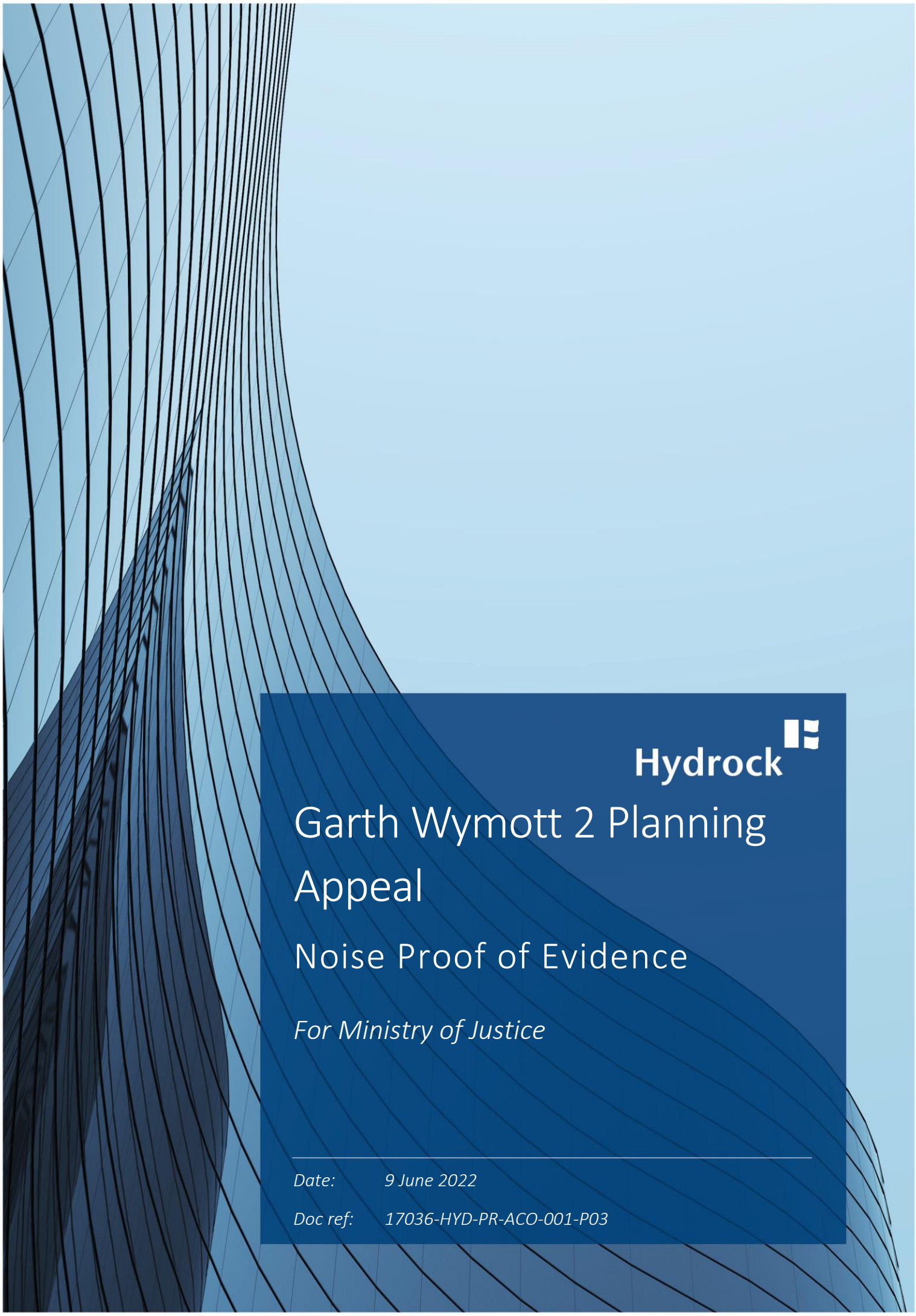


Hydrock

Garth Wymott 2 Planning Appeal

Noise Proof of Evidence

For Ministry of Justice

Date: *9 June 2022*

Doc ref: *17036-HYD-PR-ACO-001-P03*

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited Northern Assurance Buildings 9-21 Princess Street Albert Square Manchester M2 4DN United Kingdom	T +44 (0)161 804 5550 E manchestercentral@hydrock.com www.hydrock.com
Client	Ministry of Justice	
Project name	Garth Wymott 2 Planning Appeal	
Title	Noise Proof of Evidence	
Doc ref	17036-HYD-PR-ACO-001-P03	
Project no.	17036	
Status	S2	
Date	09/06/2022	

Document Production Record		
Issue Number	P03	Name
Prepared by		Eddy Goldsmith - Associate, BEng, MIOA
Checked by		Lewis Stonehouse - Technical Director, BA, MSC, MIOA
Approved by		Eddy Goldsmith - Associate, BEng, MIOA

Document Revision Record			
Issue Number	Status	Date	Revision Details
P01	1st Draft	25/05/2022	Draft Issue
P02	2nd Draft	01/06/2022	Second Draft
P03	3rd Draft	09/06/2022	Third Draft

CONTENTS

Tables

1. INTRODUCTION

1.1 Background and Witness

1.1.1 My name is Eddy Goldsmith. I am a full Member of the Institute of Acoustics (MIOA) and have a BEng (hons) degree in Acoustics from the University of Salford.

1.1.2 I have approximately 9 years of professional experience in the field of environmental acoustics engineering consultancy and have been based in the North West of England for the majority of my career but worked on projects across the UK and occasional international schemes.

1.1.3 My career has provided me with extensive experience of managing noise and vibration impacts in the planning domain for a range of land uses, including large scale residential, road links, manufacturing, waste, distribution, energy, minerals, retail and leisure.

1.1.4 I am an Associate at Hydrock Consultants Ltd, and am responsible for the northern Acoustics team, based in Manchester City Centre and more widely for the technical content of Hydrock national environmental acoustics work across the UK.

1.1.5 I have been employed by Hydrock since June 2019, prior to which I was a Principal Acoustic Consultant at Wardell Armstrong LLP, based in Bolton, Greater Manchester.

1.1.6 During the last 9 years, I have advised both private and public sector organisations on the potential noise and vibration impacts associated with proposed schemes, some of which have been through the planning appeal process.

1.1.7 In relation to this appeal, Hydrock are instructed by the Ministry of Justice (MoJ) to prepare evidence on the aspects of:

- Noise associated with development generated road traffic;
  - » Operational traffic noise
  - » Construction traffic noise
- Noise associated with proposed car parking.

1.1.8 The evidence I have prepared and provided for this planning appeal (ref: 21/01028/OUTMAJ) is true and has been prepared in accordance with current policy and guidance to the best of my knowledge and I Garth

1.2 Scope of Evidence / Reasons for Refusal

1.2.1 The proposed development was refused planning permission on the 22nd December 2021. The Local Planning Authority (LPA) reasons for refusal are set out in their Statement of Case (SoC), Core Document C4. The following paragraphs are considered to be relevant to potential noise impacts associated with the scheme:

> *'3. The potential noise nuisance and disturbance associated with the vehicular traffic movements that would be generated throughout the use of the development would result in a harmful impact on the amenity of residents in the locality contrary to policy BNE1 of the Chorley Local Plan 2012 - 2026.'*
>
> *'6.81 The proposed development would generate a significant number of additional vehicular movements to and from the prison site. There is a residential dwellinghouse directly opposite the proposed entrance to the new prison in addition to dwellinghouses at sporadic intervals along Ulnes Walton Lane. It is considered that*

the noise nuisance and disturbance associated with the vehicular traffic movements that would be generated throughout the use of the development would be of such frequency and intensity that they would result in a harmful impact on the amenity of residents in the locality over and above the levels of amenity that they currently enjoy and contrary to policy BNE1 of the Chorley Local Plan 2012 – 2026.'

1.2.2 In addition to the LPA SoC, the Ulnes Walton Action Group (UWAG) have provided a SoC, Core Document - C5, which set out their reasons for objection to the proposed development. The following paragraphs are considered to be relevant to potential noise impacts associated with the scheme:

'6.7 UWAG will evidence that the MoJ's projected 50% increase in prison-generated traffic has serious potential to impact safety and noise disturbance.'

'7.2 UWAG will demonstrate that the noise assessments undertaken by the MoJ were limited in their scope and failed to assess the noise disturbance the increase in traffic volumes will have on the whole length of Ulnes Walton Lane. The noise receptors placed at ML1 and ML4 (Hydrock drawing - figure 1 - Noise Monitoring Locations) are essentially irrelevant to the impact of this proposed development.'

'7.3 UWAG will argue that noise and disturbance is not only caused by the volume of traffic but also its speed, weather conditions, and associated noise of car doors slamming, music systems blaring, engines starting etc.'

1.2.3 While noise associated with development generated road traffic during the construction phase of the development is not specifically referenced in either SoC submitted, it is included in the earlier UWAG response to the application. The following paragraph is considered to be relevant to potential noise impacts associated with the scheme, that are not covered in the SoCs submitted:

In reference to consultation documents: '2.8 These are easy statements to make but are essentially worthless as, in reality, they are almost impossible to keep when project management exigencies inevitably present themselves. Those residents who experienced the construction phases of Wymott and Garth will testify to the disruption and disturbance caused and the impact on their quality of life by hundreds of large and noisy HGVs and heavy plant machinery delivering to and from, and operating within, the site during the construction phase.'

1.3 Consultation with the Local Planning Authority

1.3.1 No direct consultation with the LPA was undertaken by Hydrock.

1.3.2 No communication, requests for data or comment was received from Chorley Council (CC) with regards to noise prior to the decision to refuse planning permission.

1.3.3 No opportunities were provided by CC for Hydrock to provide further demonstration that proposed development is deliverable, with respect to noise, or respond to their specific concerns.

2. DEVELOPMENT CONTEXT

2.1 Overview

2.1.1 The appeal is made following the refusal of planning permission (ref. 21/01028/OUTMAJ) by Chorley Council ('the Council') for the following description of development:

> *Hybrid planning application seeking: Outline planning permission (with all matters reserved except for means of access, parking and landscaping) for a new prison (up to 74,531.71 sqm GEA) (Class C2A) within a secure perimeter fence following demolition of existing buildings and structures and together with associated engineering works; Outline planning permission for a replacement boiler house (with all matters reserved except for access); and Full planning permission for a replacement bowling green and club house (Class F2(c)) on land adjacent to HMP Garth and HMP Wymott, Leyland*

2.1.2 The site comprises land surrounding HMP Garth and HMP Wymott prisons. HMP Garth and HMP Wymott have a combined capacity of circa 2,050, with associated car parking and facilities, with primary vehicular access to the local road network off the western carriageway of the southern section of Moss Lane.

2.1.3 The proposed development, hereby referred to as Garth Wymott 2, comprises 7 new four-storey houseblocks to accommodate 1,715 prisoners, with associated carparking (c. 525 spaces) and facilities. Primary vehicular access to the local road network is located off the western carriageway of the central section of Moss Lane, in the vicinity of Windy Harbour residence, to the east of Moss Lane.

2.1.4 Based on the above, the proposed development therefore represents an increase in local prisoner population of approximately 85%.

