields) has 76 passes between 0700 and 2300 with 11 passes between 2300 and 0700. These numbers reduce slightly over a weekend.
- The Nexus 'out' line (Towards Newcastle) has 76 passes between 0700 and 2300 with 11 passes between 2300 and 0700. These numbers reduce slightly over a weekend.

3.4.6 As the frequency of movements fluctuates throughout the day, night and week, the decision has been made base the assessment of impact on a 'peak' hour scenario; whereby the peak weekday movements have been evaluated as follows:

- Baseline Daytime (1 hour peak):
  - 5 metro movements on Nexus 'in' and 'out' lines
  - 1 freight movement in reference hour on 'JAW1' line
- Baseline Night-time (1 hour peak):
  - 4 metro movements on Nexus 'in' and 'out' lines
  - 1 freight movement in reference hour on 'JAW1' line
- Option B Daytime (1 hour peak):
  - 5 metro movements on reconfigured Nexus 'in' and 'out' lines, plus 1 freight movement
- Option B Night-time (1 hour peak):
  - 4 metro movements on reconfigured Nexus 'in' and 'out' lines, plus 1 freight movement

3.4.7 Table 4 summarises the information used as part of the calculations:

Table 4: Summary of CRN calculation for 1-hour peak reference period (dBA)

Location	Daytime 0700 to 2300h		Night-time 2300 to 0700h	
	Metro	Freight	Metro	Freight
Number of Train Passes (N)	5	1	4	1
SEL Log Average (SEL)	87.7	93.2	87.7	93.2
Period in Seconds (T)	3600s		3600s	
Line Source Distance Attenuation from monitoring location to 25m	-4.9	-8	-4.9	-8
Train LAeq at 25m	54.2dB	49.7dB	53.2dB	49.7dB

3.4.8 The above levels have been adopted as part of the modelling assessment of railway noise, as discussed in Section 4.

4 CADNAA NOISE MODELS

4.1 Input Data

4.1.1 Satellite topographic data of the site and surrounding land has been incorporated into the noise models, with buildings, railways, roads and structures positioned to reflect baseline and Option B conditions respectively.

4.1.2 Due to the complex nature of the topography in the area, the satellite data has been supplemented by reference to engineering drawings supplied by Nexus, in addition to a ground truthing exercise to ensure the precision of the models. Reference has also been made to publicly available data from the South Tyneside Planning Portal, to provide additional information with regards to acoustic fencing for nearby residential development sites.

4.1.3 Road traffic noise levels for the B1297 Station Road have been derived from a CRTN assessment conducted by NJD Environmental on this road in 2018.

4.1.4 For the purpose of these calculations, the ground absorption has been set to G=0.5 (which represents a mixture of acoustically hard and soft ground) with buildings and roads set to G=0 (acoustically hard and reflective), with two orders of reflection considered.

4.1.5 The models have been programmed to assess scenarios based on the daytime (0700 to 2300h) and night-time (2300 to 0700h) periods, with receiver and grid calculation heights set at 1.5m and 4m respectively.

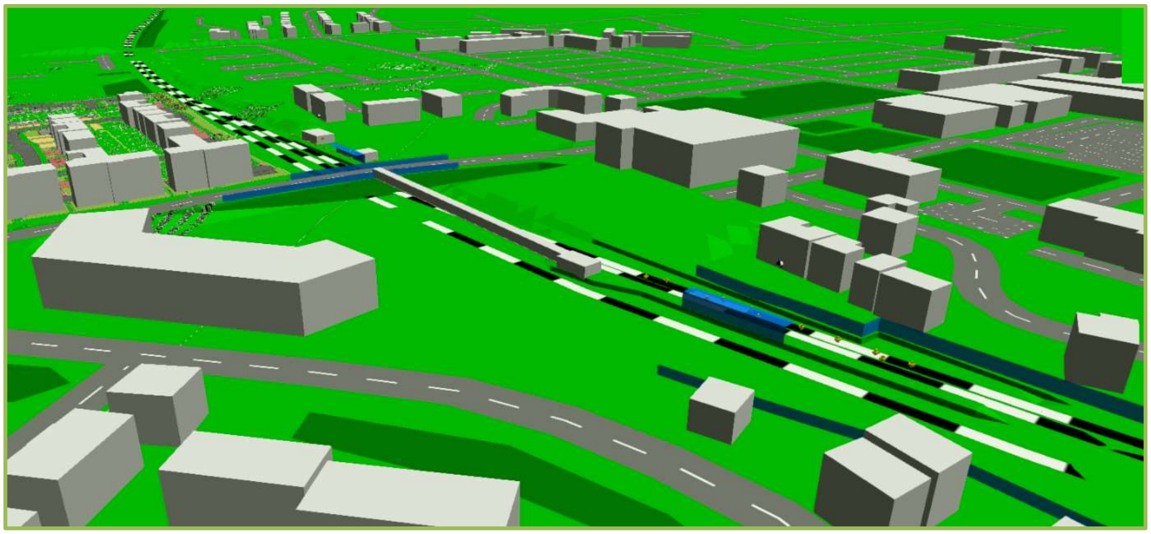
4.1.6 Noise associated with Tannoys and door beepers has been derived from the spot measurement data outlined in Section 3. The data are summarised in Table 5 below.

