North East Cambridge Area Action Plan

Proposed Submission

Topic Paper: Environmental Health

Greater Cambridge Planning Service

November 2021

Contents

Abstract / Summary

Environmental Protection is an integral part of Environmental Health, the branch of public health primarily concerned with monitoring or mitigating those factors in the environment that affect human health and disease.

Environmental Protection considers and deals with the effects of environmental pollution, with the aim of reducing and where possible avoiding / eliminating risks to human health and quality of life associated with living and working environments. It is about the practice of protecting the natural environment by individuals, organizations and governments. Its objectives are to conserve natural resources and the existing natural environment, protect the public from environmental health risks and, where possible, to repair damage, consider opportunities for improvement and reverse trends.

Health and wellbeing is influenced by the wider physical environment. By addressing the wider determinants of health, living conditions / housing standards, air quality, noise and environmental issues generally including the risk of contaminated land, environmental health makes a fundamental contribution to the maintenance and improvement of public health, well-being and general quality of life in any new development.

In terms of environmental protection / pollution paragraph 174 of the National Planning Policy Framework (NPPF, 2021) is relevant and states as follows:

"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;"

With specific regard to NEC the following strategic objectives of the AAP are relevant:

'2. North East Cambridge will be a vibrant mixed-use new district where all can live and work.

- *Beautifully designed and accessible places, spaces and buildings will improve wellbeing and quality of life for all through creating opportunities for social integration, community engagement and connecting people with nature.*

***4. North East Cambridge will be a healthy and safe neighbourhood**.*

- *The health and wellbeing of people will help structure new development and inform decision-making, **to create a high quality of life** for everyone.*
- *Human health will be at the forefront of **design by ensuring that noise, air quality, lighting and odour are key factors in determining the layout and functionality** of the area.'*

Policy 25: Environmental Protection aims to ensure that development at North East Cambridge takes full account of all environmental conditions to ensure that the future health, quality of life, amenity and the natural environment are fully considered and effective mitigation and remediation plans are in place that understand individual and cumulative impacts, timing and phasing, and current and future uses.

The site-specific environmental protection issues of air quality, noise, contaminated land, are key site-specific constraints / considerations.

Air Quality

The potential impacts of poor air quality on human health are well documented and the guidance on what is deemed “safe” in terms of air pollutant concentrations is regularly re-assessed and updated. It is considered that there is no absolute ‘safe’ level of harmful air pollutants and exposure at levels below the adopted National Air Quality Objectives can still give rise to health impacts.

The area of North East Cambridge sits alongside the busy A14 and Milton Road, including the junction between the two routes and as such areas adjacent to / adjoining those carriageways are exposed to pollutants such as nitrous oxides and particulate matter (such as PM10 and PM2.5) resulting from vehicle emissions. It is clear that design of the North East Cambridge development area needs to take account of this and is designed to prevent sensitive receptors (such as future residents / site users) from being exposed to dangerous levels of air pollution – this includes the use of external amenity spaces and exposure at home. There are a number of design and mitigation measures that can be implemented to minimise / negate the risk of unacceptable exposure to air pollutants outside the home. The various options are presented within this document.

Notwithstanding the above, it is also key that any new development does not worsen the existing air quality conditions in the locality and give rise to increased emissions of the key pollutants. The design and mitigation measures detailed and recommended within this topic paper also take this into account.

Noise

Noise can have a significant effect on the environment, including sensitive ecological receptors, human health / wellbeing, the amenity/quality of life experienced and enjoyed by individuals and communities and the utility of noise sensitive land uses.

Noise needs to be considered when development may generate additional noise, or would be sensitive to the prevailing acoustic environment. When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment.

Site specific noise sources that will require assessment and consideration include Transport (the A14 and Milton Road traffic noise, the Cambridge to Ely / King’s Lynn

railway line and the Cambridge Guided Busway and future internal streets / and haul roads) and Industrial (existing industrial type uses that may remain and coexist including safeguarded minerals and waste uses such as the aggregates railhead, Cambridge North Station, Cambridge Waste Water Treatment Plant (WWTP) (formerly known as the Cambridge Water Recycling Centre) and any future proposed).

The A14 traffic noise has the potential to have widespread prevalent adverse impacts across a significant proportion of the development site.

Therefore, the future daytime and night-time noise environment of the site will be dominated by road traffic noise from the A14 and Milton Road. The Cambridge to Ely / King's Lynn railway line and the Cambridge Guided Busway will have more of a limited localised impact immediately adjacent to these sources. For transport noise sources, the noise risk across the site varies from between low medium within the centre of the site and to medium to high in areas close to the A14 and Milton Road.

Good acoustic design needs to be considered early in the planning process and is integral to ensure that the most appropriate and cost-effective design, mitigation and solutions are identified from the outset.

Features of the proposed development such as spatial layout, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse noise effects on the environment including future receptors will need to be considered in detail.

For noise sensitive developments, mitigation measures can include avoiding noisy locations in the first place; designing the development to reduce the impact of noise from adjoining activities or the local environment; incorporating noise barriers; and optimising design and layout or the sound insulation provided by the building envelope. It may also be possible to work with the owners/operators of existing businesses or other activities in the vicinity, to explore whether potential adverse effects could be mitigated at source.

It is likely that a strategic site environmental noise barrier close to the A14 will be the most effective option to mitigate and reduce to a minimum adverse noise both internally and externally.

Care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development.

Contaminated Land

Land contamination has the potential to cause significant constraints to the intended redevelopment of parcels of land within the North East Cambridge area. The North East Cambridge development area has a long history of past industrial / commercial / potentially contaminative uses. At present, little is understood of the potential contamination issues beneath the surface (including soils and groundwater). Indeed, there may be particular areas where the existence of contamination may require significant remediation to achieve an acceptable level to accommodate sensitive types

of development. Therefore, to inform the Area Action Plan a Phase 1 Geo-Environmental Desktop Study was commissioned by the Councils to identify the headline contamination issues which in turn will inform the more detailed site investigations and provide an understanding of future site remediation requirements.

The conclusions of the Phase 1 Geo-Environmental Desk Study outline that majority of the challenges posed in terms of contamination at the North East Cambridge site are typical of brownfield redevelopment in England. We consider that there are unlikely to be any issues which would challenge the viability of such a large scheme but there may be individual pockets of land that pose a greater risk in terms of land contamination than others. These areas will be identified through further, more detailed investigation at a later date.

The Study identifies the main areas of concern in terms of land contamination and subsequently identities the potential contaminants that may be associated with those areas. A rough "ranking" of those areas is provided to give an indication of which area or contaminants may pose the greatest risk in terms of land contamination.

Odour

Any new development which may coexist with existing sources of odour and dust on the NEC site such as industrial, commercial or business uses will require an odour and dust impact assessments to ensure acceptability in principle in the first instance and secondly to ensure that no unacceptable adverse impact arise on health and quality of life / amenity, internally and externally.

Operational odours from the existing Cambridge WWTP, a safeguarded use, are a key constraint, as existing odour levels can be prevalent and detectable at times throughout the NEC site. Sewage odours can be offensive to sensitive receptors even at very low concentration levels.

When considering planning applications for development in the vicinity of WWTP, the councils have produced a Technical note on interpretation of 'Odour Impact Assessment for Cambridge Water Recycling Centre' Report / Study (Odournet, October 2018 – ref. CACC17A_08_final) as a material consideration in determining Planning Applications in the vicinity of Cambridge WWTP (CWRC Version - Final: 20-05-21) Technical note on interpretation of Odour Impact Assessment for Cambridge Water Recycling Centre (greatercambridgeplanning.org). This includes the likely acceptability of different types of development within different odour exposure contours that are likely to be generated by the WWTP.

Air Quality

1.1 Introduction

1.1.1 Air pollution affects everyone throughout their lifetime. Long term exposure to air pollution is a real health burden. In particular, it affects the most vulnerable in society: children and older people, and those with heart and lung conditions. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas.

1.1.2 Local air quality is legislated for under Part 4 of the Environment Act 1995 which introduces Local Air Quality Management, guided by The Air Quality Strategy for England, Wales and Northern Ireland published by the Department of Environment, Food & Rural Affairs (DEFRA) in 2000.

1.1.3 Local Air Quality Management is a statutory obligation for all Local Authorities. It involves a rolling programme of air quality assessment, impacting on decisions made by all internal and external bodies responsible for transport planning, highways, growth agendas, development plans and environmental protection.

1.1.4 The Air Quality Strategy provides Local Authorities with air quality objectives and a year by which the objectives should be achieved. With the use of prediction tools and air quality modelling, it is possible to estimate future concentrations of a pollutant at various receptors. If exceedances of any one of the objectives is identified at a receptor point, an Air Quality Management Area (AQMA) is declared.

1.1.5 South Cambridgeshire District council declared an AQMA in 2008 as a result of exceedances of the national objectives for annual mean nitrogen dioxide (NO_2) and daily mean Particulate Matter (PM_{10}) along a stretch of the A14 between Milton and Bar Hill as an AQMA, and includes a small section of NEC at the Cambridge Regional College. The area of the AQMA can viewed by clicking on the link provided below:

https://www.scambs.gov.uk/media/7295/aqma.pdf

1.1.6 Cambridge City Council declared an AQMA in 2005 for annual mean $NO_2$and daily mean PM_{10} for an area encompassing the inner ring road and all the land within it (including a buffer zone around the ring road and its junctions with main feeder roads). Subsequently, an Air Quality Action Plan was drawn up which identifies practical, feasible and cost-effective measures that can be implemented to improve the air quality within the AQMA. The AQMA can viewed by clicking on the link provided below:

https://uk-air.defra.gov.uk/aqma/details?aqma_ref=311#30

1.1.7 As a result of the declaration of the AQMAs, both Authorities have published Air Quality Action Plans (AQAP). The Joint Air Quality Action Plan for Huntingdonshire, Cambridge City and South Cambridgeshire incorporates priority actions for tackling air quality issues through the land use planning process. Cambridge has also recently adopted its new Air Quality Action Plan, covering the period from 2018 to 2023, which

will need to be taken into consideration for cross boundary applications. The requirements set out in these documents, along with successor documents, will need to be taken into consideration when developing planning proposals. The AQAPs can be viewed at the following links:

South Cambridgeshire District Council: https://www.scambs.gov.uk/media/6727/air-quality-action-plan.pdf

Cambridge City Council: https://www.cambridge.gov.uk/media/3451/air-quality-action-plan-2018.pdf

1.2 National Planning Policy and Guidance

1.2.1 The **National Planning Policy Framework (NPPF) 2021** states that planning policies and decisions should contribute to and enhance the natural and local environment. Development should, wherever possible, help to improve local environmental conditions such as air quality. Planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with local Air Quality Action Plans.

1.2.2 In addition to the NPPF, the **National Planning Practice Guidance – Air Quality** states:

"What is the role of plan-making with regard to air quality?

All development plans can influence air quality in a number of ways, for example through what development is proposed and where, and the provision made for sustainable transport. Consideration of air quality issues at the plan-making stage can ensure a strategic approach to air quality and help secure net improvements in overall air quality where possible.

It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality. Air quality is also an important consideration in habitats assessment, strategic environmental assessment and sustainability appraisal which can be used to shape an appropriate strategy, including through establishing the 'baseline', appropriate objectives for the assessment of impacts and proposed monitoring."

Paragraph: 002 Reference ID: 32-002-20191101- Revision date: 01 11 2019

1.2.3 The **National Design Guide** (***Planning practice guidance for beautiful, enduring and successful places MHCLG, October 2019***) also covers topic areas relevant to air quality. It sets out ten characteristics of well-designed places based on

national planning policy, practice guidance and objectives for good design as set out in the National Planning Policy Framework.

It is illustrated by projects that demonstrate good practice. Part 2 of the Design Guide sets out the ten characteristics of beautiful, enduring and successful places. The specific design guidance characteristics relevant to air quality are provided in Appendix 1 but include, amongst other things:

- Context – Enhances the Surroundings
- Identity - Attractive and distinctive
- Movement - Accessible and easy to move around
- Nature - Enhanced and optimised
- Public spaces - Safe, social and inclusive
- Uses - Mixed and integrated:
- Homes & buildings - Functional, healthy and sustainable
- Resources - Efficient and resilient
- Lifespan - Made to last

1.3 Local Policy and Guidance

1.3.1 At a local level, Local Plans have been adopted by both Cambridge City Council and South Cambridgeshire District Council in 2018 that set out policies and proposals for future development and land use in the Greater Cambridge area. The Plans set out a vision for Greater Cambridge and objectives for its achievement. These Plans provide a means of guiding change over long periods of time and establishes a framework against which planning applications can be assessed. Air quality is specifically referenced by Policy 36 Air Quality in Cambridge City Council's Local Plan 2018 and by Policy SC/12: Air Quality in South Cambridgeshire District Council's Local Plan 2018. Policies 15: Cambridge Northern Fringe East and new railway station Area of Major Change (Cambridge City) and SS/4: Cambridge Northern Fringe East and Cambridge North railway station (SCDC) are also relevant. The wording of the Policies is provided below:

Policy 36: Air quality, odour and dust - Cambridge City Council Local Plan 2018

"Development will be permitted where it can be demonstrated:

a. *that it does not lead to significant adverse effects on health, the environment or amenity from polluting or malodorous emissions, or dust or smoke emissions to air; or*
b. *where a development is a sensitive end-use, that there will not be any significant adverse effects on health, the environment or amenity arising from existing poor air quality, sources of odour or other emissions to air.*

According to the end-use and nature of the area and application, applicants must demonstrate that:

a. there is no adverse effect on air quality in an air quality management area (AQMA);
b. pollution levels within the AQMA will not have a significant adverse effect on the proposed use/users;
c. the development will not lead to the declaration of a new AQMA;
d. the development will not interfere with the implementation of the current Air Quality Action Plan (AQAP);
e. any sources of emissions to air, odours and fugitive dusts generated by the development are adequately mitigated so as not to lead to loss of amenity for existing and future occupants and land uses; and
f. any impacts on the proposed use from existing poor air quality, odour and emissions are appropriately monitored and mitigated by the developer."

Policy SC/12: Air Quality - South Cambridgeshire District Council's Local Plan 2018

"1. Where development proposals would be subject to unacceptable air quality standards or would have an unacceptable impact on air quality standards they will be refused.

2. Where emissions from the proposed development are prescribed by EU limit values or national objectives, the applicant will need to assess the impact on local air quality by undertaking an appropriate air quality assessment and detailed modelling exercise having regard to guidance current at the time of the application to show that the national objectives will still be achieved.

3. Development will not be permitted where it would adversely affect air quality in an Air Quality Management Area (AQMA); or lead to the declaration of a new AQMA through causing a significant deterioration in local air quality by increasing pollutant levels either directly or indirectly; or if it would expose future occupiers to unacceptable pollutant levels.

4. Larger development proposals that require a Transport Assessment and a Travel Plan as set out in Policy TI/2 will be required to produce a site based Low Emission Strategy. This will be a condition of any planning permission given for any proposed development which may result in the deterioration of local air quality and will be required to ensure the implementation of suitable mitigation measures.

5. Development will be permitted where:

a. It can be demonstrated that it does not lead to significant adverse effects on health, the environment or amenity from emissions to air; or
b. Where a development is a sensitive end use, that there will not be any significant adverse effects on health, the environment or amenity arising from existing poor air quality.

6. Specifically applicants must demonstrate that:

c. There is no adverse effect on air quality in an Air Quality Management Area (AQMA) from the development;
d. Pollution levels within the AQMA will not have a significant adverse effect on the proposed use / users;
e. The development will not lead to the declaration of a new AQMA;
f. The development will not interfere with the implementation of and should be consistent with the current Air Quality Action Plan;
g. The development will not lead to an increase in emissions, degradation of air quality or increase in exposure to pollutants at or above the health based air quality objective;
h. Any impacts on the proposed use from existing poor air quality, are appropriately mitigated;
i. The development promotes sustainable transport measures and use of low emission vehicles in order to reduce the air quality impacts of vehicles.

7. Applicants shall, where appropriate, prepare and submit with their application, a relevant assessment, taking into account guidance current at the time of the application."

Cambridge Northern Fringe East – CCC / SCDC Local Policy

1.3.5 In addition to local specific air quality related policies both plans have policies relating to parts of the NEC area, formerly known as Cambridge Northern Fringe East. These are policy 15: Cambridge Northern Fringe East and new railway station Area of Major Change (CCC) and SS/4: Cambridge Northern Fringe East and Cambridge North Railway Station (SCDC).

1.3.6 These policies state that the Cambridge Northern Fringe East and the new railway station will enable the creation of a revitalised, employment focussed area centred on a new transport interchange. Amongst other requirements the following are relevant to noise:

"All proposals should:

a. take into account existing site conditions and environmental and safety constraints;
b. demonstrate that environmental and health impacts (including odour) from the Cambridge Water Recycling Centre can be acceptably mitigated for occupants;"

1.4 Existing Air Quality – Constraints

1.4.1 With regards to air quality as a constraint, there are two fundamental issues to consider:
- The placement of sensitive receptors in areas where the air quality is considered to be a risk
- Ensuring that new development is considered and designed in accordance with all relevant National and local policies and guidance.

1.4.2 Air quality can be a concern when there is likely to be a significant increase in the number of people exposed to a problem with air quality, such as when new residential properties are proposed in an area known to experience poor air quality. Exposing people to existing sources of air pollutants is a material consideration. This could also be by building new homes, workplaces or other development in places with poor air quality. This could be the case with sensitive development close the A14 carriageway as may be the case with the NEC development.

1.4.3 To determine the risks presented to the end-users by existing air quality conditions, the National Air Quality Strategy introduced the National Air Quality Objectives (NAQOs). These are health based objectives providing both a short term (hourly / daily) and long term (annual) triggers. Local Authorities have a duty to assess / monitor air quality in areas of concern to identify where NAQO's are (or are likely to be) exceeded, which may ultimately result in the declaration of an AQMA. The following table provides the objectives that are the most relevant to the NEC area. These objectives relate to a variety of urban background sources (road traffic, agricultural, industrial) but do not account for the potential impacts of air pollution issues from individual, local industrial premises.

Pollutant	**Long Term Mean (annual) µg/m^3**	**Short Term Mean**	
		Concentration, µg/m^3	**Duration**
Particulate matter (PM10)	40	50	24hr mean not to be exceeded more than 35 times a year
Particulate matters (PM2.5)	25	25	24hr mean
Nitrogen dioxide (NO2)	40	200	1hr mean not to be exceeded more than 18 times per year

1.4.4 It is recommended that sensitive development / relevant receptors are not introduced to areas that are shown to (or are forecast to) exceed the NAQO's. Such receptors include residential dwellings, schools, hospitals and external amenity space.

1.4.5 It is important to note that in July 2019, the then Environment Secretary Michael Gove stated that the upcoming Environment Bill will enshrine World Health Organisation (WHO) limits for particulate matter (PM) in UK law. Given this, it is important that the more stringent PM limits quoted above are given consideration.

https://www.gov.uk/government/news/stronger-protections-for-the-environment-move-closer-as-landmark-bill-takes-shape

1.5 Air Quality Modelling Study

1.5.1 In 2019, Cambridge Environmental Research Consultants (CERC) modelled air quality across Cambridge and South Cambridgeshire in what is considered to be the

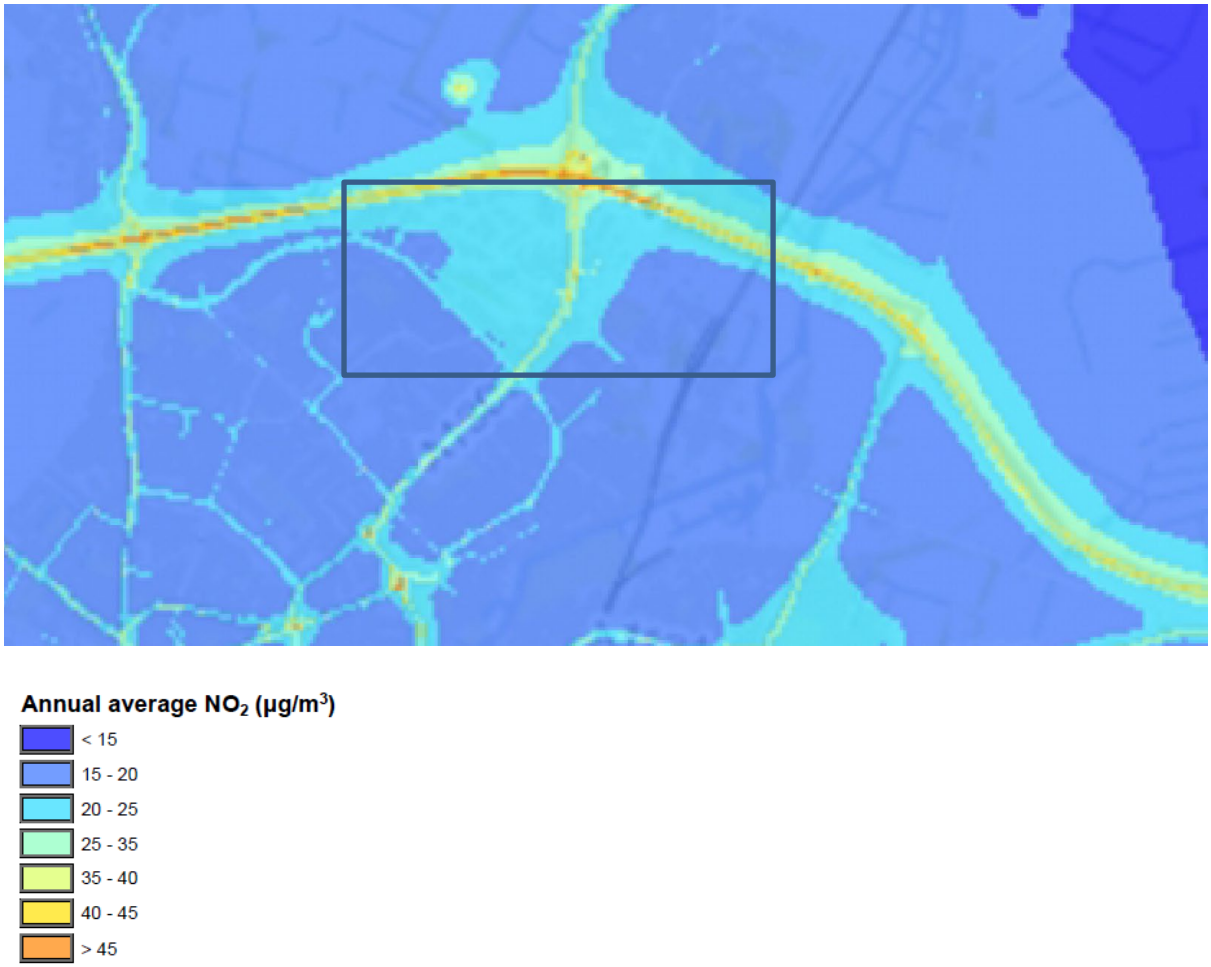
most comprehensive air quality study carried out to date in the Greater Cambridge area. The work was carried out on behalf of the Greater Cambridge Partnership. The study included all major development proposals (with the exception of the NEC area) within the Greater Cambridge Area including the upgrades to the A14 Area and provided contoured outputs for the concentrations of the relevant pollutants for the year 2030. The modelled outputs have been used in this Topic Paper to identify if any locations within the NEC will be significantly constrained by local air quality (this excludes air pollution form localised industrial sources).

1.5.2 It should be noted that further, detailed air quality modelling will be required at a later date to assess the impacts of the wider development of the NEC on local air quality. At this early stage, it is not possible to carry out such work as more detailed design considerations will be required to obtain appropriate and accurate input data for the air quality model. Any future air quality modelling will also need to be carried out in accordance with the relevant air quality sections (pages 113-135) of the Greater Cambridge Sustainable Design and Construction SPD, January 2020 (GC- SD&C SPD, 2020), available to view at the following link:
https://www.cambridge.gov.uk/media/8157/greater-cambridge-sustainable-design-and-construction-spd.pdf

1.5.3 Figures 1-8, below provide a visual representation of potential exceedances of the National Air Quality Objectives in the NEC study area. Brief commentary is also provided for the purpose of interpretation.

Nitrogen Dioxide (NO_2)

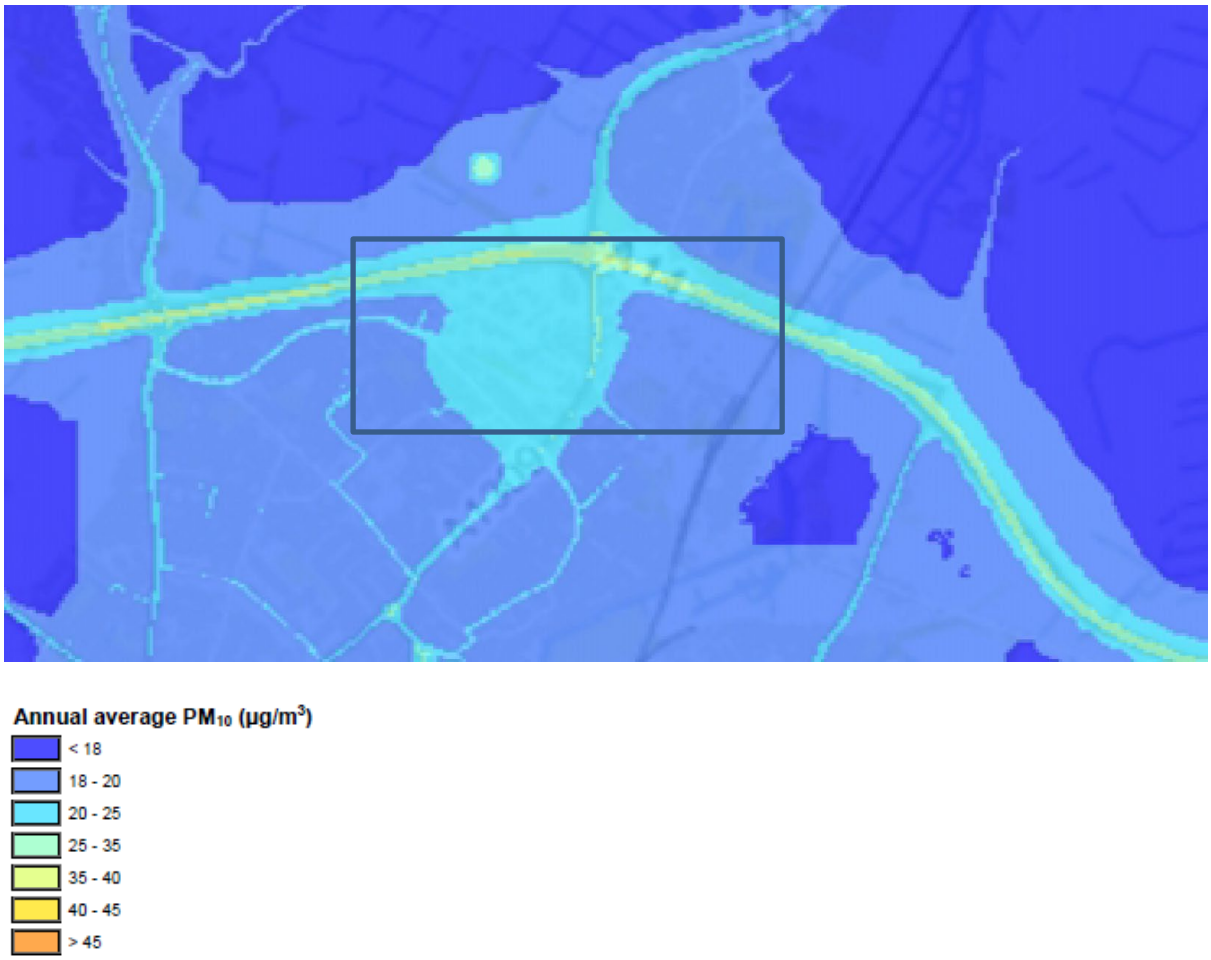
Figure 1: Annual Mean NO_2 Concentrations, µg/m^3 (based on existing baseline NAQO of 40µg/m^3)



1.5.4 As shown in Figure 1, the annual average NO_2 in the study area does not appear to present a constraint to development across the wider site when compared to the existing NAQO of 40µg/m^3. Average modelled concentrations range between 15-35µg/m^3. The highest are predicted alongside the existing major roads. However, there remains a negative health impact from NO_2 at levels below the National Air Quality Objectives, such that it is advised that consideration should be given to the protection of health of the future residents and people. For this reason, it is strongly advised against the development of sensitive / relevant receptors such as residential dwellings, hospitals, schools and external amenity spaces in close proximity to the A14 carriageway in particular and recommend a buffer separation distance of at least 20-30m from the edge of the A14, if such uses are to be considered.

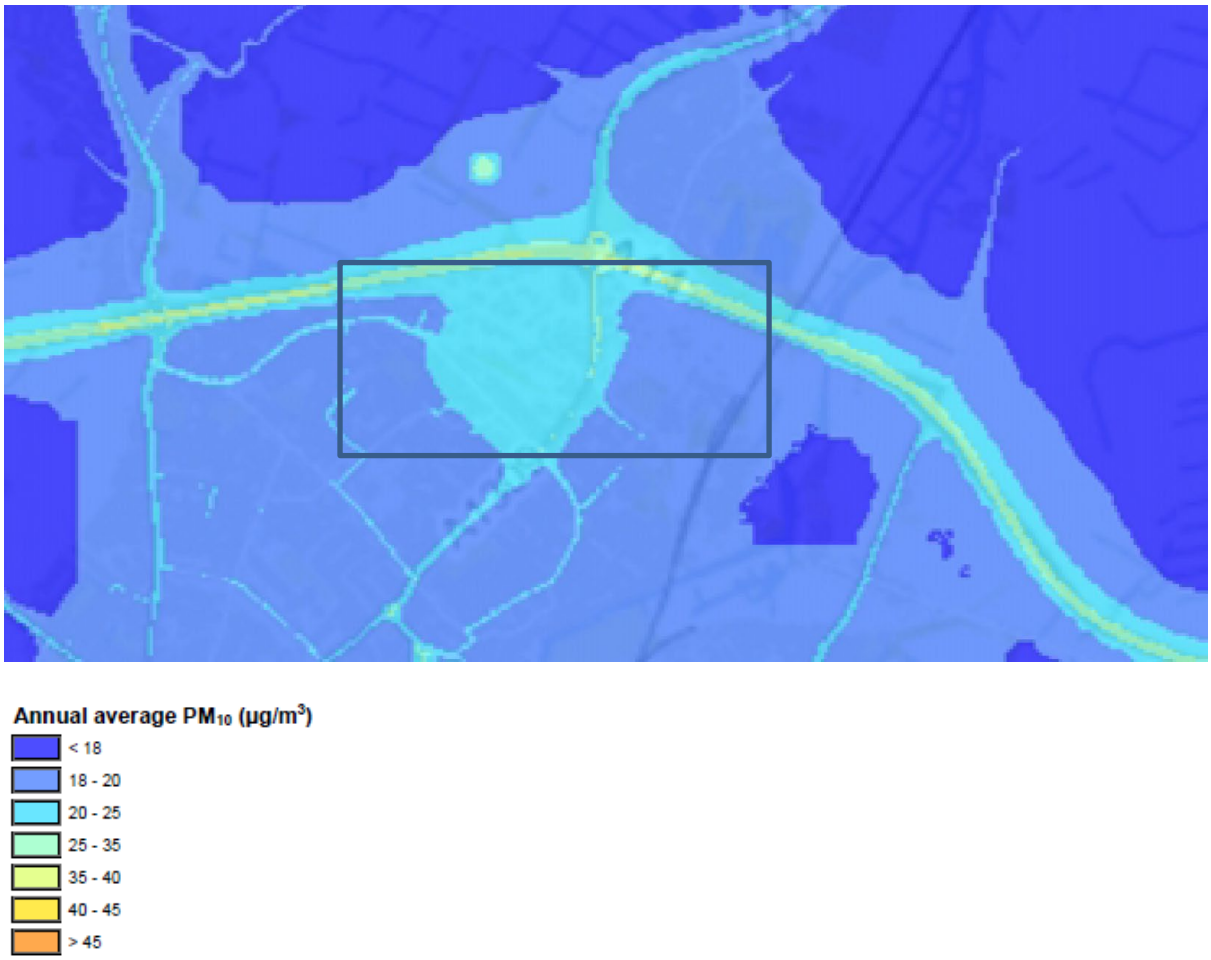
Particulate Matter (PM10)

Figure 2: Annual Mean PM_{10} Concentrations, µg/m^3 (based on existing NAQO of 40µg/m^3)



1.5.5 As shown in Figure 2, the annual average PM_{10} in the NEC study area does not appear to present a constraint to development across the wider AAP area when compared to the existing NAQO of 40µg/m^3. Average modelled concentrations range between 18-25µg/m^3. The highest concentrations have been modelled alongside the busy carriageways. However, there remains a negative health impact from PM_{10} at levels below the National Air Quality Objectives, such that it is advised that consideration should be given to the protection of health of the future residents and people. For this reason, it is strongly advised against the development of sensitive / relevant receptors such as residential premises, hospitals, schools and external amenity spaces in close proximity to the A14 carriageway in particular and recommend a buffer of at least 20-30m if such uses are to be considered.