3. POLICY CONSIDERATIONS

3.1 Policy Summary

3.1.1 Relevant current policy documents considered herein are as follows:

- National Planning Policy Framework, 2021 (NPPF);
- Noise Policy Statement for England, 2010 (NPSE);
- Planning Practice Guidance – Noise, 2014 (PPG);
- Central Lancashire Core Strategy, 2012; and,
- Chorley Local Plan 2012-2026, 2015.

3.2 National Planning Policy Framework (NPPF)

3.2.1 Paragraph 174 of the NPPF states:

> *174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *…*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
>
> *…*

3.2.2 Paragraph 185 of the NPPF states:

> *185. 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;*
>
> *…*

3.2.3 With regard to 'adverse impacts' this paragraph of the NPPF refers to the NPSE.

3.3 Noise Policy Statement for England (NPSE)

3.3.1 The aims of the NPSE are:

> *Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
>
> - *avoid significant adverse impacts on health and quality of life;*
> - *mitigate and minimise adverse impacts on health and quality of life; and*
> - *where possible, contribute to the improvement of health and quality of life.*

3.3.2 With regard to 'adverse impacts' the NPSE defines three categories, as follows:

> *NOEL - No Observed Effect Level*
>
> *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.*
>
> *LOAEL – Lowest Observed Adverse Effect Level*
>
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> *SOAEL – Significant Observed Adverse Effect Level*
>
> *This is the level above which significant adverse effects on health and quality of life can occur.*

3.3.3 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second states that where impacts are placed between the LOAEL and SOAEL, all reasonable steps should be taken to mitigate and minimise the adverse effects of noise. However, the requirement to mitigate and minimise the adverse effects of noise does not mean that such adverse effects cannot occur.

3.3.4 With regard to health and quality of life the NPSE refers to the World Health Organisation, who have published '*Guidelines for Community Noise, 1999'* which provides health-based guidance on evaluating potential noise impacts, namely *Guidelines for Community Noise 1999*, which is applicable to "noise emitted from all sources except noise at the industrial workplace."

3.4 Planning Practice Guidance (PPG) - Noise

3.4.1 PPG is provided by the government as supplementary guidance to the NPSE and national policies. It provides detail on how the 'adverse' and 'significant adverse' effect levels described by NPPF and the NOEL, LOAEL and SOAEL described by the NPSE can be recognised, as follows:

- Noise levels above the NOEL become noticeable, however they have no adverse effect as they do not result in any change in behaviour or attitude.
- Noise levels above the LOAEL (adverse) begin to have an adverse effect and therefore consideration needs to be given to mitigating and minimising associated effects, taking account of the economic and social benefits being derived from the activity causing the noise.
- Noise levels above the SOAEL (significant adverse) should be avoided. The planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the noise source and associated development, but it is undesirable for such exposure to be caused.
- Should noise exposure increase further, at the highest extreme, the situation should be prevented from occurring regardless of the associated economic and social benefits.

3.4.2 PPG summarises noise exposure and the associated effect levels within the noise exposure hierarchy, shown in Table 1 below.

Response	Example of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			

Not Present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes a small change in behaviour, attitude or other physiological response, e.g. turning up the volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Leve			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished sue to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening' loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

3.5 Chorley Local Plan 2012 – 2026

3.5.1 Policy BNE1 of the Chorley Local Plan is considered to be relevant to Garth Wymott 2 as it sets out design criteria for new developments, and is referenced specifically in the LPA SoC.

3.5.2 The relevant parts of Policy BNE1 are shown below:

> *Planning permission will be granted for new development, including extensions, conversions and free standing structures, provided that, where relevant to the development:*
>
> *…*
>
> *g) The proposal would not cause an unacceptable degree of noise disturbance to surrounding land uses;*
>
> *…*

4. METHODOLOGY AND SIGNIFICANCE CRITERIA

4.1 Guidance Summary

4.1.1 This proof of evidence considers the following potential noise impacts, in accordance with the LPA and UWAG SoCs, together with the UWAG objection letter:

- Noise associated with development generated road traffic;
  - » Operational
  - » Construction
- Noise associated with proposed car parking;
  - » Average noise levels
  - » Individual parking event noise

4.1.2 Relevant current guidance documents considered herein are as follows:

- World Health Organisation (WHO) 1999: Guidelines for Community Noise;
- BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings (BS8233);
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, 2011 (DMRB);
- Bavarian State Office for the Environment: Parking Area Noise – 6. Revised Edition, 2007 (PAN);
- Department of Transport Technical Memorandum: Calculation of Road Traffic Noise, 1975 (CRTN); and
- Transport Research Laboratory: Converting the UK traffic noise index $L_{A10,\ 18h}$ to EU noise indices for noise mapping, 2002 (TRL).

4.2 Existing Sensitive Receptors

4.2.1 Existing Sensitive Receptors (ESRs) have been selected based on their proximity to the adjacent local road network, proposed site access and proposed car park. Any noise impacts at other ESRs located further away from the site are likely to be less, due to the increased dispersion of traffic over the local road network. Therefore, impacts predicted at this sample of ESRs is considered to be representative of all nearby ESRs.

Table 1 Existing Sensitive Receptors

Receptor	Description	Building Occupancy	Bearing from Site	Approximate distance from Site
ESR1	5 The Maples	Residential	East	25m
ESR2	7 Willow Road	Residential	North east	55m
ESR3	Windy Harbour	Residential	East	30m
ESR4	2 Ulnes Walton Lane	Residential	South	250m

4.2.2 ESR locations are presented in Figure 2.

4.3 Noise from Development Generated Road Traffic

4.3.1 The Design Manual for Roads and Bridges (DMRB), published by National Highways, is a suite of documents which contains requirements and advice relating to works on motorway and all-purpose trunk roads for which one of the Overseeing Organisations is highway or road authority. The proposed works in the case of this development are to MoJ land and are facilitated by public roads. While the proposed development itself does not fall within the remit of the highway or road authority, DMRB is considered to provide a good methodology for the determination of noise impacts associated with road traffic noise from the proposed development. It provides guidance on evaluating the magnitude of impact associated with development generated road traffic, during both operational and construction phases of a development.

4.3.2 Noise from road traffic associated with the construction phase of the proposed development was not previously assessed specifically in the NIA submitted in support of the application. The decision to scope out this assessment is based on the assumption that operational road traffic is typically higher in volume than construction road traffic, and therefore the magnitude of impact during construction is typically lower than during the operational phase. However, based on the information presented in the draft Construction Traffic Management Plan (CTMP), it is understood that there is potential for construction traffic volumes to exceed that of the operational phase.

4.3.3 Therefore, a discrete assessment of road traffic noise generated during construction is provided herein in order to evaluate both peak and average periods, with respect to construction road traffic noise. This is in response to comments included within the UWAG objection letter, as set out in paragraph 1.2.3. above in this proof of evidence.

Operational Phase Road Traffic Noise

4.3.4 The assessment of operational phase road traffic noise is based on the traffic data provided by Atkins in Appendix A. The latest available traffic data, which is used herein, supersedes that adopted for the NIA. Operational road traffic noise predictions are carried out in accordance with CRTN using SoundPLAN 8.2 modelling software.

4.3.5 When determining the significance of operational road traffic noise DMRB recommends that LOAELs and SOELs should be set for all ESRs within the study area, for the time periods when they are in use. As all ESRs considered are residential in nature, both daytime and night-time effect levels have been determined. LOAELs and SOAELs are set by DMRB as shown in Table 3 below (Table 3.49.1 of DMRB).

Table 2 Operational Noise LOAELs and SOAELs for ESRs

Time Period	LOAEL	SOAEL
Daytime (0600 to 2400)	55dB $L_{A10, 18hour}$ facade	68dB $L_{A10, 18hour}$ facade
Night-time (2300 to 0700)	40dB $L_{night, outside}$ (free-field)	55dB $L_{night, outside}$ (ree Field)

Table 3 DMRB Magnitude of Impact at Receptors (Operational Road Traffic)

Magnitude of Impact	Change in noise level, dB $L_{A10, 18hr}$	
	Short-term	Long-term
Major	Greater than or equal to 5.0	Greater than or equal to 10.0
Moderate	3.0 to 4.9	5.0 to 9.9
Minor	1.0 to 2.9	3.0 to 4.9
Negligible	Less than 1.0	Less than 3.0

Where short-term impact magnitudes are determined to be between minor and major, DMRB recommends that the final operational significance shall be determined based on the local circumstances and acoustic context.

Construction Phase Road Traffic Noise

4.3.6 The assessment of construction phase road traffic noise is based on the Construction Traffic Management Plan (CTMP) together with traffic flow information provided by Atkins in Appendix B. Construction road traffic noise predictions are carried out in accordance with CRTN using SoundPLAN 8.2 modelling software.

4.3.7 Magnitude of impact at ESRs associated with noise from construction road traffic should be determined in accordance with the criteria recommended by DMRB guidance (Table 3.17 of DMRB), as shown in Table 4 below.

Table 4 DMRB Magnitude of Impact at Receptors (Construction Road Traffic)

Magnitude of Impact	Increase in noise level of closest public roads used for construction traffic, dB
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

4.3.8 The threshold of significant effect is typically between minor and moderate impact categories i.e. an increase of 3dB or more, as recommended by DMRB. Furthermore, DMRB recommends that construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

1. 10 or more days or nights in any 15 consecutive days or nights;
2. a total number of days exceeding 40 in any 6 consecutive months.

Summary

4.3.9 The threshold of significant effect recommended by DMRB is between minor and moderate impact categories. However, the guidance recognises that predicted noise level changes within 1dB of the lower end of the moderate category can indicate that it is more appropriate to consider the change is not a likely significant effect, depending on circumstances.

4.4 Car Parking noise

4.4.1 WHO *Guidelines for Community Noise* provides health-based impact thresholds for assessing community noise in the context of dwellings. The guidance defines community noise as follows:

> *'Community noise is (also called environmental noise, residential noise or domestic noise) is defined as noise emitted from all sources except noise at the industrial workplace. Main sources of community noise include road, rail and air traffic; industries; construction and public work; and the neighbourhood.'*

4.4.2 While noise from car parking activities is not specifically referenced, it is considered that WHO guidance provides impact thresholds based on the combined effect on health from mixed sources, including sleep disturbance, annoyance and speech interference in the residential context. Therefore, it is considered

the most relevant guidance document when determining the impact of car parking noise with regards to the proposed development.

4.4.3 WHO recommends the following noise levels should be achieved in order to avoid adverse health impacts:

- 50dB $L_{Aeq\ 16hour}$ during the daytime within gardens, where practical and feasible;
- 55dB $L_{Aeq,\ 16hour}$ during the daytime within gardens, where 50dB is not practical or feasible;
- 35dB $L_{Aeq,\ 16hour}$ during the daytime (0700 to 2300) within living rooms; and,
- 30dB $L_{Aeq,\ 8hour}$ and 45dB L_{AFmax} during the night time (0700 to 2300) within bedrooms.

Average Parking Noise Levels

4.4.4 The assessment of average car parking noise is based on the trip generation assumptions provided by Atkins (xx) and the proposed number of parking spaces (c. 525). Average levels are predicted in accordance with Parking Area Noise guidance using SoundPLAN 8.2 modelling software.