Table 5: Summary of platform noise levels for 1-hour reference period.

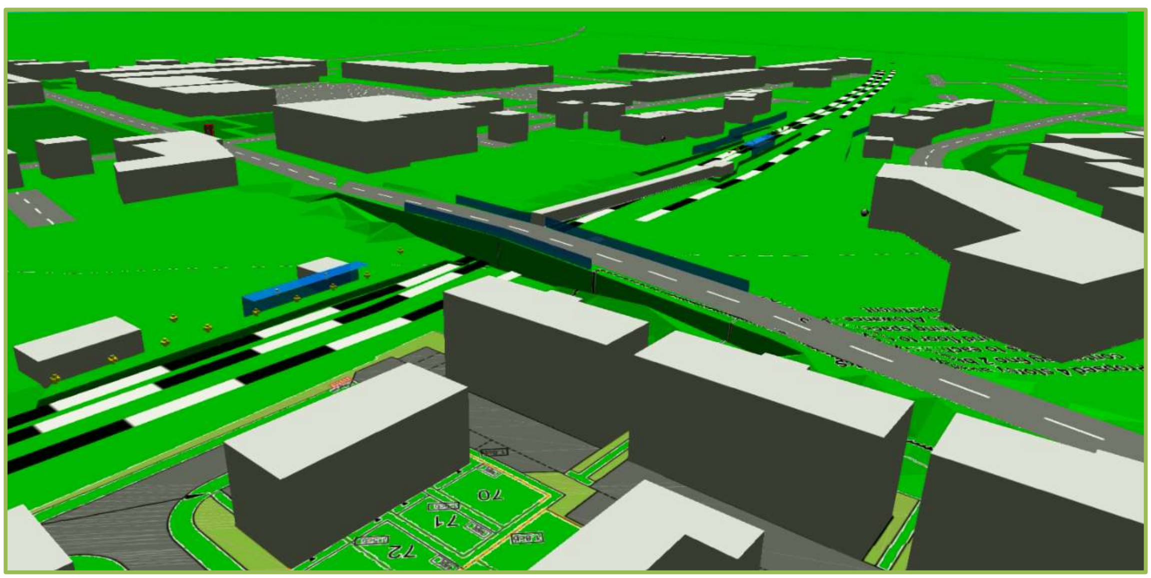
Source	Sound Power Level (dB LwA)	Average Duration (Sec)	No. Per Hour	Total 'on-time' (Sec)
Tannoys (i.e. cluster of 2no. Tannoy speakers)	80	5	5	25
Door Beepers Opening (i.e. per train door)	79	3	5	15
Door Beepers Closing (i.e. per train door)	77	3	5	15

4.1.7 The platform sources have been positioned to reflect the existing and proposed scenarios assessed. The heights of the sources have either been measured during the survey or derived from architect plans.