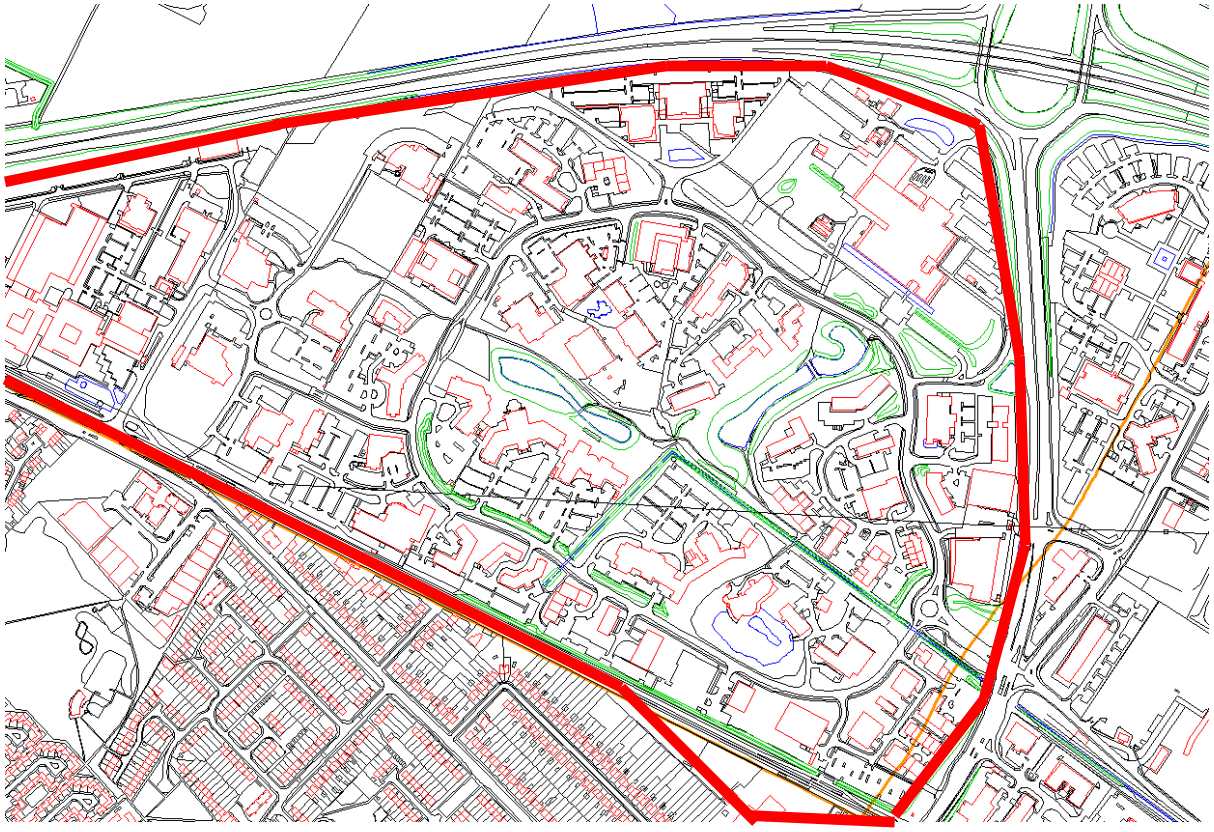
Figure 3: Annual Mean PM_{10} Concentrations, µg/m^3 (based on future NAQO of 20µg/m^3)



1.5.6 As shown in Figure 3, the annual average PM_{10} in the NEC study area **does appear to present a constraint** to development when compared to the future NAQO of 20µg/m^3. Average modelled concentrations range between 18-25µg/m^3. With the highest levels recorded alongside the existing major roads. Should the NQO of 20µg/m^3 be introduced as part of the upcoming Environment Bill, parts of the study area may be unsuitable for sensitive developments, in particular residential dwellings, schools, hospitals and external play areas / amenity space. The areas that are forecast to be impacted by this (as identified in Figure 3, above) are as follows:

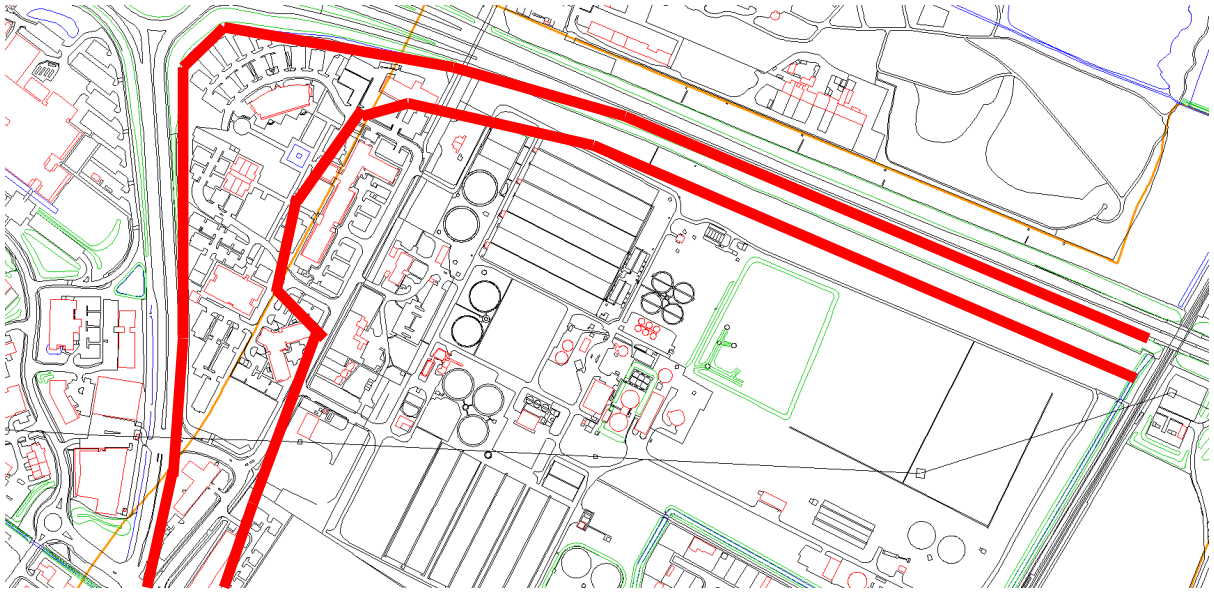
- Cambridge Science Park and area of Cambridge Regional College (in its' entirety)
- St John's Innovation Park (including a portion of St John's Innovation Centre) and
- A further strip of land on the eastern side of Milton Road

Figure 4: Modelled Exceedances of Annual Mean PM_{10} Concentrations, µg/m^3 based on future NAQO of 20µg/m^3 (Science Park) – This NAQO is quoted by Government as being the future NAQO for PM_{10} but no year for this is provided by them



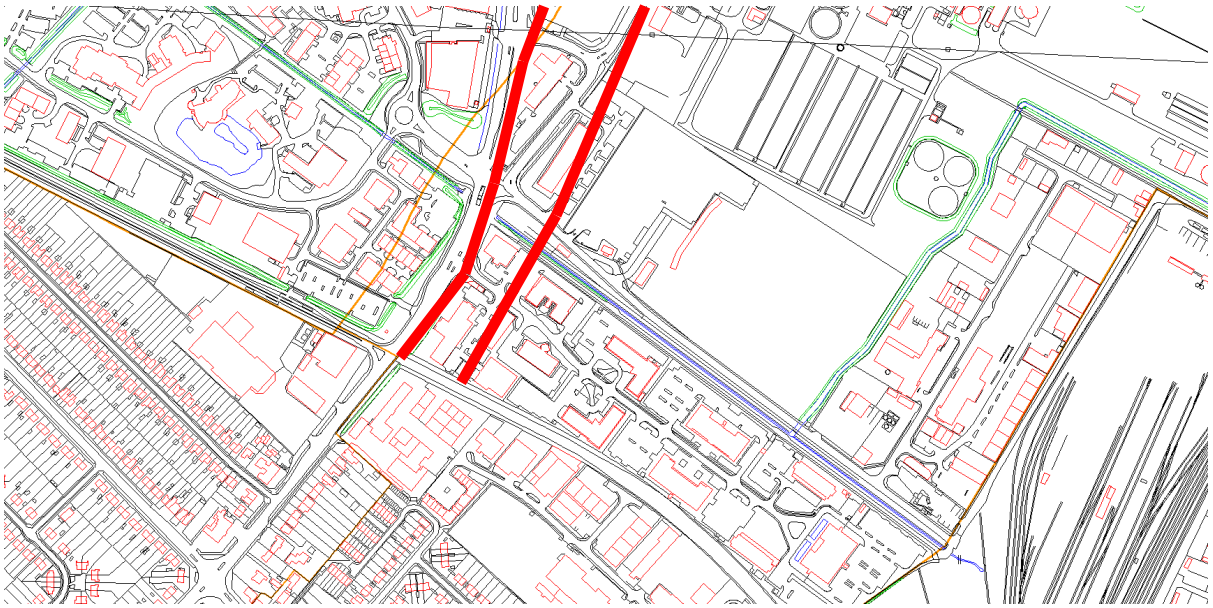
Boundary within which PM_{10} is predicted to be exceeded within the area of the NEC **based on future NAQO of 20µg/m^3** (Science Park)

Figure 5: Modelled Exceedences of Annual Mean PM_{10} Concentrations, µg/m^3 based on future NAQO of 20µg/m^3 (Cowley Road and A14)



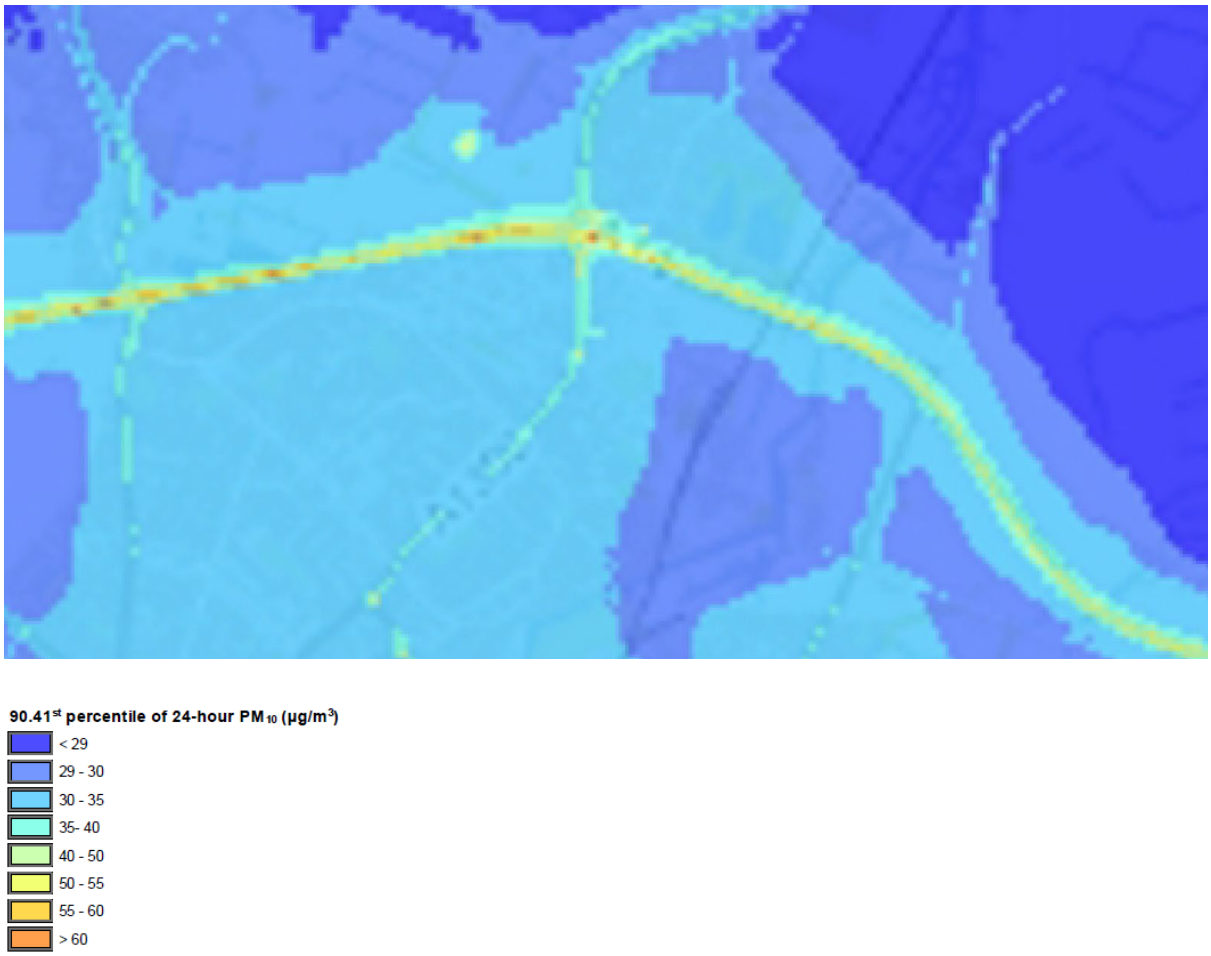
Boundary within which PM10 is predicted to be exceeded within the area of the NEC **based on future NAQO of 20µg/m^3** (Cowley Road and A14)

Figure 6: Modelled Exceedences of Annual Mean PM_{10} Concentrations, µg/m^3 based on future NAQO of 20µg/m^3 (Nuffield Road, Milton Road)



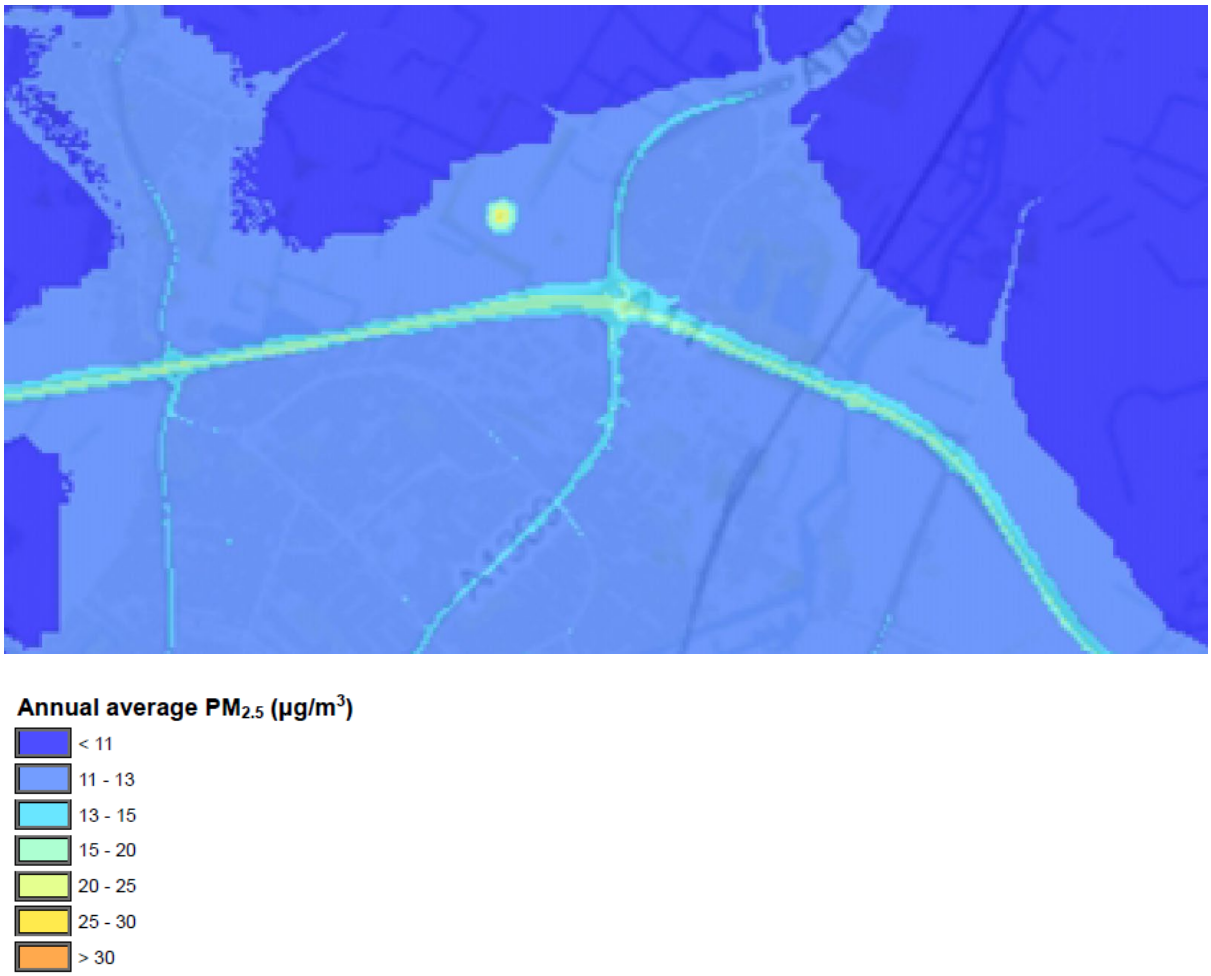
Boundary within which PM10 is predicted to be exceeded within the area of the NEC **based on future NAQO of 20µg/m^3** (Nuffield Road and Milton Road)

Figure 7: 24-hr Mean PM_{10} Concentrations, µg/m^3 (based on existing NAQO of 50µg/m^3)



1.5.7 As shown in Figure 7, the 24-hr mean PM_{10} in the NEC study area does not appear to present a constraint to development across the wider site when compared to the existing NAQO of 50µg/m^3. Average modelled concentrations range between 29-35µg/m^3. The highest levels are predicted alongside the busy carriageways. However, there remains a negative health impact from PM_{10} at levels below the National Air Quality Objectives, such that it is advised that consideration should be given to the protection of health of the future residents and people. For this reason, it is strongly advised against the development of sensitive / relevant receptors such as residential premises, schools, hospitals and external amenity spaces in close proximity to the A14 carriageway in particular and recommend a buffer of at least 20-30m if such uses are to be considered.

Figure 8: Annual Mean $PM_{2.5}$ Concentrations, µg/m^3 (based on existing NAQO of 25µg/m^3, respectively)



1.5.8 As shown in Figure 8, the annual mean $PM_{2.5}$ in the NEC study area does not appear to present a constraint to development across the wider site when compared to the existing NAQO of 25µg/m^3. Average modelled concentrations range between 11-15µg/m^3. The highest levels are predicted alongside the busy carriageways. However, there remains a negative health impact from $PM_{2.5}$ at levels below the National Air Quality Objectives, such that it is advised that consideration should be given to the protection of health of the future residents and people. For this reason, it is strongly advised against the development of sensitive / relevant receptors such residential premises, schools, hospitals and external amenity spaces in close proximity to the A14 carriageway in particular and recommend a buffer of at least 20-30m if such uses are to be considered.

1.6 Air Quality – Enhancement, Design and Mitigation Measures

1.6.1 In line with NPPF, which states that development should contribute to and enhance the environment, the Greater Cambridge Sustainable Design and Construction SPD advocates a hierarchy within the approach to air quality improvements that should be followed, and consideration of the following enhancement and mitigation:

- Primary (inherent design) - Design measures to help reduce air quality impacts
- Secondary (foreseeable) – Project specific mitigation measures
- Tertiary (inexorable / unavoidable) - Possible offsetting measures

Primary - inherent design measures

1.6.2 The following points detail a (non-exhaustive) list of the general primary / inherent design measures and considerations that can be used to reduce air quality impacts:

- Installation of electric vehicle (EV) charge points
- Car free development
- Reduced car parking provision/parking restrictions
- Reserved parking for EV/car clubs
- Design/layout of the development to promote walking, cycling and public transport
- Design and layout of infrastructure to increase separation, for example, set buildings back from the roadside / provide a buffer zone
- Locate habitable spaces away from busy roads
- Ensure windows that open face away from sources of outdoor air pollution, such as busy roads
- Arrange site to separate polluting and sensitive uses
- Arrange site to centrally locate trip attractors
- Ensure high quality walking and cycling routes
- Plan mixed-use developments where appropriate
- Home Zones
- Consider impact on local road network
- Avoid creation of non-dispersive canyons
- Install combined heat and power (CHP) to up to date emissions standards
- Provision of efficient electric heating, low or ultra-low NOx boilers only
- Incorporation of solar thermal and/or PV technology to reduce emissions
- Incorporation of air source or ground source heat pumps to reduce emissions

Secondary (foreseeable) - project specific mitigation

1.6.3 Where inherent design cannot adequately reduce the air quality impacts, project secondary specific mitigation measures will need to be used to either protect receptors or minimise the need for vehicle use. There are a variety of such measures that can be considered as detailed below. As above, the list is not exhaustive:

- Support access to a car share scheme, with financial incentives and promotion
- Provision of bike hire scheme, including E-bikes and off-gauge bikes
- Travel planning
- Mechanical ventilation with clean air intake, if appropriate
- Fit mechanical systems with filtration to protect against outdoor pollutants
- Eco-driving training, where appropriate
- Low emission fleet strategy
- Large-scale major developments could consider:
    - Support measures to reduce the need to travel:
    - Alternative working practices – flexitime, teleworking, homeworking, videoconferencing, compressed work periods.
    - Local sourcing of staff, products and raw materials.
    - Development and use of hub distribution centres employing low emission deliveries.
    - Provision of discounted on-site shopping, eating, child-care, banking facilities.
- Support measures to reduce polluting motorised vehicle use:
    - Use of pooled low emission vehicles – cars, vans, taxis, bicycles.
    - Provision of dedicated low emission shuttle bus including managed pick-up and drop-off.
    - Contribution to the emerging low emission vehicle refuelling infrastructure.
    - Contribution to site low emission waste collection services.
    - Incentives for the take-up of low emission vehicle technologies and fuels.
- Measures to support improved public transport:
    - Provision of new or enhanced public transport services to the site.
    - Shuttle services to public transport interchange, rail station or park and ride facilities.
    - Support improving information systems for public transport.
    - Supporting city free bus expansion schemes.
    - Promoting low emission bus service provision.
    - Support air quality monitoring programmes.
    - Subsidised bus passes
- Further measures to promote walking and cycling:
    - Improvements to district walking and cycling networks including lighting, shelters, and information points and timetables.
    - Support cycle training and awareness schemes.
    - Guaranteed ride home in emergencies.
    - Support secure and safe cycle parking facilities.
    - Installation of charge points for EV bikes
    - Provision of pool EV bikes
- Measures to promote sustainable travel plans:
    - Support local travel to school and school travel plans initiatives.
    - Marketing aimed at persuading a switch to sustainable modes with incentives
    - Promotion of subsidised/sponsored travel plan measures
    - Supporting community/local organisation groups to promote sustainable travel

Tertiary - possible offsetting measures

1.6.4 Offsetting by providing money for schemes that improve overall air quality should be a last resort but may need to be combined with good design and mitigation in some circumstances.

Some examples of possible offsetting measures are as follows:

- Financial contribution towards traffic management measures
- Financial contribution towards improvements in public transport facilities and/or support for new services
- Financial contribution towards improvements in walking and cycling facilities
- Financial contribution towards air quality improvement projects

Consideration should be made for the following by Local Authorities:

1.6.5 The National Institute for Health and Care Excellence (NICE) in their Quality Standard - QS181 publication '*Air pollution: outdoor air quality and health, Published: 28 February 2019'* www.nice.org.uk/guidance/qs181 advise that Local authorities should be strategic leaders of local initiatives to address air pollution, working in a coordinated way with key partners to ensure a consistent and planned approach.

1.6.6 NICE state that a clear framework for joined-up local action should be followed and key components should include enabling zero- and low-emission travel (such as electric cars, buses, bikes and pedal cycles; and car sharing schemes or clubs) and developing buildings and spaces to reduce exposure to air pollution.

1.6.7 NICE's rationale is that the built environment can affect the emission of road-traffic-related air pollutants by influencing how and how much people travel, for example, by ensuring good connections to walking and cycling networks. Buildings can affect the way air pollutants are dispersed through street design and the resulting impact on air flow. Addressing air pollution at the planning stage for major developments may reduce the need for more expensive remedial action at a later stage. It can also help to maintain people's health and wellbeing during and after construction. Assessing proposals to minimise and mitigate road-traffic-related air pollution will help to ensure they are robust and evidence based.

1.6.8 When developing buildings and spaces to reduce exposure to air pollution, NICE recommend that this could include the following:

- siting and designing new buildings, facilities and estates to reduce the need for motorised travel
- minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high
- siting living accommodation away from roadsides
- avoiding the creation of street and building configurations (such as deep street canyons) that encourage pollution to build up where people spend time

- including landscape features such as appropriate species of trees and vegetation in open spaces or as 'green' roofs where this does not restrict ventilation
- considering how structures such as buildings and other physical barriers will affect the distribution of air pollutants.

1.6.9 Notwithstanding the above, it is expected that any proposals are designed and built out in accordance with the relevant air quality sections (pages 113-135) of the GC- SD&C –SPD, 2020. These pages give guidance for and requirements of designing and providing low emission developments. The SPD is available to view at the following link:
https://www.cambridge.gov.uk/media/8157/greater-cambridge-sustainable-design-and-construction-spd.pdf

1.7 Interrelation with Other Topic Themes

1.7.1 Air quality can be directly affected by decisions and proposals within other disciplines and development characteristic. Appendix 2: Interrelation with other NECAAP Strategic Objectives, Policies and Topic Themes **-** presents / details how air quality is crosscutting / overlaps with and is interrelated to other strategic objectives, policies and other topic themes.

1.8 Conclusion – Approach to Air Quality at North East Cambridge Policy 25

1.8.1 Despite the implementation of the National Air Quality Objectives, there is no absolute “safe” level of air pollution. As such, it is required that developments within the North East Cambridge Area are designed and constructed in order to combat two key issues:

1) To prevent / reduce as far as is practicable, the potential for future residents / workers / site users from being exposed to unacceptable levels of air pollution
2) To prevent / reduce as far as is practicable the development giving rise to an unacceptable increase in emissions of key pollutants.

1.8.2 In the first instance, proposals should be inherently designed so as to reduce / negate risk. Such design elements could include the placing of less sensitive developments closer to the carriageways with the more sensitive developments behind these or providing an adequate buffer between the carriageway and sensitive developments, taking into account that external amenity space and gardens are considered to be sensitive locations. Where designing out exposure to poor air quality is not possible (heavily constrained), there are various other design and mitigation options that would need to be considered as alternatives.

Noise

2.1 Introduction

2.1.1 Noise in society is defined as unwanted sound, which is unpleasant and causes disturbance/annoyance. It is an unavoidable part of everyday life and is commonly caused by environmental noise originating from various sources including transportation (road traffic, railway and aircraft), leisure/recreational and industrial, trade/commercial and business premises.

2.1.2 Unwanted sound in and around homes can be at best a nuisance, but at worst can cause longer term health issues. In the short term, noise can cause activity disturbance, speech interference and disturb rest, relaxation and sleep. In the longer term there is emerging evidence of more concerning health effects, because the presence of noise can cause increased levels of stress hormones, increasing the risk of cardiovascular effects (heart disease and hypertension). Noise has been shown to elevate blood pressure and stress hormones in children and it can contribute to feelings of helplessness. It can also lead to cognitive issues, including impaired cognitive development and lack of concentration.

2.1.3 Noise can therefore have a significant effect on the environment, including sensitive ecological receptors, human health and wellbeing including sleep disturbance, the amenity/quality of life experienced and enjoyed by individuals and communities and the utility of noise sensitive land uses. Consequently, noise can be a material planning consideration when new developments have the potential to create noise and when new developments would be sensitive to the existing noise conditions. Noise within the living and working environment is a key aspect of sustainable development.

2.1.4 The planning process is the primary mechanism for local authorities to prevent serious conflicts between different land uses. Many developments can generate significant amounts of noise or are sensitive to the impact of noise. It is the responsibility of LPAs to ensure that developments are appropriately located and designed so that they do not have an unacceptable impact on local communities and that noise sensitive developments are not subjected to unacceptably high levels of noise.

2.1.5 It is important that good acoustic design is considered at an early stage in the development management process. This guidance is intended to help protect occupiers of new or existing noise sensitive buildings from existing or introduced noise sources respectively and to seek to protect and improve the residential amenity of the area overall. It is government policy that noise should not be considered in isolation or separately from the economic, social and other environmental dimensions of proposed development.

2.1.6 The types of development and instances when noise is a material consideration and when an acoustic assessment/report is likely to be required can be summarised as:

(i) New Noise Sensitive Development (NSD) and receptors such as residential etc introduced into an area with existing high noise levels – transport or industrial, commercial or business uses / premises; and
(ii) Noise Generating Development (NGD) – new or existing such as new highways or industrial, commercial or business uses / premises and impact on noise sensitive development.
(iii) Good acoustic design and noise control is a key element for the design of stress-free restorative environments as part of healthy living conditions and environments.

2.1.7 However, the effects of sounds are highly context-dependent. This means that available guidance on suitable acoustic standards needs to be intelligently interpreted in the context of the overall setting of developments, and carefully set against potentially conflicting design aims or constraints.

2.2 National Planning Policy

THE NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

2.2.2 The original NPPF was published by central government in 2012 with revised versions published in July 2018, February 2019 and again July 2021. It replaces previous noise policy contained in Planning Policy Guidance Note 24. It does not replace the Noise Policy Statement for England 2010 to which it refers.

2.2.3 Specifically, on the subject of noise, paragraphs 174, 185 and 187 state that:

"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;"

"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[60];

(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;"

Footnote 60 See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)'

Paragraph 187 of the NPPF provides additional policy information applicable where new development is proposed close to existing commercial noise sources and is reproduced below.

"187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

THE NOISE POLICY STATEMENT FOR ENGLAND (NPSE, March 2010)

2.2.5 This provides more detail than the NPPF setting out the long-term vision of Government noise policy and applying to all forms of noise excluding occupational noise. The NPPF is consistent with the NPSE which refers to the management and control of noise within the context of Government Policy on sustainable development.

2.2.6 Through effective management and control of environmental noise within the context of Government policy on sustainable development, the NPSE aims to:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise other adverse impacts on health and quality of life; and
- Contribute to improvements to health and quality of life, where possible.

2.2.7 The Explanatory Note to the NPSE assists in the definition of significant adverse and adverse with reference to **No Observed Effect Level (NOEL), Lowest Observed Adverse Effect Level (LOAEL)** and **Significant Observed Adverse Effect Level (SOAEL)** values:

- **NOEL:** the level of noise exposure below which no effect at all on health or quality of life can be detected.
- **LOAEL**: the level of noise exposure above which adverse effects on health and quality of life can be detected.
- **SOAEL**: The level of noise exposure above which significant adverse effects on health and quality of life occur.

2.2.8 The Government policy and guidance do not state / recommended numerical noise values for the levels referred to in NOEL, LOAEL and SOAEL, rather, they consider that they are different for different noise sources, for different receptors and

at different times and should be defined on a strategic or project basis taking into account the specific features of that area, source or project.

2.2.9 The NPSE recognised that, at the time of Publication, further research was needed into how these categories might be quantified for different scenarios. There is still no robust, universally accepted method of deriving suitable values and a variety of approaches are adopted in different circumstances. The subjective guidance provided in the Planning Practice Guidance (PPG) for noise can be of assistance in deriving suitable values and this guidance is described in Section 2.4 below.

2.2.10 The three aims of the NPSE are in alignment with the categories described above:

1. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

3. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.3 Noise Action Plans and Important Areas - Environmental Noise (England) Regulations 2006

2.3.1 The Environmental Noise (England) Regulations 2006 (as amended) transpose the Environmental Noise Directive into domestic law for England. These Regulations apply to environmental noise, mainly from transport. The regulations require regular noise mapping and action planning for road, rail and aviation noise and noise in large urban areas (agglomerations).

2.3.2 They also require us to produce Noise Action Plans based on the maps for road and rail noise and noise in agglomerations. The Action Plans identify Important Areas (areas exposed to the highest levels of noise) and suggests ways the relevant authorities can reduce these. Major airports and those which affect agglomerations are also required to produce and publish their own Noise Action Plans separately. 'Important Areas' for road and rail have been identified within Cambridge and an indicative plan of these areas can be viewed at http://extrium.co.uk/noiseviewer.html.

2.3.3 National planning practice guidance states that where relevant, Noise Action Plans, and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account when considering noise impacts.

2.3.4 These ‘Important Areas’ give a good indication of those places that are exposed to the highest levels of existing road and rail transport noise. Proposals for new residential development in these locations need to be carefully considered and opportunities to reduce noise levels in these areas should be secured to improve the acoustic quality of the environment. The local authority environmental health department may also be able to provide additional information about the location of identified ‘Important Areas’.

2.3.5 Currently the NEC site does not have any designated ‘Important Areas’, primarily due to the fact that no noise receptors are currently present in the area. It should be noted that other residential premises along the A14 in this area at similar locations and distances to the residential proposed for the NEC, are considered to be a priority in terms of traffic noise exposure levels.

2.4 Local Plan Policy

Cambridge City Council’s (CCC’s)

2.4.2 Cambridge City Council’s (CCC) local policies relating to noise are set out in the Cambridge Local Plan, October 2018. The main noise Policy 35: Protection of human health and quality of life from noise and vibrations, is set out below:

‘Development will be permitted where it is demonstrated that:

a) it will not lead to significant adverse effects and impacts, including cumulative effects and construction phase impacts wherever applicable, on health and quality of life/amenity from noise and vibration; and

b) adverse noise effects/impacts can be minimised by appropriate reduction and/or mitigation measures secured through the use of conditions or planning obligations, as appropriate (prevention through high quality acoustic design is preferable to mitigation).

People’s health and quality of life needs be protected from unacceptable noise impacts by effectively and appropriately managing the relationship between noise sensitive development and noise sources through land use planning. Noise must be carefully considered when new development might create additional noise and when development would be sensitive to existing or future noise.

Residential and other noise sensitive development will be permitted where it can be demonstrated that future users of the development will not be exposed internally and externally to unacceptable levels of noise pollution/disturbance from existing or planned uses. This would include proposed noise sensitive development that may experience adverse impacts as a result of exposure to noise from existing or planned/future (i) transport sources (air, road, rail and mixed sources) or (ii) industrial, trade or business/commercial sources.

Noise generating development including industrial, trade or business/commercial uses with associated transport noise sources will be permitted where it can be demonstrated that any nearby noise sensitive uses (as existing or planned) will not be exposed to noise that will have an unacceptable adverse impact on health and quality of life both internally and externally.

A Noise Impact Assessment will be required to support applications for noise sensitive and noise generating development as detailed above including consideration of any noise impacts during the construction phase wherever applicable, when noise sensitive uses are likely to be exposed to significant or unacceptable noise exposure and impacts.'

South Cambridgeshire District Council's (SCDC's)

2.4.4 South Cambridgeshire District Council's (SCDC) local policies relating to noise are set out in the Cambridge Local Plan, October 2018. The main noise Policy 35: SC/10: Noise Pollution is set out below:
'

1. *Planning permission will not be granted for development which:*

   a. Has an unacceptable adverse impact on the indoor and outdoor acoustic environment of existing or planned development;
   b. Has an unacceptable adverse impact on countryside areas of tranquillity which are important for wildlife and countryside recreation;
   c. Would be subject to unacceptable noise levels from existing noise sources, both ambient levels and having regard to noise characteristics such as impulses whether irregular or tonal.