4.4.5 Despite not being a native national guidance document in England, the most comprehensive and widely accepted methodology guidance document for the prediction of car parking noise is the Parking Area Noise document published by the Bavarian State Office for the Environment in 2007. The methodology allows the prediction of average noise levels from a car park based on the number of spaces and number of parking events per hour, per space. This method has been adopted for the purposes of predicting average noise levels from the proposed car park.

4.4.6 Predicted average levels associated with the car park should then be compared to the guideline average noise levels recommended by WHO in order to avoid potential adverse health impacts

Noise from Individual Parking Events

4.4.7 The assessment of noise associated with individual parking events, such as car engines starting and the closing of car doors, is based on example data taken from the Hydrock archive. The typical free field maximum level associated with car engines starting and car doors slamming is 65 dB L_{AFmax}, measured at 10m. Noise from individual parking events are predicted at ESRs using SoundPLAN 8.2 modelling software.

4.4.8 Predicted maximum levels associated with the car park should then be compared to the guideline night-time L_{AFmax} noise levels recommended by WHO, in order to avoid potential adverse health impacts.

5. BASELINE NOISE ENVIRONMENT

5.1 Overview

5.1.1 In the context of this proof of evidence, the primary purposes of the establishing baseline noise data are:

1. To validate noise predictions based on baseline traffic information derived from the traffic survey undertaken in 2021. If measured noise data accords with baseline traffic survey data, it provides a good indication that the two data sets are reliable and therefore that noise modelling/predictions and subsequent conclusions derived from that data set are in turn reliable; and,
2. To establish existing absolute noise levels in the vicinity of ESRs in order to evaluate the significance of any change in baseline noise environment. Absolute levels are an important indicator when determining final potential road traffic noise impacts in accordance with DMRB, and adverse health impacts in accordance with WHO guidance.

5.1.2 A noise survey was undertaken at and in the vicinity of the site between Tuesday 20th and Wednesday 21st October 2020, as part of the NIA. The noise survey included 4 Monitoring Locations, for which appropriate justification is provided in the NIA.

5.1.3 A supplementary noise survey was undertaken between Wednesday 18th and Thursday 19th May 2022 as part of this proof of evidence. The reasons for carrying out additional noise survey works are as follows:

- The October 2020 survey was carried out prior to the end of national Covid-19 restrictions in the UK. While the survey was undertaken outside of any 'lockdown periods', an up-to-date noise survey was considered to be appropriate in order to capture any change in the baseline noise environment since the previous survey; and,
- The SoCs issued by the LPA and UWAG, together with the objection letter submitted by UWAG give specific attention to the potential impacts at ESRs located in close proximity to Ulnes Walton Lane and Moss Lane. The supplementary survey intended to further characterise the baseline noise environment in these areas, increasing the reliability of the whole data set.

5.1.4 The results of the May 2022 are considered to supersede the October 2020 survey given the intersection of geographical scope and the reasons described above. The survey was carried out at 3 MLs in total as shown on Figure 1.

5.1.5 Unattended noise monitoring was undertaken at ML1 and ML2 for approximately 24 hours, between approximately 1400 on Wednesday 18th and 1400 Thursday 19th May 2022. This monitoring period includes a full 16 hour daytime (0700 to 2300) and 8 hour night time (2300 to 0700) noise levels to be captured in accordance with current guidance.

5.1.6 Attended monitoring was undertaken at ML3, adjacent to Ulnes Walton Lane for a consecutive 3hour period, in order to characterise road traffic noise in accordance with the shortened measurement methodology outlined by CRTN guidance. This procedure allows daytime and night time noise levels to be derived based on a standardised prediction method, outlined by TRL.

5.2 Baseline Survey Summary

5.2.1 All noise measurements were made using Class 1, integrating sound level meters. Microphones were positioned vertically on a tripod at least 1.2m above the ground and at least 3.5m from any other

reflecting surfaces. The sound level meter was calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

5.2.2 Monitoring was carried out by Suzy Everett, Acoustic Engineer at Hydrock, who holds a bachelor's degree in Acoustics BEng (Hons) and is an associate member of the Institute of Acoustics (AMIOA). All measurement equipment has been laboratory calibrated within the appropriate calibration interval.

Noise monitoring undertaken at the 4 aforementioned MLs described above are considered to be representative of ESRs. Noise monitoring locations are shown on Figure 1, and summarised as follows:

- ML1: Unattended noise monitoring to the east of the Site, adjacent to the junction of Moss Lane and Willow Road, approximately 5m from the carriageway. This location is representative of road traffic noise from the northern section of Moss Lane (north of the site access) and existing levels in the vicinity of ESR1 and ESR2;
- ML2: Unattended noise monitoring to the south of the Site, adjacent to the junction of Moss Lane and the existing access road for HMP Garth and HMP Wymott, approximately 5m from the carriageway. This location is representative of road traffic noise from the southern section of Moss Lane (between existing and proposed access roads), together with distant road traffic noise from Ulnes Walton Lane;
- ML3: Attended noise monitoring to the south of the Site, approximately 3m from Ulnes Walton Lane. This location is representative of road traffic noise from Ulnes Walton Lane and existing levels in the vicinity of ESR4;

5.2.3 Observations and subjective evaluation of noise sources was carried out and noted during initial site walkover and attended monitoring. Measurements were also supplemented with audio recordings to allow retrospective subjective analysis of the acoustic environment.

5.2.4 The following noise sources have been identified as contributors to the existing noise environment in the vicinity of the MLs:

Road Traffic: Road Traffic noise from Ulnes Walton Road was continuously dominant at ML3. At the remainder of MLs, local traffic on Moss Lane was regularly dominant, with distant noise from Ulnes Walton lane dominant in-between. In addition, local traffic on the existing Garth Wymott site access was occasionally dominant at ML2.

Other Sources: Bird song was dominant during the 'morning chorus' from approximately 0400, which became gradually less dominant as activity reduces approaching the daytime period and as road traffic noise increases towards peak transportation periods. Noise from distant aircraft movements was occasionally audible at MLs.

5.2.5 A summary of baseline noise levels is provided in Table 5 below.

Table 5 Average Measured Daytime and Night-time Noise Levels

Monitoring Location	Time Period	Measured Noise Level, $L_{Aeq,T}$ dB
ML1b	0700 - 2300 2300 - 0700	54 48
ML2b	0700 - 2300 2300 - 0700	59 50
ML3b	0700 - 2300 2300 - 0700	64* 56*
*Denotes daytime and night time noise levels derived from the measured 3 hour L_{A10} in accordance with CRTN and TRL guidance		

6. NOISE PREDICTION MODELLING

6.1 Overview

6.1.1 Predicted noise levels associated with the proposed development, considered in this proof of evidence, have been predicted using SoundPLAN V8.2 software, incorporating OS mapping, ground absorption and topography of the site and surrounding areas to create a 3D study area.

6.1.2 The previous iteration of noise modelling carried out as part of the NIA did not consider the currently available traffic information, and was based upon the predicted development trips appended to the NIA.

6.1.3 The current noise model however, carried out as part of this evidence, incorporates currently available traffic information pertaining to operational and construction phases of the proposed development. Therefore, the predicted noise impacts presented herein supersede the NIA.

6.1.4 The following current data sets have been considered within the noise prediction model:

- 18hour AAWT traffic data provided by Atkins, presented in Appendix A, for the following scenarios:
  - » Baseline 2021
  - » Opening Year 2025
  - » Opening Year 2025 + Proposed Development
- Construction traffic is derived from the draft Construction Traffic Management Plan (CTMP), as presented in Appendix B:
  - » Typical daily construction traffic
  - » Peak daily construction traffic
- Car park trip generation information provided by Atkins (xx)

6.2 Modelling Assumptions

6.2.1 The noise prediction model incorporates the following:

- The base map of the acoustic model is derived from Ordinance Survey vector mapping of the surrounding areas;
- A Digital Terrain Model (DTM) has been created within the acoustic model based on 5m resolution topographical data of the Site and surrounding areas;

- Existing buildings, that will not be demolished as part of the proposed development, are incorporated within the acoustic model, to allow prediction of screening effects. Buildings are assumed to have fully reflective facades;
- Noise propagation is predicted in accordance with ISO 9613-2:1996 *'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General Method of calculation'* (ISO9613);
- To reflect the local ground cover, ground absorption is set to G = 0.9 for majority soft ground (90% acoustically absorptive ground);
- Road traffic is assumed to travel at the known speed limits on each road; and,
- 1st order reflections included in predictions of transportation noise.

6.3 Model Validation

6.3.1 A comparison of predicted noise levels, based on 2021 baseline traffic information provided by Atkins, and measured noise levels at each ML has been carried out in order to validate the reliability of the noise prediction model, as presented in Table 6 below.

Table 6 Noise Prediction Model Validation

Monitoring Location	Measured Noise Levels, dB $L_{Aeq, T}$		Predicted Noise Levels, dB $L_{Aeq, T}$		Deviation, dB $L_{Aeq, T}$	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
ML1	54	48	55	47	+1	-1
ML2	59	50	57	49	-2	-1
ML3	64	56	64	56	0	0

6.3.2 Table 6 indicates that predicted daytime and night-time noise levels at ML1 and ML3 are within 1dB of the measured levels.

6.3.3 Predicted levels at ML2 were up to 2dB below the measured levels. It's considered that this is likely due to noise contributions from the existing Garth Wymott access road, to the south of ML2, which is not considered within the prediction model.

6.3.4 This provides a good indication that the noise prediction model is representative of existing baseline noise conditions across the study area and that noise propagation predictions associated with the surrounding local road network are reliable.

7. DEVELOPMENT GENERATED ROAD TRAFFIC NOISE

7.1.1 Noise prediction scenarios associated with the assessment of development generated road traffic during the operational phase and construction phase are as follows:

- Scenario 1 – 2021 Baseline
- Scenario 2 – 2025 Without Development
- Scenario 3 – 2025 With Development
- Scenario 4 – 2025 With Typical Construction Traffic
- Scenario 5 – 2025 With Peak Construction Traffic

7.2 Operational Phase

Supplementary Figures

7.2.1 Predicted noise levels associated with baseline and development generated road traffic are provided in the following Figures:

- Figure 3 – Baseline Average Daytime Noise Levels $L_{Aeq, 16hour}$
- Figure 4 – Baseline Average Night-time Noise Levels $L_{Aeq, 8hour}$
- Figure 5 – Scenario 2 to Scenario 3: Change in Average Noise Levels $L_{A10, 18hour}$
- Figure 6 – Predicted Average Daytime Noise Levels, With Development $L_{Aeq, 16hour}$
- Figure 7 – Predicted Average Night-time Noise Levels, With Development $L_{Aeq, 8hour}$
- Figure 8 – Predicted Average Night-time Noise Levels at ESR3, With Development $L_{Aeq, 8hour}$

Predicted Impacts

A comparison of predicted $L_{A10, 18hour}$ noise levels from Scenario 2 and Scenario 3, at ESRs, is provided in Table 7 below, in accordance with DMRB.