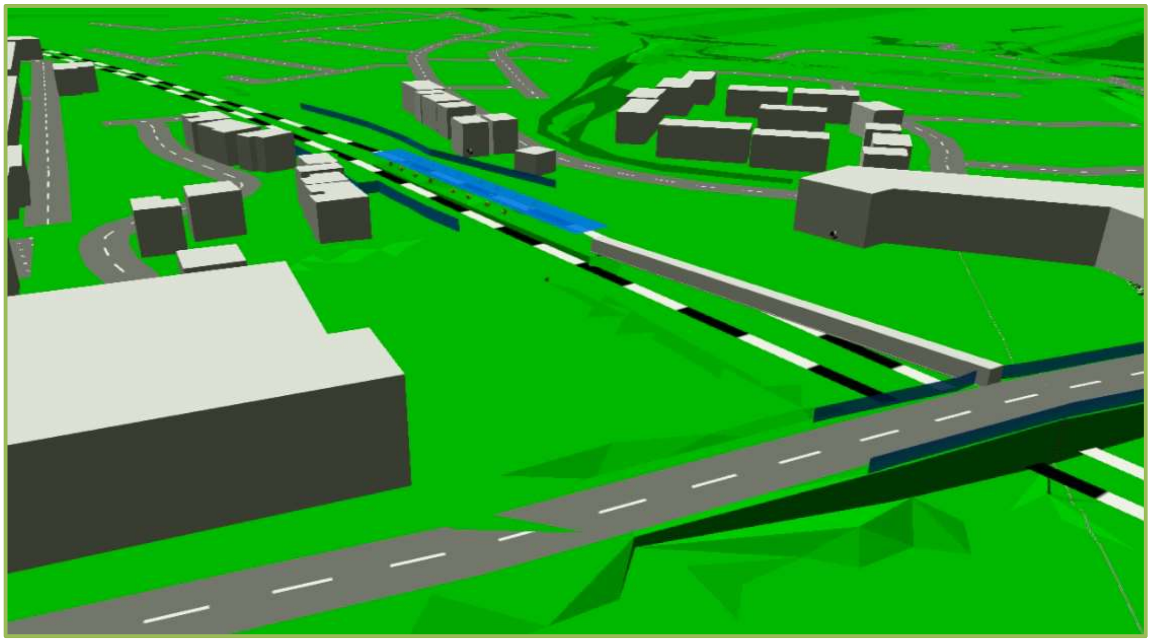
4.1.8 Each Metro train has been assumed to have two carriages as standard, with each carriage having 4 doors on either side (of which, only one side will open when the train arrives at the platform). 3D models of the platforms are provided below.



Drawing 4: 3D CadnaA model view of the baseline scenario; from the west orientated towards the east.



Drawing 5: 3D CadnaA model view of the baseline scenario; from the north-east orientated towards the south-west.



Drawing 6: 3D CadnaA model view of the Option B scenario; from the east orientated towards the west.

4.2 Noise Model Results

4.2.1 The results from each scenario assessing transportation noise sources are shown in Figures 1 to 4. The results are summarised as part of the IEMA assessment in Section 5.

4.3 Noise Model Factors and Limitations

4.3.1 The noise models presented in this assessment calculate noise propagation to the methodologies contained within ISO 9613-2 Acoustic – Attenuation of sound during propagation outdoors. This gives a higher level of accuracy for the level of attenuation provided by intervening topography and barriers than the method provided by BS5228.

4.3.2 All noise level predictions are based on simplified models of sound generation and propagation; however, some local conditions such as gusts of wind or bursts of turbulence in the air are too complex to be factored into the algorithms.

4.3.3 The noise models may therefore be subject to some minor uncertainties; however, it is noted that all predictions assume theoretical down-wind propagation from all sources to all receptors, and as such the models are more likely to over-predict noise levels compared to real-life conditions.

4.3.4 It is noted that certain architectural intricacies are beyond the capability of the noise modelling software parameters. However, the models are deemed to closely replicate the dimensions of all significant structural elements wherever possible.

4.3.5 The primary factor that governs the validity of the models is the quality of the input data. As such, all practicable means have been explored to ensure that the data used in the models is as accurate as possible.

