



**Proposed Development
Hampstead Police Station
Rosslyn Hill
Camden
NW3 1PA**

Review of Air Quality Issues

**S16-296
June 2019**

R2

Prepared by :

Southwest Environmental Limited

On behalf of :

HCRD

1.0 Introduction

Acting on instruction from HCRD, Southwest Environmental Limited are to make review of the Air Quality Issues relating to the proposed Primary School at Hampstead Police Station.

There are have been various studies¹ that point to unsatisfactory air quality in the area, yet reports submitted in support of planning appear to show that this is not the case thus indicating a discrepancy.

There is also the issue of the building design which shows both ventilation systems to mitigate against poor air quality, yet the design includes outdoor areas, where pupils would be clearly exposed to air born pollutants which have been shown to have numerous serious negative impacts on health.

These concerns are exacerbated considering the nature of the receptors, in this case being children. Children are particularly sensitive to exposure to pollutants; many assessment methodologies² consider them as a worst case scenario, owing to this high sensitivity.

1.1 The Site

The site is occupied by a former metropolitan police station. It is intended that this building be repurposed as a school.

Address	Roslyn Hill Camden London
Postcode	NW3 1PA
Grid Reference	526870, 185560

1.2 Proposed Development

The proposed development (2019-2375-P) is for a Primary School, comprising 1906m² gross space. There will be 36 staff members at the school.

2.0 Aims of this Report

The aims of this report are to examine the conclusions and workings of REC Report AQ106285, and to make comments aside on the suitability of the site for the intended use.

3.0 Terms of Reference

There are various key documents which have been considered when making this assessment. The below documents represent a very small percentage of documentation published on the negative impacts of air quality. Despite current UK guidance not having been updated since 2008 – 2009, many recent sides are uncovering the true severity of air quality impacts on human health.

¹ <http://www.hampsteadforum.org/airtest>

² Environment Agency SC050021/SR2

- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA - 2007
- Local Air Quality Management Technical Guidance LAQM.TG(09), DEFRA - 2009
- IARC: Outdoor Air Pollution a leading environmental cause of cancer deaths – WHO – **2013**
- Review of evidence on health aspects of air pollution – REVIHAAP Project - **2013**
- Camden Clean Air Action Plan **2016-18**

4.0 Legilsative Considerations

Chapter 2 of the REC's Report (AQ106285R1) submitted in support of the application makes a reasonable review of European, UK and Local Legislation. Although some key documents are not referenced³.

Transposed from EU directives are the air quality objectives: Although named as objectives, these are legal European **Air Quality Standards**⁴ above which the UK will subject to formal legal proceedings should the UK government fail to make appropriate efforts to reduce said pollution.

In 2014 The European Commission launched legal proceedings against the UK for failing to deal with air pollution. The EU reasoning behind this case was that levels of nitrogen dioxide, mainly from diesel engines, are "excessive" in many British cities. The Commission noted in its written statement at the time that nitrogen dioxide gas can lead to major respiratory illnesses and premature deaths.

5.0 On Site Air Quality

There are a number of data sources that can be referenced to describe air quality near site.

The London Air Quality Network 2014 report gives long term average records of Nitrogen Dioxide at monitoring location Swiss Cottage, this shows repeated breaches of the European Air Quality Standards, including a breach in the annual mean kerbside concentration at 66 $\mu\text{g}\text{m}^{-3}$, the EU Standard being 40 $\mu\text{g}\text{m}^{-3}$.

These high nitrogen dioxide levels are again experienced in the studies undertaken by the Hampstead Neighbourhood forum which show levels of 56.07 $\mu\text{g}\text{m}^{-3}$, immediately adjacent to site.

6.0 REC Report AQ106285R1

The report AQ106285R1 has been submitted in support of the application, there are various limitations to the report:

6.1 Construction Phase

³ Camden Clean Air Action Plan 2016-18

⁴ <http://ec.europa.eu/environment/air/quality/standards.htm>

This section of the report outlines acceptable criteria for the construction phase. Owing to refurbishment rather than demolition of the building we are in agreement with the conclusion of construction impacts that they will be minimal.