Table 7 Predicted Change in Road Traffic - Operational Phase

Existing Sensitive Receptors	Floor Level	Predicted Road Traffic Noise Level at ESRs, $L_{10\ 18hour}$ dB(A)		Change in Noise Level associated with the Proposed Development
		Scenario 2 – 2025 Without Development	Scenario 3 – 2025 With Development	
ESR1	GF	46.4	46.5	0.1
	1st Floor	48.2	48.3	0.1
ESR2	GF	43.8	44.5	0.7
	1st Floor	46.3	46.6	0.3
ESR3	GF	48.2	51.8	3.6
	1st Floor	50.1	53.7	3.6
ESR4	GF	60.0	60.7	0.7
	1st Floor	61.8	62.5	0.7

7.2.2 Table 7 indicates that the predicted change in road traffic noise at ESR1, ESR2 and ESR4 is less than 1dB. This provides an indication of negligible impact in accordance with DMRB.

7.2.3 The predicted change in road traffic noise at ESR3 is 3.6dB which is within the moderate short-term and minor long-term categories defined by DMRB. This suggests a significant impact in the short term has the potential to occur. However, DMRB recognised that local circumstance should be considered when arriving at conclusions with regards to final potential noise impacts.

7.2.4 NB: *3dB is accepted as the threshold of human perception of change in sound level; what's known as the just-noticeable difference in psychoacoustics.*

7.2.5 DMRB states that "noise level changes within 1 dB of the bottom of a 'moderate' range can indicate that it is more appropriate to consider a change is not a likely significant effect", depending on local circumstances.

7.2.6 Table 8 below presents the predicted average daytime and night time noise levels, with the development in place, at ESR3, together with the LOAEL and SOAEL levels recommended by DMRB. These predicted levels are also presented in Figure 6 and Figure 7, respectively.

Table 8 Predicted Daytime and Night-time Levels at ESR3

Time Period	Height	Existing Level	Predicted Level	LOAEL	SOAEL
Daytime, $L_{A10, 18hour}$ dB (façade)	1.5m	48	52	55	68
	4m	50	54		
Night-time, $L_{Aeq, 8hour}$ dB (free-field)	1.5m	40	43	40	55
	4m	41	45		

7.2.7 Table 8 indicates that the predicted daytime levels are below the LOAEL defined by DMRB. In accordance with PPG this indicates that noise may be present and not intrusive. Based on local circumstances it is therefore considered that daytime noise levels associated with the operational phase of the development are not likely to be significant.

7.2.8 Table 8 indicates that predicted night-time levels are between the LOAEL and SOAEL, but in the bottom end of this bracket, recommended by DMRB. DMRB also recommends that LOAEL and SOAEL thresholds should be modified where it is merited by local circumstances, for example where sensitive parts of a receptor are protected from the noise source and/or where receptors have some ability to absorb noise.

7.2.9 Given that existing night-time noise levels exceed the LOAEL at 1st floor level in the vicinity of ESR3, its considered that the receptor will inherently have some ability to absorb noise above this threshold recommended by DMRB.

7.2.10 With regards to night-time noise levels WHO recommends that night-time noise levels at dwellings should not exceed 45 dB L_{Aeq}, so that people may sleep with bedroom windows open in order to avoid potential adverse health impacts i.e. achieving an internal level of 30dB $L_{Aeq, T}$.

7.2.11 The LOAEL defined by NPSE is "*the level above which adverse effects on health and quality of life can be detected*". Therefore, it is considered that an external level of 45dB, recommended by WHO health-based guidance, in order to avoid adverse health impacts in the context of dwellings, provides a more suitable LOAEL which accords with the aims of national policy, in the context of the proposed development.

7.2.12 Furthermore, observation made at the site indicate that the western aspect of ESR3, which faces directly on to Moss Lane, has no 1st floor glazed elements. The primary 1st floor glazed elements of ESR3 are located on the northern and southern aspects of the building.

7.2.13 The northern aspect of ESR3 has an acute angle of view to the northern section of Moss Lane, north of the proposed site access. This section of Moss Lane is not predicted to facilitate any vehicles attributed to the proposed development. Therefore, this façade is less exposed to road traffic noise associated with the proposed development. Night-time levels in the vicinity of ESR3 are presented in more detail in Figure 8.

7.2.14 The southern aspect of ESR3 has an acute angle of view to the southern section of Moss Lane which will facilitate development generated vehicles accessing the site. Given that this façade is partially screened

from Moss Lane by the building itself, noise levels incident on this façade are predicted to be less than detailed in Table 8.

7.2.15 An additional calculation has been carried out in order to establish the predicted level of road traffic noise at the façade of the southern aspect of ESR3. The results are shown in Table 9 below and presented on Figure 8.

Table 9 Predicted Night-time Level at the Southern Aspect of ESR3

Receptor Height	Predicted Level, $L_{Aeq, 8hour}$
4m	42

7.2.16 The results presented in Table 9 and Figure 8 indicate that noise levels are predicted to be below the 45dB $L_{Aeq, 8hour}$ recommended by WHO as the threshold of adverse health impacts, and adopted to represent the LOAEL at ESR3. This is considered to be a good indication that road traffic noise associated with the proposed development will be present and not intrusive in accordance with PPG and therefore no specific mitigation measures are required.

7.3 Construction Phase

Supplementary Figures

7.3.1 Predicted noise levels associated with baseline and development generated road traffic are provided in the following Figures:

- Figure 9 – Scenario 2 to Scenario 4: Typical Construction Change in Average Noise Levels $L_{A10, 18hour}$
- Figure 10 – Scenario 2 to Scenario 5: Peak Construction Change in Average Noise Levels $L_{A10, 18hour}$
- Figure 11 – Predicted Average Daytime Noise Levels, Typical Construction Traffic $L_{Aeq, 16hour}$
- Figure 12 – Predicted Average Daytime Noise Levels, Peak Construction Traffic $L_{Aeq, 16hour}$

Predicted Impacts

7.3.2 Typical construction hours occur during the daytime period only, therefore no night-time impacts associated with construction road traffic are predicted or considered herein.

Impacts associated with the typical construction period are evaluated via a comparison of predicted $L_{A10, 18hour}$ noise levels from Scenario 2 and Scenario 4, at ESRs, is provided in Table 10 below, in accordance with DMRB.

Table 10 Predicted Change in Road Traffic – Typical Construction Period

Existing Sensitive Receptors	Floor Level	Predicted Road Traffic Noise Level at ESRs, $L_{10\ 18hour}$ dB(A)		Change in Noise Level associated with the Proposed Development
		Scenario 2 – 2025 Without Development	Scenario 4 – 2025 With Development	
ESR1	GF	46.4	46.9	0.5
	1st Floor	48.2	48.8	0.6
ESR2	GF	43.8	45.2	1.4
	1st Floor	46.3	47.4	1.1
ESR3	GF	48.2	52.2	4.0
	1st Floor	50.1	54.0	3.9
ESR4	GF	60.0	61.4	1.4

	1st Floor	61.8	63.8	1.4

7.3.3 Table 10 indicates that the predicted change in road traffic noise during the typical construction period at ESR1 is less than 1dB, which provides an indication of negligible impact in accordance with DMRB. The predicted change in road traffic noise at ESR2 and ESR4 is less than 3dB, which provides an indication of potential minor impact in accordance with DMRB.

7.3.4 The predicted change in road traffic noise at ESR3 is 4dB which provides an indication of potential moderate impact during typical construction periods.

Impacts associated with the peak construction period are evaluated via a comparison of predicted $L_{A10, 18hour}$ noise levels from Scenario 2 and Scenario 5, at ESRs, is provided in Table 10 below, in accordance with DMRB.

Table 11 Predicted Change in Road Traffic – Peak Construction Period

Existing Sensitive Receptors	Floor Level	Predicted Road Traffic Noise Level at ESRs, $L_{10\ 18hour}$ dB(A)		Change in Noise Level associated with the Proposed Development
		Scenario 2 – 2025 Without Development	Scenario 5 – 2025 With Development	
ESR1	GF	46.4	47.1	0.7
	1st Floor	48.2	49.0	0.8
ESR2	GF	43.8	45.7	1.9
	1st Floor	46.3	47.8	1.5
ESR3	GF	48.2	53.3	5.1
	1st Floor	50.1	55.2	5.1
ESR4	GF	60.0	62.0	2.0
	1st Floor	61.8	63.8	2.0

7.3.5 Table 11 indicates that the predicted change in road traffic noise during the peak construction period at ESR1 is less than 1dB, which provides an indication of negligible impact in accordance with DMRB. The predicted change in road traffic noise at ESR2 and ESR4 is less than 3dB, which provides an indication of potential minor impact in accordance with DMRB.

7.3.6 The predicted change in road traffic noise at ESR3 is 5.1dB which provides an indication of potential major impact during the peak construction period according to DMRB.

7.3.7 In summary, the modelling results provide an indication that potential construction traffic impacts at ESR1, ESR2 and ESR4 are not likely to be significant, based on change in road traffic noise. However, the initial assessment of road traffic noise level change indicates that there is potential for significant impacts at ESR3.

7.3.8 The peak construction period is expected to take place for up to 6 weeks based on the draft CTMP provided by Atkins. It's understood this is based on the construction programme for the recent construction of HMP Wellingborough.

7.3.9 DMRB recommends that moderate to major impacts occurring for more than 40 days in 6 consecutive months should be considered to be significant. However, DMRB also recognised that local circumstance should be considered when arriving at conclusions with regards to final potential noise impacts.

7.3.10 Table 12 below presents the predicted average daytime noise levels, rounded to the nearest single dB, with construction, at ESR3, together with the LOAEL and SOAEL levels recommended by DMRB.

Table 12 Predicted Daytime Road Traffic Noise during Typical and Peak Construction Periods at ESR3

Time Period	Height	Typical Construction	Peak Construction	LOAEL	SOAEL
Daytime, $L_{A10, 18hour}$ dB (façade)	1.5m	52	53	55	68
	4m	54	55		

7.3.11 Table 12 indicates that the predicted daytime levels do not exceed the LOAEL recommended by DMRB for operational road traffic noise levels during both typical and peak construction periods. In accordance with PPG this indicates that noise associated with construction road traffic may be present and not intrusive.

7.3.12 NB: *the 1st floor peak construction level at ESR3 is presented as 55.2 in Table 11 because DMRB recommends that the initial change in noise level assessment is carried out with a precision of 0.1 dB, as shown in Table 3 and Table 4. This level of precision is considered to be greater than the typical tolerance of noise predictions in practice i.e. ±0.5dB. However, LOAEL and SOAEL values are presented with a precision of 1dB, therefore its considered appropriate to round predicted level values accordingly, when assessing their absolute value, in accordance with DMRB.*

7.3.13 However, given that there is potential for major impacts during peak construction periods, based on noise level change, it is considered that attention should be given to reducing the impact associated with construction traffic within the CTMP for the scheme.

7.3.14 As an example of one potential noise management measure, the implementation of a temporary 20mph speed limit on the southern section of Moss Lane during the peak construction period would reduce associated traffic noise. A prediction of road traffic noise during the peak construction period has been carried out in accordance with CRTN and presented in Table 13 below.