5 IEMA ASSESSMENT OF IMPACT

5.1 Daytime Assessment

5.1.1 The modelled daytime noise levels from Baseline/Option A scenario (Figure 1) have been compared to the respective levels from the Option B scenario (Figure 2), with the initial IEMA process conducted as follows:

Table 6: Summary of IEMA Assessment (Daytime 0700 to 2300h)

Description	ESR1	ESR2	ESR3	ESR4	ESR5
Baseline (dB LAeq)	49	52	51	54	59
With Development Noise (i.e. Noise resulting from Option B) (dB LAeq)	51	50	51	55	60
Predicted Resultant Change from Baseline Noise Level (dB LAeq)	+2	-2	+0	+1	+1
IEMA Significance of Impact (short term)	Minor Adverse	Negligible	Negligible	Minor Adverse	Minor Adverse
IEMA Significance of Impact (long term)	Negligible	Negligible	Negligible	Negligible	Negligible

5.1.2 With reference to the IEMA criteria, the results from Table 6 suggest that the significance of the impact is likely to range from negligible to minor adverse.

5.1.3 However, as noted in the guidance, a basic comparison of 'baseline' and 'with development' noise levels is not sufficient to adequately define the overall significance of any particular development.

5.1.4 It is therefore important to consider other pertinent factors, including:

- **Spectral Characteristics**: All existing receptors are subject to noise from the Metro lines and the platform sources. The 'with development' scenario is therefore unlikely to change the spectral characteristics of the area.
- **Days and Times of Operation**: The noise source could potentially be present during an extended daytime period during weekday and weekend periods, with reduced operations during the weekend. This is consistent with the baseline conditions.
- **Frequency of Occurrence**: The number of Metro train passes are not anticipated to change as an immediate result of the development. However, receptors in the vicinity of ESR1, 2 and 4 are likely to be subject to more frequent occurrences of

noise from the door beepers and announcements on the Tannoys if the Option B scenario is developed.

- **Absolute Level of Sound**: The predicted noise is not expected to exceed the WHO/BS8233 guideline values for gardens of 55dB LAeq,T. Noise levels impacting living rooms may however exceed the BS8233 internal guidance levels for daytime noise of 35dB LAeq,16h (assuming 15dB of attenuation from an open window). It is however noted that where such exceedances are predicted, the existing dwellings are generally relatively new and are likely to have been designed with Metro noise as a constraint and should therefore typically benefit from enhanced double glazing and acoustic ventilation.

5.1.5 Taking into considerations the factors set out above, the impact is likely to reside between negligible to minor adverse during the daytime period at peak capacity.

5.2 Night-time Assessment

5.2.1 The modelled night-time noise levels from Baseline/Option A scenario (Figure 3) have been compared to the respective levels from the Option B scenario (Figure 4), with the initial IEMA process conducted as follows:

Table 7: Summary of IEMA Assessment (Night-time 2300 to 0700h)

Description	ESR1	ESR2	ESR3	ESR4	ESR5
Baseline (dB LAeq)	54	53	58	53	58
With Development Noise (i.e. Noise resulting from Option B) (dB LAeq)	56	50	57	54	58
Predicted Resultant Change from Baseline Noise Level (dB LAeq)	+2	-3	-1	+1	+0
IEMA Significance of Impact (short term)	Minor Adverse	Negligible	Negligible	Minor Adverse	Negligible
IEMA Significance of Impact (long term)	Negligible	Negligible	Negligible	Negligible	Negligible

5.2.2 With reference to the IEMA criteria, the results from Table 7 suggest that the significance of the impact is likely to range from negligible to minor adverse.

5.2.3 However, as noted in the guidance, a basic comparison of 'baseline' and 'with development' noise levels is not sufficient to adequately define the overall significance of any particular development.

5.2.4 It is therefore important to consider other pertinent factors, including:

- **Spectral Characteristics**: All existing receptors are subject to noise from the Metro lines and the platform sources. The 'with development' scenario is therefore unlikely to change the spectral characteristics of the area.

