Air Quality Monitoring Strategy:

Great Ormond Street Hospital, CRRDC, Demolition and Construction Dust

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Experts in air quality management & assessment

Document Control

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1 Introduction

1.1 This document sets out an air quality monitoring strategy to be applied during the demolition and construction works associated with the proposed Centre of Research into Rare Diseases in Children (CRRDC) development at Great Ormond Street Hospital (GOSH) in Camden, London. It has been prepared by Air Quality Consultants Ltd (AQC) on behalf of Gardiner and Theobald, in order to satisfy Condition 15 of the planning permission for the development, which stipulates the following requirements for dust monitoring during construction and demolition:

"No development shall take place until full details of the air quality monitors have been submitted to and approved by the local planning authority in writing. Such details shall include the location, number and specification of the monitors, including evidence of the fact that they have been installed in line with guidance outlined in the GLA's Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance and have been in place for 4 weeks prior to the proposed implementation date. The monitors shall be retained and maintained on site for the duration of the development in accordance with the details thus approved.

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies CS5 (Managing the impact of growth and development) and CS16 (Improving Camden's health and wellbeing) of the London Borough of Camden Local Development Framework Core Strategy and policies DP32 (Air quality and Camden's Clear Zone) and DP22 (Promoting sustainable design and construction) of the London Borough of Camden Local Development Framework Development Policies."

1.2 In preparing this document, regard has been given to guidance on monitoring strategies as set out in the Greater London Authority's *Supplementary Planning Guidance for the Control of Dust and Emissions During Construction and Demolition* (GLA, 2006). It is understood that the Council expects two sites located on the site boundary, with a further site located at the nearest sensitive receptor, making three monitoring sites in total.

2 Summary of Construction Dust Risk Assessment

2.1 The impacts from the construction phase of the CRRDC development were previously assessed by AQC in September 2014[1]. This assessment identified the area surrounding the construction site as being of high sensitivity to dust soiling and medium to high sensitivity in terms of human health (Table 1). The determination of the sensitivity of the area to human health effects takes into account the local background PM_{10} concentrations; in this case 25.7 µg/m^3 (2014 background concentration).

Table 1: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	High Sensitivity	High Sensitivity
Human Health	Medium Sensitivity	High Sensitivity

2.2 The sensitivities identified in Table 1 were combined with the dust emission magnitudes for the scheme to define a risk category to each activity of the construction process. These are detailed in Table 2.

Table 2: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Demolition	Medium Risk	Medium Risk
Earthworks	Medium Risk	Medium Risk
Construction	Medium Risk	Medium Risk
Trackout	Medium Risk	Medium Risk

2.3 Overall, the area surrounding the construction site is judged to be at medium risk to dust soiling and human health. The suggested approach to PM_{10} and dust monitoring detailed in this document has been defined based upon these identified risks.

[1] Centre for Research into Rare Diseases in Children, Great Ormond Street Hospital J2086/1/F1

3 General Approach

3.1 The GLA Guidance (GLA, 2006) states that, for all demolition and construction sites in London, "*it is essential to monitor for dust generation, including PM_{10}".* Furthermore, it defines the approach to be adopted for monitoring PM_{10} from high risk sites, and details the type of monitor to be used to provide high resolution measurements in short time periods (i.e. 15 minute and 1 hour intervals). More specifically, the guidance stipulates the requirement to:

"Operate a minimum of two automatic particulate monitors to measure PM_{10} levels at either end of the line - either inside or outside the site boundary. These instruments should provide data that can be downloaded in real-time by the local authority."

3.2 The guidance in the document cited above is founded on a risk-based approach, taking into account the size of the development and the proximity of sensitive receptors. Other issues that should be taken into account are the duration and phasing of the works and the prevailing baseline air quality conditions.

3.3 The background pollutant concentrations in the vicinity of the development were considered in the Air Quality Assessment[2] completed to support the application for the development. The development lies within an Air Quality Management Area for nitrogen dioxide, but the area is not declared for PM_{10}. PM_{10} concentrations in the vicinity of the site are not predicted to exceed the air quality objectives. The background PM_{10} concentration in 2015 is estimated to be 24.8 $\mu g/m^3$, which is well below the air quality objective of 40 $\mu g/m^3$.