Table 13 Predicted Change in Road Traffic – Peak Construction Period with 20mph Speed Limit

Existing Sensitive Receptors	Floor Level	Predicted Road Traffic Noise Level at ESRs, $L_{10\ 18hour}$ dB(A)		Change in Noise Level associated with the Proposed Development
		Scenario 2 – 2025 Without Development	Scenario 3 – 2025 With Development	
ESR3	GF	48.2	52.5	4.3
	1st Floor	50.1	54.4	4.3

7.3.15 Table 13 indicates that, with the implementation of a temporary 20mph speed limit on Moss Lane, noise from construction traffic during the peak period is predicted to result in a 4.3 dB change in n level at ESR3. This reduces the initial impact from major to moderate, based on the recommended categories outlined in DMRB.

7.3.16 It should be noted that there are various options for temporary measures which could be implemented to reduce construction traffic during peak periods, which can be secured via a suitably worded CTMP.

7.3.17 When considering the reduced change in traffic noise during peak construction to within the moderate category, together with the evaluation of absolute levels being below the LOAEL recommended by DMRB, it is considered that the final impact would be not significant.

7.4 Character of Road Traffic Noise

7.4.1 Baseline conditions in the vicinity of the site and ESRs is characterised primarily by existing road traffic noise, as described in Paragraph 5.2.4.

7.4.2 The proposed development is predicted to increase the volume of road traffic on the southern section of Moss Lane, Ulnes Walton Lane and the remainder of the local road network. There is no indication that the make-up of road traffic associated with the proposed development would differ to any significant degree to that of existing road traffic.

7.4.3 The traffic data used for the basis of this assessment, shown in Appendix A and Appendix B, indicates that the HGV percentage on the southern section of Moss Lane is expected to increase by 3% during the operational phase and 8% during the construction phase, which is relatively small in noise terms.

7.4.4 Road traffic noise is generally made up from a combination of two sources: tyre noise and engine noise. While the level of noise associated with the local road network is predicted to increase, proportional to the increase in traffic volume, the basic noise sources are not considered to change as a result of the development therefore the associated frequency spectrum is not expected to change.

8. PROPOSED CAR PARKING NOISE

8.1 Average Levels

8.1.1 Average levels associated with the proposed car park have been predicted in accordance with Parking Area Noise, as set out in Paragraph 4.4.5, in conjunction with the trip generation assumptions provided by Atkins in Appendix C.

8.1.2 The proposed Garth Wymott 2 is intended to accommodate c. 1,715 prisoners, has c. 525 parking spaces, and its understood there is a prisoner:staff ratio of 0.5, and that 74% of staff are expected to be on site. The equals 635 staff on site. 381 of which would be uniformed and 254 would be non-uniformed.

8.1.3 Each prisoner is expected to have 2 visits per month and two visitation days occur each week. Assuming 4 weeks in a month, and 4 visitation days per week (Monday to Thursday), this equates to 215 visitors on each visitation day. Visitations are split over 3 sessions on these days.

8.1.4 While shift changes occur during the daytime, it is assumed that staff and visitors could arrive up to 1 hour prior to the start of their appointment.

8.1.5 Based on the above, the hourly distribution of staff and visitor parking activities is derived per parking space as shown in Table 14 below.

Table 14 Staff and Visitor Parking Events

Time Period	Staff Parking Events	Visitor Parking Events	Total E/h	E/h per parking space
0600 to 0700	107	0	107	0.2
0700 to 0800	244	0	244	0.5
0800 to 0900	127	48	175	0.3
0900 to 1000	66	48	114	0.2
1000 to 1100	0	48	48	0.1
1100 to 1200	0	48	48	0.1
1200 to 1300	42	48	90	0.2

1300 to 1400	42	77	119	0.2
1400 to 1500	0	29	29	0.1
1500 to 1600	0	29	29	0.1
1600 to 1700	61	29	90	0.2
1700 to 1800	285	29	314	0.6
1800 to 1900	92	0	92	0.2
2000 to 2100	67	0	67	0.1
2100 to 2200	44	0	44	0.1

8.1.6 Having carried out an inspection of the noise model and predictions undertaken as part of the NIA, the results and conclusions pertaining to average levels from the car park remain valid. In summary, average daytime levels associated with car parking activity are predicted to be 40dB $L_{Aeq\ 16hour}$. This is significantly below the health-based guideline levels recommended by WHO, together with existing ambient noise levels. Therefore, average levels associated with the proposed car park are considered to be insignificant and unlikely to result in any adverse health impacts.

8.2 Maximum Levels

8.2.1 Predictions undertaken as part of the NIA, indicate that noise from engines starting and/or door slamming has the potential to result in an internal level of 37dB L_{AFmax}, when considered at the closest point of the proposed car park to existing receptors and with resident's windows open.

8.2.2 This is significantly below the health-based guideline level of 45 dB L_{AFmax} as recommended by WHO with respect to potential sleep disturbance. Which indicates that potential adverse health impacts are unlikely to occur.

8.2.3 Furthermore, while there is potential for 107 parking events to occur across the car park between 0600 and 0700, these would be spread out over the car park area. Therefore, the majority of events would result in night time maximum levels below the 37dB L_{AFmax} adopted for the purposes of the assessment.

8.2.4 Therefore, night time maximum levels associated with the proposed car park are considered to be insignificant and unlikely to result in any adverse health impacts.

8.3 Character of Car Parking Noise

8.3.1 Noise associated with carpark usage is expected to comprise vehicles manoeuvring around the car park at low speeds, engines idling, engines starting and vehicle doors opening/closing. These noise sources exist as part of the baseline acoustic environment in residential areas, such as those surrounding the site.

8.3.2 While parking events located in closest proximity to nearby residents may occasionally be audible, for example transient noise from doors slamming, car parking activity is to be spread out over a relatively large area. Therefore, it is considered that the majority of car parking events are likely to be inaudible within nearby receptors, i.e. when located at greater distance.

9. CONCLUSIONS

9.1.1 When considering the potential impacts associated with development generated road traffic during both the operational and construction phases of the development, the initial assessment of change in road traffic noise level, in accordance with DMRB, indicates that moderate impacts have the potential to occur at Windy Harbour, to the east of the proposed site access. Impacts at the remainder of existing receptors were identified as negligible to minor.

9.1.2 DMRB guidance recognises that local circumstances should be considered when arriving at a final conclusion on the significance of potential impact, and that the predicted change in noise level alone is often not adequate in providing a complete assessment.

9.1.3 When comparing predicted daytime noise levels associated with the operational and construction phase with the LOAEL and SOAEL thresholds recommended by DMRB, no exceedances of the LOAEL were identified. This demonstrates that predicted levels are relatively low, with respect to potential adverse health impacts.

9.1.4 However, it is considered that road traffic noise associated with the construction phase, in particular during the peak construction period, can be reduced by means of a suitably worded Construction Traffic Management Plan. It's demonstrated that a temporary reduction in speed limit along Moss Lane during the construction phase would reduce the associated change in noise level.

9.1.5 Construction is not expected to occur during the night-time, therefore there is no associated noise affect during this period.

9.1.6 Night-time noise levels associated with the operational phase are predicted to be between the LOAEL and SOAEL thresholds recommended by DMRB, at Windy Harbour. However, DMRB recognises that these thresholds are not suitable for all situations and should be adjusted, where appropriate.

9.1.7 Furthermore, existing night-time noise levels associated with baseline road traffic exceed the LOAEL at 1st floor level in the vicinity of Windy Harbour. Therefore, it is considered that the receptor will inherently have some ability to absorb noise above this standard LOAEL threshold recommended by DMRB.

9.1.8 When determining significance of noise impacts, it is considered that a health-based approach is fundamental in the context of community noise, including road traffic noise. The aim of the NPSE is to manage, reduce and avoid potential health impacts associated with noise, and the document defines the LOAEL as "*the level above which adverse effects on health and quality of life can be detected*".

9.1.9 WHO recommends that night-time noise levels at dwellings should not exceed 45 dB L_{Aeq}, so that people may sleep with bedroom windows open in order to avoid potential adverse health impacts i.e. achieving an internal level of 35dB $L_{Aeq, T}$.

9.1.10 Therefore, it is considered that an external level of 45dB, recommended by WHO health-based guidance, provides a suitable LOAEL, which accords with the aims of national policy, in the context of the proposed development.

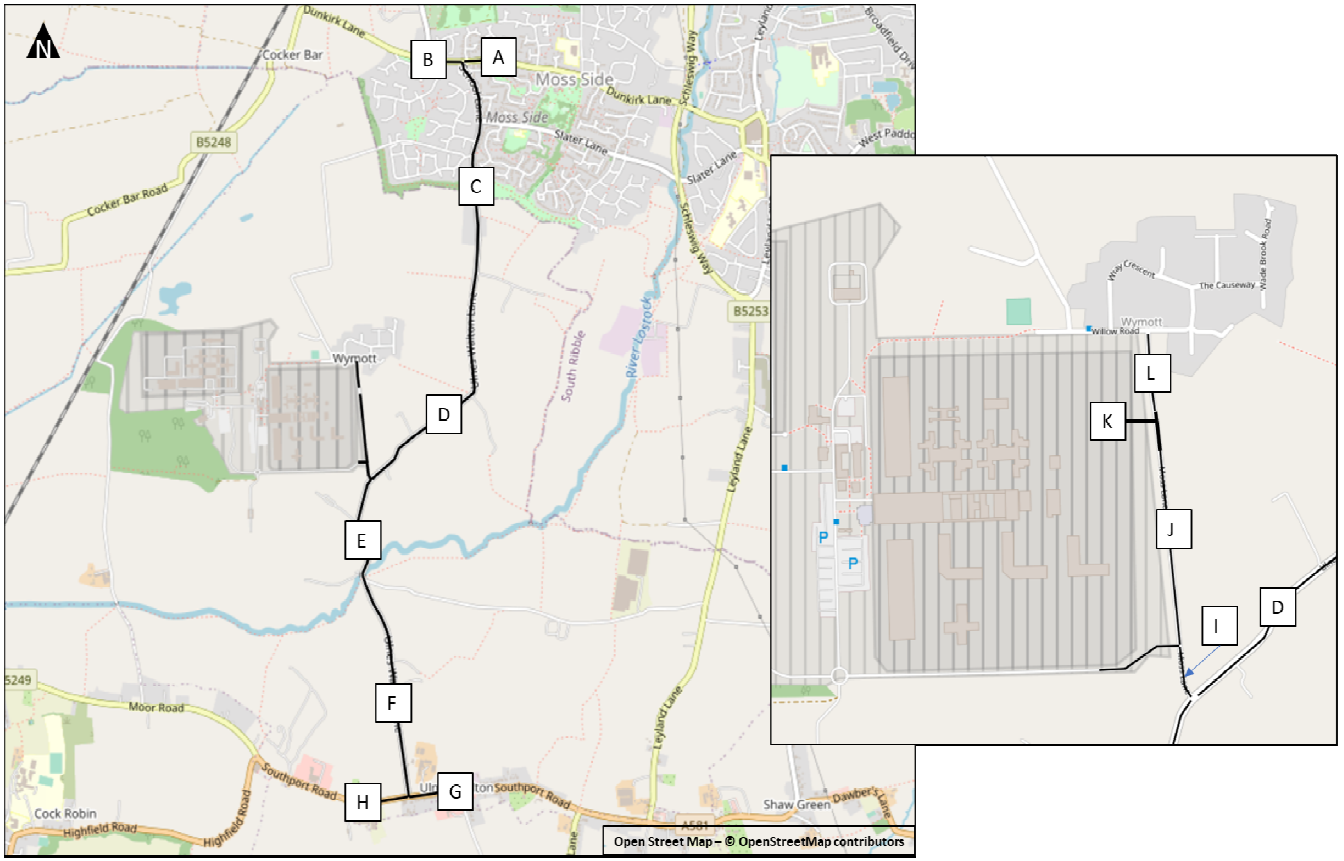
9.1.11 It's demonstrated that noise associated with development generated road traffic during the night time period does not exceed the night time LOAEL of 45dB. Therefore, potential impacts associated with development generated road traffic are not considered to be significant. Associated noise may be noticeable but not intrusive and no change in quality of life due to the noise is anticipated.