- **Days and Times of Operation**: The noise source will only be present during a relatively short night-time period, with reduced operations during the weekend. This is consistent with the baseline conditions.
- **Frequency of Occurrence**: The number of train passes is not anticipated to change as an immediate result of the development. However, receptors in the vicinity of ESR1, 2 and 4 are likely to be subject to more frequent occurrences of noise from the door beepers and announcements on the Tannoys if the Option B scenario is developed.
- **Absolute Level of Sound**: Noise levels impacting bedrooms may exceed the BS8233 internal guidance levels for night-time noise of 30dB LAeq,T (assuming 15dB of attenuation from an open window). It is however noted that where such exceedances are predicted, the existing dwellings are generally relatively new and are likely to have been designed with Metro noise as a constraint and should therefore typically benefit from enhanced double glazing and acoustic ventilation. Fewer than 15 movements are expected during the night-time period, so noise from LAmax events should not be significant.

5.2.5 Taking into considerations the factors set out above, the impact is likely to reside between negligible to minor adverse during the night-time period at peak capacity.

5.2.6 With regards to the prior approval condition A.2(b), an impact residing between negligible to minor adverse is unlikely therefore to result in conditions that would injure the amenity of the neighbourhood.

5.2.7 We are therefore of the professional opinion that the requirements of the prior approval can be complied with based on either the Option A or Option B designs, without the requirement for any additional mitigation or conditions to control noise.

6 CONCLUSIONS

6.1 Introduction

6.1.1 NJD Environmental Associates has undertaken a noise assessment to inform a prior approval process for a replacement Metro station at Hebburn in South Tyneside.

6.2 Railway and Station Noise

6.2.1 The assessment considered noise from the dualling of the three single track sections, and projected cumulative impacts from redesigns of the platform areas.

6.2.2 A CRN assessment was conducted using archive data from Metro and reight movements in the vicinity of the site, with noise sources associated with platform operations assessed using spot measurements.

6.2.3 Detailed noise models were populated in order to calculate the resultant noise levels from the scenarios assessed.

6.2.4 The results were assessed in accordance with IEMA guidelines and with reference to BS8233 guidance noise levels. The assessment found that the impact is likely to reside between negligible to minor adverse at the nearest noise sensitive receptor locations, during both the day and night-time periods.

6.2.5 It is concluded that the requirements of the prior approval can therefore be complied with based on either the Option A or Option B designs, without the requirement for any additional mitigation or conditions to control noise.

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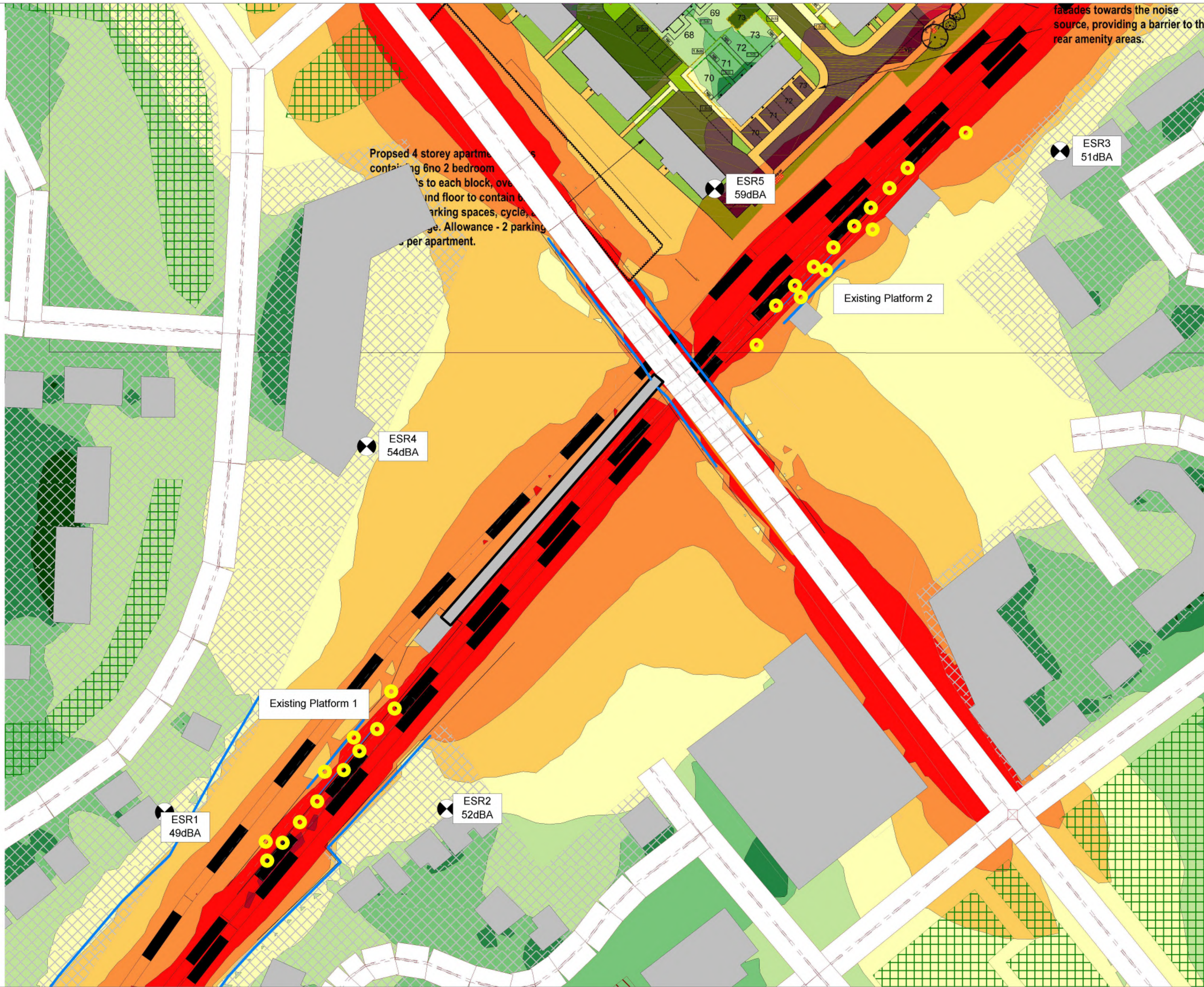