3.4 The proposed development site is located adjacent to, and will be a part of, the existing Great Ormond Street Hospital along Guilford Street. The site is bounded by Guilford Street, Millman Street and Lamb's Conduit Street. There are existing residential properties located to the south, east and west.

3.5 The prevailing wind direction in the area is from the southwest, with a significant component from the east in the 2013 dataset, as shown in the wind roses for 2013 and 2014 at London City Airport, presented in Figures 1 and 2 respectively.

3.6 The prevailing southwesterly winds would transport demolition and construction dust and PM_{10} away from the main hospital building; however, easterly and/or northeasterly winds would transport dust directly towards GOSH. In order to robustly identify any increases in PM_{10} concentrations resulting from construction operations, the key areas of the site boundary along which to establish PM_{10} monitoring will be the northern and eastern boundaries of the site, which are downwind of the

[2] Centre for Research into Rare Diseases in Children, Great Ormond Street Hospital J2086/1/F1

prevailing winds. An additional monitor will be located to the west of the development at the main hospital building, which represents the nearest sensitive receptor.

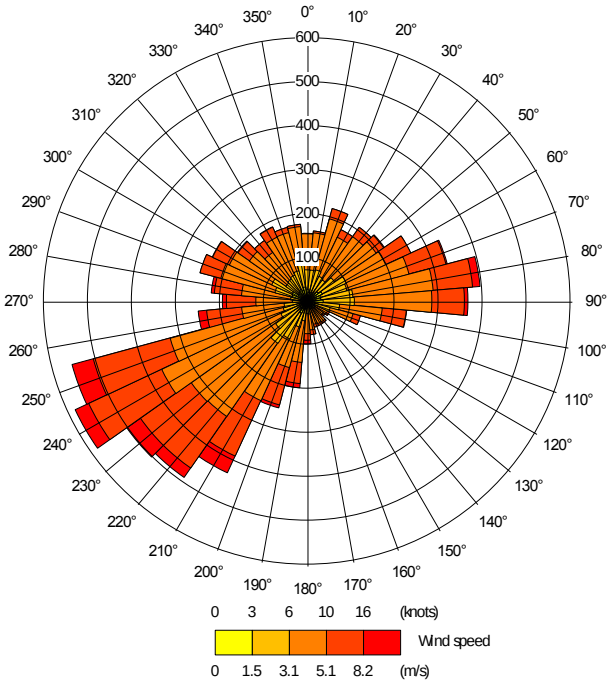

Figure 1: Wind Rose – London City Airport (2013)

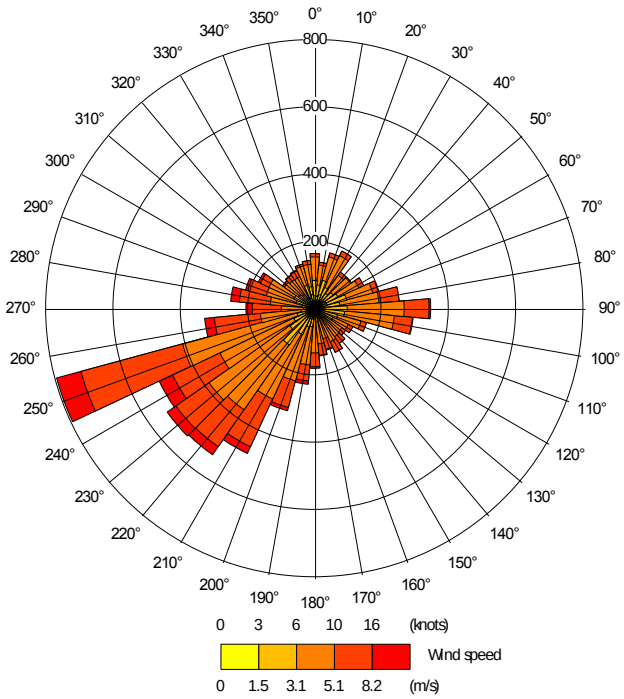

Figure 2: Wind Rose – London City Airport (2014)

3.1 It is anticipated that the demolition will take place over a 24 week period from April 2015. Demolition will commence with soft-stripping in April, with hard demolition commencing in August 2015. The main construction works will be undertaken from January 2016 for an anticipated total period of 104 weeks. The planning condition states that PM_{10} monitoring should commence three months in advance of commencement of the works; however, it is recommended that a one-month period of baseline monitoring should suffice and it is proposed that site works would commence after this period. The proposed date of commencement of monitoring and commencement of site works will be confirmed with Camden Council prior to commission.