9.1.12 When considering average and maximum noise levels associated with the proposed car park at nearby sensitive receptors, predicted noise levels are significantly lower than external and internal health-based guideline level. Therefore, potential impacts are not considered to be significant.

Appendices

Appendix A - Operational Traffic Data

ID	Location	Scenario 1 Baseline 2021 Link Flows 18hr AAWT		Scenario 2 Opening Year (2025) Without Development Traffic Link Flows 18hr AAWT		Scenario 3 Opening Year (2025) With Development Traffic Link Flows 18hr AAWT		peed Limit (mph
		Veh	%HGVs	Veh	%HGVs	Veh	%HGVs	
D	Ulnes Walton Lane, north of Ulnes Walton Lane / Moss Lane Junction	4468	2%	4556	2%	5143	2%	40
E	Ulnes Walton Lane, south of Ulnes Walton Lane / Moss Lane Junction	4346	2%	4434	2%	5179	2%	40
I	Moss Lane, north of Ulnes Walton Lane / Moss Lane Junction	2789	3%	2789	3%	4120	4%	30
J	Moss Lane between existing HMP Garth Wymott Site Access and Proposed Prison Site Access	853	1%	853	1%	2104	4%	30
K	Proposed Prison Site Access	0	0%	0	0%	1331	5%	20*
L	Moss Lane between Proposed Prison Site Access and Willow Road	853	1%	853	1%	773	1%	30



Appendix B - Construction Traffic Data

ID	Location	Scenario 2 Opening Year (2025) Without Development Traffic Link Flows			Scenario 5 Opening Year (2025) With PEAK Construction Traffic			Scenario 4 Opening Year (2025) With AVG Construction Traffic			
		18hr AAWT			18hr AAWT			18hr AAWT			
		Veh	%HGVs	No. HGVs	Veh	No. HGVs	%HGVs	Veh	No. HGVs	%HGVs	eed Limit (mp
D	Ulnes Walton Lane, north of Ulnes Walton Lane / Moss Lane Junction	4556	2%	81	6680	183	3%	5408	227	4%	40
E	Ulnes Walton Lane, south of Ulnes Walton Lane / Moss Lane Junction	4434	2%	87	6558	189	3%	5286	233	4%	40
I	Moss Lane, north of Ulnes Walton Lane / Moss Lane Junction	2789	3%	84	4913	186	4%	3641	230	6%	30
J	Moss Lane between existing HMP Garth Wymott Site Access and Proposed Prison Site	853	1%	9	2977	111	4%	1705	155	9%	30
K	Proposed Prison Site Access	0	0%	0	2124	102	5%	852	146	17%	20*
L	Moss Lane between Proposed Prison Site Access and Willow Road	853	1%	9	853	9	1%	853	9	1%	30
Speed Limit of 20mph has been assumed for the proposed access											

4.4.2. Average Construction Month

The number of construction trips forecast during an average construction month are outlined in Table 4-2. The construction information presents the forecast number of HGVs (deliveries associated with the construction phase) and Cars (construction personnel). It is assumed that there are 4 weeks and 20 working days in a month.

Table 4-2 - Number of Construction Vehicles on Site (Average Month)

Vehicle	Per Day	Per Week	Per Month
Cars	426	2,129	8,514
HGVs	73	365	1,459
Total	**499**	**2,494**	**9,973**

4.4.1. Peak Construction Month

The number of construction trips forecast during the peak construction month are outlined in Table 4-1. The construction information presents the forecast number of HGVs (deliveries associated with the construction phase) and Cars (construction personnel). It is assumed that one HGV trip is equal to one 16 tonne Max Articulated Vehicle. It is assumed that there are 4 weeks and 20 working days in a month.

Table 4-1 – Number of Construction Vehicles on Site (Peak Month)

Vehicle	Per Day	Per Week	Per Month
Cars	1,011	5,057	20,228
HGVs	51	254	1,014
Total	**1,062**	**5,311**	**21,242**

Technical Note

Project:	Prison Sites
Subject:	Trip Generation Assumptions – Category C Prisons
Author:	Atkins
Date:	21/08/2020

Given the nature of the land use, there is limited publicly available information about trip generation at prison sites. This technical note summarises the proposed trip generation assumptions for Category C prisons. It is based on the information previously used for planning applications at HMP Berwyn in Wrexham, HMP Full Sutton in York and HMP Glen Parva in Leicester.

Staff Numbers

- The prisoner to staff ratio is assumed to be 0.50.
- It is understood that 74% of the staff will be on site.
- Staff types would be split using the following proportions:
  - Uniform / Operational 60%; and
  - Non-uniform 40%.

Table 1 presents the proposed staff patterns.

Table 1 Staff Shift Patterns

Title	Time Period	Proportion of Staff (%)
Uniformed Staff		
Early Shift	07:00 to 12:30	22%
Main Shift	08:00 to 17:30	48%
Late Shift	13:30 to 20:30	23%
Nights	20:00 to 07:00	6%
Non-uniformed Staff (Flexible Working		
Early Shift	08:30 to 16:30	48%
Main Shift	09:30 to 17:00	52%

- It is assumed that staff arrive throughout the hour prior to the start of their shift and leave throughout the hour after a shift finishing.
- Due to operational processes, staff usually have a longer lead in time to allow them to go through security and hand-over shifts.
- Therefore, it is estimated that staff will arrive between 07:00-08:00 and leave between 17:30-18:30 for 'Main' uniform shift, and arrive between 07:30-08:30, and leave between 16:30-17:30 for the 'Early' non-uniform shift.

Staff Modal Split

- Journey to Work data from the 2011 Census for the area within which the prison development is proposed is used to understand likely travel modes of staff.
- Journey to Work modal splits from the 2011 Census can be applied to daytime staff but are amended for those working late shifts as it is considered that these staff are not likely to walk, cycle, or use public transport.

Visitor Numbers

The following sets out the methodology used to estimate the visitor numbers at the proposed prison.

- Assume prisoners receive two visits per month- this has been determined from prison visitation rates from other similar prisons.
- Assume visits are spread evenly across the month.
- There are morning visiting periods Monday to Thursday, 09:30-12:30 (2 x 90 minute slots), one afternoon period 14:30-16:30, and one visiting period on Friday and Saturday between the hours of 09:30-12:30.
- Evening visits take place twice a week between the hours of 17:00-19:00.
- For a typical weekday, this results in four visiting periods each day.
- It is assumed daily visits are spread evenly across these visiting periods.
- Each prisoner can be visited by a maximum of three people. It is assumed that the visitors of each individual prisoner will all travel together. Therefore, each prisoner will only generate a single 'Visiting Trip'.
- We have assumed visitors will arrive in the hour before the start time of the visiting period.
- In addition to the social visits, there will also be ad-hoc legal visits utilising five legal visit rooms. In reality, these trips are unlikely to generate material traffic volumes or occur during the peak hour. For robustness these trips have been added to the social visits.

Visitor Modal Split

- It is considered that all visitor trips and legal visits will be made by private car, given the limited choices for other transport modes.
- If sites are located in areas of good existing sustainable transport provision, there might be a case to include a proportion of sustainable travel for visitor trips.
- However, legal visits are always assumed to be undertaken by private car.

Table 2 - Modal Split for Visitors and Legal Visits

Mode	Visitor Trips	Legal Visits
Car	100%	100%
Taxi/ Public Transport	0%	0%

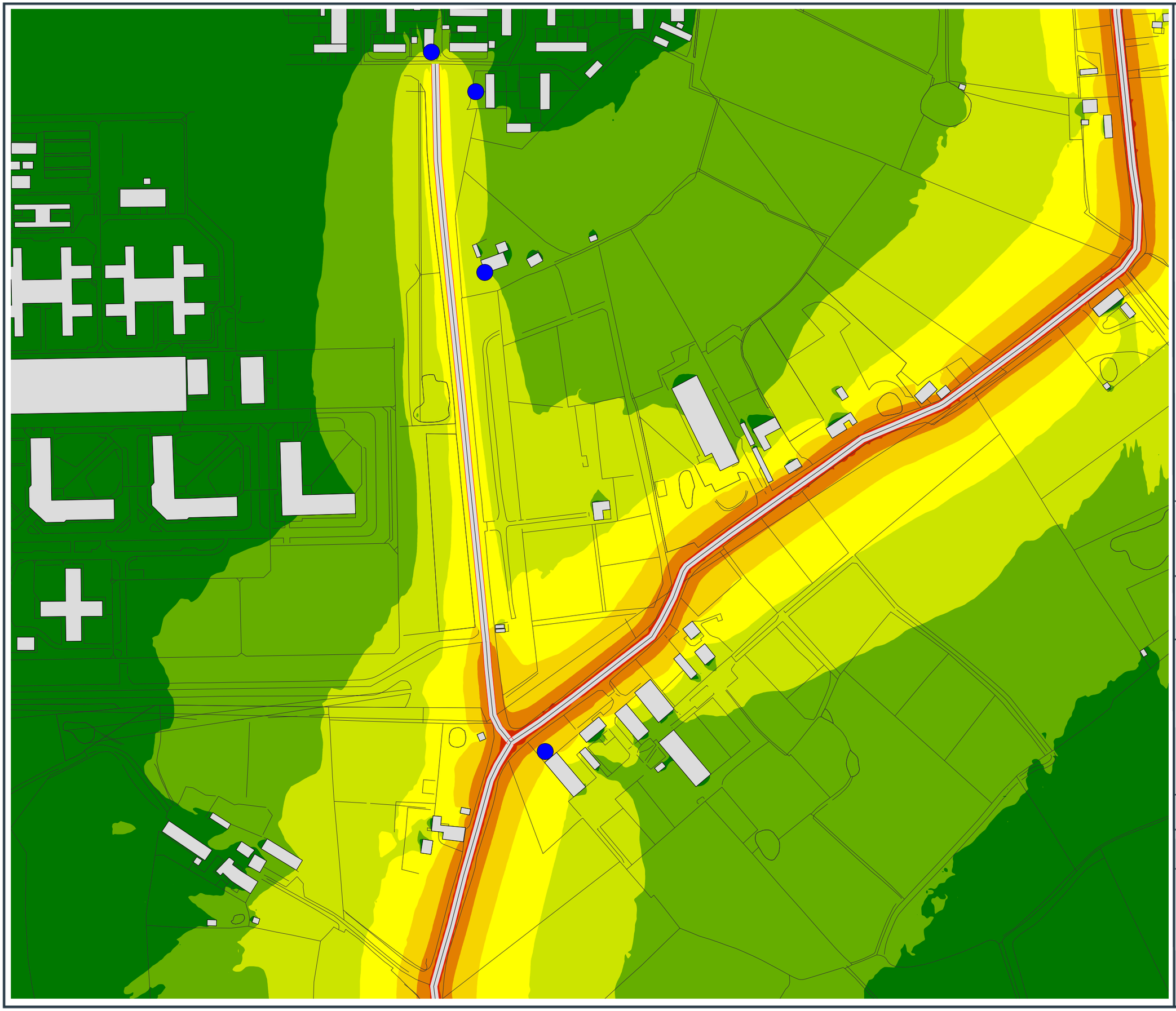
Figures

Hydrock

Project Title: Garth Wymott 2	Drawing Title: Approximate Monitoring Locations (MLs)	Job Number: 17036	By: EG	Rev	Description	Date	By	Drawing No.: Figure 1
		Date: 01.06.22	Checked: EG	-	-	-	-	
		Scale: NTS	Status: A1	-	-	-	-	Issue: 01
				-	-	-	-	
				-	-	-	-	