We fully anticipate that a CEMP will be submitted and a neighbourhood consultation will be arranged as part of the planning process. If problems with dust for example were then to arise responsibility would be established, responsible persons easily contactable.

6.2 Operational Phase Impacts

In the first instance we would question why combined heat and power is not be considered. This would offset some generation emissions, and would add to GLA heat network.

Secondly we would comment on the non-existent fabric energy efficiency measures, and the associated NO₂ and CO₂ emissions associated with heating a large poorly insulated building.

6.1 Source Details

REC Report AQ106285R1 submitted in support of the application ignores results from long term monitoring programmes in favour of generic mapped emissions data. We question the logic behind inclusion of "predicted" concentration levels when "actual" results are available.

6.1.1 NO₂

AQ106285R1 Appendix 1 Figure 6 shows a maximum annual mean kerbside concentration of 45 ug/m³. Yet just 100 meters to the west the Hampstead Neighbourhood Forum Study shows concentrations of 56.07 ug/m³.

These tally closely with AQ106285R1 Table 12 Results from 47 Fitzjohn's Road which shows Annual Mean NO₂ levels of 60 ug/m³ and 56.38 ug/m³.

We would suggest that the model should be run with line sources at kerbside, rather than central to the carriageway. This would likely see modelled ground floor concentrations at around 60ug/m³.

6.1.2 Particulates

Particulate monitoring undertaken by HCRD has shown level of PM₁₀ and PM_{2.5} consistently over AQO.

PM_{2.5} has been associated with adverse health outcomes including acute and chronic respiratory illnesses such as pneumonia and chronic bronchitis, cardiovascular diseases such as coronary heart disease, congestive heart failure, and premature death.

6.2 Dispersion Model

This understatement is further enhanced via the introduction of the dispersion modelling employed to give an averaged plume. However, it is obvious that in the real world that plumes do not look like the plumes shown in AQ106285R1 Appendix 1 Figure 6. Real world plumes are elongated, heavily influenced by wind direction.

By means of comparison DISPER 5.2 software was used to provide a modelled scenario, based on generic emission factors, but using a south westerly wind, in place of an average annual wind direction. The results show that for a minimum of >20% in any given year, there is a high likely hood that there would be site wide exceedances of the European Targets.

Table All.5 AQ106285R1 describes the application of a "verification factor" to the modelled results of 3.6175, but the table shows no difference between monitored and adjusted model inputs. It would appear that the model has been run with incorrect input parameters.

7.0 Commentary

7.1 Sensitivity of Occupants

It is important to note that there is no safe level set for exposure to nitrogen dioxide. Nitrogen dioxide is converted to nitric acid in the lungs, and this can exacerbate illnesses such as asthma, and other respiratory conditions. Studies⁵ note the clear "associations between NO₂ and respiratory problems among children".

The planned use is ill conceived when considered chronic effects of exposure of children to elevated levels of nitrogen dioxide. However, the aforementioned exacerbating effects on illnesses create the potential for acute type significant harm to intended occupants.

7.2 Exposure of Occupants

There is also the exposure pathway to consider. Children will require an outdoor play area / external teaching space, and in such close proximity to an established linear source of nitrogen dioxide, it is unavoidable and entirely foreseeable that they will be exposed to concentrations of nitrogen dioxide that are in breach of European Targets.

It is certain that *interior* courtyard area would experience periods where nitrogen dioxide levels were in breach of European Targets.

Last paragraph page 30 AQ106285R1:

"it should be noted that playground areas are not sensitive to long-term exposure"

Table 2 of same report is then quoted as justification. Yet in table 2 "*gardens of residential properties*" are deemed as sensitive. In terms of exposure we would suggest a playground is *more* sensitive receptor than a garden owing to it regular use through all seasons, and the primary receptor being children.

7.3 Exposure during Travel

School children will be exposed to NO₂ and PM pollutants during their trip to school. Those cycling may experience concentrations of up to 70ug/m³, with PM 2.5 levels at around double the safe level (not just locally but across GLA).