2. Conditions may be attached to any planning permission to ensure adequate attenuation of noise emissions or to control the noise at source. Consideration will be given to the increase in road traffic that may arise due to development and conditions or Section 106 agreements may be used to minimise such noise.

3. Where a planning application for residential development is near an existing noise source, the applicant will be required to demonstrate that the proposal would not be subject to an unacceptable noise levels both internally and externally.

4. The Council will seek to ensure that noise from proposed commercial, industrial, recreational or transport use does not cause any significant increase in the background noise level at nearby existing noise sensitive premises which includes dwellings, hospitals, residential institutions, nursing homes, hotels, guesthouses, and schools and other educational establishments.'

Cambridge Northern Fringe East – CCC / SCDC Local Policy

2.4.5 In addition to local specific noise policies both plans have policies relating to a part of the NEC area, formerly known as Cambridge Northern Fringe East. These are policy 15: Cambridge Northern Fringe East and new railway station Area of Major

Change (CCC) and SS/4: Cambridge Northern Fringe East and Cambridge North Railway Station (SCDC).

2.4.6 These policies state that the Cambridge Northern Fringe East and the new railway station will enable the creation of a revitalised, employment focussed area centred on a new transport interchange. Amongst other requirements the following are relevant to noise:

'All proposals should:

a. take into account existing site conditions and environmental and safety constraints; b. demonstrate that environmental and health impacts (including odour) from the Cambridge Water Recycling Centre can be acceptably mitigated for occupants;'

North East Cambridge Area Action Plan - Issues and Options 2019 Report

2.4.7 The North East Cambridge Area Action Plan issues and options 2019 consultation recognises that the Area Action Plan will need to consider site constraints and the impacts of noise, vibration and air quality from the road and rail network and existing commercial and industrial uses. The report states: *'The preferred approach to noise is:*

- *Set by CSUCP Policy CS14*
- *Undertake noise, vibration and air quality assessments which will inform the AAP.'*

2.4.8 There was recognition that existing businesses in NEC should not be unduly prejudiced by having restrictions imposed on their operation by any proposed development. There was also general support over the criteria within the policy that stipulates noise and air quality assessments are required at the design stages of proposals as well as the general requirements to protect the natural environment. A related point under question 3 which refers to location and mix of uses at the new centres within NEC were generally supported too, as respondents felt that industrial uses and related HGV movements do not relate well to residential amenity in terms of noise and air pollution.

2.4.9 The section on Noise 4.17 states:

'Areas adjacent to noise sources including the A14 trunk road, Milton Road, Cambridge Guide Busway, the railway line, Cambridge North Station and railway sidings may be unsuitable for some forms of development or will require careful acoustic design and mitigation due to adverse noise impact issues.'

2.4.10 Evidence base studies are to include Air Quality and Noise Assessment - Further assessments related to the impact of constraints on development including the A14 trunk road, railway station/line, and existing industrial sources of noise. Impacts generated by and associated with development itself will also be assessed.

2.5 Guidance and Standards

PLANNING PRACTICE GUIDANCE: Noise

2.5.1 Planning Practice Guidance (PPG) for Noise was published in March 2014 and updated in July 2019. It provides advice on how planning can manage potential noise impacts in new development. It states that:

"Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced). When preparing plans, or taking decisions about new development, there may also be opportunities to make improvements to the acoustic environment. Good acoustic design should be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset."

2.5.2 The guidance also advises that:

'Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

•whether or not a significant adverse effect is occurring or likely to occur;
•whether or not an adverse effect is occurring or likely to occur; and
•whether or not a good standard of amenity can be achieved"

2.5.3 It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) falls in relation to the SOAEL, LOAEL and NOEL. The guidance then provides the definitions of the observed effect levels, in line with the definitions from the Explanatory Note to the NPSE.

2.5.4 The guidance presents a table, which is reproduced in Table 2-1. The implication of the final line of the table is that only the *"present and very disruptive"* outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

2.5.5 The PPG recognises that there is not a simple relationship between measured or predicted noise levels and the resultant impact and that this will depend on how various factors combine. The factors thought to be most relevant in this assessment are:

- The source and absolute level of the noise together with the time of day it occurs
- For non-continuous sources of noise, the number of noise events and the frequency and pattern of occurrence of the noise
- The spectral content and general character of the noise i.e. tonal or with other particular features
- The local topology and topography
- The existing or, where appropriate, planned character of the area

2.5.6 The NPPG does not provide numerical values for the different noise effect levels, instead recognising that ‘the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation’.

2.5.7 It therefore remains for local authorities to consider the NPPG noise exposure hierarchy and seek to align it with significance criteria, having regard to national and industry standards, codes of practice and best practice technical guidance such as British Standards, World Health Organisation guidance and other relevant sources of information.

2.5.8 With regard to acoustic design and noise control, the NPPF provides a set of overarching aims and broad principles for the consideration of noise (and vibration) in accordance with the NPSE to be applied in the planning process as follows:

- Avoid significant adverse effects of noise on people living and working in the LPAs;
- Mitigate and reduce to a minimum the adverse effects of noise within the context of sustainable development;
- Prevent development which is unacceptable in terms of noise
- Encourage good acoustic design as far as is reasonably practical;
- Improve living and working conditions where the acoustic environment already has a significant adverse effect on people’s quality of life; and
- Improve and enhance the acoustic environment and promote soundscapes that are appropriate for the local context, including the promotion of a vibrant acoustic environment where this is appropriate and the protection of relative tranquillity and quietness which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason, and are valued.

2.5.9 In terms of planning, increasing noise exposure results in a corresponding increasing ‘observed effect level’ and the likely planning actions and outcomes of these, based on the likely average response are explained in detail in NPPG and are summarised in table 1: ‘Noise Exposure Effect Level Hierarchy’ below.

Perception	Examples of effects / outcomes	Increasing effect level	Planning Action
No Effect			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Effect Level (NOAEL)			
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, 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 the 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 due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

National Design Guide

2.5.10 The National Design Guide (*Planning practice guidance for beautiful, enduring and successful places MHCLG, January 2021*) also covers topic areas relevant to noise. It sets out ten characteristics of well-designed places based on national planning policy, practice guidance and objectives for good design as set out in the National Planning Policy Framework.

2.5.11 It is illustrated by projects that demonstrate good practice. The specific design guidance characteristics relevant to noise / sound are detailed in Appendix 1 but include, amongst other things:

- Context – Enhances the Surroundings
- Identity - Attractive and distinctive
- Movement - Accessible and easy to move around
- Nature - Enhanced and optimised
- Public spaces - Safe, social and inclusive
- Uses - Mixed and integrated:
- Homes & buildings - Functional, healthy and sustainable
- Resources - Efficient and resilient
- Lifespan - Made to last

BS 4142:2014 +A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND

2.5.12 This Standard provides an assessment method for noise arising from industrial and/or commercial sources, including external plant, on-site vehicle movements and unloading, at residential receptors.

2.5.13 This standard is applicable to the determination of the following levels at outdoor locations:

a) rating levels for sources of sound of an industrial and/or commercial nature; and
b) ambient, background and residual sound levels, for the purposes of:

1) investigating complaints;
2) assessing sound from existing, proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and
3) assessing sound at proposed new dwellings or premises used for residential purposes.

2.5.14 Sound of an industrial and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems.

2.5.15 It is a relative noise assessment approach whereby the predicted commercial sound level (suitably adjusted for annoyance character if appropriate) is compared with the prevailing background noise level. A summary of the BS 4142 approach is set out below.

- establish the specific sound level of the source(s)
- measure the representative background sound level
- correct the specific sound level for on-time and interferences if necessary
- rate the specific sound level to account for distinguishing characteristics
- estimate the impact by subtracting the background sound level from the rating level
- consider the initial estimation of impact in the context of the noise and its environs

2.5.16 An initial estimate of the impact of specific sound is obtained by subtracting the measured background sound level from the rating level as described in section 11 of BS 4142:2014. The results of this comparison are assessed on the basis of the following guidance:

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

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

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

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

2.5.18 All pertinent contextual considerations should be taken into account including the following:

- The absolute level of the sound.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

BS 8233:2014 GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

2.5.19 BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings is a code of practice for acoustic design of buildings. For dwellings, the standard provides guidance on internal ambient noise levels and for the control of noise in and around buildings. These criteria should be achieved inside the dwellings under normal background ventilation conditions.

2.5.20 These values are also used in the Acoustics Ventilation and Overheating: Residential Design Guide that has been prepared by the Association of Noise Consultant's Acoustics, Ventilation and Overheating Group, and released in January 2020. This guidance also references ProPG.

World Health Organization Environmental Noise Guidelines 2018

2.5.21 The main purpose of the World Health Organization (WHO) Environmental Noise Guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources, namely

transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise.

2.5.22 For road traffic noise, the WHO Environmental Noise Guidelines strongly recommend that the average noise exposure at a property is reduced to below 53dB Lden, with night noise exposure reduced below 45dB LAeq, 8hr. Road traffic noise above these levels are associated with adverse health effects, and adverse effects on sleep, respectively.

2.5.23 For railway noise, the WHO Environmental Noise Guidelines strongly recommend that the average noise exposure at a property is reduced to below 54dB Lden, with night noise exposure reduced below 44dB LAeq, 8hr. Railway noise above these levels are associated with adverse health effects, and adverse effects on sleep, respectively.

2.5.24 The values in the guidelines are those where adverse effects are confirmed to have occurred rather defining the point at which those adverse effects begin to occur. The document also strongly recommends that policymakers introduce suitable measures where road traffic noise exceeds these guideline values. At the time of writing no changes to policy have been made as a result of the WHO Environmental Noise Guidelines.

Design Manual for Roads and Bridges, LA 111: Noise and Vibration 2019

2.5.25 This document issued by Highways England sets out the requirements for noise and vibration assessments to be completed for road projects, and states that the LOAEL and SOAEL threshold levels shown in Table 2 below (Table 3.49.1 of the document) that should be used for all noise sensitive receptors.

2.5.26 For comparison with the predicted noise maps, the LA10,18hr façade levels can be converted to LAeq, 16hr free field by subtracting 5dB.

Table 2: Operational noise LOAELs and SOAELs for all receptors

Time Period	LOAEL	SOAEL
Day (06:00-24:00)	55dB $L_{A10,18hr}$ facade	68dB $L_{A10,18hr}$ facade
Night (23:00-07:00)	40dB $L_{night,\ outside}$ (free-field)	55dB $L_{night,\ outside}$ (free-field)

Professional Practice Guidance: Planning and Noise – New Residential Development (ProPG)

2.5.27 The primary goal of the Professional Practice Guidance on Planning and Noise (ProPG): Planning and Noise (2017) is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise within the planning system in England.

2.5.28 It seeks to do this through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

2.5.29 ProPG advocates a two-stage risk-based approach to encourage early consideration of potential noise issues. This strategy accelerates straightforward decision making for lower risk sites and assists in proper consideration of noise issues in higher risk sites. The stages are broken down into the following:

• Stage 1 – an initial noise risk assessment of the proposed development site; and
• Stage 2 – a systematic consideration of four key elements.

2.5.30 The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:

• Element 1 – demonstrating a “Good Acoustic Design Process”;
• Element 2 – observing internal “Noise Level Guidelines”;
• Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
• Element 4 – consideration of “Other Relevant Issues”.

2.5.31 The ProPG document also provides detail on practical considerations for decision makers, acoustic design principles and expands on the latest research behind noise limits and dealing with night-time noise events.

2.6 Stage 1 - Initial Noise Risk Assessment

2.6.1 The ProPG Stage 1 initial noise risk assessment criterion is shown in Figure 1 below. The noise risk identified is used to determine the likelihood of planning approval and the measures required to achieve good acoustic design.

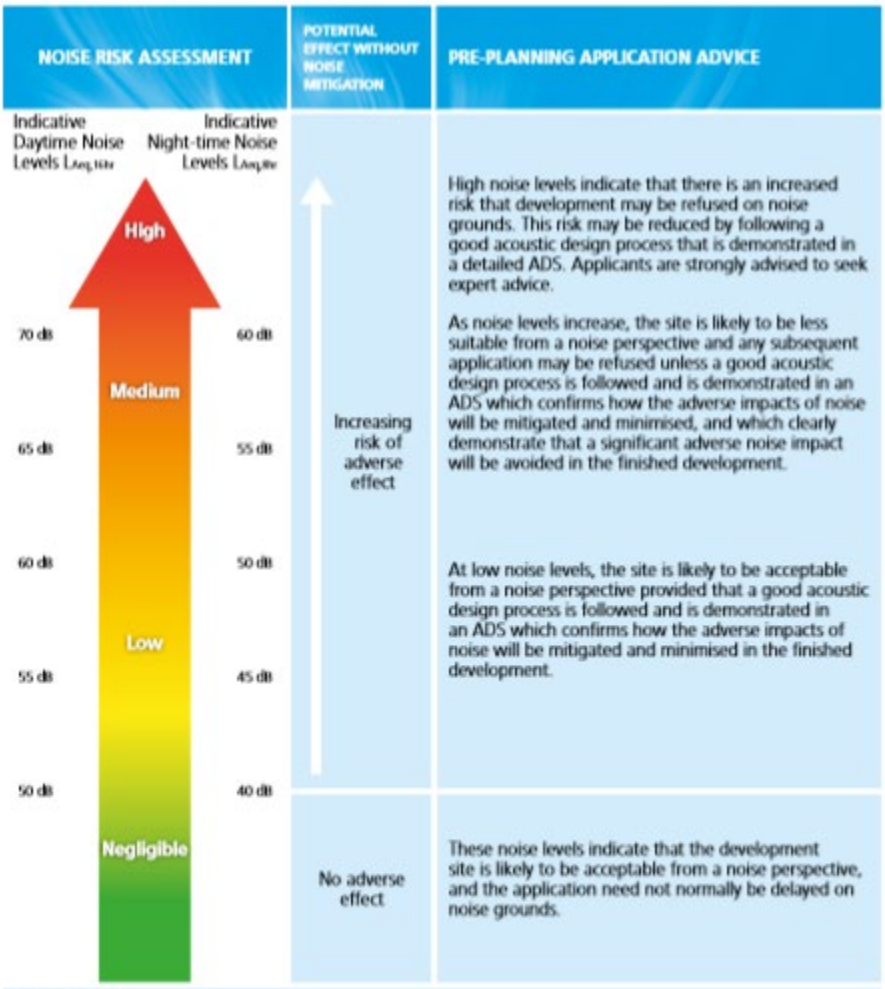


Figure 1. Stage 1– Initial Site Noise Risk Assessment

https://www.ioa.org.uk/sites/default/files/14720%20ProPG%20Main%20Document.pdf

2.7 Road Traffic Noise Levels for LOAELs and SOAELs

2.7.1 As NPPG does not provide any numerical levels for LOAELs and SOAELs, having regard to national and industry standards and codes of practice, the following noise levels in Table 3 below are considered appropriate for defining the various significance of adverse noise impacts that are likely to arise for traffic noise.

Table 3: Road Traffic Noise Levels for LOAELs and SOAELs

ROAD TRAFFIC								
Time Period	DMRB: LA111		BS 5228 (external amenity only)		GCPS SPD - 2020		WHO-2018 Lden	
	LOAEL	SOAEL	LOAEL	SOAEL	LOAEL	SOAEL	LOAEL ?	SOAEL ?
Day (07:00-23:00) outside LAeq, 16hr (free-field)	50dB *55dB LA10,18 hr facade*	63dB *68dB LA10,18 hr facade*	50 (desirable) – 55 dB (upper guideline value)	55 - 63 dB?	<46 - 50dB	56 - 60dB	reduced to below 53dB Lden	
Night (23:00-07:00) outside LAeq, 8hr, (free-field)	40dB	55dB			41 - 45dB	46 - 55dB	reduced to below 45dB	

2.8 Existing Noise – Constraints

2.8.1 With regards to environmental noise as a constraint, there are two fundamental issues to consider:

- The placement of sensitive receptors into areas where environmental noise levels are considered to be an unacceptable risk – both transport and industrial / commercial / business noise
- Ensuring that new development is considered and designed in accordance with all relevant National and local policies and guidance.

2.8.2 It is considered that the dominate noise sources across the NEC site are those related to transport namely the A14 trunk road, Milton Road and the Ely to Cambridge Railway Line. Therefore, this topic paper concentrates on transport noise associated with these noise sources. Industrial / commercial / business noise sources both new and existing that may coexist with future noise sensitive premises such as residential are not considered in detail.

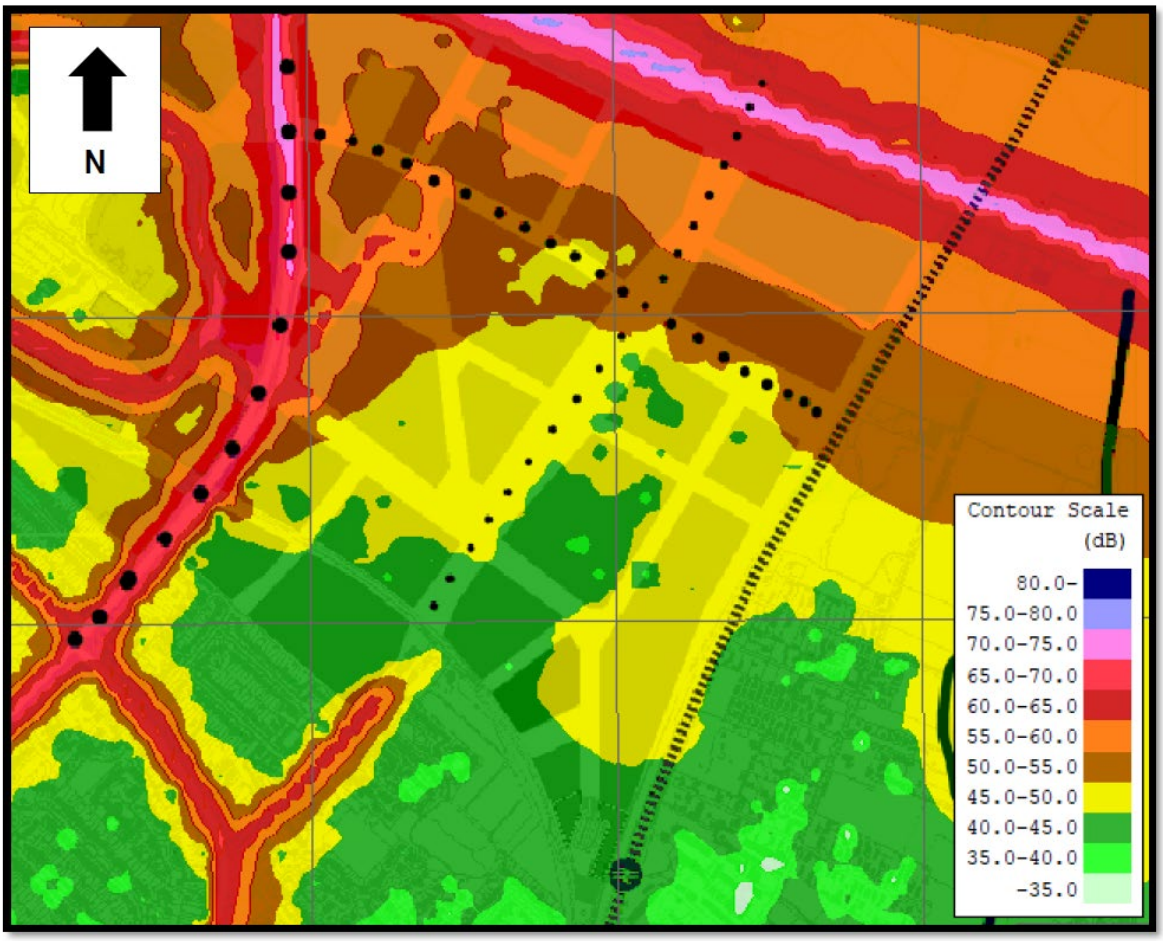
2.8.3 Industrial / commercial / business noise sources remain important material considerations and the significance of their impact and mitigation as necessary should be carried out in accordance with the relevant noise sections - Noise Pollution (including vibration) (pages 89-113), Table 3.11: New Noise Generating Development - External Noise Standards for “non- anonymous noise and Appendix 8: Further technical guidance related to noise of the Greater Cambridge Sustainable Design and Construction SPD, January 2020 (GC- SD&C SPD, 2020). The SPD is available to view at the following link:
https://www.cambridge.gov.uk/media/8157/greater-cambridge-sustainable-design-and-construction-spd.pdf

2.9 Transport Noise Modelling Study - No Mitigation

2.9.1 The proposed site is located between the Ely to Cambridge Railway Line and Milton Road, but not including Cambridge Regional College. At the northern edge of the site area is the A14 trunk road, with the southern edge on or near to the guided busway. There are concerns that noise from the A14, and the railway line, could be a constraint on the site.

2.9.2 To characterise the existing A14 trunk road, Milton Road and the Ely to Cambridge Railway Line transport noise source constraints Atkins were commissioned to undertake a Transport Noise Modelling Study (Cambridge NECAAP: Noise Model and Mitigation Assessment - Greater Cambridge Planning Service, 27 February 2020 – Report Ref.5193128/14/Feb/2020 - https://www.greatercambridgeplanning.org/media/1244/noise-model-and-mitigation-assessment-2019.pdf)

2.9.3 The scope of work was to generate a series of noise contour maps to demonstrate the extent of noise from existing roads and the railway at this site considering open unmitigated site, plus a series of potential noise mitigation options, using a 3D noise model of the area. The Atkins study / report provides the modelling results, as well as some context and legislation to enable the comparison of mitigation scenarios and against guidance on acceptable noise limits and ultimately the suitably of the site for noise sensitive residential development . The model incorporates the latest ‘design year’ 2035 traffic flows on the A14 and associated local traffic.



2.9.4 Figure 2-1 indicates that **d**uring the daytime at ground floor (1.5m), in terms of likely observed effect noise levels, at a distance of up to approx. 350m from the edge of the A14 the site falls generally between LOAEL and SOAEL (**50** - **60** - **65**: **brown / amber / red**). The amber / orange contour band (**55-60: approx. 240m from the A14**) is at SOAEL and the red contour band (**60-65: approx. 65-70m from the A14**) closest to the A14 is considered at and above the SOAEL.

2.9.5 For a distance of 630 m along Milton Road from the A14 Milton Junction the noise levels fall between LOAEL and SOAEL approx. 200 from Milton Road edge (**50 – 65**: **brown / amber / red**).

2.9.6 Based on a ProPG Stage 1 initial noise risk assessment criteria (as shown in Figure 1) it is concluded that during the daytime ground floor large areas of the site, about a third, is in low medium to high risk.

Figure 2-2: No Mitigation – Daytime $L_{Aeq,\ 16hr}$ – Second Floor (6.5 m height)

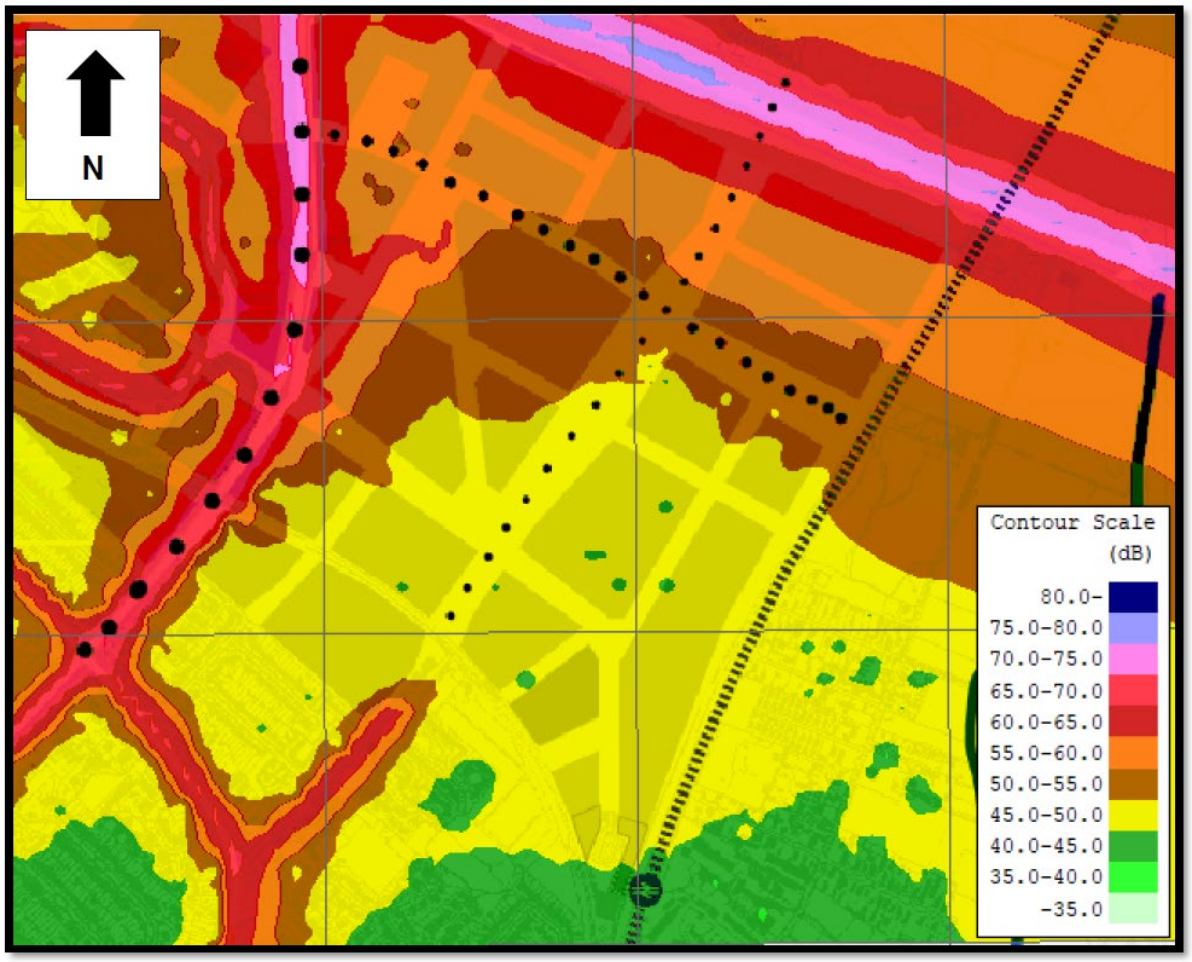
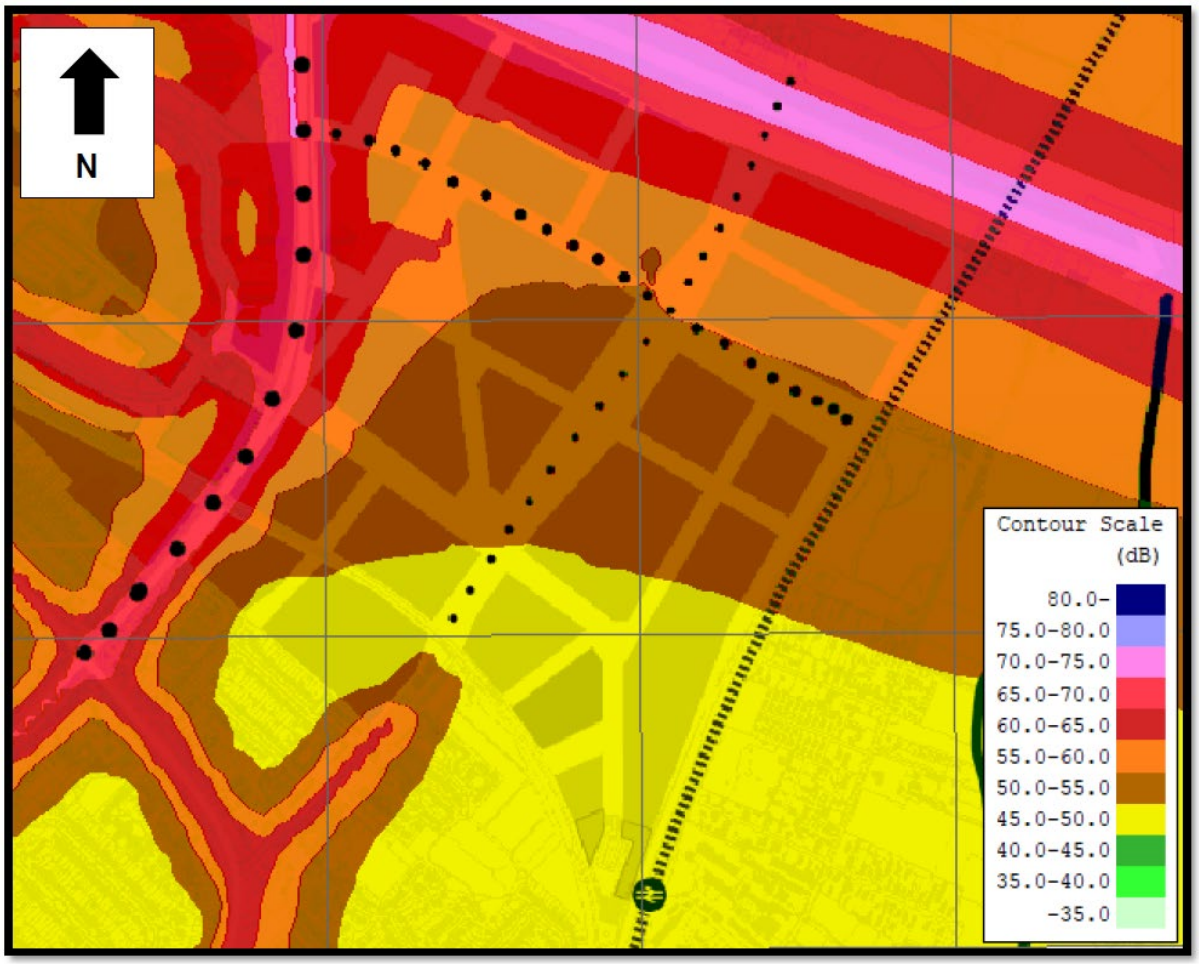


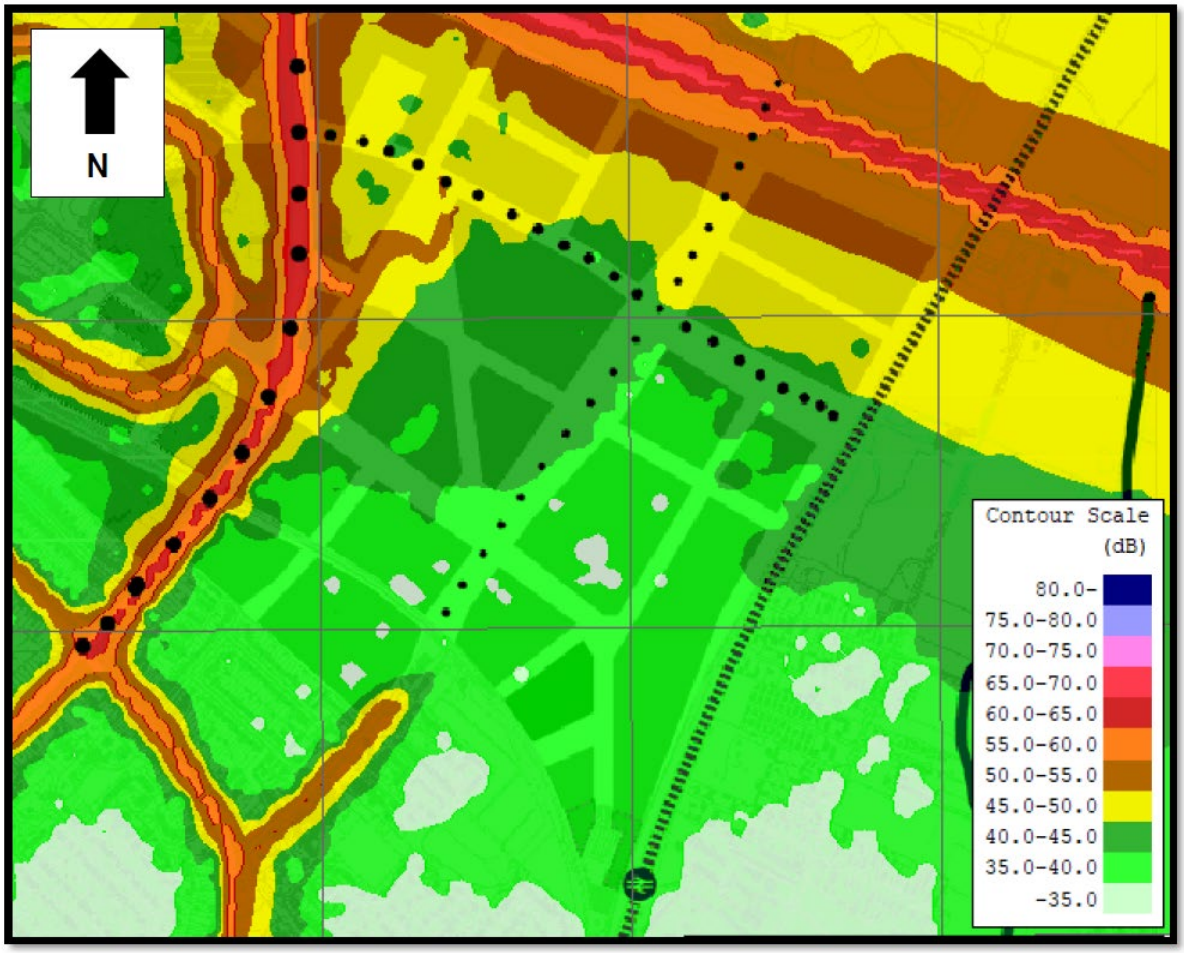
Figure 2-3: No Mitigation – Daytime $L_{Aeq, 16hr}$ – Fifth Floor (14/15 m height)



2.9.7 During the daytime at fifth floor (15m), in terms of likely observed effect noise levels, at a distance of up to approx. 700m from the edge of the A14 the site falls between LOAEL and SOAEL (**50 - 60 – 65dB: brown / amber / red**). The amber / orange contour band (**55-60dB: approx. up to 350m from the A14**) is at SOAEL and the red contour band (**60-65dB: approx. up to150m from the A14**) closest to the A14 is considered at and above the SOAEL.