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Client:
Nexus Metro Flow

Figure 1:
Baseline/Option A Scenario
Daytime LAeq,1hr
(1.5m receptor height)

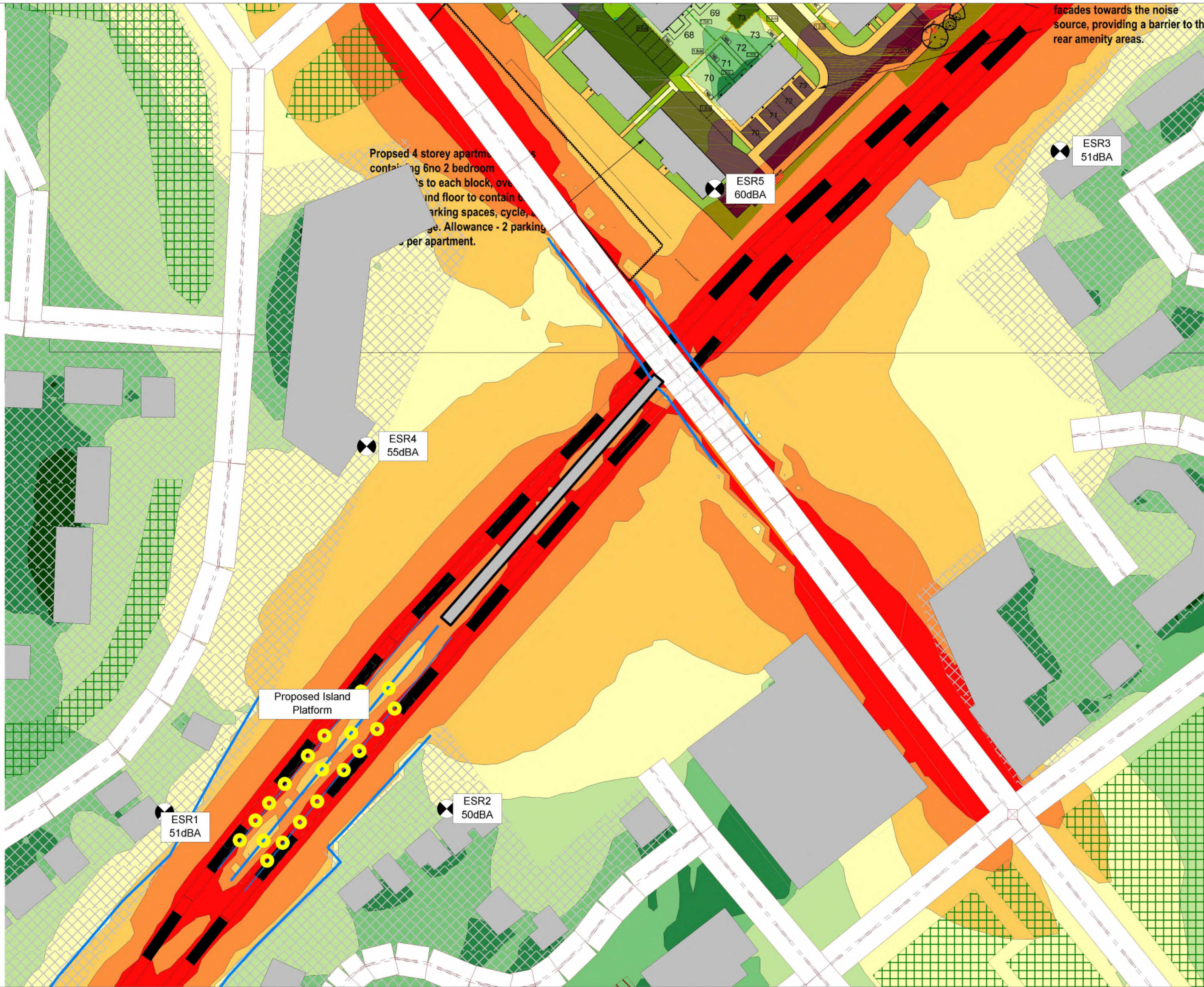
- 0 <= ... < 35
- 35 <= ... < 40
- 40 <= ... < 45
- 45 <= ... < 50
- 50 <= ... < 55
- 55 <= ... < 60
- 60 <= ... < 65
- 65 <= ... < 70
- 70 <= ... < 75
- 75 <= ... < 80
- 80 <= ...