World Health Organisation Guidance states:

"Long-term exposure to PM_{2.5} is associated with an increase in the long-term risk of cardiopulmonary mortality by 6–13% per 10 µg/m³ of PM_{2.5}."

⁵ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2465552/>

The same WHO report also highlights:

"Susceptible groups with pre-existing lung or heart disease, as well as elderly people and children, are particularly vulnerable."

7.4 Proposed Mitigatory Measures

Proposed filtration / air treatment systems may well provide air of sufficient chemical quality within the building. However, the efficacy of these systems rely entirely on their upkeep, and the willingness of staff and pupils to follow the necessary procedures to maintain a safe atmosphere within the building.

Opening of windows would likely not be allowable when operating a mitigatory system. This is difficult to enforce in the long-term. There would also be the requirement for air conditioning in the summer months which would greatly increase energy costs for the school.

The complexity of environmental control systems in buildings is a very real problem for users of the buildings, and a detailed maintenance plan and training regime would need to be submitted alongside any proposed system specification to ensure efficacy.

7.5 Camden Clean Air Action Plan 2016-18

The Camden Clean Air Action Plan was published by Camden Borough Council in February 2016. Key objectives are as follows:

"Improve the health and well-being of the local population"

It is unclear how siting a large number of sensitive receptors in the vicinity of an area known to experience harmful levels of nitrogen dioxide could be seen as to improve health and well-being.

"work in partnership with . . . local public organisations"

The Hampstead Neighbourhood Forum have identified numerous cases where schools are situated in areas with poor air quality. The proposed development would add to this list. It would be wise if CBC EHO's and Planning Officials alike were to consider the Hampstead Neighbourhood Forum's finding and act accordingly to prevent the opening of a further school where children are routinely exposed to nitrogen oxide levels in breach of European Standards.

Significant harm to children is more likely given the following factors:

- Distance of journey to school - school is outside of catchment
- Promotion of walking and cycling - whilst breathing unsafe air

The factors combined will lead to children attempting to use active transport methods, over longer distances than is ordinary, maximising negative impacts. A large proportion of children will be driven to school, as journey will be 1 mile plus, and as such the air quality will worsen, coupled with the placement of more children in harm's way.

7.6 Monitoring & Future Liability

It is likely an aim of the Hampstead Neighbourhood Forum to carry out long term monitoring programs in the vicinity of the site.

The modelled results are understated both via use of optimistic source concentrations, and averaged plumes. It is likely that any monitoring carried out in open courtyard areas would show regular exceedances of European Targets.

To knowingly allow children to learn and play in such an environment may potentially expose Camden Council to future liabilities. In the very least a program of monitoring should be used to conclusively prove whether concentrations on site are *actually* acceptable.

8.0 Conclusions

Considering the sensitivity of the receptors and the likely under representation of the source concentrations. It would be irresponsible of Camden Borough Council to grant planning for a school at this site.

It is the consultants opinion that owing to the nature of nitrogen dioxide as a toxin; with the lack of a maximum safe exposure level, that to allow planning permission for a school at this location would be akin to knowingly expose children to significant harm. This is exacerbated by the relatively high distance children will have to travel each day.

Exposure to elevated PM2.5 will, according to WHO figures, may increase cardiopulmonary mortality rates by 15%.

The project itself is also likely to have various negative impacts on air quality arising from transport burden and building energy systems, further elevating the illegal pollution levels.

9.0 Certification

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any Third Party who may rely upon it.

The conclusions and recommendations given in this report are based on our understanding of the future plans for the site. If, however, the site is developed for a more or less sensitive use, then a different interpretation might be appropriate. Information within this report should not be utilised in making of assumptions and judgements with regard to the financial value of land or property.

For the avoidance of doubt this report does not form a guarantee express or implied against negative impacts of pollutants or other emissions on persons, property or amenity value within the vicinity of the proposed site.

It necessarily relies on the co-operation of other organizations and the free availability of information and total access.

The scope of this Assessment was discussed and agreed with the Client. No responsibility is accepted for conditions not encountered, which are outside of the agreed scope of work.

This report may suggest an opinion regarding possible concentrations on site and in the vicinity of the site. However, this is for guidance only and no liability can be accepted for its accuracy.