2.9.8 For a distance of 630 m along Milton Road from the A14 Milton Junction the noise levels fall between LOAEL and SOAEL approx. 200 from Milton Road edge (**50 – 65: brown / amber / red**).

Figure 2-4: No Mitigation – Night Time $L_{Aeq, 8hr}$ – Ground Floor (1.5m height)



2.9.9 During the night time at ground floor (1.5m), in terms of likely observed effect noise levels, at a distance of up to approx. 340m from the edge of the A14 the site falls between LOAEL and SOAEL (**45/50-50/55-55/60: yellow / brown / amber**). The brown contour band (**50/55: approx. 150m from the A14**) close to the A14 is considered at and above the SOAEL.

2.9.10 For a distance of 630 m along Milton Road from the A14 Milton Junction the noise levels fall between LOAEL and SOAEL approx. 200 from Milton Road edge (**50 – 65: brown / amber / red**).

Figure 2-5: No Mitigation – Night Time $L_{Aeq,\ 8hr}$ – Second Floor (6.5m height)

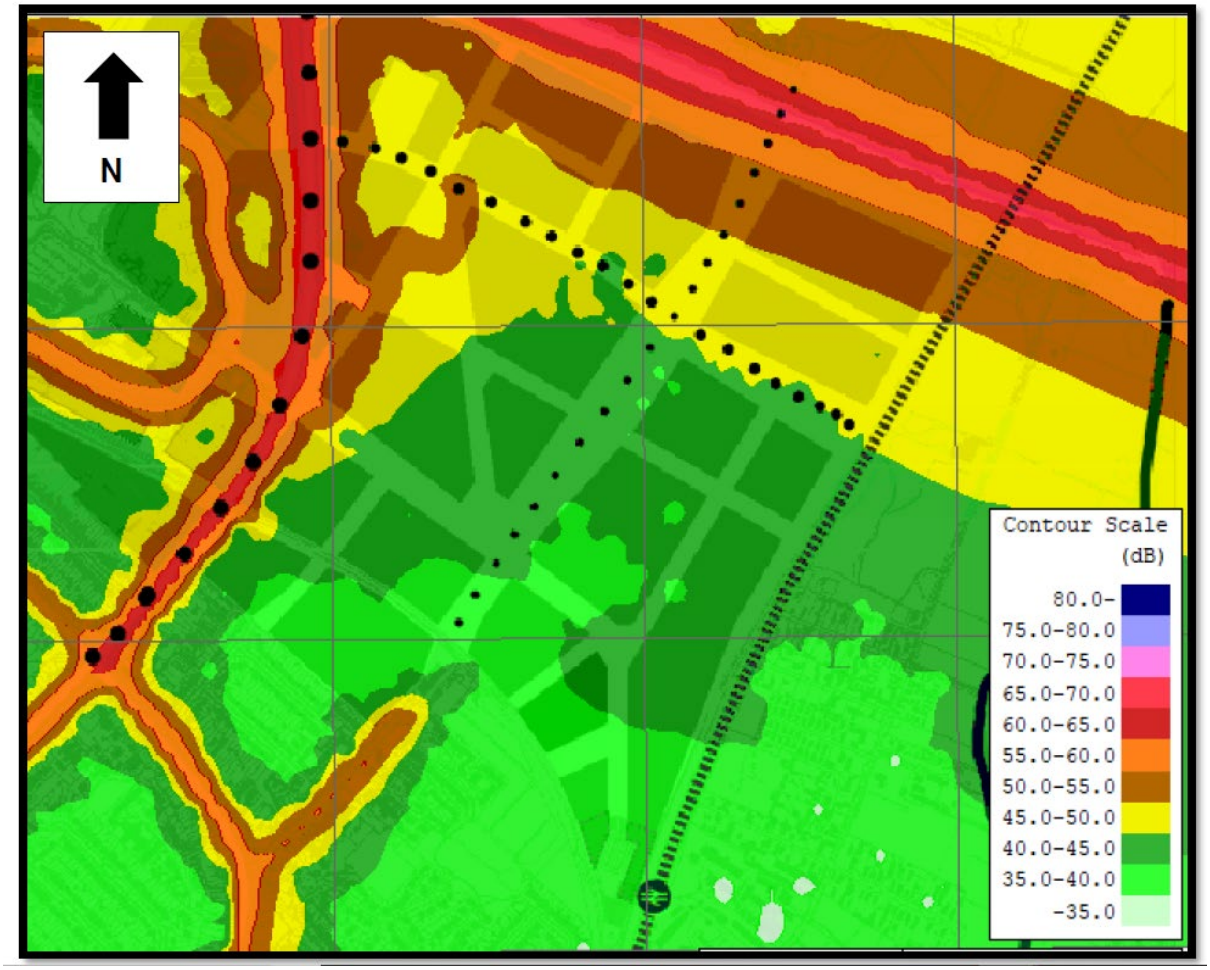
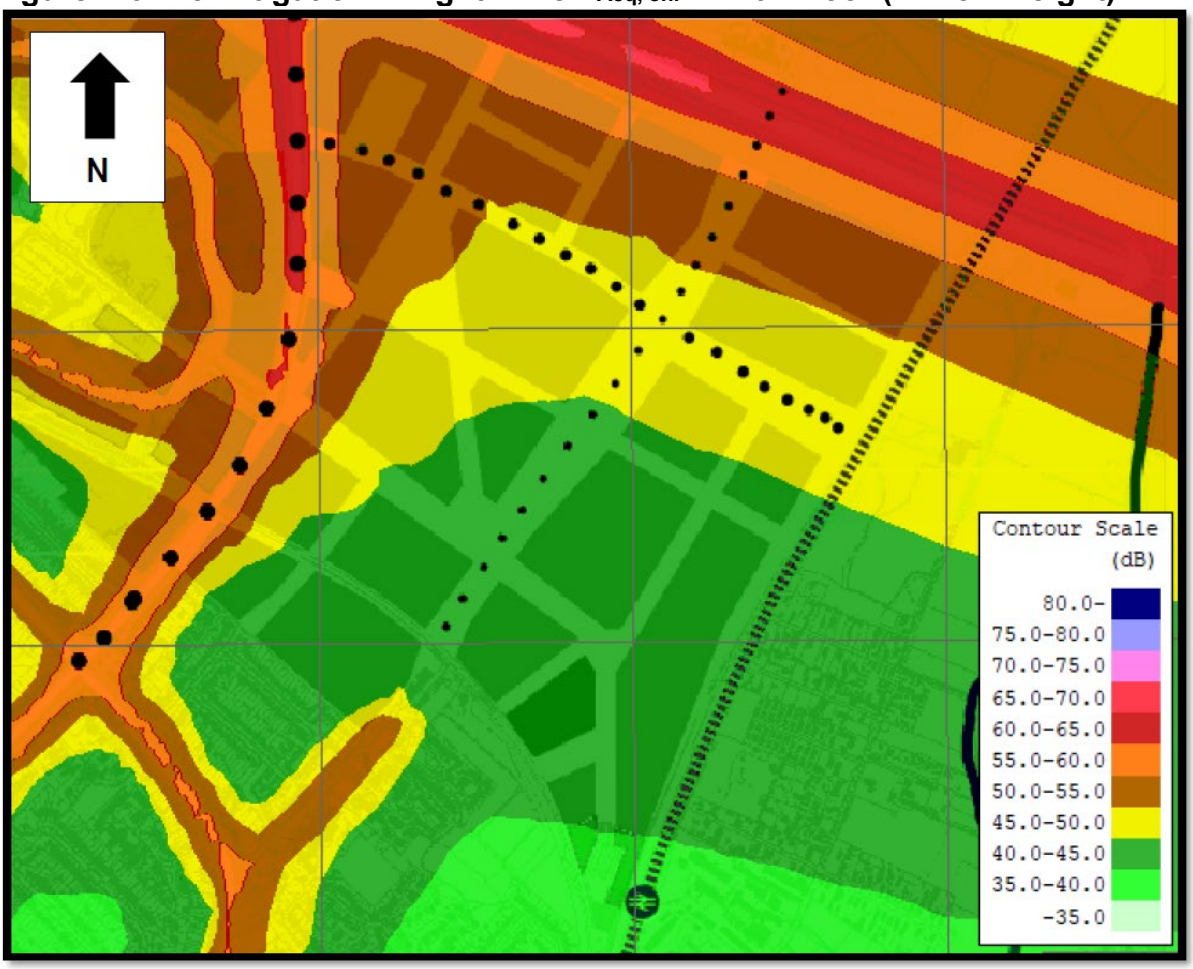


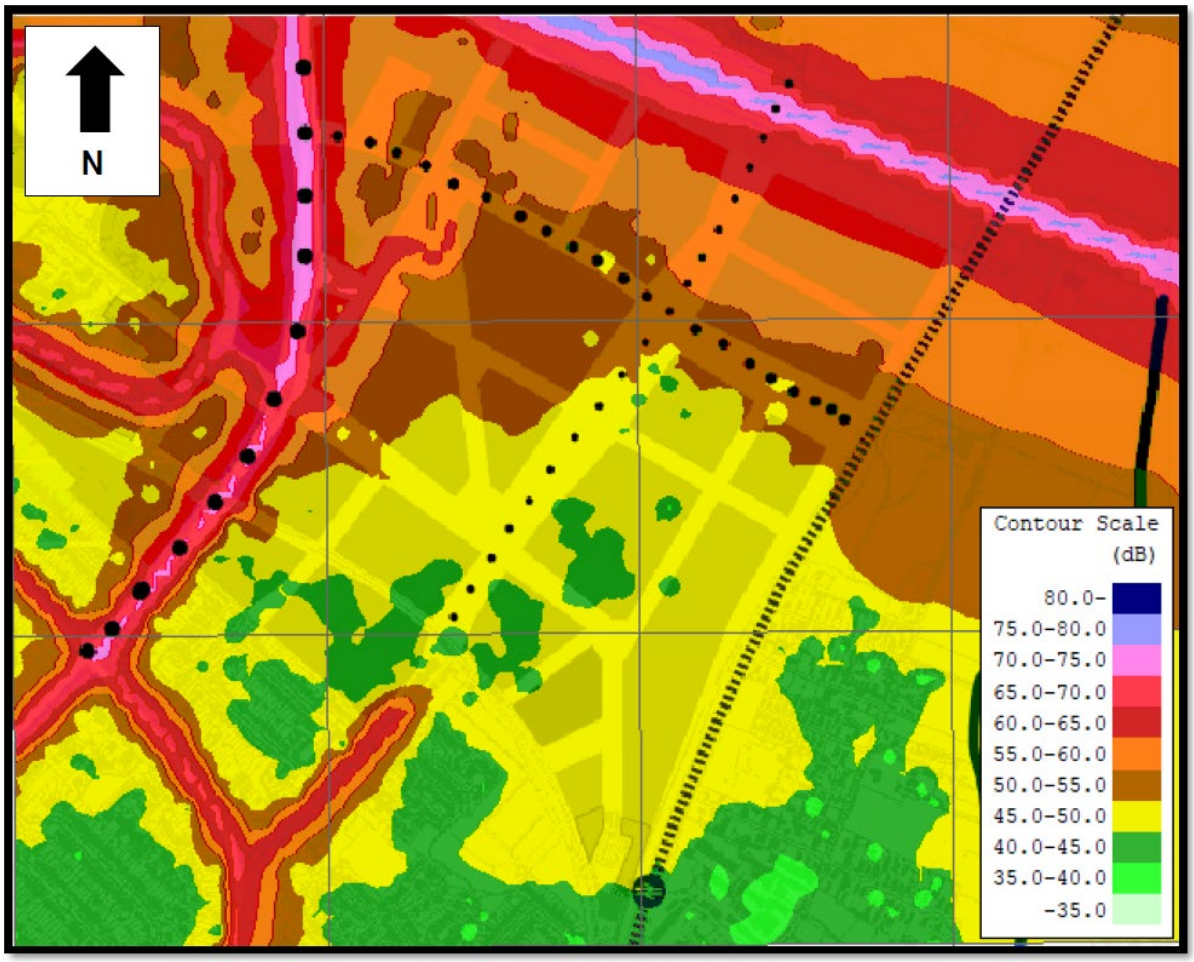
Figure 2-6: No Mitigation – Night Time $L_{Aeq, 8hr}$ – Fifth Floor (14/15m height)



2.9.11 During the night time at fifth floor (15m), in terms of likely observed effect noise levels, most of the site is a LOAEL and above. At a distance of up to approx. 500m from the edge of the A14 the site falls between LOAEL and SOAEL (**45/50-50/55-55/60**: **yellow / brown / amber**). The brown contour band (**50/55: approx. 240m from the A14**) is at / approaching SOAEL and the orange contour band (**55-60: approx. 65m from the A14**) closest to the A14 is considered at and above the SOAEL.

2.9.12 For a distance of 630 m along Milton Road from the A14 Milton Junction the noise levels fall between LOAEL and SOAEL approx. 200 from Milton Road edge (**50 – 65**: **brown / amber / red**).

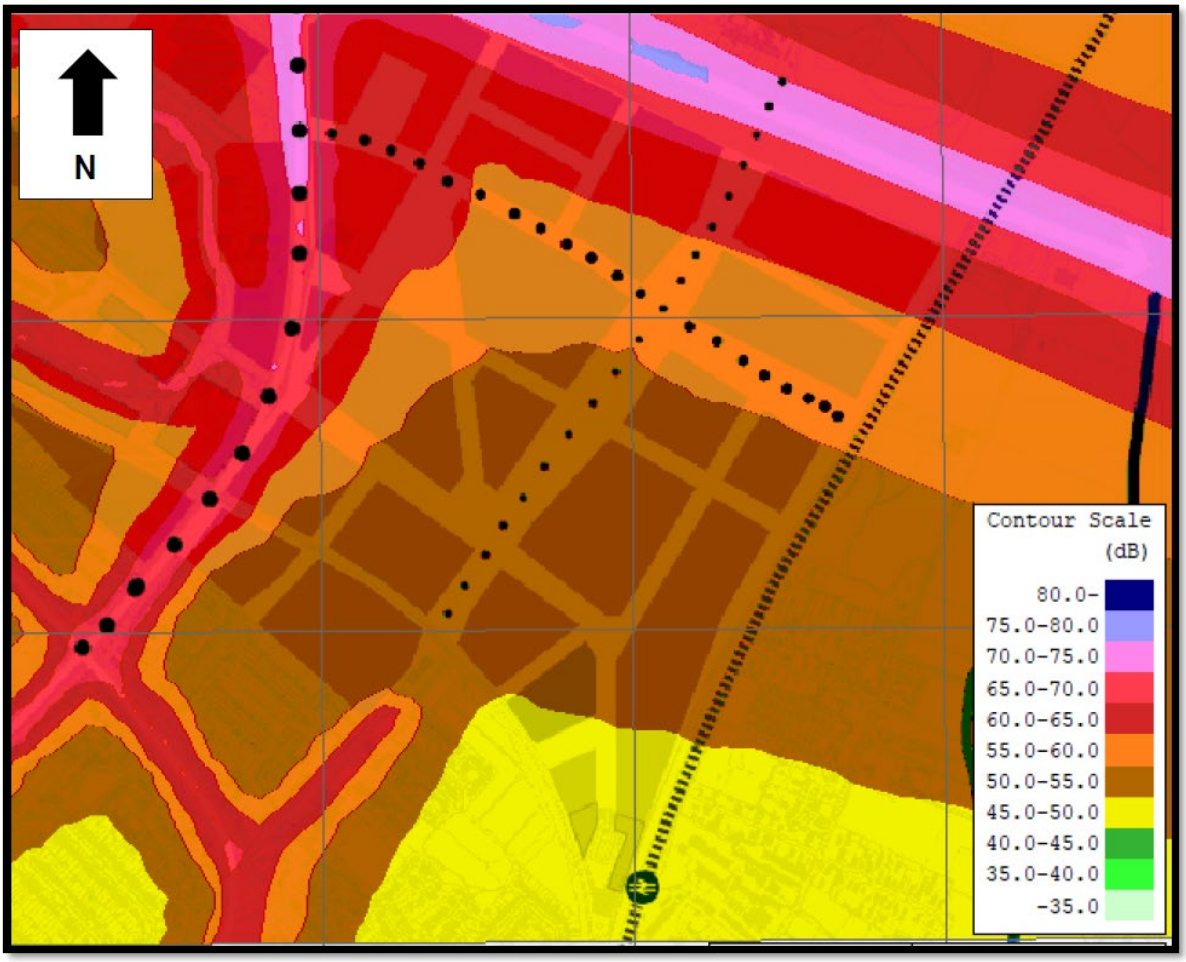
Figure 2-7: No Mitigation – Day, Evening and Night L $_{den}$ – Ground Floor $_{den}$



2.9.13 The modelling above indicates that an area of land up to approx. 300m from the A14 at ground level is as Day, Evening and Night L $_{den}$ 55 and above (**brown** / **amber** / **red** contours).

2.9.14 For average noise exposure, the WHO guidelines strongly recommends reducing noise levels produced by road traffic below 53 decibels (dB) Lden, as road traffic noise above this level is associated with adverse health effects.

Figure 2-8: No Mitigation – Day, Evening and Night Lden – Fifth Floor



2.9.15 The modelling above indicates that almost the entire development site fall above a Day, Evening and Night L_{den} of 45 (**brown** / **amber** / **red** contours).

2.9.16 For night noise exposure, the WHO guidelines strongly recommends reducing noise levels produced by road traffic during night time below 45 dB Lnight, as night-time road traffic noise above this level is associated with adverse effects on sleep.

Conclusion - ProPG Stage 1 initial noise risk assessment

2.9.18 Based on a ProPG Stage 1 initial noise risk assessment criteria (as shown in Figure 1 above) and having regard to unmitigated site noise modelling for various scenarios, it is concluded that during the daytime and night time large areas of the site, about a third, is in low medium to high risk at all floors levels. At areas closest to the A14 the line of proposed building blocks closest to the A14 are considered at medium to high risk, and potential significant adverse noise impact.

2.9.19 ProPG advises that high noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in detailed ADS. Applicants are strongly advised to seek expert advice.

2.9.20 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

2.10 Good Acoustic Design: Enhancement, Design and Mitigation Measures – Transport Noise

2.10.1 In line with NPPF, which states that development should contribute to and enhance the environment, the Greater Cambridge Sustainable Design and Construction SPD advocates a hierarchy within the approach to air quality improvements that should be followed, and consideration of the following enhancement and mitigation:

- Primary (inherent design) - Design measures to help reduce air quality impacts
- Secondary (foreseeable) – Project specific mitigation measures
- Tertiary (inexorable / unavoidable) - Possible offsetting measures

2.10.2 There should be a commitment to good acoustic design and a hierarchy of noise management should be followed to reduce noise impacts, including the following (but not limited to), in descending order of preference:

- Maximising the spatial separation of noise source(s) and receptor(s).
- Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources (possible S106 agreement if noise sources off site).
- Using existing topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.
- Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise - such as landscaping, fencing and solid balconies to reflect/shield sound.
- Using the layout of the scheme to reduce noise propagation across the site.
- Creating setbacks.
- Using the shape and orientation of buildings to reflect and or shield noise to protect the most sensitive uses
- Locating noise sensitive areas/rooms away from the parts of the site most exposed to noises and careful internal configuration of internal rooms to reduce the noise exposure of noise-sensitive rooms.
- Stacking similar room use (such as kitchens and living rooms) above each other.
- Positioning non-residential uses closer to the noise source in mixed use developments
- Anti-vibration foundations/vibration reducing separation trenches
- Incorporating ‘sound proof’ construction/cladding materials e.g. absorptive materials/finishes to soffits of balconies, consideration of winter garden type arrangements

- Using the building envelope to mitigate noise to acceptable levels - insulating and soundproofing doors, walls, windows, floors and ceilings with an appropriate level of acoustic performance
- Alternative forms of ventilation if internal noise levels exceeded with a partially open window to negate the need to ventilate passively e.g. mechanical ventilation systems and acoustically attenuated free areas

Good Acoustic Design Mitigation / Noise insulation scheme – industrial / commercial noise sources

2.10.3 Examples of mitigation as part of good acoustic design and use of a noise insulation scheme for industrial / commercial noise sources include:

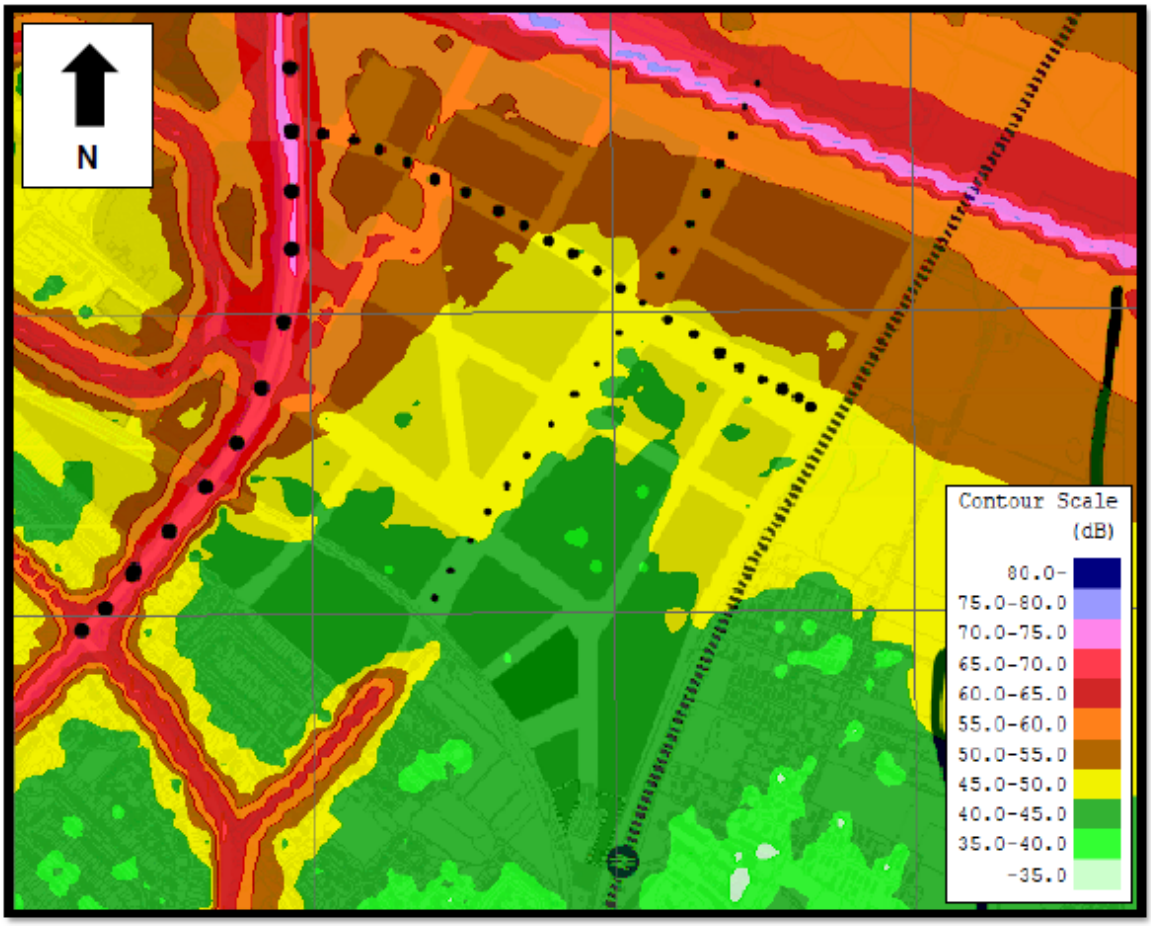
- reducing the noise emitted at its point of generation (e.g. by using quiet machines and/or quiet methods of working);
- containing the noise generating equipment (e.g. by insulating buildings which house machinery and/or providing purpose-built barriers around the site);
- use of acoustic enclosures / silencers at source
- protecting any surrounding noise-sensitive buildings (e.g. by removing a direct line of sight, improving sound insulation in these buildings and/or screening them by purpose-built barriers);
- ensuring an adequate distance between source and noise-sensitive buildings or areas;
- screening by natural barriers, buildings, or non-critical rooms in the development.
- limiting the operating time of the source;
- restricting activities allowed on the site;
- specifying an acceptable noise limit;
- use of noise management plans;
- restricting window openings;
- sound proofing internal and external walls; and
- using cladding specifically designed for sound reduction.

Mitigation Option 1 – Roadside Barrier

2.10.4 The first road traffic noise mitigation option that has been considered is a 1,150m long noise barrier that would be installed adjacent to and alongside the A14 towards the northern boundary of the proposed development. The noise barrier would extend from Cowley Road to just beyond the River Cam (shown in blue). Figure 3 shows the location of the roadside noise barrier.