Hydrock

Project Title: Garth Wymott 2	Drawing Title: Existing Sensitive Receptors (ESRs)	Job Number: 17036	By: EG	Rev	Description	Date	By	Drawing No.: Figure 2
		Date: 01.06.22	Checked: EG	-	-	-	-	
		Scale: NTS	Status: A1	-	-	-	-	Issue: 01
				-	-	-	-	
				-	-	-	-	



Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Daytime $L_{Aeq, 16hour}$, dB

	<=	40.0
40.0 <	<=	45.0
45.0 <	<=	50.0
50.0 <	<=	55.0
55.0 <	<=	60.0
60.0 <	<=	65.0
65.0 <	<=	70.0
70.0 <		

Client

MoJ

Project

Garth Wymott 2

Title

Daytime Average Baseline Noise Levels
- 1.5m height

Figure	Date		
FIGURE 3	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2750	EG	

Hydrock

Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Night Time $L_{Aeq, 8hour}$, dB

	<=	40.0
40.0 <	<=	45.0
45.0 <	<=	50.0
50.0 <	<=	55.0
55.0 <	<=	60.0
60.0 <	<=	65.0
65.0 <	<=	70.0
70.0 <		

Client

MoJ

Project

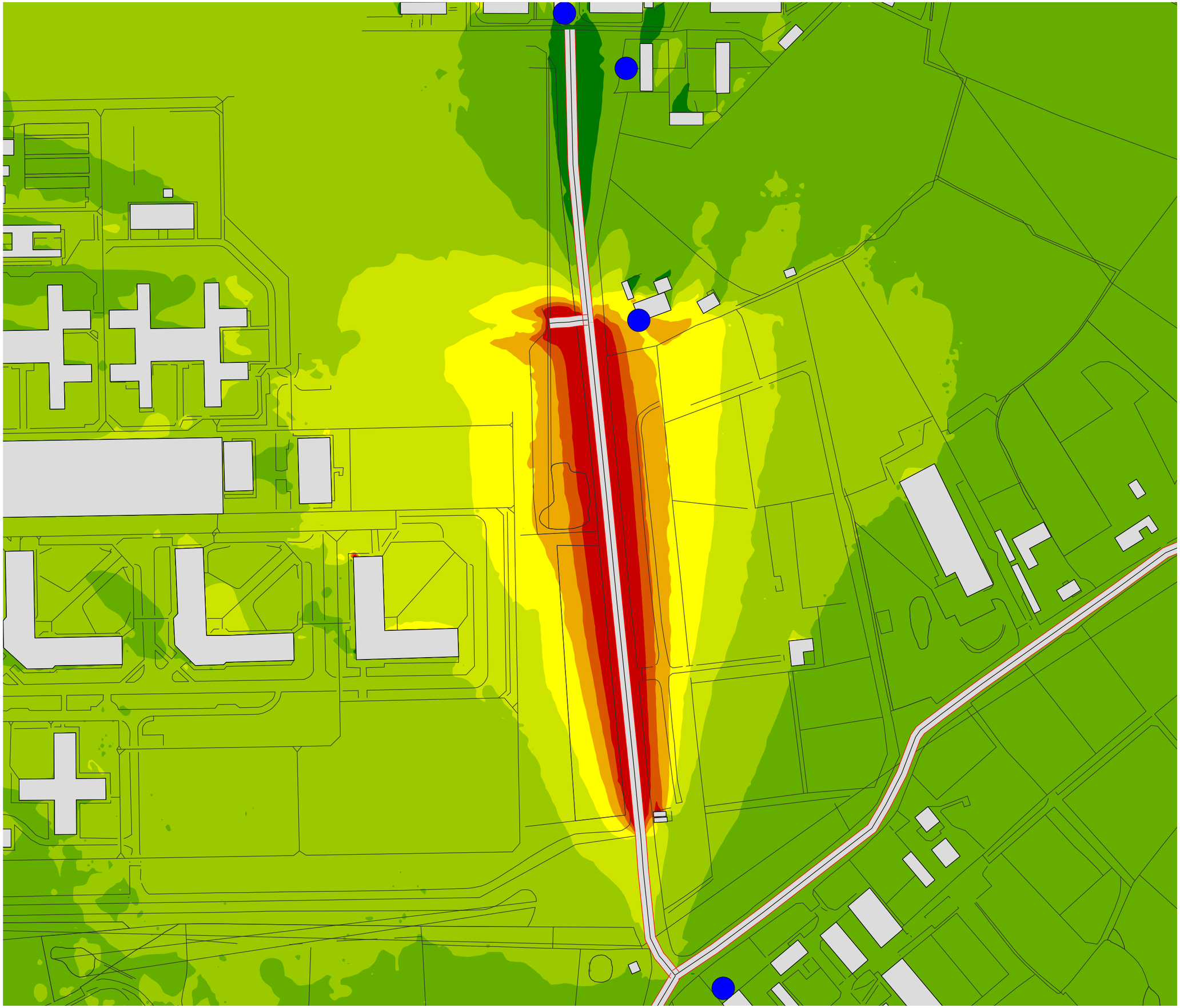
Garth Wymott 2

Title

Nigh-time Average Baseline Noise Levels - 4m height

Figure	Date		
FIGURE 4	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2750	EG	

Hydrock



Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Average $L_{A10,\ 18hour}$, dB

	<=	0.0
0.0 <	<=	1.0
1.0 <	<=	2.0
2.0 <	<=	3.0
3.0 <	<=	4.0
4.0 <	<=	5.0
5.0 <	<=	6.0
6.0 <		

Client

MoJ

Project

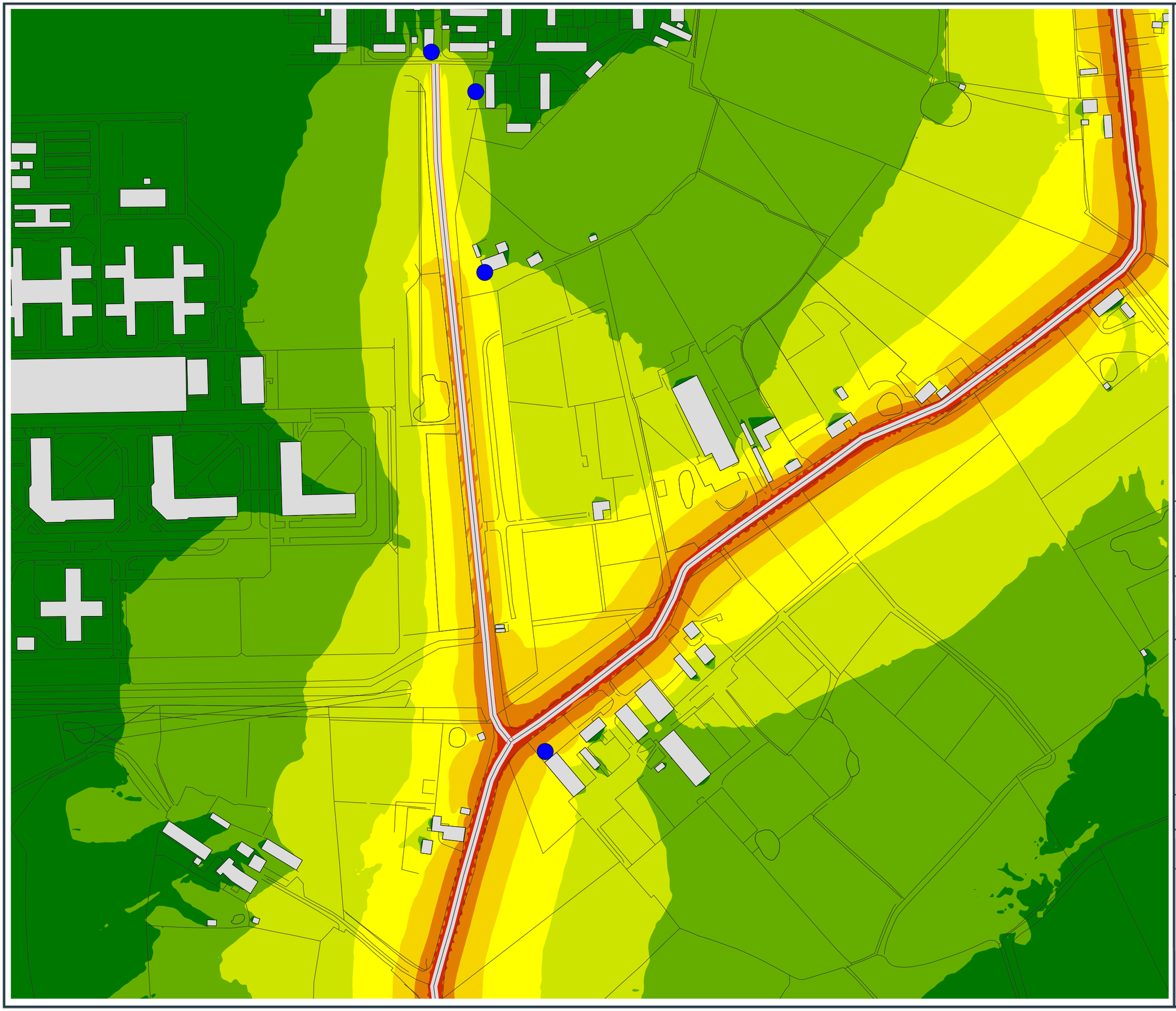
Garth Wymott 2

Title

Scenario 2 to Scenario 3: Change in Noise Level - Operational Phase

Figure	Date		
FIGURE 5	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2000	EG	

Hydrock



Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Daytime $L_{Aeq, 16hour}$, dB

	<=	40.0
40.0 <	<=	45.0
45.0 <	<=	50.0
50.0 <	<=	55.0
55.0 <	<=	60.0
60.0 <	<=	65.0
65.0 <	<=	70.0
70.0 <		