N

Job Title:
NJD21-0045-002R
Hebburn Metro Station

Drawn By:
NJ Dennon

Date:
April 2021



njd Environmental Associates

Client:
Nexus Metro Flow

Figure 2:
Option B Scenario
Daytime LAeq,1hr
(1.5m receptor height)

0 <= ... < 35
35 <= ... < 40
40 <= ... < 45
45 <= ... < 50
50 <= ... < 55
55 <= ... < 60
60 <= ... < 65
65 <= ... < 70
70 <= ... < 75
75 <= ... < 80
80 <= ...

N

Job Title:
NJD21-0045-002R
Hebburn Metro Station

Drawn By:
NJ Dennon

Date:
April 2021

njd
Environmental Associates

Client:
Nexus Metro Flow

Figure 3:
Baseline/Option A Scenario
Night-time LAeq,1hr
(4m receptor height)

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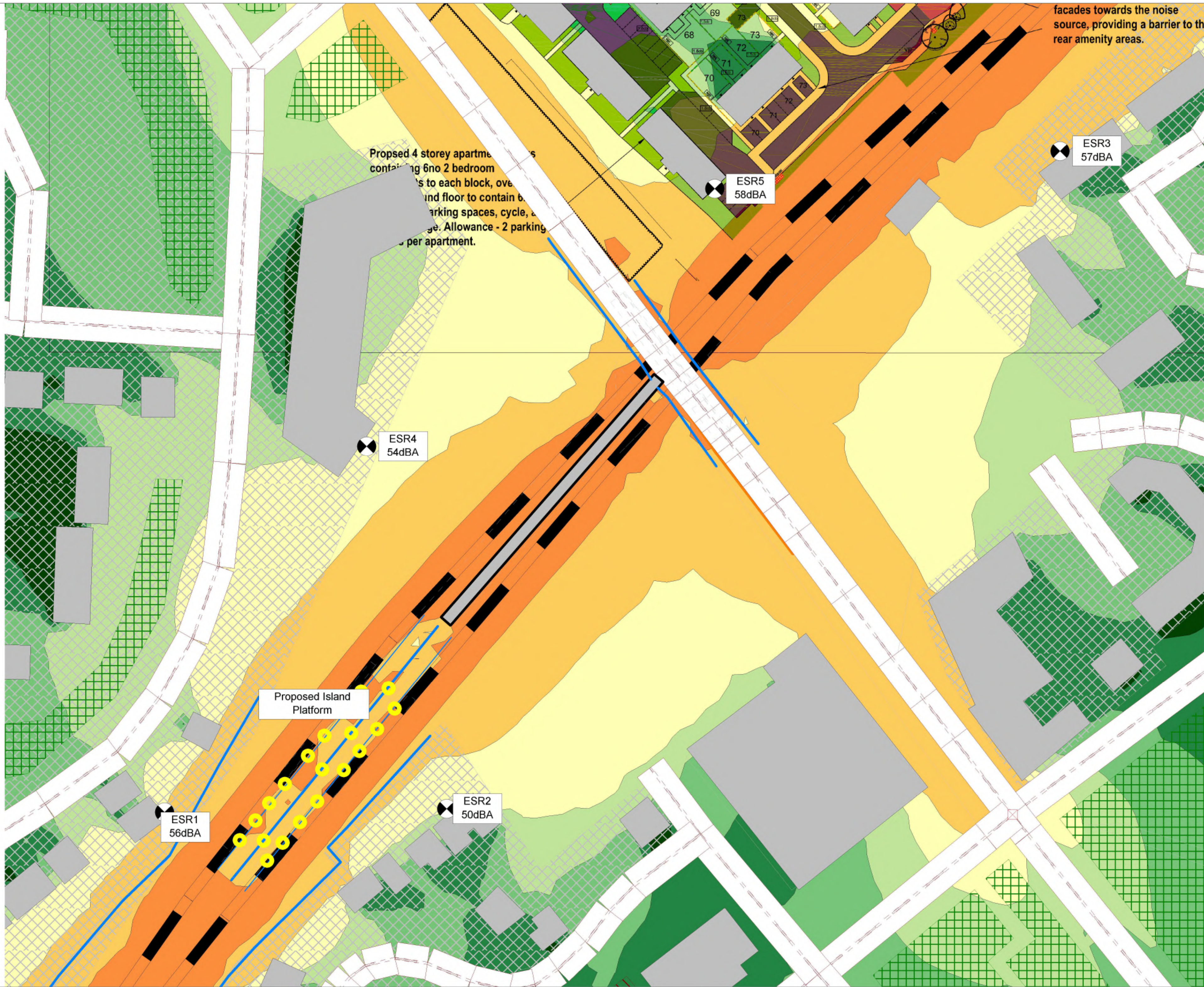
0 <= ... < 35
35 <= ... < 40
40 <= ... < 45
45 <= ... < 50
50 <= ... < 55
55 <= ... < 60
60 <= ... < 65
65 <= ... < 70
70 <= ... < 75
75 <= ... < 80
80 <= ...

N

Date:
April 2021



njd
Environmental Associates