Figure 3: Suggested Location of Roadside Barrier

2.10.5 Three different options have been modelled, a 2m high, a 4m high and a 5m high environmental noise barrier. The barrier is situated adjacent to the A14, with the base of the barrier at road height, the development area behind the barrier varies from being at road height to the west and 6m below road height to the east.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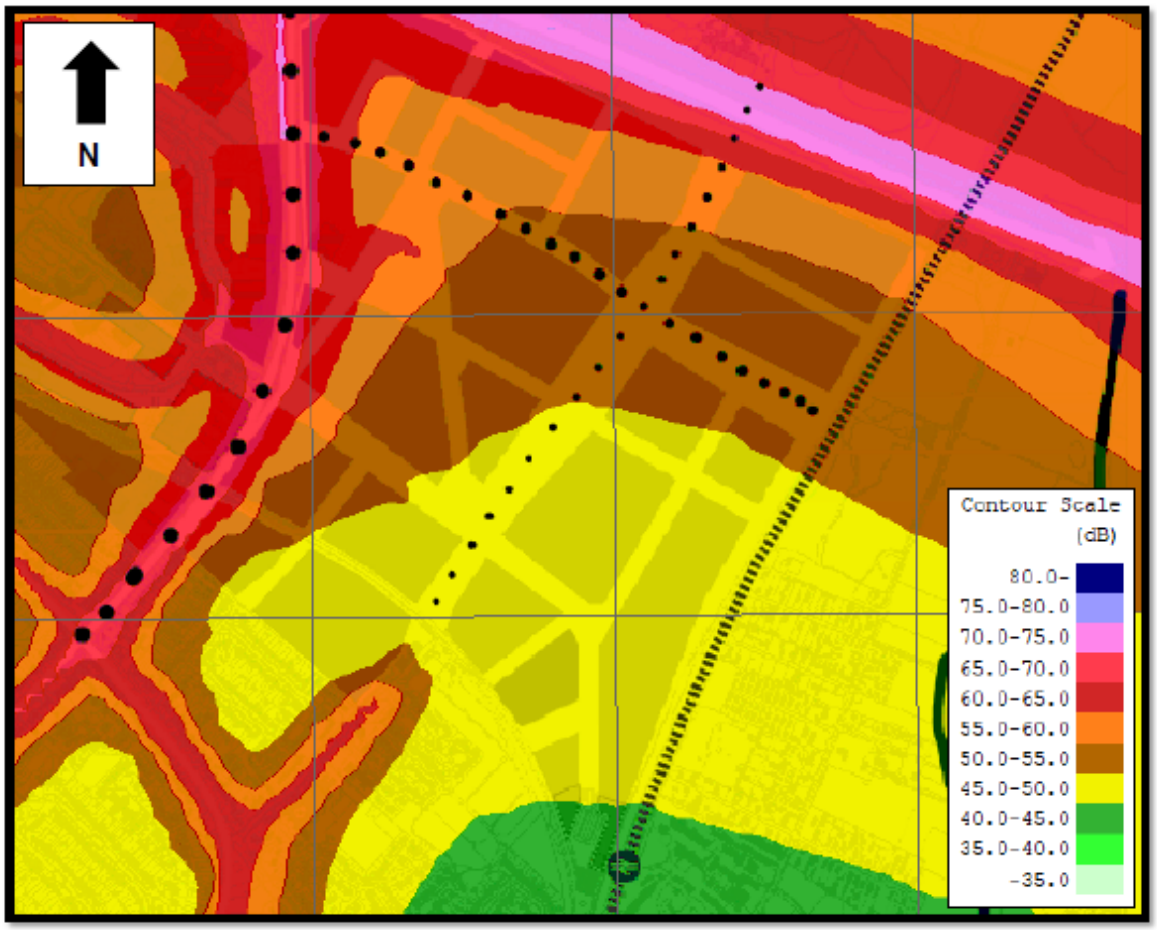
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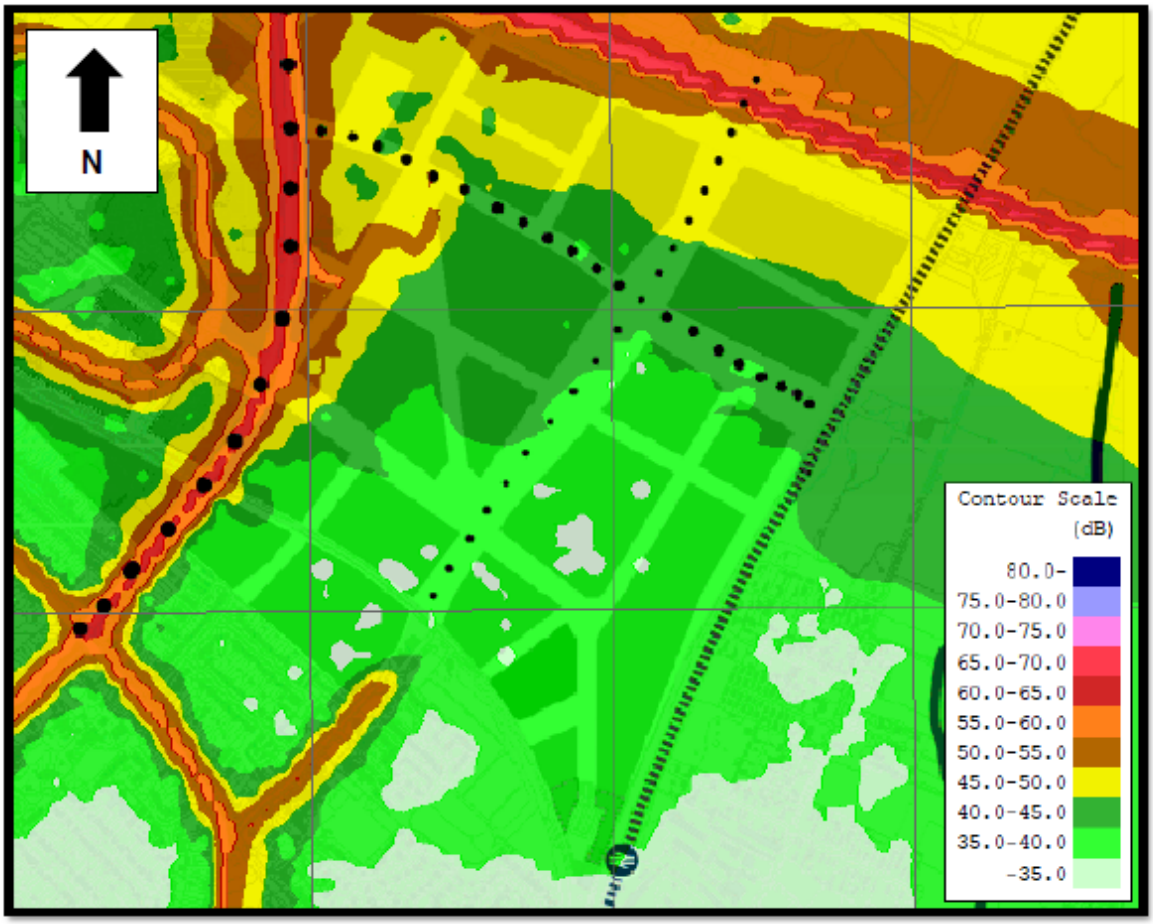
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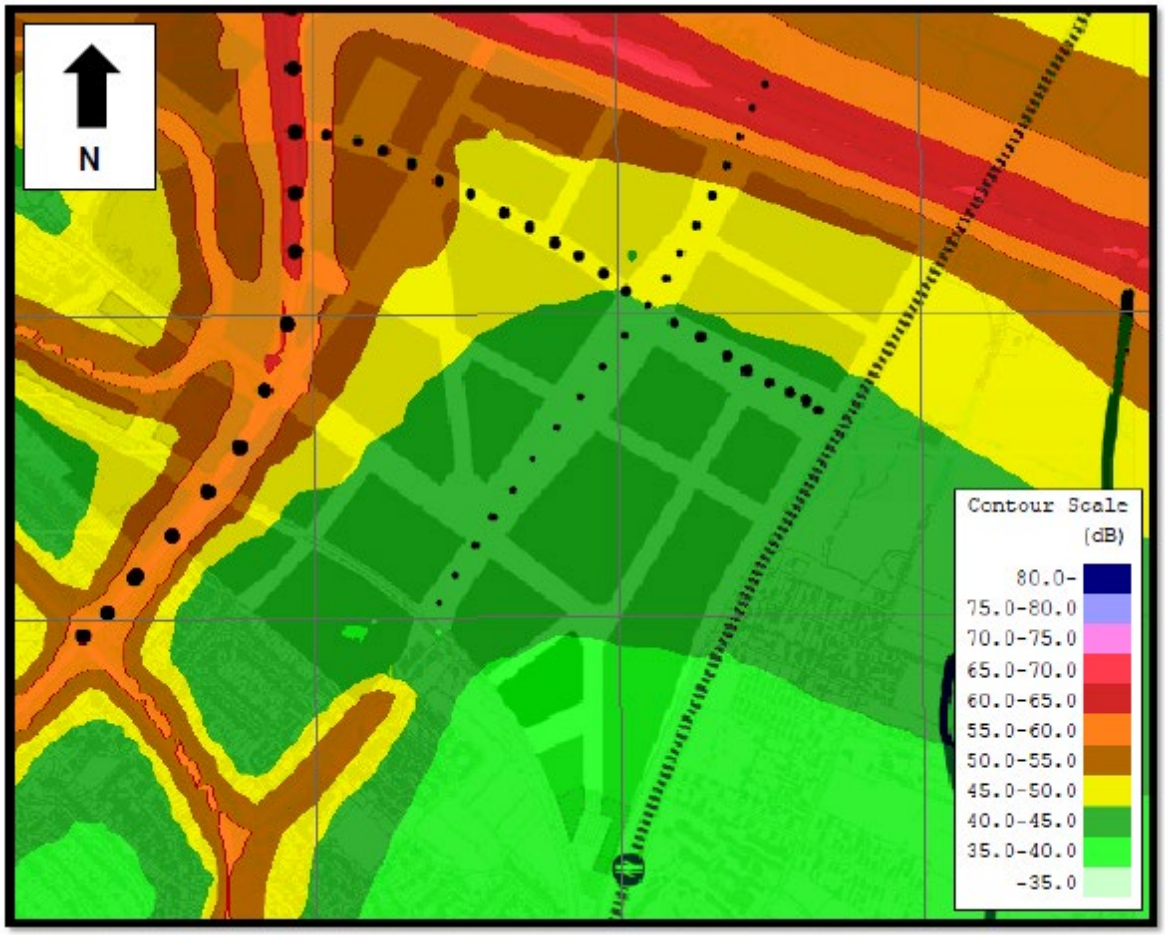
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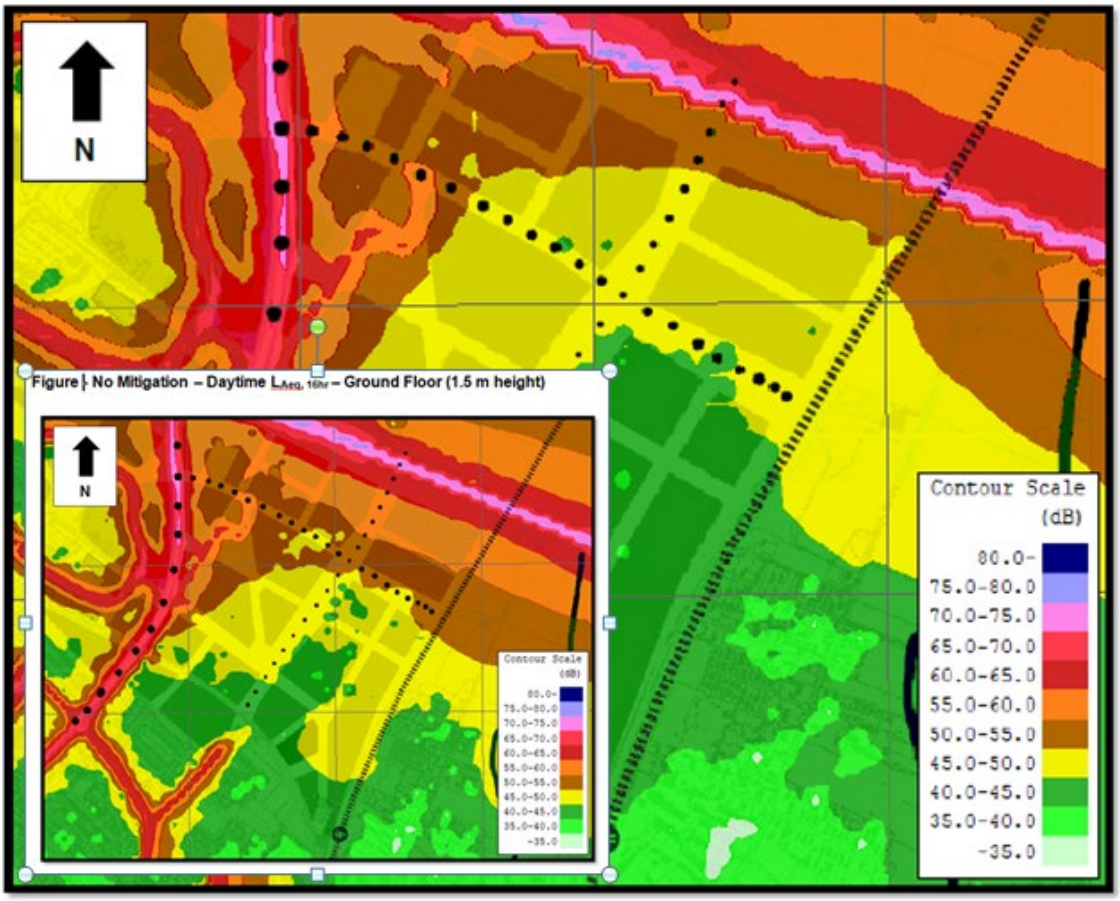
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Figure 1 No Mitigation – Daytime $L_{Aeq,\ 16hr}$ – Ground Floor (1.5 m height)
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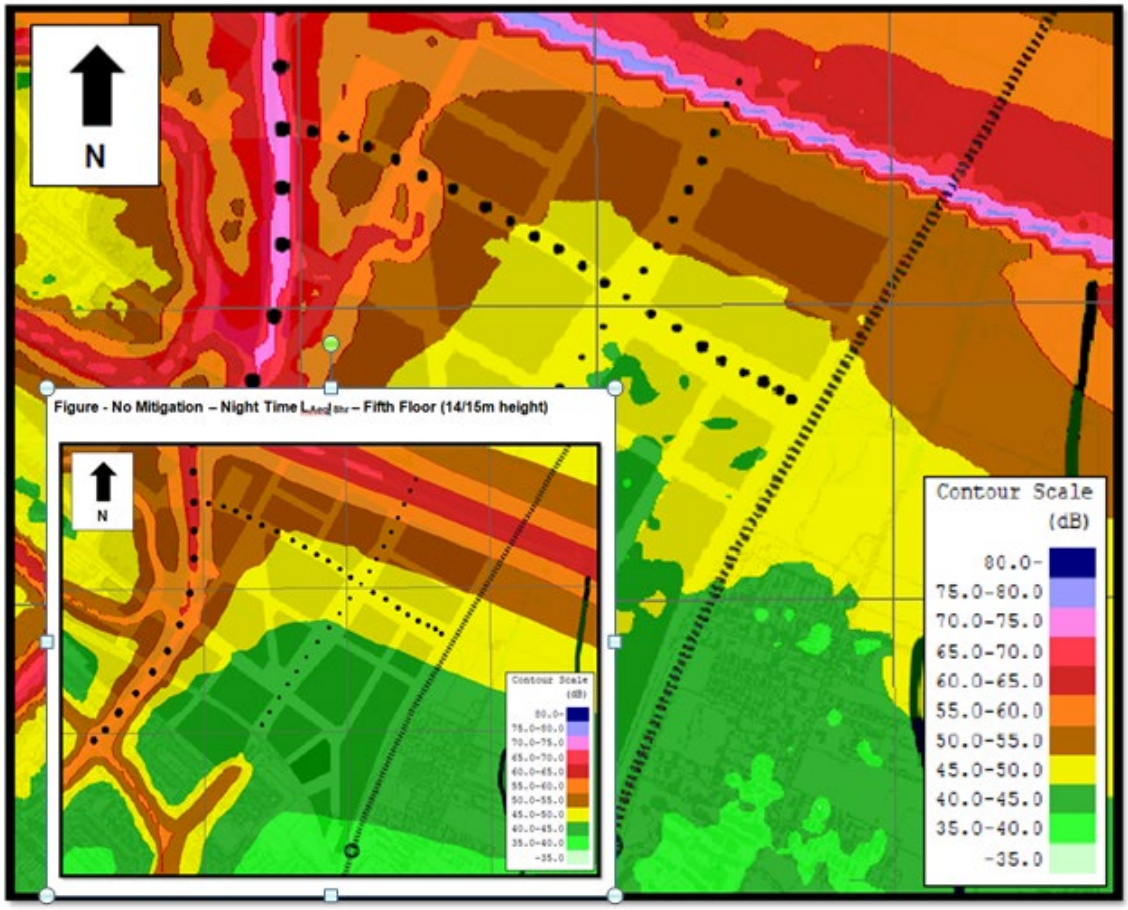
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Figure - No Mitigation – Night Time LAeq 8hr – Fifth Floor (14/15m height)
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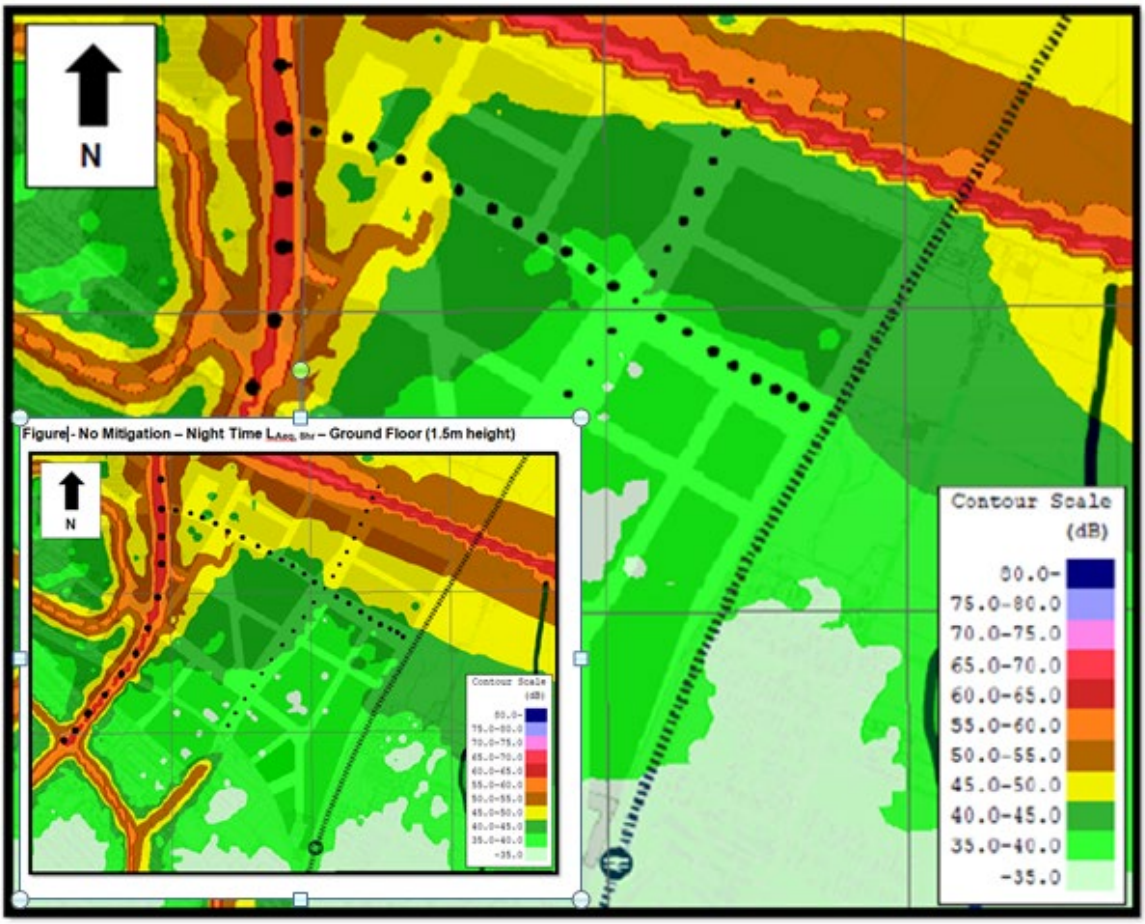
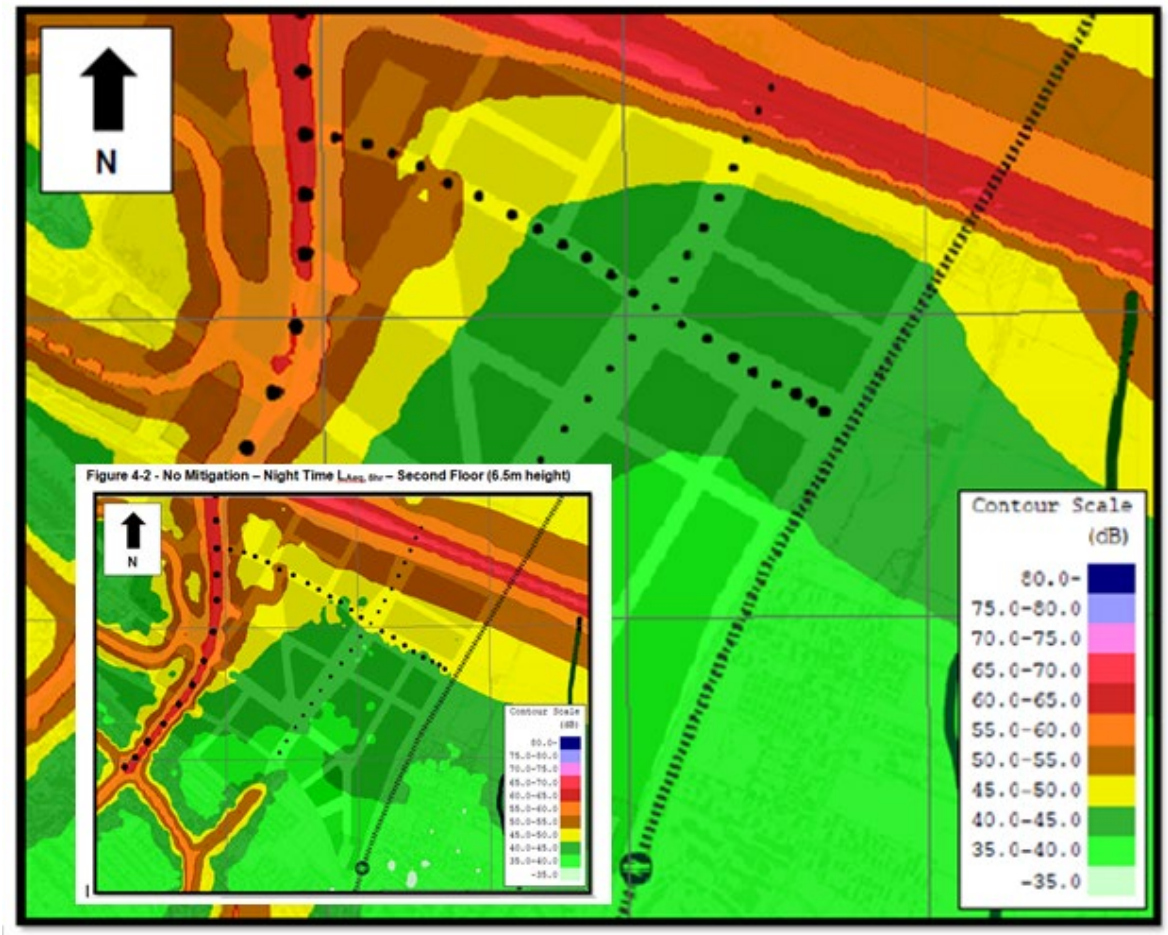


***The inset figure shows the same scenario with no mitigation**



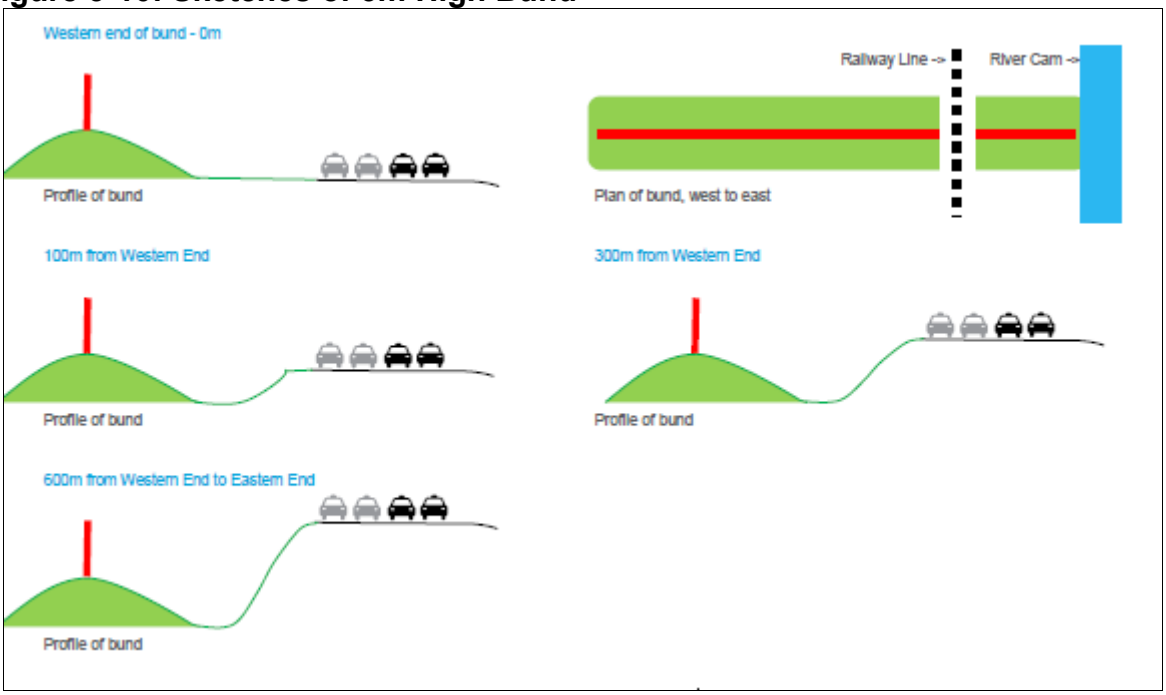
***The inset figure shows the same scenario with no mitigation**

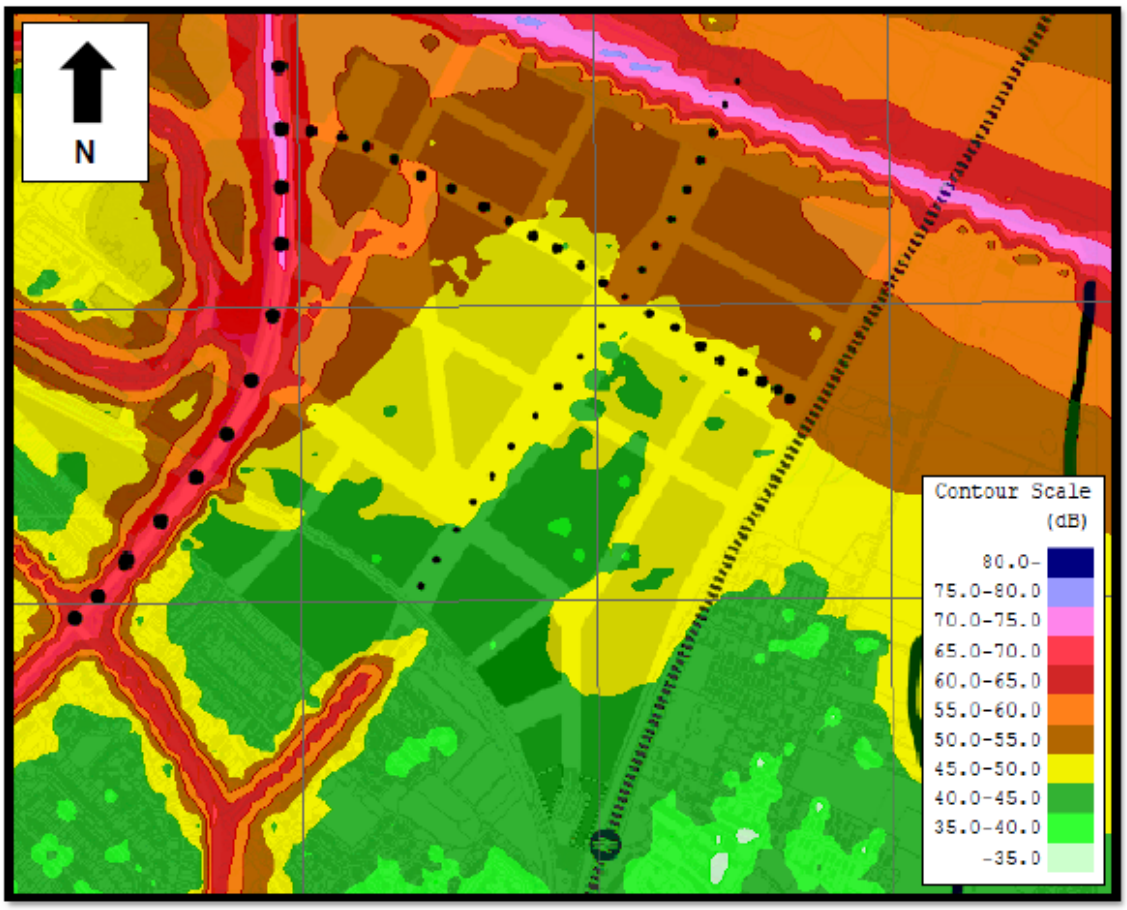
Mitigation Option 2 – Barrier on a 3m high Bund

2.10.6 The second option considered for reducing road traffic noise is a 1km long earth bund with an environmental noise barrier on top. The bund is assumed to have a slope of 1:3 and would be situated in the tree line at the bottom of the embankment of the A14, between Cowley Road and the railway line. The environmental impact on tree belt would need to be assessed for this option.

2.10.7 The noise bund is of equal height throughout, at 3m high for the length of the bund, and approximately 18m wide. The top of the bund is below the surface of the A14 for the eastern half of the bund. Two different heights of environmental noise barriers have been tested on top of the bund, at 3m and 4m tall. Figure 3-9: Suggested Location of the 3m or 4m high Barrier on a 3m High Bund shows the location of the earth bund and barrier and Figure 3-10 shows a sketch of the bund.

Figure 3-10: Sketches of 3m High Bund

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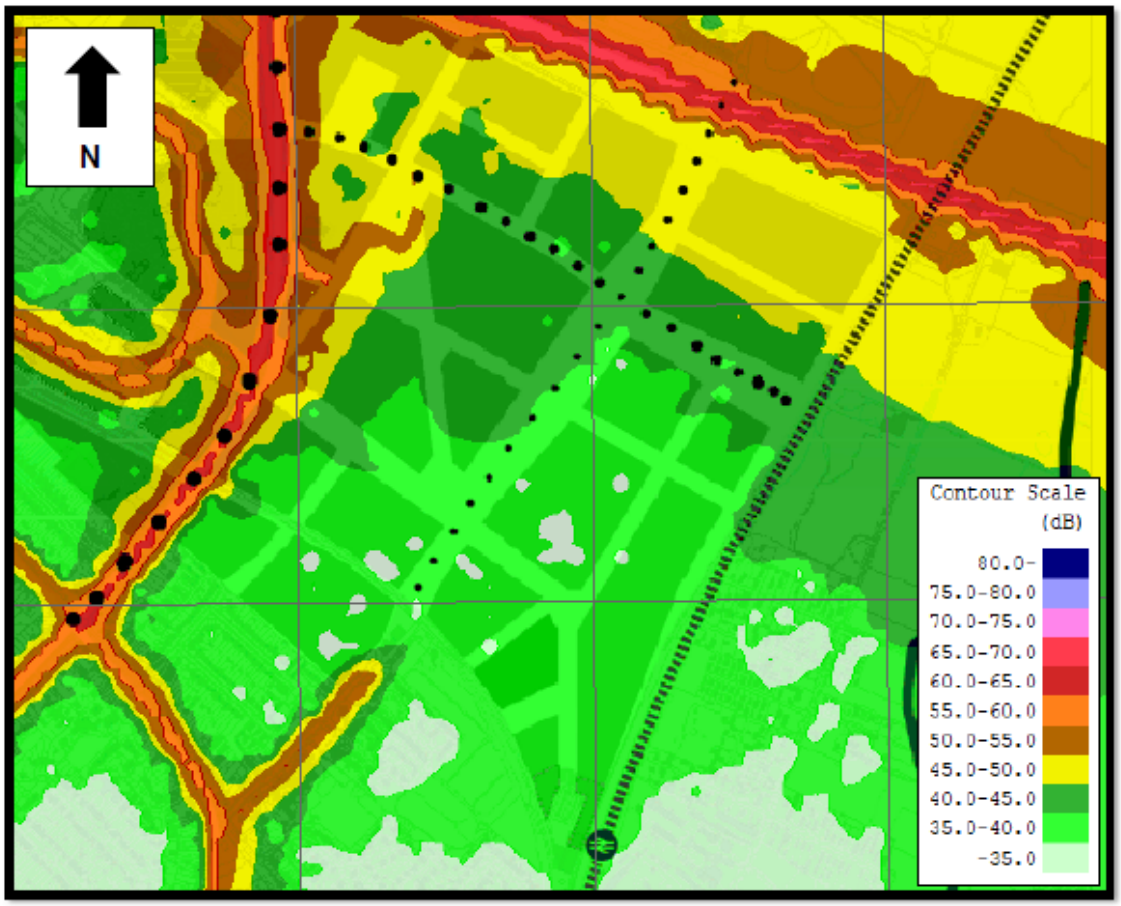


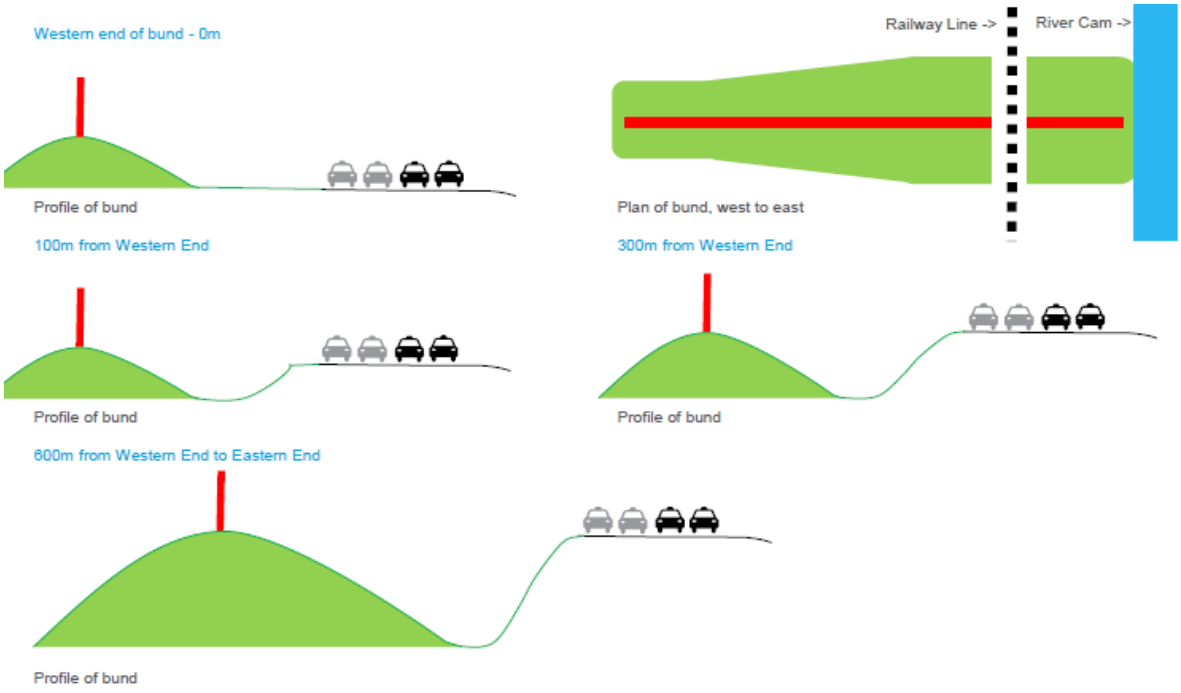
Mitigation Option 3 – Barrier on a Road Height Bund

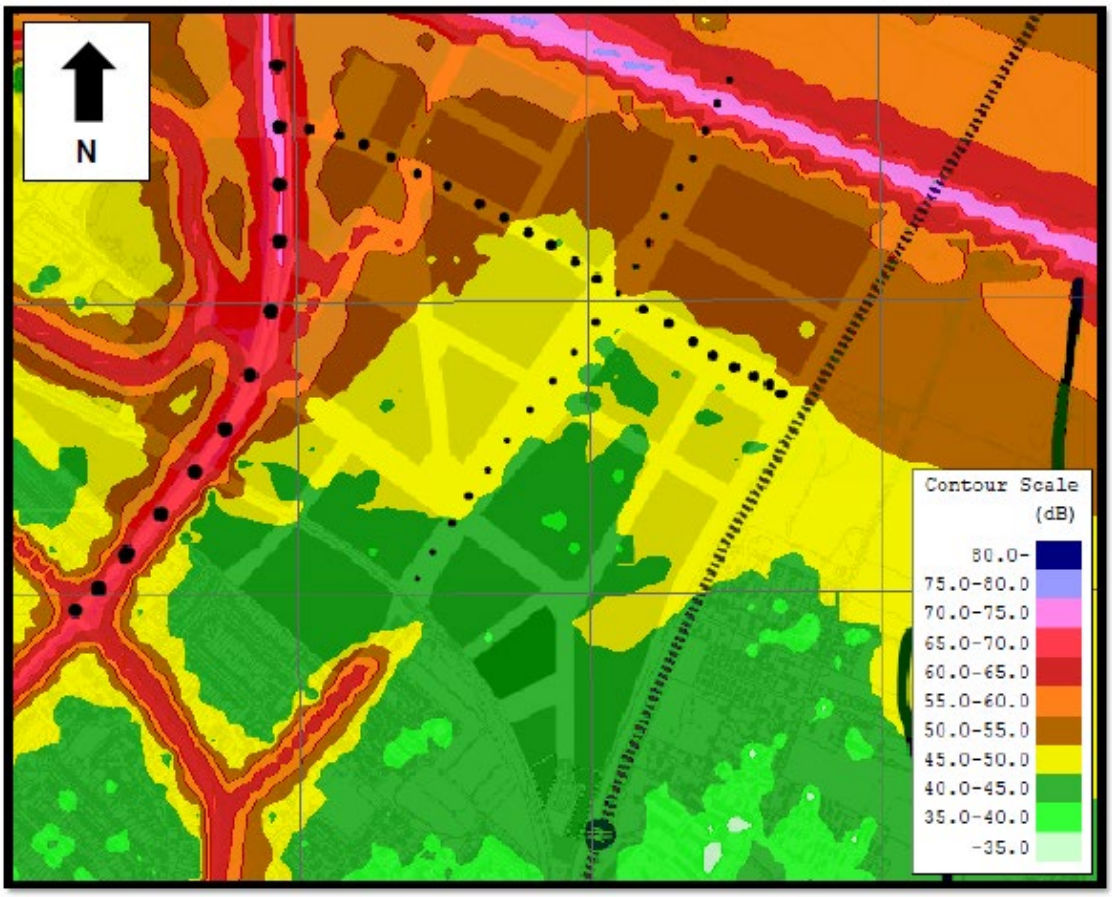
2.10.8 The third option that has been considered for reducing road traffic noise at the proposed development is a variant of Mitigation Option 2, where a 1km long earth bund with an environmental noise barrier on top would be installed. Like Mitigation Option 2, the bund is assumed to have a slope of 1:3 and would be situated in the tree line at the bottom of the embankment of the A14, between Cowley Road and the railway line. Again, the environmental impact on tree belt would need to be assessed for this option.

2.10.9 The noise bund is of variable height beginning at around 3m high to the West, and approximately 18m wide, and ending approximately 6m high to the East, and 36m wide, and does not drop below the A14 road height.

2.10.10 The first 150m of the bund, at the Western end, is above the surface of the A14; by up to 3m. The rest of the bund is at the same height as the surface of the A14. Two different heights of environmental noise barriers have been tested on top of the bund, at 3m and 4m tall. Figure 3-13: Suggested Location of the 3m or 4m High Barrier on a Road Height Bund shows the location of the earth bund and barrier and Figure 3-14 shows a sketch of the bund.

Figure 3-14: Sketches of Road Height Bund

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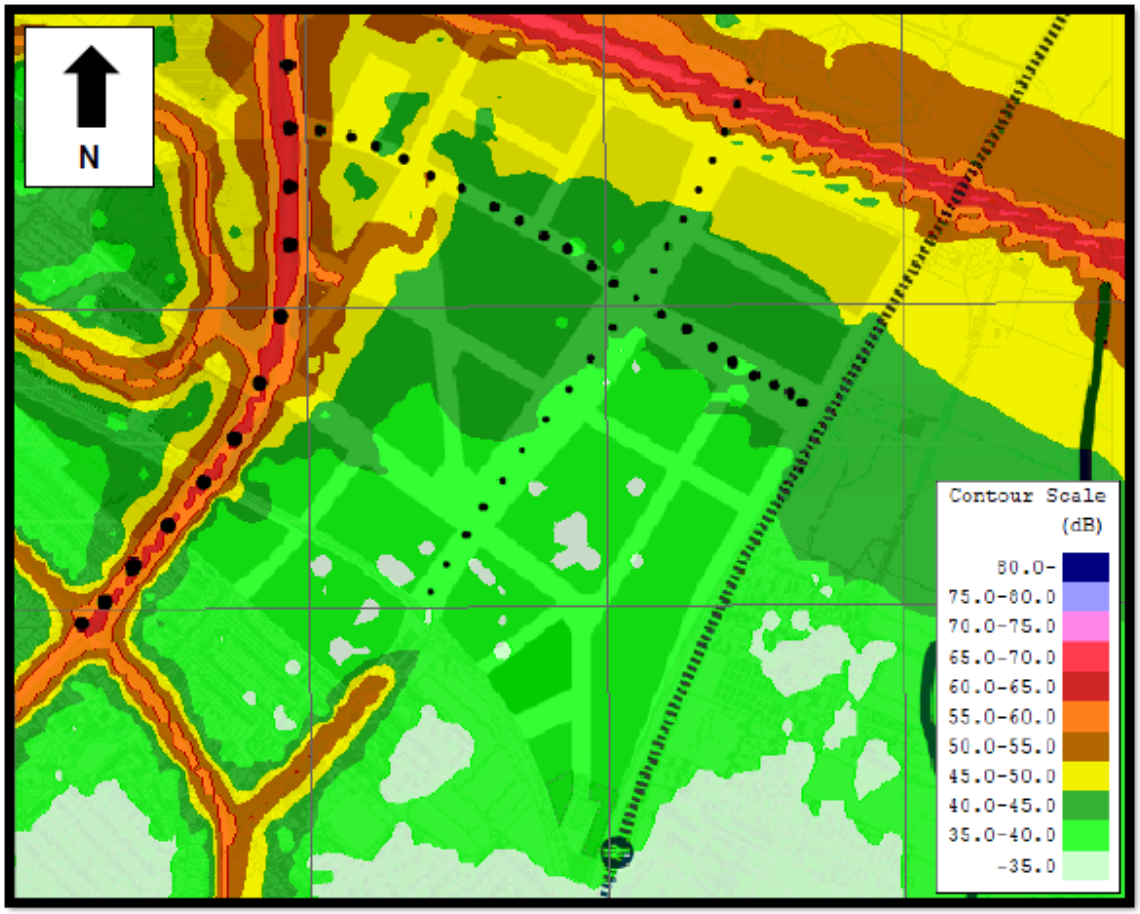


Mitigation Option 4 – Barrier Block

2.10.11 The fourth option for reducing road traffic noise at the proposed development from the A14 is a series of tall buildings, located along the northern edge of the site, next to the A14.