Client

MoJ

Project

Garth Wymott 2

Title

Predicted Daytime Average Noise Levels
- 2025 With Development
- 1.5m height

Figure	Date		
FIGURE 6	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2750	EG	

Hydrock

Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Night Time $L_{Aeq, 8hour}$, dB

	<=	40.0
40.0 <	<=	45.0
45.0 <	<=	50.0
50.0 <	<=	55.0
55.0 <	<=	60.0
60.0 <	<=	65.0
65.0 <	<=	70.0
70.0 <		

Client

MoJ

Project

Garth Wymott 2

Title

Predicted Night-time Average Noise Levels
- 2025 With Development
- 4m height

Figure	Date		
FIGURE 7	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2750	EG	

Hydrock

Legend

- Existing Buildings
- Road
- Southern Aspect Receptor

Daytime $L_{Aeq, 16hour}$, dB

	<=	40.0
40.0 <	<=	45.0
45.0 <	<=	50.0
50.0 <	<=	55.0
55.0 <	<=	60.0
60.0 <	<=	65.0
65.0 <	<=	70.0
70.0 <		

Client

MoJ

Project

Garth Wymott 2

Title

Predicted Night-time Average Noise Levels
- 2025 With Development
- 4m height

Figure	Date		
FIGURE 8	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:500	EG	

Hydrock

Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Average $L_{A10,\ 18hour}$, dB

	<=	0.0
0.0 <	<=	1.0
1.0 <	<=	2.0
2.0 <	<=	3.0
3.0 <	<=	4.0
4.0 <	<=	5.0
5.0 <	<=	6.0
6.0 <		

Client

MoJ

Project

Garth Wymott 2

Title

Scenario 2 to Scenario 4: Change in Noise Level - Typical Construction Period

Figure	Date		
FIGURE 9	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2000	EG	

Hydrock

Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Average $L_{A10,\ 18hour}$, dB

	<=	0.0
0.0 <	<=	1.0
1.0 <	<=	2.0
2.0 <	<=	3.0
3.0 <	<=	4.0
4.0 <	<=	5.0
5.0 <	<=	6.0
6.0 <		

Client

MoJ

Project

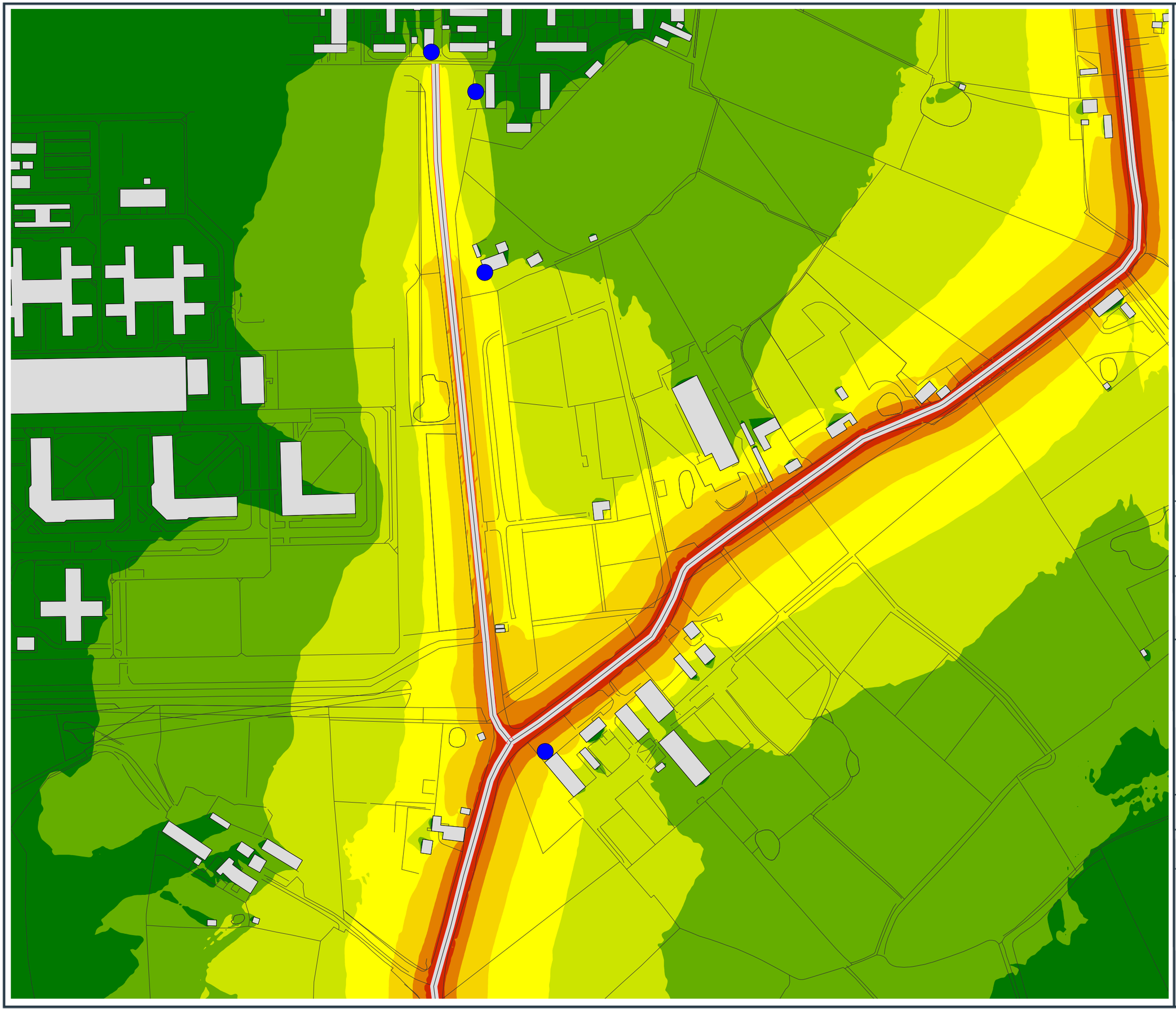
Garth Wymott 2

Title

Scenario 2 to Scenario 5: Change in Noise Level - Peak Construction Period

Figure	Date		
FIGURE 10	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2000	EG	

Hydrock



Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Daytime $L_{Aeq, 16hour}$, dB

		<=	40.0
40.0 <		<=	45.0
45.0 <		<=	50.0
50.0 <		<=	55.0
55.0 <		<=	60.0
60.0 <		<=	65.0
65.0 <		<=	70.0
70.0 <			

Client

MoJ

Project

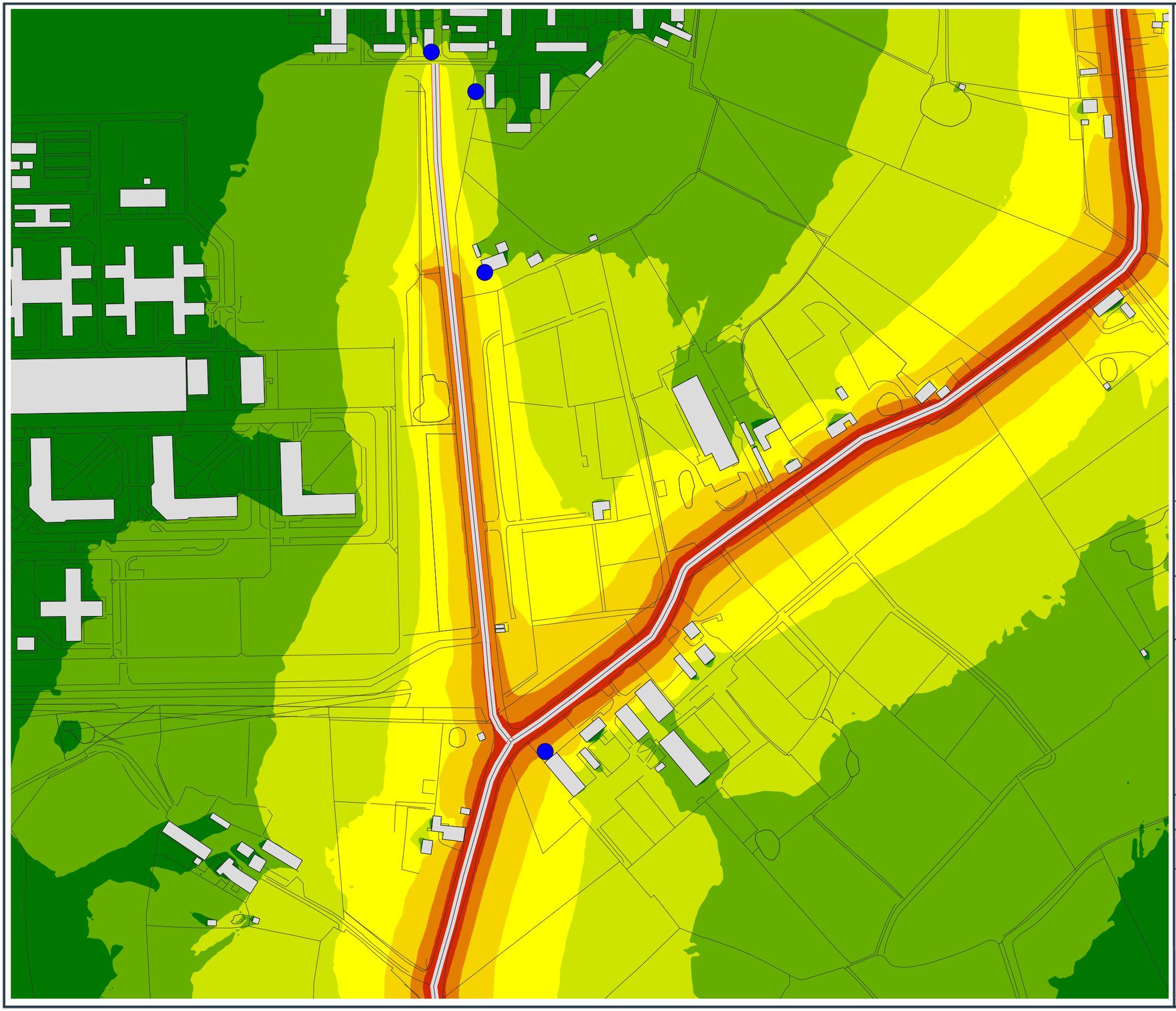
Garth Wymott 2

Title

Predicted Daytime Average Noise Levels
- Average Construction Period
- 1.5m height

Figure	Date		
FIGURE 11	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2750	EG	

Hydrock



Legend

- Existing Buildings
- Road
- General Industrial
- ESRs

Daytime $L_{Aeq, 16hour}$, dB

	<=	40.0
40.0 <	<=	45.0
45.0 <	<=	50.0
50.0 <	<=	55.0
55.0 <	<=	60.0
60.0 <	<=	65.0
65.0 <	<=	70.0
70.0 <		

Client

MoJ

Project

Garth Wymott 2

Title

Predicted Daytime Average Noise Levels
- Peak Construction Period
- 1.5m height

Figure	Date		
FIGURE 12	01/06/2022		
Revision	Scale	Drawn	Approved
REV 1	1:2750	EG	

Hydrock