Client:
Nexus Metro Flow

Figure 4:
Option B Scenario
Night-time LAeq,1hr
(4m receptor height)

0 <= ... < 35
35 <= ... < 40
40 <= ... < 45
45 <= ... < 50
50 <= ... < 55
55 <= ... < 60
60 <= ... < 65
65 <= ... < 70
70 <= ... < 75
75 <= ... < 80
80 <= ...

N

Job Title:
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Hebburn Metro Station

Drawn By:
NJ Dennon

Date:
April 2021

Appendix 1 – Noise Measurements

File	20210412_124412_124533_1.CMG	
Location	Unit_4	
Data type Weighting	Leq A	
Start End	12/04/2021 12:44:12 12/04/2021 13:03:26	
Source	Leq specific dB	Lmax dB
P2 - Speaker at 2m (under canopy)	76.4	78.4
P2 - Door Beeper Open at 1m (under canop...	72.4	75.3
P2 - Speaker at 2.3m (no canopy)	72.6	74.2
P2 - Door Beepers Close at 1m (no canopy...	68.6	70.4
P1 - Door Beeper Open at 1m (no canopy)	70.8	74.6
P1 - Door Beeper Close at 1m (no canopy)	69.1	71.2
P1 - Speaker at 2.3m (no canopy)	64.5	65.7