2.10.12 These blocks of buildings would act as a barrier, providing screening from road traffic noise to the buildings behind them and the rest of the site. These buildings could be commercial or residential, but if apartments they would be designed with all openable windows located to the south, with garden space located behind the blocks. Figure 3-17 shows the location of the blocks. Mitigation Option 4 is based on the proposed site layout shown in the Masterplan provided, with apartment blocks located to the north of the site. Only the results at ground floor have been calculated.

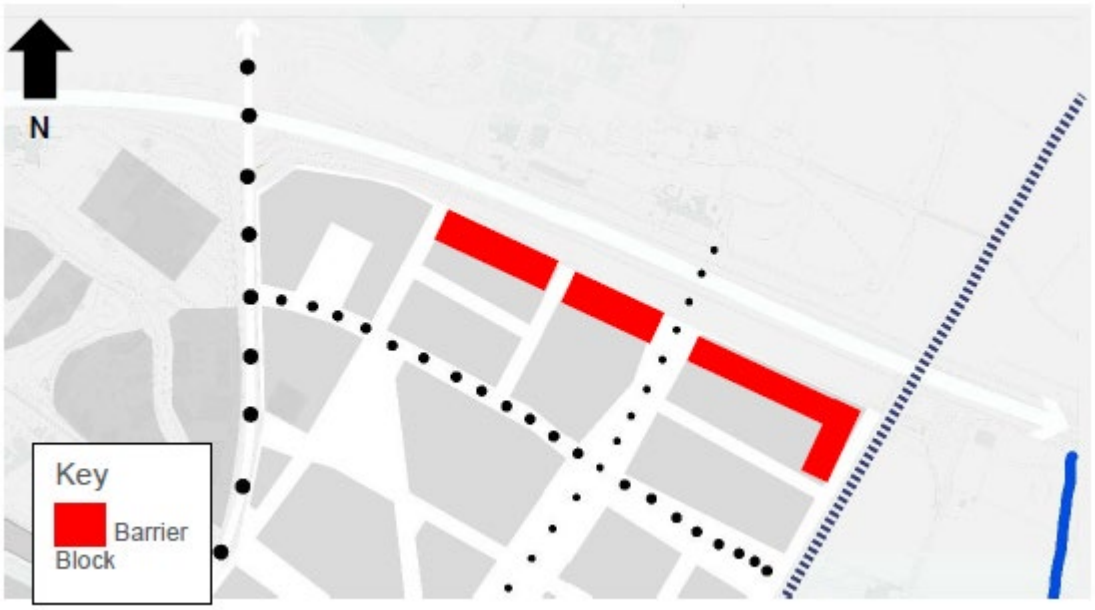
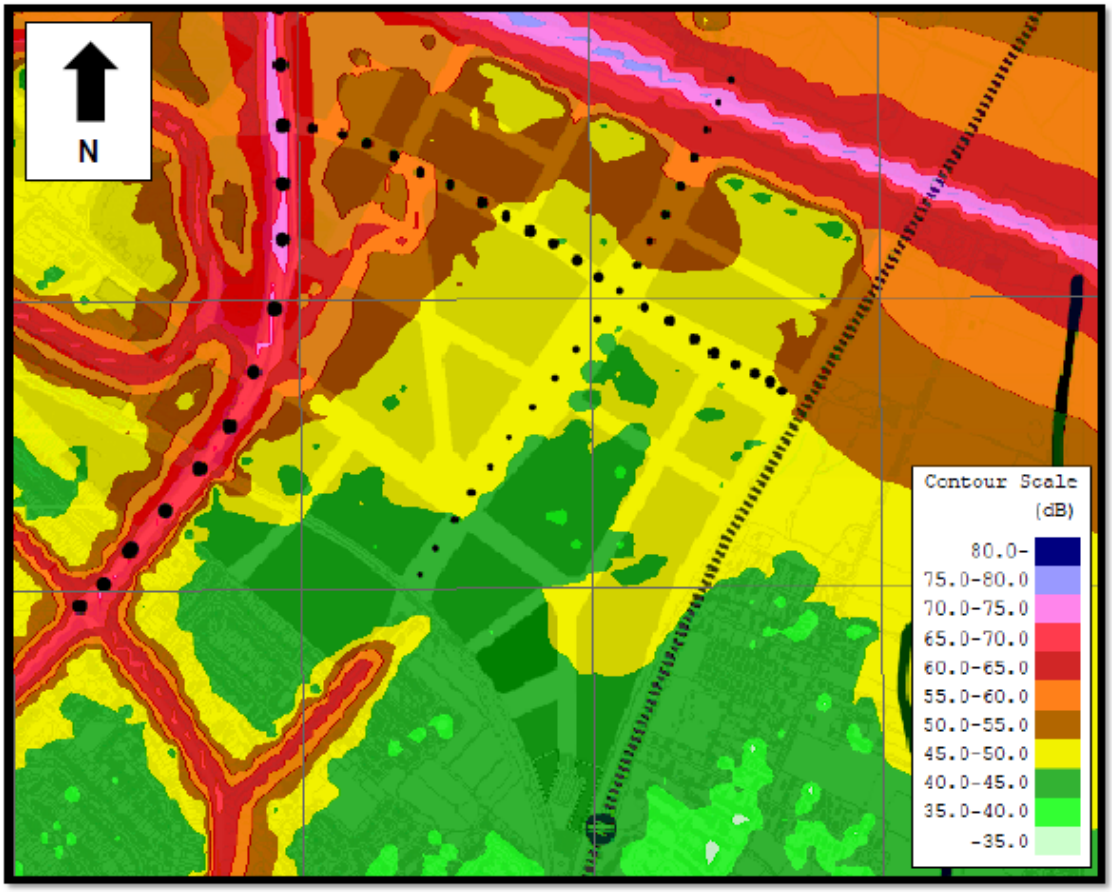
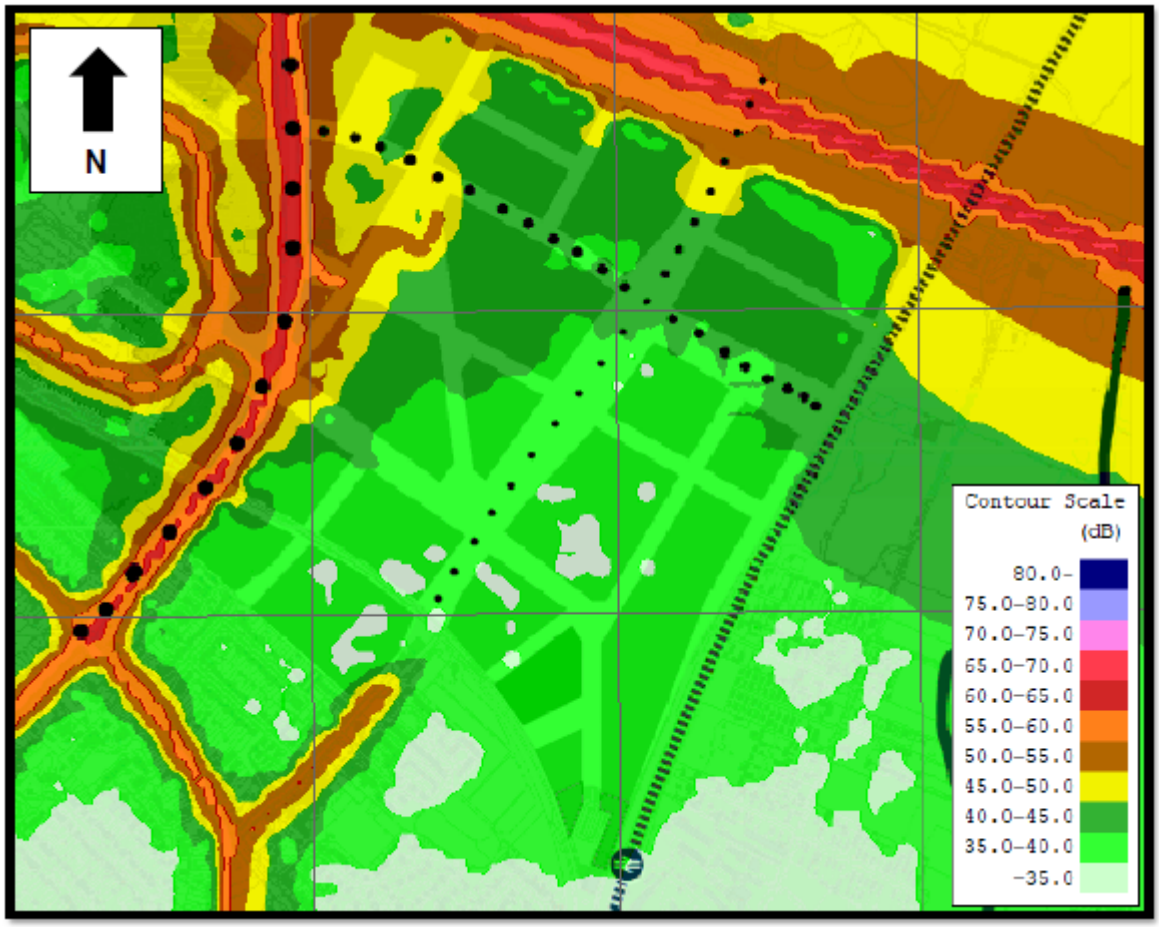


Figure 3-18: 4 Storey Barrier Block – Daytime LAeq, 16hr – Ground Floor

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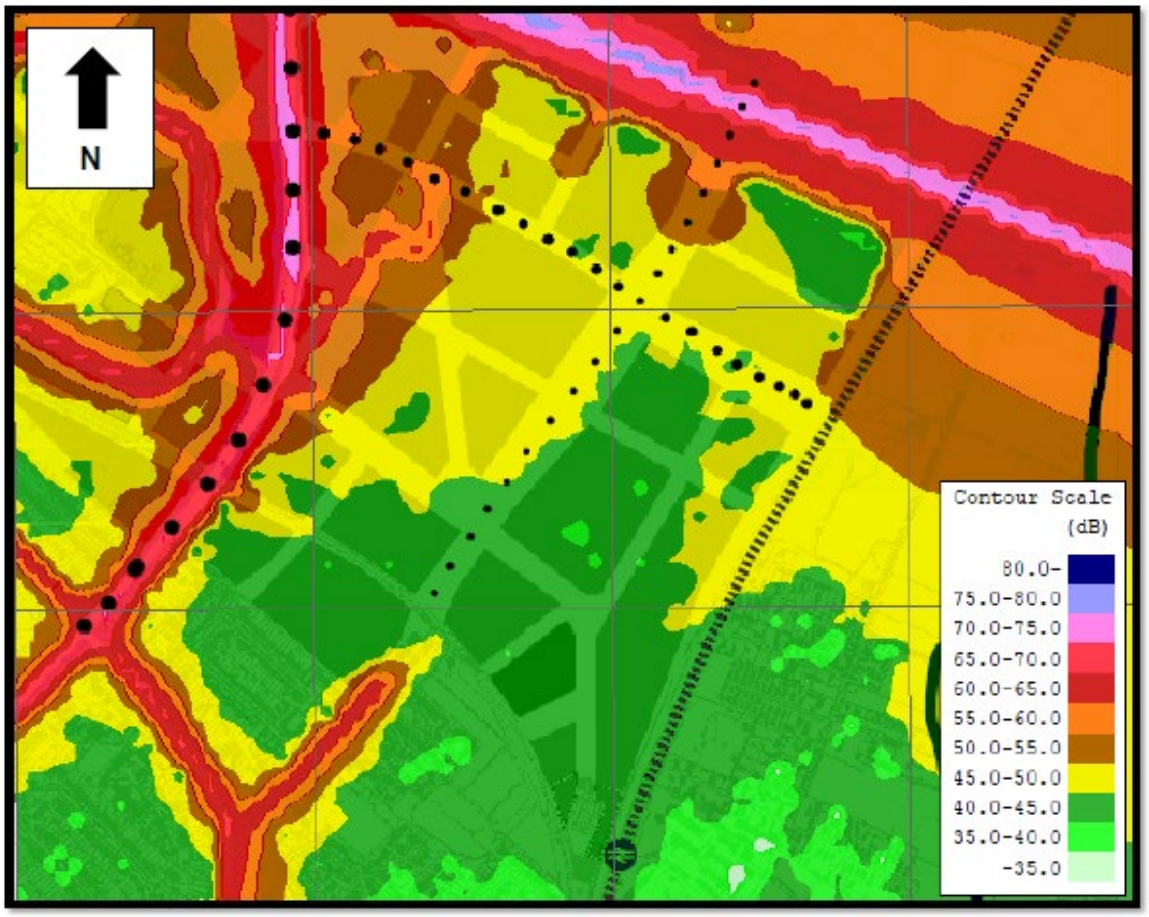
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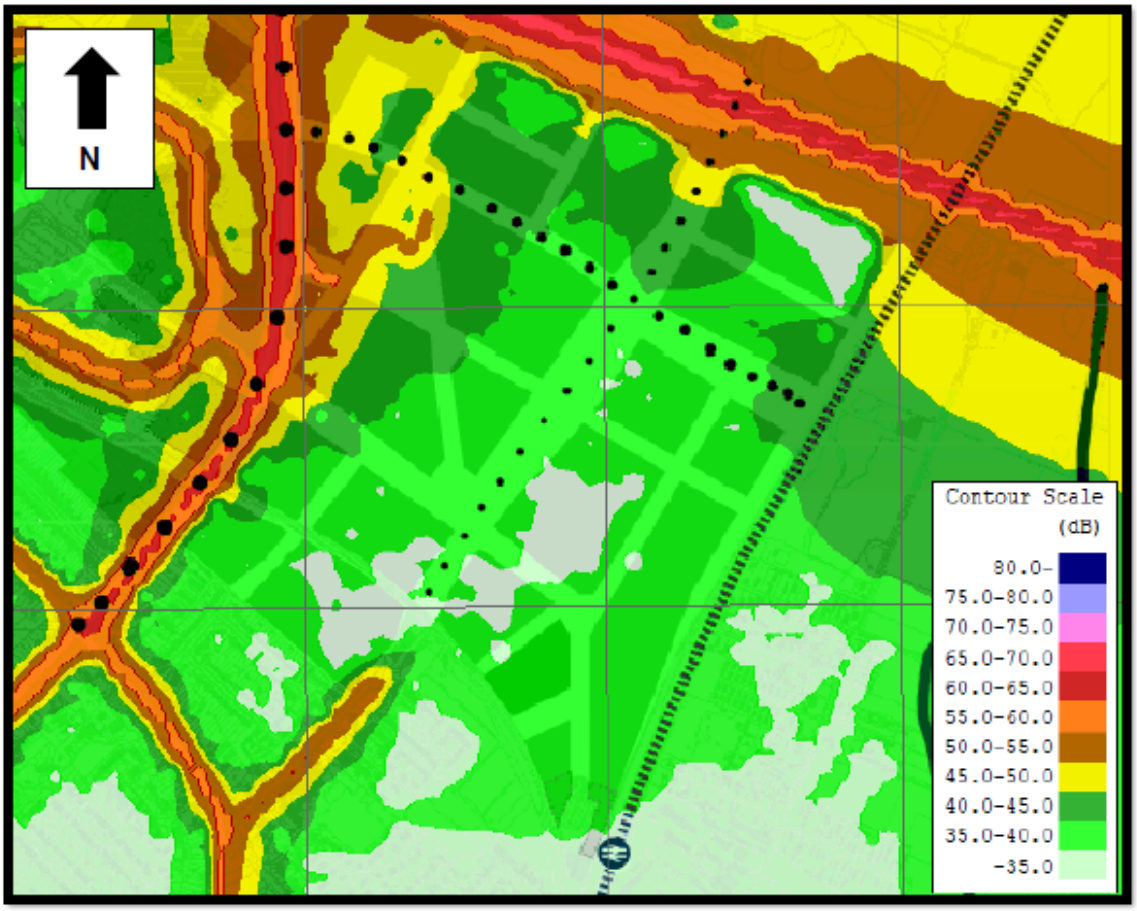
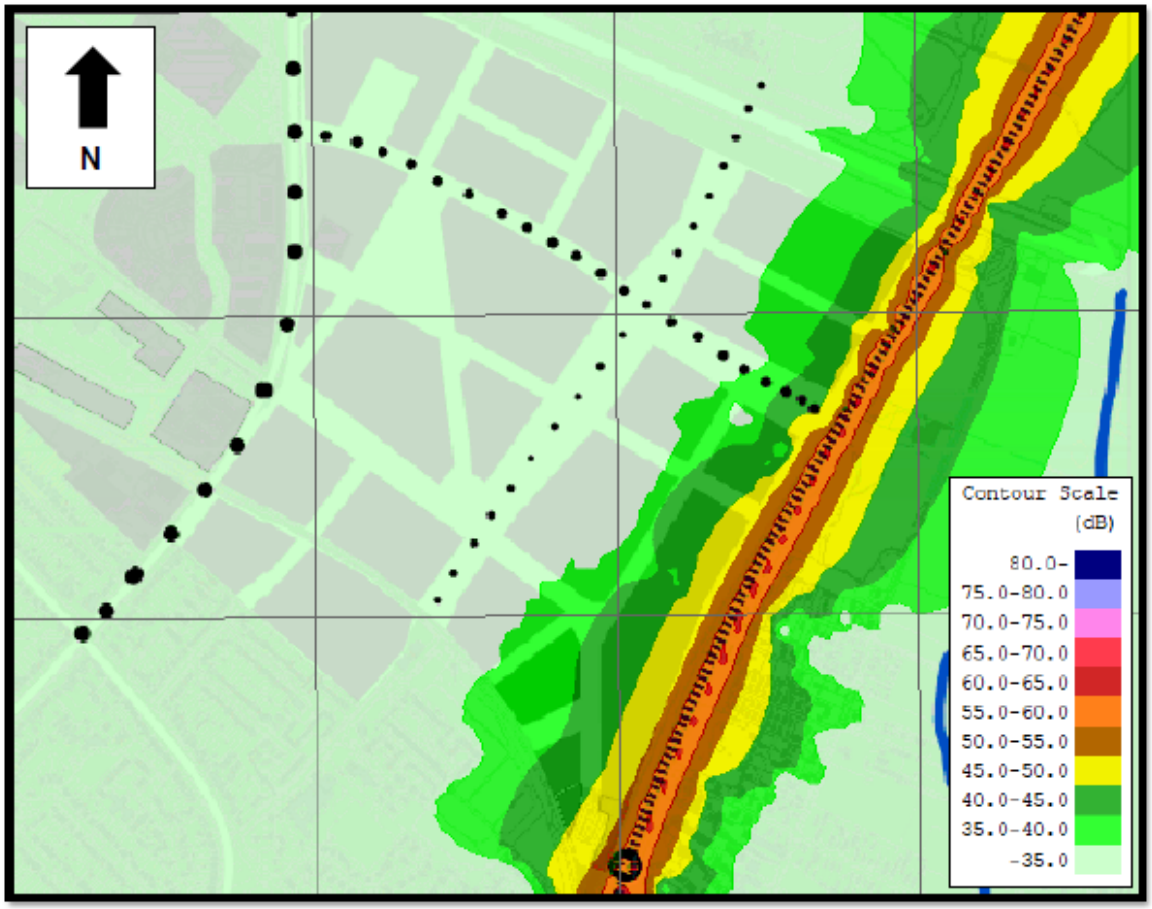


Railway Noise

2.10.13 This section provides the results of the 'no mitigation' scenario for Ely to Cambridge railway noise.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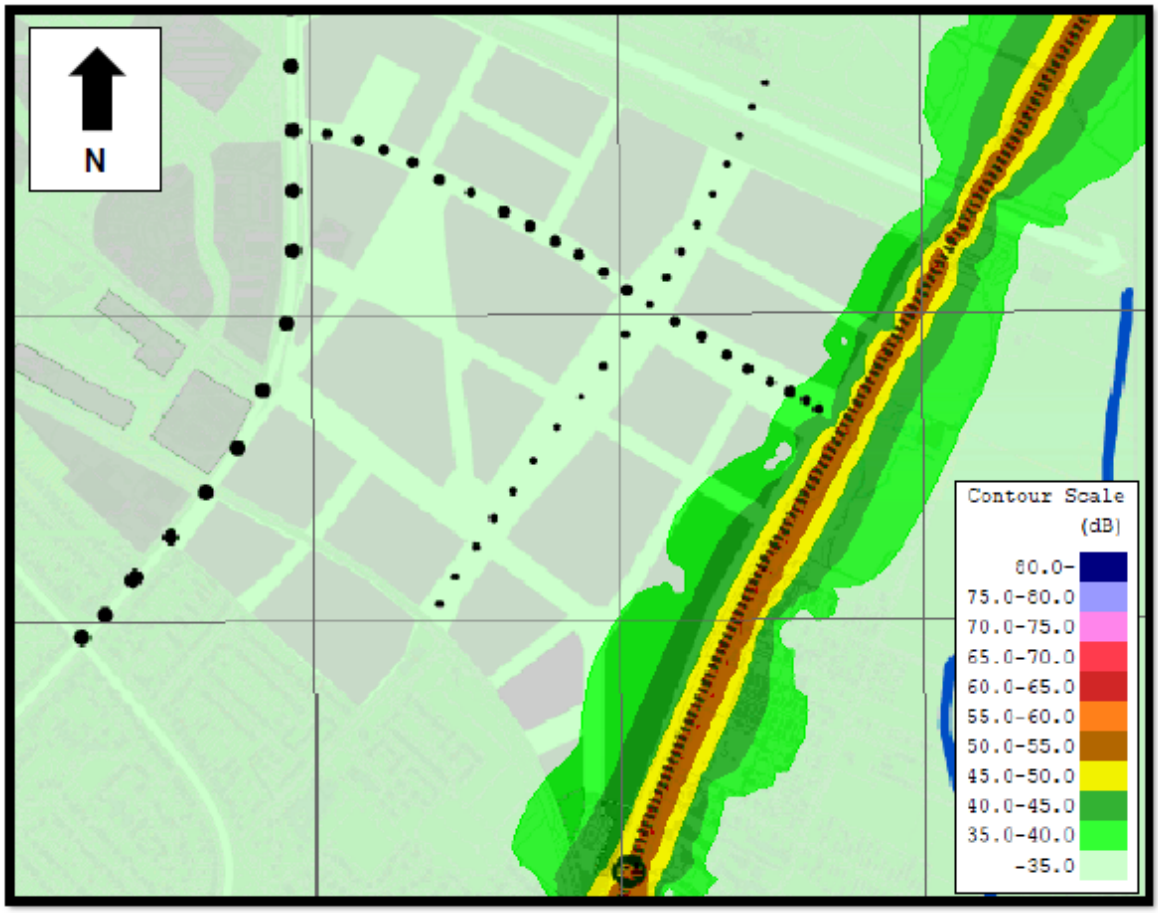
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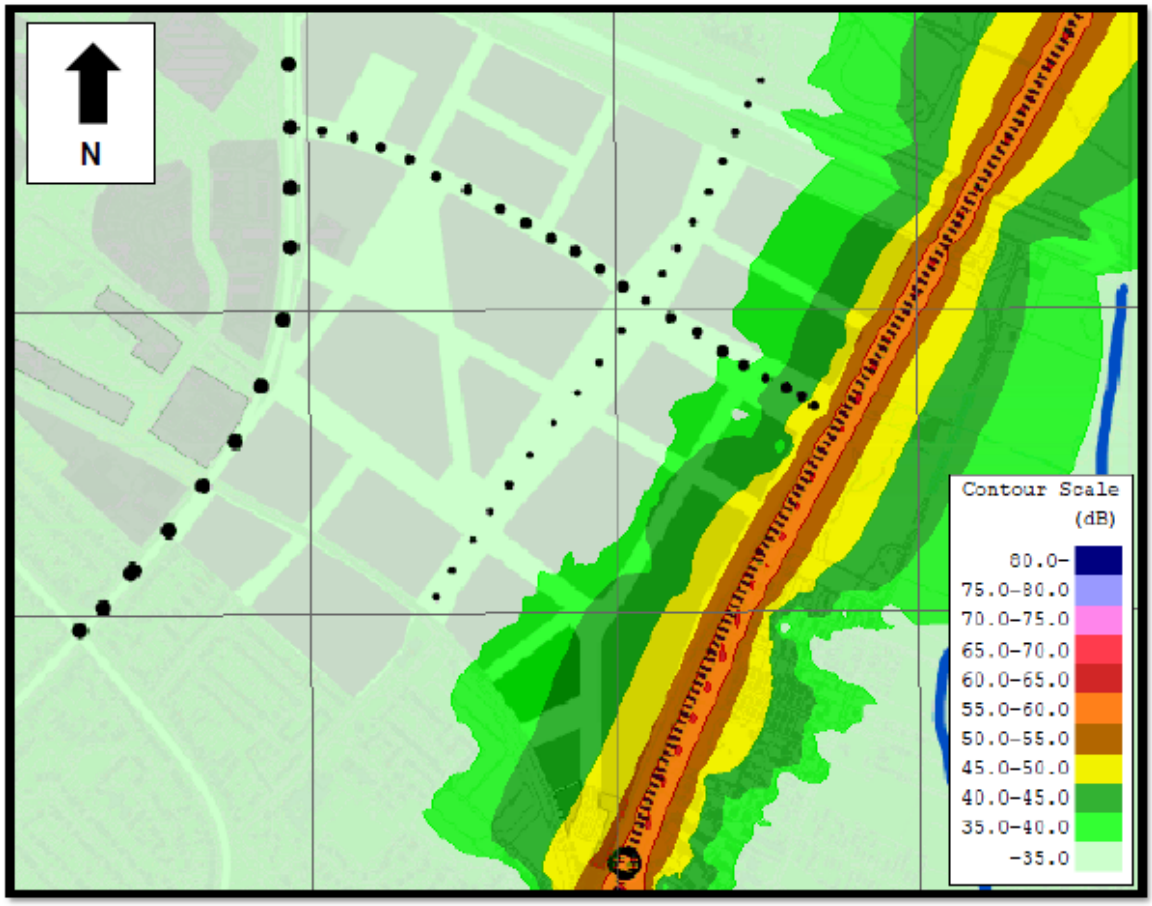
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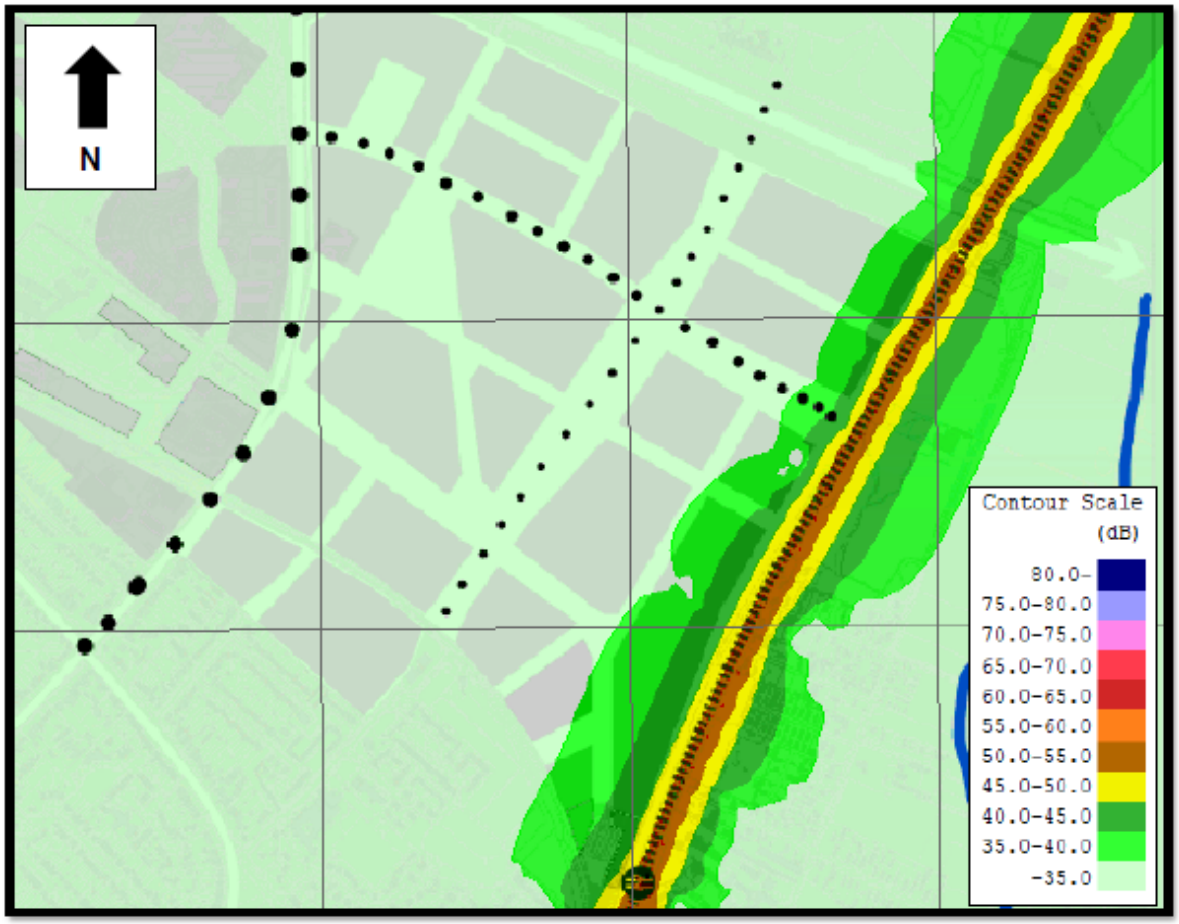


2.11 Interrelation with Other Topic Themes

2.11.1 Noise can be directly affected by decisions and proposals within other disciplines and development characteristic. Appendix 2: Interrelation with other NECAAP Strategic Objectives, Policies and Topic Themes - presents / details how noise is crosscutting / overlaps with and is interrelated to other strategic objectives, policies and other topic themes.

2.12 Conclusion – Approach to Noise at North East Cambridge Policy 25

2.12.1 The Greater Cambridge Planning Service have plans to develop a new residential area south of the A14, Cambridge Northern Bypass.

2.12.2 A series of noise contour maps were created for road traffic noise, including an investigation of various environmental noise barrier mitigation options such as roadside barriers, bunds and barrier apartment blocks, and railway noise.

2.12.3 This noise section provides the noise contour maps for carious modelled situations for traffic noise constraints, as well as a series of indicative noise threshold values that can be used in this assessment to determine the risk of adverse effect, as shown in Table 3: Road Traffic Noise Levels for LOAELs and SOAELs

2.12.4 A series of noise modelling scenarios have been completed in order to determine the existing levels of noise across the NEC Site – unmitigated, due to transport noise associated with the A14, Milton Road and the Ely to Cambridge railway line. Noise modelling software has been used in order to predict the noise levels in external amenity areas and also incident upon any proposed facades for the proposed residential development.

2.12.5 An initial ProPG noise risk assessment has been undertaken for the proposed development site in order to provide an indication of the likely risk of adverse effects from noise with no subsequent mitigation included.

2.12.6 The initial noise risk assessment has determined that large areas of the Site is subject to a mainly medium risk during the daytime and medium to high risk during the night-time in areas close to and due to noise from the A14 and Milton Road.

2.12.7 With regards to road traffic sound, the Noise Impact Assessment / Modelling has determined that strategic mitigation measures in the form of an environmental noise barrier or similar building structures close to the A14 and Milton Road will be required for garden areas / habitable rooms located facing the A14 (M) and Milton Road and to reduce noise levels in the proposed off-site open space at Chesterton Fen which is between the Area Action Plan area and the River Cam North Street, all to ensure that external noise levels do not exceed significant criteria. The most effective mitigation is achieved by a 5m high physical barrier installed adjacent to and alongside the A14 towards the northern boundary of the proposed development. Open spaces within North East Cambridge will be for informal play, recreation and amenity purposes therefore, it is not envisaged that these areas will be frequented by the public for long periods of time during the day.

2.12.8 First and foremost, good acoustic design must be followed across the Site, particularly for areas closest to the roads. In addition, it is strongly recommended that gardens and habitable rooms should be orientated such that they are protected by the building structure / envelope from the roads and gaps between, those dwellings facing the roads, kept to a minimum.

2.12.9 Furthermore, alternative ventilation for the majority of habitable rooms across the Site is likely to be required when open windows are relied upon for background ventilation and where habitable rooms cannot be orientated away from the sources. However, this can only be confirmed by further detailed noise modelling when the site layout and building heights are more definitive.

2.12.10 The mitigation options considered in this paper assume that the measures suggested are possible, buildable, safe, and built on land that is owned by the developer. Further investigations by other specialists, such as structural engineers and landscape architects would be required before any option is finalised.

2.12.11 Also further discussion and liaison with Highways England who are responsible for the operation and maintenance of the A14 may also be required, if barriers need to be placed on land they own.

2.12.12 Finally, design measures taken to reduce intrusion by noise may have unintended adverse consequences for the building or the nearby environment and may affect the attractiveness of the living environment for the occupants. Examples include sealed up balconies that result in a lack of connection with the external environment, roadside barriers that remove views or prevent crossing roads, sealed facades that affect personal control over the internal environment etc. Wherever possible, such unintended adverse consequences should be obviated by good acoustic design. All transport noise sources including the Ely to Cambridge railway noise and the Cambridge Guided Busway will require further detailed noise assessment and consideration of good acoustic design and mitigation.

2.12.13 The draft NEC AAP acknowledges that an environmental noise barrier to the A14 is necessary to secure strategic site wide noise reductions. Policy 25 states that development will be permitted where it can be demonstrated that:

'i. The noise barrier along the A14 is effectively assessed and integrated into the overall masterplan and resolves landscape, heritage, ecology and visual impacts.'

Contaminated Land

3.1 Introduction

3.1.1 Land contamination is often the unintended result of past industrial/commercial land use and, since it can negatively impact upon human health, property, and/or the wider environment, land contamination is a material planning consideration. In addition, some areas may be affected by the natural or background occurrence of potentially hazardous substances, such as radon, ground gases or elevated concentrations of metallic elements.

3.1.2 Failure to deal adequately with contamination can cause harm to human health, property, and the wider environment. It can also limit or preclude certain new development and undermine compliance with the various environmental legislation and guidance such as Part 2A of the Environmental Protection Act 1990 (see 3.2, below) and The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

3.1.3 The term 'land contamination' covers a wide range of situations where land is contaminated in some way. In a small number of these situations where certain criteria are met, a site might be determined 'contaminated land' which has a specific legal definition set out in Part IIA of the Environmental Protection Act 1990. However, given the pressure to redevelop brownfield land, the issue of land contamination is generally regulated by the Local Authority through the planning process.

3.2. National and Local Planning Policy and Guidance

3.2.1 There is a range of national, regional, and local planning policies that, along with other legislation, set out requirements for dealing with contaminated land.

3.2.2 At the national level, the overarching national planning policy document is the National Planning Policy Framework (NPPF, 2021) whose purpose is to encourage sustainable development, including the reuse of brownfield land. Under the NPPF the potential for land contamination is a material planning consideration intended to ensure that land is made suitable for its proposed use.

3.2.3 At the local level, Local Plans have been adopted by both Cambridge City Council and South Cambridgeshire District Council that set out policies and proposals for future development and land use in the Greater Cambridge area. The Plans set out a vision for Greater Cambridge and objectives for its achievement. These Plans provide a means of guiding change over long periods of time and establishes a framework against which planning applications can be assessed. Land contamination is specifically referenced by Policy 33 Contaminated Land in Cambridge City Council's Local Plan 2018 and by Policy SC/11: Contaminated Land in South Cambridgeshire District Council's Local Plan 2018. Both Policies share the following wording:

"*All major development and any development proposals on land subject to contamination or land that is suspected to be contaminated. Developers are*

responsible for ensuring that a proposed development will be safe and 'suitable for use' for the purposes for which it is intended."
Summary of requirements:

"Development will be permitted where the applicant can demonstrate that:

a. *there will be no adverse health impacts to future occupiers from ground contamination resulting from existing/previous uses of the area;*
b. *there will be no adverse impacts to the surrounding occupiers, controlled waters, and the environment from suspected/identified ground contamination from existing/previous uses, caused by the development; and*
c. *there will be no impact to future and surrounding occupiers from on-site and off-site gas migration.*

Where contamination is suspected or known to exist, an assessment should be undertaken to identify existing/former uses in the area that could have resulted in ground contamination; and if necessary:

d. *design and undertake an intrusive investigation to identify the risks of ground contamination, including groundwater and ground gases; and if proven there is a risk;*
e. *submit a remediation strategy and/or adopt and implement mitigation measures, to ensure a safe development and ensure that the site is stable and suitable to the new use in accordance with the National Planning Policy Framework (2012);*
f. *ensure that there are no adverse health impacts to future/surrounding occupiers and groundwater impacts and that there is no deterioration of the environment.*

Proposals for sensitive developments on existing or former industrial areas will be permitted where it is demonstrated that the identified contamination is capable of being suitably remediated for the proposed end use."

3.3 Role of the Landowner / Developer

3.3.1 The landowner / developer is responsible for ensuring that any proposed development is safe and suitable for use for the purpose for which it is intended. In order to fulfil this responsibility, the developer will be required to undertake a process of risk assessment in order to determine the severity of any contamination and the degree of harm that it poses to future site users and to the wider environment. The NPPF requires this site investigation has to be prepared by a 'competent person'. Whilst the term 'competent person' has not been defined further, the developer must consider the full range of technical expertise that is likely to be required when sourcing consultants or advisors to undertake the risk assessment process.

3.3.2 A development is more likely to be successful, and considerable effort and expense spared, if appropriately qualified experts with relevant environmental experience are used at appropriate stages.

3.3.3 After the completion of the risk assessment process, which may include remediation, the development site, as a minimum, should not be capable of being

determined as contaminated land under Part 2A of the Environmental Protection Act 1990 (see Table 1 below).

Table 1: Definition of Contaminated Land under Part 2A of the Environmental Protection Act 1990)

Part 2A of the Environmental Protection Act 1990 requires Local Authorities to inspect their areas for potentially contaminated land and, if necessary, to ensure that any contamination is remediated. Part 2A introduced a legal definition of *contaminated land* whereby contamination is assessed and defined in the context of a site's current use and where the contamination must be capable of causing either significant harm, or the significant possibility of significant harm, to human health and/or to other specified receptors. Where contaminated land is identified, details of the contamination and any remediation undertaken are placed on a Public Register. The narrow definition of the term *contaminated land* means that the number of sites that will be determined as legally defined contaminated land by Local Authorities is likely to be very small.

A site that contains contaminants which, in its current use, do not have the potential to cause significant harm will fall outside of Part 2A. It is government policy that these sites will be dealt with through the planning and development control system as and when they are brought forward for development. In such circumstances the developer must provide the Council with enough information to enable it to decide that the site will be suitable for use. For some sites that are identified as contaminated land under Part 2A, redevelopment of the land may be a cost-effective solution for securing remediation. In such circumstances action taken under the planning regime to ensure that land is suitable for use would also satisfy the Part 2A regime and turn a liability into an asset.

3.4 The Contaminated Land Risk Assessment Procedure

3.4.1 The site investigation procedure aims to identify the potential for contamination and aims to identify areas that may require remediation to make the site suitable for use. In order to achieve these aims the site investigation procedure is sub-divided into distinct phases that are intrinsically linked together with the results from each phase being used to inform and to design the next subsequent phase of site investigation. Typically, these sub-divisions comprise of a Phase 1 - desk study, a Phase 2 - intrusive site investigation, a Phase 3 - remediation proposal, and a Phase 4 - verification report.

- The Phase 1 - desk study / preliminary risk assessment establishes whether there have been any former contaminative uses on the site or adjacent properties which could impact upon the development;
- The Phase 2 - intrusive site investigation determines the nature, extent, and severity of contamination using risk-based criteria.
- The Phase 3 - remediation proposal uses the results from Phase 2 to inform remedial options, health and safety issues, potential impacts on the environment, and a remediation work plan;

- The Phase 4 - verification report provides a summary of remediation work carried out together with relevant documentary evidence and, if required, post-remediation test results.

3.4.2 The site investigation procedure involves specialist technical knowledge, and it is essential that all phases of the site investigation procedure are conducted by competent and experienced persons (who should hold recognised and appropriate qualifications). It is essential that developers conduct their site investigations in accordance with the latest good practice.

3.4.3 Examples of current good practice may be found in the following documents:

- Environment Agency (2004). Model Procedures for the Management of Land Contamination CLR 11
- BS 10175:2011+A2:2017 - Investigation of Potentially Contaminated Sites – Code of Practice, British Standard Institute, London.
- BS 5930:2015+A1:2020 - Code of practice for ground investigations
-
- BS EN ISO 21365:2020 - Soil quality. Conceptual site models for potentially contaminated sites
- Environment Agency (2001) Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination. R&D Technical Report P5-066/TR. Water Research Centre, Swindon.
- Environment Agency (2000) Technical Aspects of Site Investigation (2 Vols.). Research and Development Technical Report P5-065/TR. Water Research Centre, Swindon.
- Environment Agency (2000) Guidance for the Safe Development of Housing on Land Affected by Contamination. The Stationary Office, London.

3.4.4 Please note that good practice is constantly evolving, and the onus is on the developer / consultant to use the most up to date version of any relevant document.

3.5 Contaminated Land as a Constraint for NEC Proposal

3.5.1 Given the past uses on the wider NEC area, there is a potential for contaminated land to present a significant risk / constraint to certain types of development. The Councils have commissioned a Phase 1 Geo-Environmental Desk Study which provides a preliminary risk assessment taking into consideration the sensitivity of the receptors. Uses such as residential (with or without gardens) and allotments are defined as sensitive end-uses with commercial and industrial end-uses defined as less sensitive (although not free from risk).

3.5.2 The Phase 1 Geo-Environmental Desk Study included the following work:

- Examining the site history - late 1800s to present day, through collection of historical maps of the area, site records, records held by relevant local authorities, the Environment Agency and review of other information databases.

- Characterising the area's environmental and geological sensitivity through examination of existing geological, hydrogeological, topographical, and historical maps and aerial photographs of the area.
- Identifying Potential Areas of Concern (PAOCs) through a combination of historical map and data review.
- Consideration of any future plans for the site and the effects any proposed changes may have on contaminant linkages over time.

3.5.2 The conclusions of the Phase 1 Geo-Environmental Desk Study outline that the majority of the challenges posed in terms of contamination within the North East Cambridge area are typical of brownfield redevelopment in England. We consider that there are unlikely to be any issues which would challenge the viability of such a large scheme but there may be individual pockets of land that pose a greater risk in terms of land contamination than others. These areas will be identified through further, more detailed investigation at a later date.

3.5.3 Based on the information obtained, the following table provides a rough ranking based on the level or contamination risk considered to be present in the above areas of the site (1 = highest).

Key Areas of Concern Risk Ranking

Site Area	Site Area Risk Ranking
Nuffield Road Industrial Estate & Car Showrooms	1
Former Railway Depot/ Siding	2
Sewage Treatment Works (WWTP)	3
Cowley Road Industrial Estate	4
Cambridge Science Park	5
St John's Innovation Park	6
Cambridge Business Park	7

3.5.4 The report has sub-divided the site into the seven site areas. On the basis of the risks, the following table outlines a broad idea of the site investigation work which would be required in each of these areas.

Typical Site Investigation Recommendations

Site Area	Boreholes / Trial Pits	Soil Sampling	Monitoring Well Installation	Groundwater Sampling*	Ground Gas Monitoring
Nuffield Road Industrial Estate & Car Showrooms	Yes	Yes	Yes	Yes	Yes
Former Railway Depot/ Siding	Yes	Yes	Yes	Yes	Yes

Sewage Treatment Works (WWTP)	Yes	Yes	Yes	No	Yes
Cowley Road Industrial Estate	Yes	Yes	Yes	No	Yes
Cambridge Science Park	Yes	Yes	Yes	No	Yes
St John's Innovation Park	Yes	Yes	Yes	No	Yes
Cambridge Business Park	Yes	Yes	No	No	No

*Where No, it may be required if soil contamination is identified

3.5.5 It should be noted that the above table provides likely requirements of ground investigations in each area however the final investigations for any plot of land should be subject to the findings of a more site-specific Phase 1 Desk Studies as and when each section of the land is redeveloped.

3.5.6 An example of a known contamination issue at the NEC area that may become quite complex is that of the Trinity Hall farm Industrial Estate on Nuffield Road. Records indicate that in 2003, part of this site was identified as being contaminated with chlorinated solvents (known to be carcinogenic, odorous, and volatile), in soils and in the groundwater. Whilst some remediation took place, it is not clear what standards the remediation achieved (commercial end-use or to a higher standard) and whether or not contamination of the land continued after that time. As such, Environmental Health cannot currently state with any confidence that this particular piece of land would be suitable for a residential end-use until such a time that it can be demonstrated otherwise. This can only be achieved through further investigation of the ground conditions. The Proposed Submission draft AAP therefore proposes the Trinity Hall Farm Industrial Estate be retained in commercial use.

3.5.7 The scenario provided above is one that may occur in locations across the wider development area, especially when considering the long history and variety of industrial and commercial uses across the area.

3.5.8 Ground conditions are not likely to be uniform across the wider area and indeed, the extent and nature of contamination will depend on a variety of factors such as the environmental setting and the historical processes and chemicals used / disposed of / stored with respect to those activities and processes. Therefore, each individual parcel of land may present its' own different challenges and risks. The challenges and risks that have been identified in the preliminary Phase 1 Desk Study, along with the site-specific Phase 1 Desk Studies produced as each section is redeveloped, will inform the need for and design of any site-specific Phase 2 (intrusive) investigations. In

general, the following contaminants have been identified as the main potential risks on individual sites:

- Solvents / Volatile organic compounds (VOC) & Semi volatile organic compounds
- Petroleum and diesel range organics
- Heavy metals
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Ground gases such as methane and carbon dioxide

3.5.9 As mentioned above, each parcel of land will present different risks. As an example, land used for wastewater treatment may require investigation for a variety of contaminants, such as:

- Heavy metals (e.g. arsenic, cadmium, chromium)
- Inorganic ions (e.g. cyanides, sulphates, chlorides)
- Organics (e.g. halogenated compounds, pesticides, oxidation products of organic compounds, fuel oils, polychlorinated biphenyls (PCBs))
- Micro-organisms (e.g. pathogens)
- Treatment chemicals (e.g. polyelectrolytes, pH adjusters, alum)
- Hazardous ground gases (e.g. methane, carbon dioxide, hydrogen sulphide)

It is not expected that such a variety of potential contaminants listed above will be present across the entire NEC area – each section of land will present its' own individual risk.

3.5.10 Each section of land may require detailed investigation to varying degrees dependant on the results and findings of further (focussed) preliminary studies and potentially as a result of findings of initial / preliminary intrusive ground investigations. In each case, the starting point will need to be in the form of a more focussed Phase 1 Desk Study for each individual section / area of land. This will enable the provision of more refined preliminary risk assessments and conceptual site models for the specific areas of concern. The results / conclusions of the Phase 1 work will guide the extent of any Phase 2 (intrusive) work giving consideration to the proposed end-use of that particular piece of land.

3.5.11 We expect that all future planning applications coming forward within the development area will include a Phase 1 Desktop Study / preliminary risk assessment as a minimum. These studies will need to be carried out in accordance with current UK Guidance and in line with Best Practice. Where further (intrusive) investigation work is identified as being necessary, we will require that proposals for that further work are presented within the Phase 1 report. The extent of any intrusive (Phase 2) investigations to be carried out and reported to us prior to planning applications being submitted will be dependent on the risks identified within the Phase 1 study.

3.5.12 At this stage, it is not possible to comment on any potential requirements for remediation in any particular area of land and / or any longer-term monitoring that may be required on any particular parcel of land within the NEC area. This will be dependent on what is identified during the Phase 1 (site specific) and subsequently Phase 2 (intrusive) work. The further Phase 1 work for the individual sections / parcels

of land will provide the preliminary risk assessment and conceptual site model. The Phase 2 work will verify the actual ground conditions. This will then be compared against the details provided in the preliminary risk assessment and conceptual site model. The Phase 2 work will then refine the original risk assessment and identify any requirements for remediation and longer-term monitoring. The scope, extent, cost and specification for any necessary remediation on a specific piece of land will be influenced by a variety of factors including but not limited to; accessibility, extent, depth, concentration and location of the contamination and the proposed end-use (the higher the sensitivity of the end-use in terms of exposure risk, the higher the level of remediation and protection that may be required).

Notwithstanding the above, there are various scenarios that may arise that will require longer term management and monitoring. For example:

- Where groundwater contamination is suspected or indeed contamination of soils that may be impacted by fluctuating groundwater levels, longer term monitoring will likely be required to gauge the influence of seasonal fluctuations in groundwater levels and contaminant concentration fluctuations during these times,
- Where ground gases are a potential risk, adequate ground gas monitoring must be carried out to detect variations due to changes in meteorological conditions (particularly during rising and falling atmospheric pressure),
- Where pilot trials are required to gauge the potential success for specific (more complex) remediation projects. It should be noted that not all contamination can be dug out and disposed of at landfill and
- Where long term monitoring is required to gauge the success of certain remediation activities.

3.5.13 As mentioned in 3.5.12 above, it is not possible to determine extent of works required or to identify timescales on the scope of works required. These very much depend on what is identified in the preliminary and refined risk assessments. However, each individual section of land will need to be investigated in accordance with current UK standards. The following factors need to be considered:

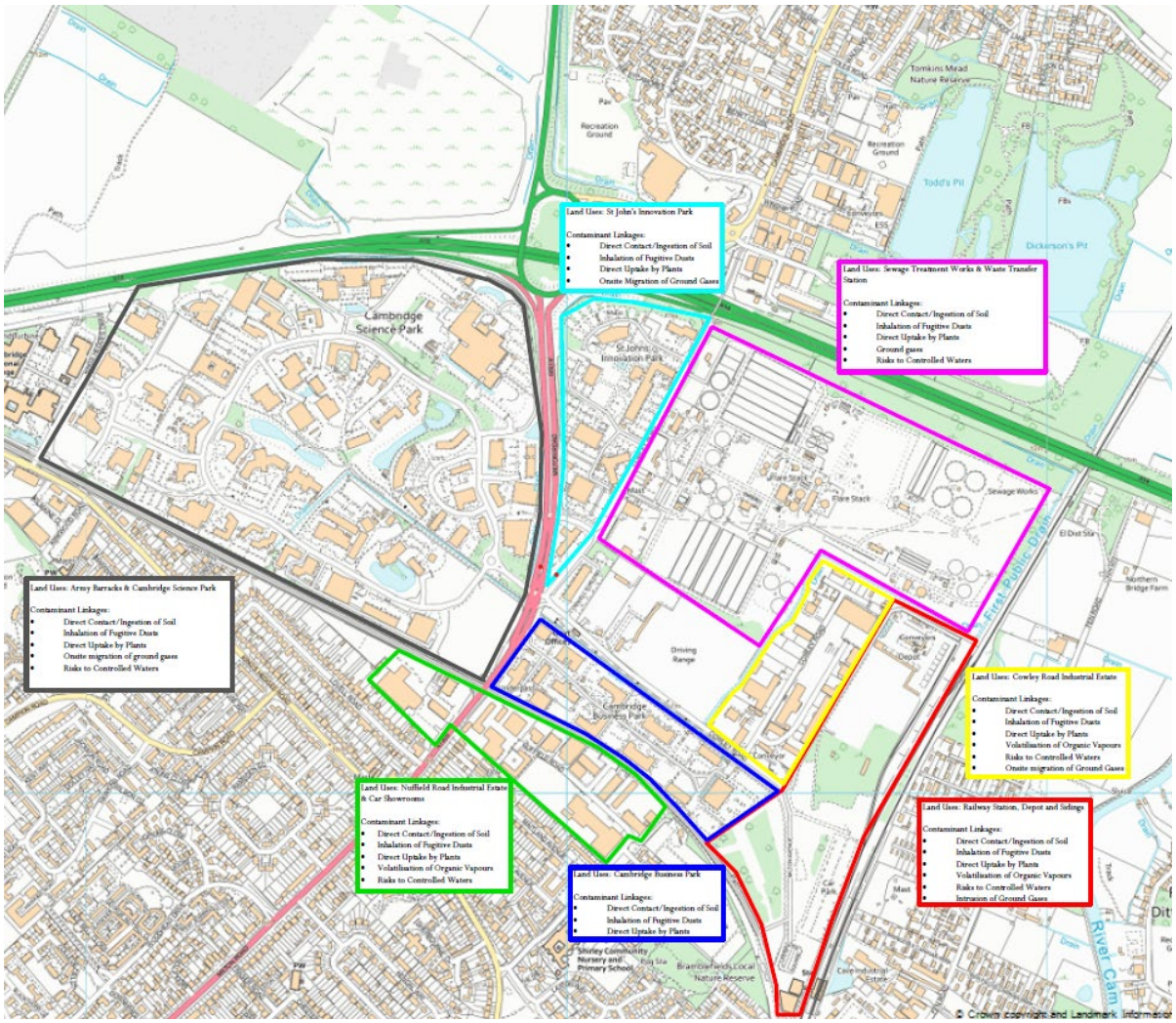
- Adequate coverage of the land in terms of sampling and monitoring locations
- Adequate representation of the various different land-uses when designing sampling and monitoring locations;
- Requirement for return visits (perhaps over a period of months) to monitor groundwater contaminant concentrations and seasonal variations;
- Requirement for return visits (perhaps over a period of months) to monitor ground gases, soil vapours / solvents;
- Acceptable timing and phasing of the above to ensure a coordinated site wide approach;
- Consider a strategic, phased approach to dealing with potential contamination if this is an issue over a wide area;
- Use Environmental Assessment scoping to shape an appropriate strategy, including through work on the ‘baseline’, appropriate objectives for the assessment of impact and proposed monitoring;
- Be clear on the approach to remediation, ensuring that the land is made suitable for its proposed end use;

- Have regard to the possible impact of land contamination on neighbouring areas (e.g. by polluting surface water or groundwater, or the migration of ground gas); and
- Be clear on the role of developers and requirements for information and assessments.

3.5.14 Assessing contaminated land impacts can be a complex process and is dependent on the complexity and history of previous operations and uses on site. It is therefore recommended that applicants / developers consult with the environmental health as part of the pre-application process to gain agreement on the approach, remit and methodology that will be used and what elements should be included.

3.5.15 A general overview of the potential contaminated land issues on some of the NEC area is provided in Figure 1, below. This is based on existing site investigation reports for certain locations and a review of historical maps and trade directories. This is only intended to provide a visual guide on how ground conditions may vary between parcels.

Figure 1: General overview of how ground conditions may change between parcels



3.5.16 The Councils expect that the cost of any site remediation, required to ensure that the land is made suitable for its proposed end use, will be borne by the developer and will be reflected in the price paid for the land. To be considered an abnormal development cost for the purpose of financial viability, applications will need to supported by detailed evidence demonstrating the complexities associated with certain types of contamination, the extent of contamination, the environmental setting (including geology and hydrogeology) and the method of remediation required to clean up the land adequately enough to ensure that safe development can occur when considering human health (or indeed controlled / groundwater) targets.

3.5.17 The Councils, having regard to the advice and recommendations of Environmental Health, will determine whether the viability of remediation causes a proposed use not to be considered sustainable. In such circumstances, the Councils will review the findings of the site investigations and discuss with the applicant the potential use of the site for less sensitive land uses such as commercial.

3.5.18 For further detailed advice and information on expectations and requirements for the individual phases of investigation, the reader is directed to Pages 86-89 and Appendix 7: The Development of Potentially Contaminated Sites in Cambridge and South Cambridgeshire: A Developers Guide (pages 208-229) of the Greater Cambridge Sustainable Design and Construction SPD, January 2020 (GC- SD&C SPD, 2020), available to view at the following link:
https://www.cambridge.gov.uk/media/8157/greater-cambridge-sustainable-design-and-construction-spd.pdf

3.6 Conclusion – Approach to Contaminated Land at North East Cambridge Policy 25

3.6.1 The North East Cambridge development area has a long history of past industrial / commercial / potentially contaminative uses. At present, there is limited understanding of the potential contamination issues beneath the surface (including soils and groundwater) and the remediation that may be required to make the land suitable for the proposed end uses. In order to guide potential future remediation schemes / costs and to provide the evidence base for the suitability of certain types of (more sensitive) development on certain areas within the NEC boundary, a Phase 1 Desktop Study and preliminary risk assessment was carried out by a suitably qualified and experienced environmental / contaminated land consultant, commissioned by the Councils. The assessment identified the headline contamination issues which in turn will inform site investigations and provide an understanding of future site remediation requirements.

3.6.2 In addition to the above, it is also recommended that the landowners take the opportunity to investigate general ground conditions (in terms of geotechnical issues / parameters for any development) at the same. It should be noted that this is not within the remit of Environmental Health but geotechnical and land contamination intrusive investigations are often carried out at the same time due to the nature of the work.

3.6.3 For large strategic sites of the size and nature of those across NEC, it would be reasonable to expect that more than one phase of site investigation may be required (as both a technically preferable and cost-effective solution).

Odour

4.1 Introduction

4.1 Potential odour impacts/effects associated with new development can be a material planning consideration, as odours can have an unacceptable adverse impact/effect on amenity, quality of life and living conditions. Impact on amenity as a result of odour annoyance can occur when a person exposed to an odour perceives the odour as unwanted and it detracts from the overall character or enjoyment of an area. Odours can give rise to unpleasantness, annoyance, nuisance or complaints. Due to chemical complexity and smell variety, it is difficult to completely eliminate all odour / smells. The odour effect that the planning process needs to be concerned with is the negative adverse appraisal by and effect on a human receptor as a result of odour exposure.

4.1.1 Odour is a complex issue that air quality professionals are frequently required to assess, particularly in respect to planning. Potential odour impacts may need to be assessed when considering a new development planning application for:

i. Odour Generating Development - a source, process, activity or use that may generate / release odours (odorous activities) and in particular when near exiting sensitive uses / premises, or
ii. Odour Sensitive Development - a new sensitive use / premises that is being proposed near to an existing / established odorous source, process, activity or use (often referred to / known as ‘encroachment’).

4.1.2 Any new development within NEC that may coexist with existing sources of odour and dust such as the Cambridge Waste Water Treatment Plant (WWTP) a safeguarded wastewater treatment plant, safeguarded minerals / waste sites and other industrial, commercial or business uses in the area may require odour and dust impact assessments to ensure no unacceptable adverse impact arise on health and quality of life / amenity, internally and externally.

4.1.3 Any odour impact assessment must consider existing odour emissions from odour sources at different times of the year and in a range of different weather conditions and detailed odour dispersal modelling may be required.

4.1.4 Although the NECAAP assumes that the WWTP will be relocated subject to national infrastructure planning development consent order approval, there is uncertainty over the timing of relocation should approval be granted. As odour from the WWTP is a significant constraint this matter is considered in detail below.

4.2 National Planning Policy

4.2.1 The National Planning Policy Framework (2021) aims to reduce air pollution and provide healthy and acceptable living conditions. The following paragraphs are relevant:

'130…planning policies and decisions should ensure that developments:… f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users'.

'185…planning policies and decisions should 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'.

'187…Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed'.

4.3 Local Planning Policy

Cambridge City Council

4.3.1 Policy 36: Air quality, odour and dust of the Cambridge Local Plan (2018) relates to air pollution from all potential sources, including odour. Part b) of the policy states that *'where the proposed development is a sensitive end-use it will be permitted where it can be demonstrated that there will not be any significant adverse effects from existing poor air quality, sources of odour or other emissions to air.'*

4.3.2 The policy goes on to state that any such impacts on the proposed use should be appropriately monitored and mitigated by the developer. The supporting text says that applicants shall, where reasonable and proportionate, prepare and submit with their application a relevant assessment, taking into account guidance current at the time of the application.

South Cambridgeshire District Council's (SCDC's)

4.3.3 Policy SC/14 of the South Cambridgeshire District Local Plan deals with odour and other fugitive emissions to air. However, it mainly relates to new development which may generate malodours or emissions to air. The supporting text to the policy recognises that odour from sewage treatment works is an issue that is addressed by the Cambridgeshire and Peterborough Minerals and Waste LDF.

4.3.4 Policy HQ/1: Design Principles, seeks to secure high quality design in all new development. Criterion (n) states that proposals must *'protect the health and amenity of occupiers and surrounding uses from development that is overlooking, overbearing or results in loss of daylight or development which would create unacceptable impacts such as noise, vibration, odour, emissions and dust'.*

Cambridge Northern Fringe East – CCC / SCDC Local Policy

4.3.4 In addition to local specific odour related policies both plans have policies relating to part of the NEC area, formerly known as Cambridge Northern Fringe East. These are policy 15: Cambridge Northern Fringe East and new railway station Area of Major Change (CCC) and SS/4: Cambridge Northern Fringe East and Cambridge North Railway Station (SCDC).

4.3.5 These policies state that the Cambridge Northern Fringe East and the new railway station will enable the creation of a revitalised, employment focussed area centred on a new transport interchange. Amongst other requirements the following are relevant to noise:

"All proposals should:

a. take into account existing site conditions and environmental and safety constraints;
b. demonstrate that environmental and health impacts (including odour) from the Cambridge Water Recycling Centre can be acceptably mitigated for occupants;"

4.4 Local Site-Specific Odour Guidance

4.4.1 A Technical note on interpretation of 'Odour Impact Assessment for Cambridge Water Recycling Centre' Report/Study (Odournet, October 2018 ref. CACC17A_08_final) as a material consideration in determining Planning Applications in the vicinity of Cambridge Water Recycling Centre (CWRC) Version - Final: 20-05-21.

4.4.2 A Technical note on interpretation of Odour Impact Assessment for Cambridge Water Recycling Centre (greatercambridgeplanning.org) has been produced to interpret the odour impact assessment for Cambridge Water produced by Odournet (Olfanet) in 2017, amended in 2020. The technical note sets out how officers intend to interpret the results of the 'Odour Impact Assessment for Cambridge Water Recycling Centre' (Odournet, October 2018 – ref. CACC17A_08_final), as amended (Addendum Report – Updated odour dispersion modelling for Cambridge Water Recycling Centre 2020) undertaken for the Councils by Odournet UK Ltd (now known as / the former

name of Olfasense UK Ltd) a specialist odour consultancy, in consideration of planning applications for development in the vicinity of Cambridge Water Recycling Centre (CWRC). Figure 1: Odour Exposure Contours around Cambridge WRC (Updated dispersion modelling output - Olfasense Addendum Report, 21 December 2020) below, shows the land / area which is covered by this note (later sections of this technical note explain how this area has been determined).

4.4.2 In summary, a key element of the updates is an improvement in model performance for odour sources that generate peak exposure concentrations under low wind, stable atmospheric conditions, and to address potential overestimation of impacts from near-ground-level emissions sources. For newer modelling studies which use the updated software the predicted level of impact is typically lower.

4.4.3 The updated model output is presented in this note as *'Figure 1: Odour Exposure Contours around Cambridge WRC (Updated dispersion modelling output - Olfasense Addendum Report, 21 December 2020',* which indicates a reduction in the extent of the odour contours spatial distribution in comparison to those produced previously in 2017.

4.4.4 Table 1 below sets out the types of development / uses which would be suitable in principle in each odour exposure contour. Where the table refers to 'new' uses this includes both new build and change of use.

4.4.5 Policy 36 of the Cambridge Local Plan states that where there may be significant impacts to proposed development from existing sources of odour, these should be appropriately mitigated. Suitable mitigation would also be required by Policy HQ/1 of the South Cambridgeshire Local Plan to protect the health and amenity of occupiers of new development. Table 1 sets out where mitigation may be possible and the types of mitigation that would be acceptable. However, even with mitigation some development may still be unsuitable, for example if it would result in poor living conditions for occupiers.

Figure 1: Odour Exposure Contours around Cambridge WWTP
(Updated dispersion modelling output - Olfasense Addendum Report, 21 December 2020)

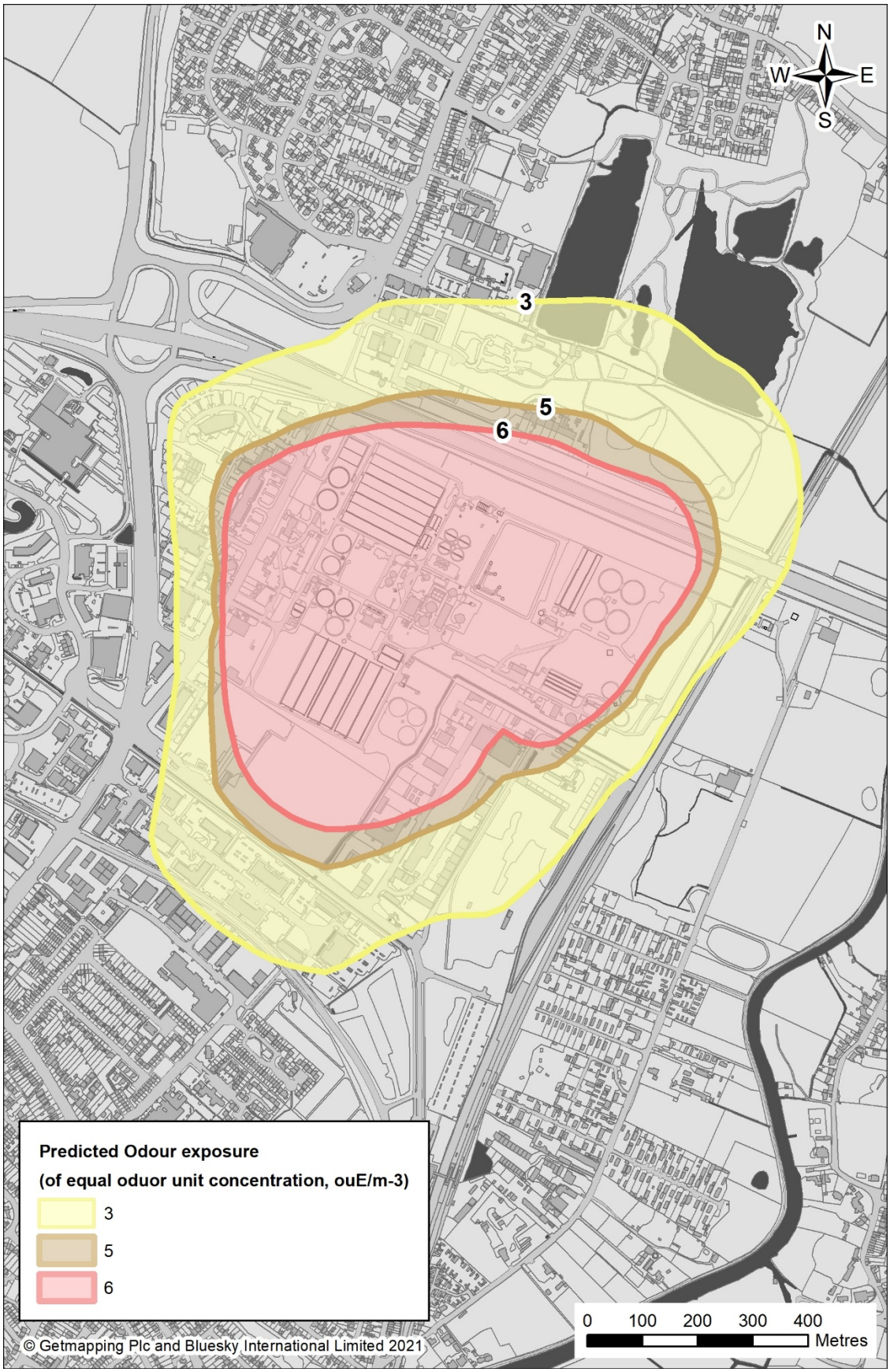


Table 1: Acceptability of development within different odour exposure contours in the vicinity of WWTP

Odour Exposure Contour (C98,ouE/m3)	**Types of development / uses that are <u>unlikely</u> to be suitable even with mitigation**	**Types of development / uses that <u>may</u> be suitable**	**Types of development / uses that are <u>likely</u> to be suitable**
<3 (outside 3)	N/A – odour not a constraint	N/A – odour not a constraint	N/A – odour not a constraint
3 to <5	**High Sensitivity Receptors** **NEW** high sensitivity receptors including residential, hospitals, school/educational uses and tourist/cultural uses (includes all uses in Use Classes C & D apart from outdoor playing/recreation fields).	**High Sensitivity Receptors** Extension / expansion of **ESTABLISHED EXISTING** residential, hospitals, school/educational uses and tourist/cultural uses (C & D planning use classes). This does not cover householder applications. Consideration may need to be given to possible mitigation.	**Medium Sensitivity Receptors** **NEW** and extension / expansion of **ESTABLISHED EXISTING** B1 (a) offices and (b) research and development, commercial / retail premises (A classes) and playing / recreation fields **Low Sensitivity Receptors** **NEW** and extension / expansion of **ESTABLISHED EXISTING** Low sensitivity receptors including

Odour Exposure Contour (C98,ouE/m3)	**Types of development / uses that are <u>unlikely</u> to be suitable even with mitigation**	**Types of development / uses that <u>may</u> be suitable**	**Types of development / uses that are <u>likely</u> to be suitable**
			industrial uses (B1(c), B2), storage and distribution (B8), farms, footpaths and roads
5 to <10	**High Sensitivity Receptors** **NEW** high sensitivity receptors including residential, hospitals, school/educational and tourist/cultural (C & D uses).	**High Sensitivity Receptors** Extension / expansion of **ESTABLISHED EXISTING** high sensitivity receptors including residential, hospitals, school/educational and tourist/cultural (C & D uses). **Medium Sensitivity Receptors** **NEW** and extension / expansion of **ESTABLISHED EXISTING** B1 (a) offices and (b) research and development,	**Low Sensitivity Receptors** NEW and extension / expansion of **ESTABLISHED EXISTING** Low sensitivity receptors including industrial uses (B1(c), B2), storage and distribution (B8), farms, footpaths and roads

Odour Exposure Contour (C98,ouE/m3)	**Types of development / uses that are <u>unlikely</u> to be suitable even with mitigation**	**Types of development / uses that <u>may</u> be suitable**	**Types of development / uses that are <u>likely</u> to be suitable**
		commercial / retail (A classes) premises and playing / recreation fields **with acceptable odour mitigation at receptor** e.g. no external seating areas, sealed external facades with building mechanical ventilation with odour abatement technology	
10 and above	**High Sensitivity Receptors** NEW and extension/expansion of ESTABLISHED EXISTING high sensitivity receptors including residential, hospitals, school/educational and tourist/cultural (C & D uses). **Medium Sensitivity Receptors**	**Medium Sensitivity Receptors** Extension / expansion of **ESTABLISHED EXISTING** B1(a) offices and (b) research and development, commercial / retail premises (A classes) **with proven and acceptable odour mitigation at receptor** e.g. no external seating areas,	-

Odour Exposure Contour (C98,ouE/m3)	Types of development / uses that are <u>unlikely</u> to be suitable even with mitigation	Types of development / uses that <u>may</u> be suitable	Types of development / uses that are <u>likely</u> to be suitable
	NEW medium sensitivity receptors including B1(a) offices and (b) research and development, commercial / retail (A classes) premises and playing / recreation fields.	sealed external facades with building mechanical ventilation with odour abatement technology This could include the replacement of existing buildings with the same use. **Low Sensitivity Receptors** NEW and extension / expansion of **ESTABLISHED EXISTING** low sensitivity receptors including industrial uses (B1(c), B2), storage and distribution (B8), farms, footpaths and roads. Consideration may need to be given to possible mitigation.	

***Note** - For clarification, where Table 1 one refers to 'Extension/expansion of **ESTABLISHED EXISTING** residential' - it should be noted that such residential does not include minor "householder applications" as defined in article 1(2) of the Town and Country Planning (General Development Procedure) Order 1995 (SI 1995/419) as amended (GDPO) and The Town and Country Planning (Development Management Procedure) (England) Order 2010

"householder application" means—

(a) an application for planning permission for development of an existing dwellinghouse, or development within the curtilage of such a dwellinghouse for any purpose incidental to the enjoyment of the dwellinghouse; or

(b) an application for any consent, agreement or approval required by or under a planning permission, development order or local development order in relation to such development,

but does not include an application for change of use or an application to change the number of dwellings in a building;

4.5 Conclusion – Approach to Odour at North East Cambridge Policy 25

4.5.1 Development will only be permitted when it has been demonstrated by assessment and design or mitigation that future uses would not be adversely affected by the continued operation of existing sources of odour and dust that may coexist, and in particular the Cambridge WWTP.

4.5.2 For potential odour sources other than the WWTP which may coexist such as other waste and recycling centres the odour assessment approach as detailed in the relevant Pollution - Odour and Other Fugitive Emissions to Air sections (pages 136 - 145) of the Greater Cambridge Sustainable Design and Construction SPD, January

2020 (GC- SD&C SPD, 2020) will need to be followed, available to view at the following link:
https://www.cambridge.gov.uk/media/8157/greater-cambridge-sustainable-design-and-construction-spd.pdf

Appendix 1: National Design Guide: Planning practice guidance for beautiful, enduring and successful places - MHCLG, January 2021

Characteristics for well-designed places	Sub- Characteristic Component	Relevant Consideration / Advice – Noise / Sound and Air Quality
Context – Enhances the Surroundings	**C1 - Understand and relate well to the site, its local and wider context**	Well-designed new development **responds positively to the features of the site itself and the surrounding context beyond the site boundary**. It enhances positive qualities **and improves negative ones.** Some features are physical, including: ➢ **environment** – including landscape and visual impact, microclimate, flood risk, **noise, air and water quality;**
Identity - Attractive and distinctive	**I2 - Well-designed, high quality and attractive**	Well-designed places appeal to all our senses. **The way a place looks, feels, sounds, and even smells**, affects its enduring distinctiveness, attractiveness and beauty.
Movement - Accessible and easy to move around	**General**	A well-designed movement network defines a clear pattern of streets that: ➢ limits the impacts of car use by prioritising and encouraging walking, cycling and public transport, mitigating impacts and **identifying opportunities to improve air quality**; ➢ incorporates green infrastructure, including street trees to soften the impact of car parking, **help improve air quality and contribute to biodiversity.**

Characteristics for well-designed places	Sub- Characteristic Component	Relevant Consideration / Advice – Noise / Sound and Air Quality
	M3 - Well-considered parking, servicing and utilities infrastructure for all users	Well-designed parking is attractive, well-landscaped and sensitively integrated into the built form so that it does not dominate the development or the street scene. **It incorporates green infrastructure**, including trees, to soften the visual impact of cars, **help improve air quality** and contribute to biodiversity. **Electric vehicle spaces and charging points need to be considered**, so they are suitably located, sited and designed to avoid street clutter.
Nature - Enhanced and optimised	**General**	**Nature contributes to the quality of a place, and to people's quality of life, and it is a critical component of well-designed places. Natural features are integrated into well-designed development.** Well-designed places: ➢ provide **attractive open spaces in locations** that are easy to access, with activities for all to enjoy, such as play, food production, recreation and sport, so as to **encourage physical activity and promote health, well-being** and social inclusion.
Public spaces - Safe, social and inclusive	**General**	Well-designed places: ➢ include well-located public spaces that support a wide variety of activities and **encourage social interaction, to promote health, well-being**, social and civic inclusion; ➢ have a hierarchy of spaces that range from large and strategic to small and local spaces, including parks, squares, greens and pocket parks; ➢ have public spaces that feel safe, secure **and attractive for all to use**; and ➢ have trees and other planting within public spaces for people to enjoy, whilst also providing shading, and **air quality and climate change mitigation**.

Characteristics for well-designed places	Sub- Characteristic Component	Relevant Consideration / Advice – Noise / Sound and Air Quality
Uses - Mixed and integrated:	**U1 A mix of uses**	Successful communities require a range of local services and facilities including schools, nurseries, workplaces, healthcare, spiritual, recreational, civic and commercial uses. These: ➢ are located **to complement rather than conflict with neighbouring uses in terms of noise, servicing and ventilation.**
Homes & buildings - Functional, healthy and sustainable	**General**	Well-designed homes and buildings are functional, accessible and sustainable. They provide **internal environments and associated external spaces that support the health and wellbeing of their users** and all who experience them. Well-designed homes and buildings: ➢ provide **good quality internal and external environments for their users**, promoting health and well-being;
	H1 - Healthy, comfortable and safe internal and external environment	**Good design promotes quality of life** for the occupants and users of buildings. This includes function – buildings should be easy to use. It also **includes comfort, safety, security, amenity,** accessibility and adaptability. Well-designed homes and buildings are efficient and cost effective to run. They help to reduce greenhouse gas emissions by incorporating features that encourage sustainable lifestyles. **They maximise natural ventilation, avoid overheating, minimise sound pollution and have good air quality.**

Characteristics for well-designed places	Sub- Characteristic Component	Relevant Consideration / Advice – Noise / Sound and Air Quality
		Well-designed homes and communal areas within buildings provide a good standard and **quality of internal space. ……..external amenity spaces** are also important.
	H2 - Well-related to external amenity and public spaces	Well-designed buildings are carefully integrated with their surrounding external space. All private and shared external spaces including parking (see Movement), **are high quality, convenient and function well.** Well-designed private or shared external spaces are fit for purpose and incorporate planting wherever possible. The appropriate size, shape and position for an external amenity space can be defined by considering: ➢ **environmental factors that may affect its usability, such as sunlight and shade, noise or pollution;** Well-designed shared amenity spaces feel safe and secure for their users. They are **social spaces providing opportunities for comfort, relaxation and stimulation** - including play - for residents
Resources - Efficient and resilient	**R3 - Maximise resilience**	Well-designed places and buildings conserve natural resources including land, water, energy and materials. Their design responds to the impacts of climate change. It identifies measures to achieve: ➢ mitigation, primarily **by reducing greenhouse gas emissions and minimising embodied energy**; and ➢ adaptation to anticipated events, such as rising temperatures and the increasing risk of flooding.

Characteristics for well-designed places	Sub- Characteristic Component	Relevant Consideration / Advice – Noise / Sound and Air Quality
		A compact and walkable neighbourhood with a mix of uses and facilities reduces demand for energy and **supports health and well-being**. It uses land efficiently so helps adaptation by increasing the ability for CO2 absorption, sustaining natural ecosystems, minimising flood risk and the potential impact of flooding, **and reducing overheating and air pollution.** Well-designed places: ➢ use materials and **adopt technologies to minimise their environmental impact.** Well-designed public and open spaces incorporate planting, structures and water for comfort. They create shade and shelter for their users, **improve air quality and mitigate the effects of pollution.**
Lifespan - Made to last	**L2 - Adaptable to changing needs and evolving technologies**	While public places are inclusive to all, well-designed private places, such as homes and gardens, are designed to be flexible to adapt to the changing needs of their users over time. **This includes changes in the health and mobility of the user, as well as potential changes in lifestyle due to developing technologies, such as use of electric vehicles, remote working and general changes to the way in which people live**.

Characteristic	Sub- Characteristic Component	Consideration / Advice – Noise / Sound and Air Quality
Context – Enhances the Surroundings	**C1 - Understand and relate well to the site, its local and wider context**	Well-designed new development **responds positively to the features of the site itself and the surrounding context beyond the site boundary**. It enhances positive qualities **and improves negative ones.** Some features are physical, including: ➢ **environment** – including landscape and visual impact, microclimate, flood risk, **noise, air and water quality;**
Identity - Attractive and distinctive	**I2 - Well-designed, high quality and attractive**	Well-designed places appeal to all our senses. **The way a place looks, feels, sounds, and even smells**, affects its enduring distinctiveness, attractiveness and beauty.
Movement - Accessible and easy to move around	**General**	A well-designed movement network defines a clear pattern of streets that: ➢ limits the impacts of car use by prioritising and encouraging walking, cycling and public transport, mitigating impacts and **identifying opportunities to improve air quality**; ➢ incorporates green infrastructure, including street trees to soften the impact of car parking, **help improve air quality and contribute to biodiversity.**
	M3 - Well-considered parking, servicing and utilities infrastructure for all users	Well-designed parking is attractive, well-landscaped and sensitively integrated into the built form so that it does not dominate the development or the street scene. **It incorporates green infrastructure**, including trees, to soften the visual impact of cars, **help improve air quality** and contribute to biodiversity.

		Electric vehicle spaces and charging points need to be considered, so they are suitably located, sited and designed to avoid street clutter.
Nature - Enhanced and optimised	**General**	Well-designed places: ➢ provide **attractive open spaces in locations** that are easy to access, with activities for all to enjoy, such as play, food production, recreation and sport, so as to **encourage physical activity and promote health, well-being** and social inclusion.
Public spaces - Safe, social and inclusive	**General**	Well-designed places: ➢ include well-located public spaces that support a wide variety of activities and **encourage social interaction, to promote health, well-being**, social and civic inclusion; ➢ have a hierarchy of spaces that range from large and strategic to small and local spaces, including parks, squares, greens and pocket parks; ➢ have public spaces that feel safe, secure **and attractive for all to use**; and ➢ have trees and other planting within public spaces for people to enjoy, whilst also providing shading, and **air quality and climate change mitigation**.
Uses - Mixed and integrated:	**U1 A mix of uses**	Successful communities require a range of local services and facilities including schools, nurseries, workplaces, healthcare, spiritual, recreational, civic and commercial uses. These: ➢ are located **to complement rather than conflict with neighbouring uses in terms of noise, servicing and ventilation.**
Homes & buildings - Functional, healthy and sustainable	**General**	Well-designed homes and buildings are functional, accessible and sustainable. They provide **internal environments and associated external spaces that support the health and wellbeing of their users** and all who experience them. Well-designed homes and buildings:

		➢ provide **good quality internal and external environments for their users**, promoting health and well-being;
	H1 - Healthy, comfortable and safe internal and external environment	**Good design promotes quality of life** for the occupants and users of buildings. This includes function – buildings should be easy to use. It also **includes comfort, safety, security, amenity, privacy**, accessibility and adaptability. Well-designed homes and buildings are efficient and cost effective to run. They help to reduce greenhouse gas emissions by incorporating features that encourage sustainable lifestyles**. They have good ventilation, avoid overheating, minimise sound pollution and have good air quality, while providing comfort and personal control for their users.** Well-designed homes and communal areas within buildings provide a good standard and **quality of internal space. ……..external amenity spaces** are also important.
	H2 - Well-related to external amenity and public spaces	Well-designed buildings are carefully integrated with their surrounding external space. All private and shared external spaces including parking (see Movement), **are high quality, convenient and function well.** Well-designed private or shared external spaces are fit for purpose and incorporate planting wherever possible. The appropriate size, shape and position for an external amenity space can be defined by considering: ➢ **environmental factors that may affect its usability, such as sunlight and shade, noise or pollution;** Well-designed shared amenity spaces feel safe and secure for their users. They are **social spaces providing opportunities for comfort, relaxation and stimulation** - including play - for residents

Resources - Efficient and resilient	**General**	Well-designed places and buildings conserve natural resources including land, water, energy and materials. **Their design responds to the impacts of climate change by being energy efficient and minimising carbon emissions to meet net zero by 2050.** It identifies measures to achieve: ➢ mitigation, primarily **by reducing greenhouse gas emissions and minimising embodied energy**; and ➢ adaptation to anticipated events, such as rising temperatures and the increasing risk of flooding. A compact and walkable neighbourhood with a mix of uses and facilities reduces demand for energy and **supports health and well-being**. It uses land efficiently so helps adaptation by increasing the ability for CO2 absorption, sustaining natural ecosystems, minimising flood risk and the potential impact of flooding, **and reducing overheating and air pollution.** Well-designed places: ➢ use materials and **adopt technologies to minimise their environmental impact.**
	R3 – Maximise resilience	Well-designed places are robust and **take account of local environmental conditions, both prevailing and forecast.** Well-designed public and open spaces incorporate planting, structures and water for comfort. They create shade and shelter for their users, **improve air quality and mitigate the effects of pollution.** Well-designed buildings make the most of passive design strategies to minimise overheating and achieve internal comfort. These include: ➢ the layout and aspect of internal spaces;

		➢ insulation of the external envelope and thermal mass; ➢ management of solar gain; and ➢ **good ventilation to reduce overheating.** They are supported by other measures where necessary, such as mechanical ventilation with heat recovery for efficient ventilation in winter
<u>Lifespan - Made to last</u>	**General**	Well-designed places sustain their beauty over the long term. They add to **the quality of life of their users** and as a result, people are more likely to care for them over their lifespan.
	L2 - Adaptable to changing needs and evolving technologies	While public places are inclusive to all, well-designed private places, such as homes and gardens, are designed to be flexible to adapt to the changing needs of their users over time. **This includes changes in the health and mobility of the user, as well as potential changes in lifestyle due to developing technologies, such as use of electric vehicles, remote working and general changes to the way in which people live**.

Appendix 2: Interrelation with other NECAAP Strategic Objectives, Policies and Topic Themes

The noise and air quality topic themes are crosscutting and overlap with and are interrelated to other strategic objectives, policies and topic themes as follows:

NECAAP Strategic Objectives, Policies and other Topic Themes	Interrelation: Yes/No?	Outline details
3.2 Strategic objectives **2. North East Cambridge will be a vibrant mixed-use new district where all can live and work.** • Beautifully designed and accessible places, spaces and buildings will **improve wellbeing and quality of life** for all through creating opportunities for social integration, community engagement and connecting people with nature. **4. North East Cambridge will be a healthy and safe neighbourhood**. • The health and wellbeing of people will help structure new development and inform decision-making, **to create a high quality of life** for everyone. • Human health will be at the forefront of design by ensuring that **noise, air quality, lighting and odour**	**Yes- noise, air quality, and odour**	Noise and air quality exposure are important determinants of health etc in the physical built and natural environment – both internally and externally Will need to be included as part of any EIA (risks to human health (for example, due to water contamination or air pollution) and HIA.

are key factors in determining the layout and functionality of North East Cambridge.		
Figure 10: Spatial Framework for the Area Action Plan *The area's high quality public transport access will provide significant opportunities to create higher density development, which will have benefits in terms of optimising the delivery of homes and jobs. However, if not appropriately designed and managed, high densities can present challenges in terms of potential impacts on the transport network, historic environment, local townscape, on climate change and the local environment, community services and on health and well-being.*	Yes – noise and air quality	Proximity of proposed and existing noise-generating and noise-sensitive uses should be carefully considered in the spatial framework. Air quality constraints identified will be used to shape the Spatial Framework.
Policy 2: Designing for the climate emergency **b) Adaptation to climate change** Where required, detailed overheating analysis must be undertaken using the latest CIBSE overheating standards (CIBSE TM52 and TM59 or successor documents) and include consideration of future climate scenarios using 2050 Prometheus weather data2. Consideration shall be given to **external environmental constraints such as noise and local air quality** which will influence the design of certain approaches such as natural ventilation. The interdependence of provisions for acoustics / noise, indoor air quality (ventilation) and	**Yes- Noise and air quality**	**Health and Wellbeing** <u>Hea 02 Indoor air quality</u> (Aim: To encourage and support healthy internal environments with good indoor air quality.) <u>Hea 05 Acoustic performance</u> (Aim: To ensure the building is capable of providing an appropriate acoustic environment to provide comfort for building users.) **Transport** <u>Tra 02 Sustainable transport measures</u>

controlling overheating is an important consideration when designing a building to provide suitable indoor environmental quality (IEQ).		(Aim: To maximise the potential for local public, private and active transport through provision of sustainable transport measures appropriate to the site.) **Pollution** <u>Pol 02 Local air quality</u> (Aim: To contribute to a reduction in local air pollution through the use of low emission combustion appliances in the building.) <u>Pol 04 Reduction of night time light pollution</u> (Aim: To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, thereby reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.) <u>Pol 05 Reduction of noise pollution</u> (Aim: To reduce the likelihood of noise arising from fixed installations on the new development affecting nearby noise sensitive buildings.) Credits are awarded under BREEAM where the requirements are achieved. **Post** Occupancy **Evaluation** (POE) - This may require **post construction testing** to identify whether the acoustic criteria have been achieved, either in the form of sound insulation testing,

		measurement of internal ambient noise levels and reverberation times or surveying of plant emission noise levels at nearby receptors. A final report would be prepared for submission to the BREEAM assessor to enable the credits to be awarded.
Policy 3: Energy and associated infrastructure In order to facilitate decarbonisation and the necessary grid upgrades required to support development at NEC, as well as making best use of grid infrastructure, the following approach must be taken: a) Expansion of the Milton Primary Sub-Station. *In the context of policy 2, it will also be important that all schemes are designed to maximise roof space for solar generation, whilst also giving consideration to the location of other plant, such as air source heat pumps, alongside the use of roofs for amenity space. Provided that careful consideration is given to the design of such spaces early in the design process, it is feasible for roofs to accommodate a number of uses.*	Yes noise and air quality	Consideration should be given to the noise impact of existing and proposed infrastructure such as substations on proposed dwellings. Onsite energy facilities, providing power, heat or both have the potential to produce emissions that could lead to deterioration in local air quality or have an impact on future receptors. Further assessment should be carried out at the detailed planning application stage.
Policy 4b: Water quality and ensuring supply All development proposals should include an assessment of the measures taken to protect and enhance water quality within the surrounding water environment, including local surface water and groundwater, in particular, where there is known or	**Yes-** Contaminated land	There is a clear overlap between potential land affected by contamination / contaminated land and impacts on (i) human health (human receptors –Local Authority / Environmental Health remit) and

potential land contamination; the proposal alters ground conditions; and in the consideration of the form(s) of sustainable drainage scheme to be incorporated. ***Water quality*** *Any site which may be contaminated to some degree by virtue of its previous usage forms a potential risk to water quality. Developers should contact the Environment Agency at the earliest opportunity to discuss the need for historical information and site investigations to determine the degree of contamination of both soil and groundwater.*		(ii) controlled waters (remit of Environment Agency remit).
Policy 5: Biodiversity and Net Gain ***Achieving biodiversity net gain*** *It will be important to ensure that habitats and species both on and off-site are resilient to disturbance from human activity, including recreation, predation by pets, noise and light pollution.*	**Yes-** Noise and possibly Air Quality	Although standardised protocols for environmental noise assessment are crucial in evaluating impacts and enforcing environmental protection policy for humans, their applicability to wildlife is limited; it is not possible simply to infer the impacts of anthropogenic noise on wildlife from the human literature. This is because the hearing ranges and sensitivities of non-human animals can be very different from those of humans Moreover, species differences in behaviour, physiology and ecology, in addition to hearing capabilities and perception, mean that extrapolations from human studies can provide only a limited understanding of the potential impact of anthropogenic noise on wildlife. Ecology Assessment remit.

		National noise policy and guidance promotes the creation and protection of 'tranquil' spaces for their benefits on health and quality of life. The visual impact of mitigation measures such as noise barriers should be taken into consideration, as the design quality and character of the built environment will be important for a sustainable development.
Policy 6b: Design of mixed-use buildings The design of vertically and horizontally mixed-use development proposals must: b) Avoid mixing incompatible uses that could impact on amenity of residents and occupiers in the same or adjacent blocks; d) Ensure uses can function effectively and residents can live without disturbance through well-resolved layout, access (including separate internal access arrangements, where required, for the different uses), servicing and delivery arrangements; *Mixed Use Development* *Higher density development creates challenges in how different uses can operate in close proximity to each other within buildings, adjacent plots or blocks. Innovative forms of building will be needed to make the best use of the land available and development proposals will need to demonstrate that the future*	Yes – Noise	Operational noise associated with noise generation of uses – internal, building services machinery, plant and equipment and collections / deliveries. Design out or mitigation.

amenity of residents, occupiers and other sensitive uses or spaces can be safeguarded (see policy 25: Environmental Protection).		
Policy 7: Creating high quality streets, spaces and landscape All development proposals within North East Cambridge should contribute towards the creation of high quality, inclusive and attractive streets and spaces that will: d) Understand microclimate **and other environmental considerations** and ensure that these are factored into design proposals so that public spaces receive good sunlight throughout the year and **have good air quality and low ambient noise levels**;	**Yes - Noise, air quality, and odour**	Street design / layout and use of the blue and green infrastructure should be used to reduce and mitigate impacts- concept of **soundscapes in architecture and urban design** –how the acoustic environment is perceived and mask unwanted noise. Improving soundscapes in outdoor environments, particularly in and around areas exposed to noise: • Localization of functions; • Reduction of unwanted sounds and • Introduction of wanted sounds –water features. Internal primary roads and noise impacts on external open spaces including balconies.
Policy 8: Open spaces for recreation and sport **North East Cambridge open space requirements** Development proposals must make provision for new or enhanced open space and recreation sites, which meet the health and wellbeing needs of existing and future users of the area. The successful integration of open space into a proposed development must be considered early in the design process through a masterplan led	Yes- noise and air quality	Enhanced open space – fit for purpose / functionality reduction of A14 transport and railway noise Any A14 noise barrier will need to absorptive to negate any reflections to Milton County Park. Impact of A14 pollutant reduced by buffer distance.

process considering the relationship with the wider Area Action Plan area. **Protection of existing open space** For the purpose of environmental amenity and landscaping, the linear planting and open space along North East Cambridge's boundary formed with the A14 and roadside noise barrier, railway line and Cambridge Guided Busway will be protected from development.		
Policy 10b: District Centre **Design requirements** • A new District Square should be created at the intersection of the District Centre, diagonal link and Linear Park. The design of the District Square should have regard to Policy 7: Legible Streets and Space, and: f) Be designed to complement rather than conflict with the neighbouring uses in terms of quality of life / amenity issues such as noise, odour and servicing.	Yes- noise	Need to complementary and appropriate for location. Operational noise associated with noise generation of uses – internal, building services machinery, plant and equipment and collections / deliveries. Design out or mitigation

Policy 10d: Station Approach **Design requirements** • Development should mitigate adverse impacts on residential amenity and public open spaces from the adjacent railway line, station and Cambridgeshire Guided Busway and any future transport interchange; ***Station Approach Local Centre*** *Station Approach will be a key transition place between Cambridge North Station and the District Centre. It will therefore be crucial that development is planned in a comprehensive manner to ensure that key issues such as land uses, active frontages and street activity are addressed whilst delivering well designed streets, spaces, and wayfinding to create a place that is easy to navigate.* *This area is identified for mixed-use development, primarily comprising of business space and apartments brought forward alongside ground floor retail provision and some community and cultural uses. Development in this area will need to respond to the constraints of the nearby railway, station and transport interchange in order to protect residential amenity.*	Yes- noise	Need to complementary and appropriate for location. Consider soundscapes concepts / opportunities as part of urban design
Policy 10e: Cowley Road Neighbourhood Centre • Development will be required to mitigate adverse impacts on residential amenity, education facilities and public open spaces from sources of environmental	Yes- noise	Need to complementary and appropriate for location. Operational noise associated with noise generation of uses – internal, building services machinery, plant and equipment and collections / deliveries.

pollution including the A14, railway line and Milton Road;		
Policy 11: Housing design standards *Environmental factors that affect usability of buildings and spaces such as daylight, sunlight and shade, noise, odour and other types of pollution need to be assessed as part of a 'design led' approach as set out in Policy 25: Environmental Protection.*	Yes- noise	Ensure noise and air quality are considered to deliver internal environments and associated external spaces that support the health and wellbeing of their users and all who experience them.
Policy 12b: Industry, storage and distribution **Consolidation and mixed use** Where industrial uses are provided or retained, developments should proactively intensify B2 and B8 uses through more efficient use of land than the existing industrial premises within North East Cambridge. Intensification can be achieved by: • Horizontal or vertical extensions; • Infill development; • Comprehensive development of existing sites; • achieving higher plot ratios (a minimum of 65%); • the development of mezzanines; • the introduction of flexible units; • multi-storey proposals for mixed-use development schemes through vertical stacking that include other uses including employment and residential uses.	Yes- noise and air quality	Need to complementary and appropriate for location. Operational noise associated with noise generation of uses – internal, building services machinery, plant and equipment and collections / deliveries. Consideration should be given to the potential impact of noise from existing and proposed noise generating uses on residential amenity. The potential implications of introducing noise-sensitive uses on the operation of existing businesses should be considered. Air quality constraints identified should be used to identify areas where residential receptors are not appropriate.

Industry (B2/B8) A key consideration for industrial proposals including within mixed-use development is that it meets high design quality by contributing to the public realm and minimising impact on residential and public amenity. Developments will also be required to demonstrate that operational vibration, noise, air quality, odour and other emissions do not have unacceptable adverse impacts on neighbouring uses, as set out in Policy 25: Environmental Protection and Policy 26: Aggregates and waste sites.		
Policy 14: Social, community and cultural Infrastructure New community infrastructure should seek to take full advantage of opportunities to maximise flexible spaces that are accessible not just in terms of physical distance and location but also in terms of availability. Proposals should ensure early provision of operational facilities in the development process, allowing for a range of uses and users (including workers not just residents). Facilities should be available throughout the day and outside of normal working hours, year-round. This will be subject to addressing any potential health and quality of life / amenity issues (see Policy 25). Individual proposals providing community, cultural, sports or leisure facilities that broaden the choice of these uses	Yes- noise	Need to complementary and appropriate for location. Operational noise associated with noise generation of uses – internal, building services machinery, plant and equipment and collections / deliveries. Design and layout.

will be supported, maximising the long-term economic sustainability of multi-use facilities.		
Policy 15: Shops and local services **Hierarchy of centres and retail capacity** All other proposed uses, listed below within this policy will be permitted provided: • they would not give rise to a detrimental effect, individually or cumulatively, on the character or amenity of the area through smell, litter, noise or car parking;	Yes- noise	Need to complementary and appropriate for location. Operational noise associated with collections / deliveries.
Policy 16: Sustainable Connectivity ***Making Sustainable travel possible for everyone:*** *Sustainable modes of travel, including walking, cycling and other forms of micromobility are zero-emission, socially inclusive, promote health and wellbeing, and help to create a more vibrant and socially interactive environment.* ***Discouraging car use:*** *The scope for highway capacity improvements is limited due to the existing road configuration and lack of space, particularly at the junction of Milton Road with King's*	Yes noise and air quality	Noise - Consideration should be given to the potential noise impact of new transport infrastructure. Air Quality - Changes in local traffic flows caused by the development could increase or decrease vehicle emissions on the local road network and could therefore improve or deteriorate local air quality. Changes in highways alignments could also move emissions closer or further away from sensitive receptors, again potentially causing an improvement or deterioration in local air quality. New highways and street design should be considered. Further assessment should be carried out at the detailed planning application stages.

Hedges Road and Green End Road. The already high levels of traffic and peak hour congestion on the existing road network mean that the introduction of additional nonessential vehicular traffic is unacceptable in terms both highway capacity, place making and air quality. As a result, development will need to support a significant shift away from the private car and towards sustainable travel to a level not seen in Greater Cambridge previously (see Policy 22).		
Policy 20: Last mile deliveries Innovative and flexible solutions are encouraged, including utilising measures such as digital and online infrastructure to better manage supply and demand, dynamic management of the kerb for deliveries of goods, and future proofing for technological improvements which may include use of drones and autonomous delivery vehicles.	Yes- noise	Need to complementary and appropriate for location. Operational noise associated with collections / deliveries. Drones – drone noise will be a key future constraint to use of drones in future. Lack of existing airspace control and safety in terms of wind analysis around buildings
Policy 23: Comprehensive and Coordinated Development Planning applications for major development within the North East Cambridge Area Action Plan area will be supported where: c. Through the masterplan, the application demonstrates how the proposal:	Yes noise, air quality and dust	Undertake appropriate impact assessment and design out or mitigate

xi. Where relevant, has regard to the existing site circumstances, including the existing character, neighbouring uses and constraints; implementing the Agent of Change principle to ensure the ongoing functioning and amenity of existing uses is not materially affected;		
Policy 25 Environmental Protection ***Noise:*** *The A14 traffic noise has widespread prevalent adverse impacts across a significant proportion of the Area Action Plan area. It is likely that a strategic site environmental noise barrier close to the A14 will be the most effective option to mitigate and reduce to a minimum adverse noise both internally and externally.* *Site specific noise sources that will require assessment and consideration include transport (the A14 and Milton Road traffic noise, the Cambridge to Ely / King's Lynn railway line and the Cambridge Guided Busway, Cambridge North Station and future internal streets / and haul roads) and industrial uses (existing industrial uses that may remain and coexist including safeguarded minerals and waste uses such as the 249 Aggregates Railheads, Waste Transfer Station, and the Waste Water Treatment Plant (until decommissioned)).*	Yes - noise	The cost implications of mitigation measures to housing are likely to be higher in the medium or high risk noise areas. This should be taken into consideration when assessing viability.

Policy 26: Aggregates and waste sites All development proposals, including the residential within the Consultation Area of either facility must apply the Agent of Change principle, and will need to demonstrate that the proposal will: • not result in unacceptable amenity issues or adverse impacts to human health for the occupiers or users of the proposed development due to the ongoing operation of the facility; • ensure that any mitigation measures proposed either as part of the new development or in relation to the existing operation or its site are practical; and	Yes noise, air quality and dust	Undertake appropriate impact assessment and design out or mitigate
Policy 30: Digital infrastructure and open innovation **Smart buildings** New development should: f) consider rooftop delivery space to provide passive provision for airborne drones; *North East Cambridge provides an opportunity to embed smart thinking into a new neighbourhood from its inception. Three key areas were identified as being the most relevant to smart considerations:*	Yes noise, air quality	Consider opportunity for smart noise and air quality monitoring to understand environmental impacts and bespoke and emerging solutions / technology

• *environmental monitoring, i.e. equipment, systems and sensors that can support the remote understanding of environmental performance* ***such as light pollution, noise, air quality,*** *building energy efficiency, flood risk to enable real-time analysis.* *North East Cambridge needs to establish the enabling infrastructure for smart and become a test bed for the experimentation of new technology. Lamp posts, for example, could not only have low energy lighting that is responsive to different times of day and use patterns, but they could also incorporate air quality sensors, publicly accessible WIFI, electric vehicle charging points, and share their data openly for reuse by others.*		