4 Monitoring Strategy

4.1 Continuous PM_{10} and dust monitoring will be undertaken at three locations (two at the site boundary, and one located at the nearest sensitive receptor, assumed to be GOSH) using indicative continuous air quality particle analysers capable of measuring and logging PM_{10} and dust in real-time, with the ability to instantly download results from the unit using a GSM modem. The exact make and model of monitor to be used has not yet been determined.

4.2 A meteorological sensor will be installed, collocated with one of the monitors, in order to gather site-specific wind speed and direction data. The suggested locations of the three monitors, including the monitor collocated with the meteorological sensor, are shown in Figure 3. The site marked for collocation with the meteorological sensor is judged to be most suitable as it is downwind of the construction area, and is less shielded by existing buildings than the other two proposed monitoring locations.

4.3 It should be noted that locating a monitor at the façade of the nearest sensitive receptor (GOSH) is unlikely to be feasible due to permission, power supply and space limitations. Furthermore, this location is separated from the construction site by a road, which is itself a potential source of PM_{10}. Therefore, the PM_{10} measured at this site may be a result of road traffic, and not directly a result of dust generated by construction activities, which will make it more difficult to identify the source of PM_{10} in the event of an exceedance of the SAL. In light of these limitations, it is suggested that the monitor will be located at the southwest boundary of the construction site as shown in Figure 3. By locating the monitor on the boundary it will be best placed to identify dust and PM_{10} from the construction and demolition works that may affect GOSH, and will not be subject to the space and power supply limitations mentioned above.

Monitoring Sites

4.4 The proposed monitoring locations take account of the location of construction activities during each phase of works, the location of sensitive receptors (both existing and new) and the prevailing wind directions. Three continuous indicative PM_{10} analysers will be installed at these fixed locations for the duration of the demolition and construction period.

Site Action Levels and Reporting

4.5 Site Action Levels (SAL) will be based on those defined in the Section 106 Planning Requirements for the proposed development. For PM_{10} measurements, a SAL of 200 $\mu g/m^3$ as a 15–minute average will be used.

4.6 In the event that the SAL is exceeded, the Local Planning Authority will be informed immediately via an automated SMS and/or email alert system, and the following actions taken (further details of the procedure to be adopted following SAL exceedences are detailed in Appendix A1):

- the event will immediately be recorded in a log book, along with the date and time and details of any actions taken on site to reduce emissions;
- an additional assessment of the results will be commissioned to ascertain the potential cause of the exceedence;
- construction activities taking place at the time the action level was exceeded will be reviewed; and
- if necessary, the mitigation measures that are in place will be reviewed and revised.

4.7 The local authority will be informed of the outcome of these additional assessments, and advised of any revisions to working practices and mitigation.

4.8 Three-monthly monitoring summary reports will be prepared and submitted to the Local Planning Authority. These reports will summarise the following:

- 24 hour average PM_{10} concentrations;
- date and time of any breach of the SAL, with the 15 minute mean concentrations recorded clearly stated;
- wind direction at the time of any breaches of the SAL; and
- details of the identified cause of elevated dust emissions and mitigation measures.

4.9 The nature of the construction works may require the relocation of one or more of the monitors during the construction programme. The Council will be notified of any proposed changes in the location and operation of the monitors, and will be allowed to agree the new location(s) prior to relocation.

4.10 In addition, PM_{10} concentrations measured by the monitors will be downloaded in real time and be accessible to view online, via a web domain, and a phone hotline that is operational during construction hours (understood to be 8am - 6pm Monday to Friday, and 8am - 1pm Saturday). This phone hotline will be set up so that complaints about high dust levels or PM_{10} concentrations can be reported directly to the developer outside of construction hours, using an answerphone system.

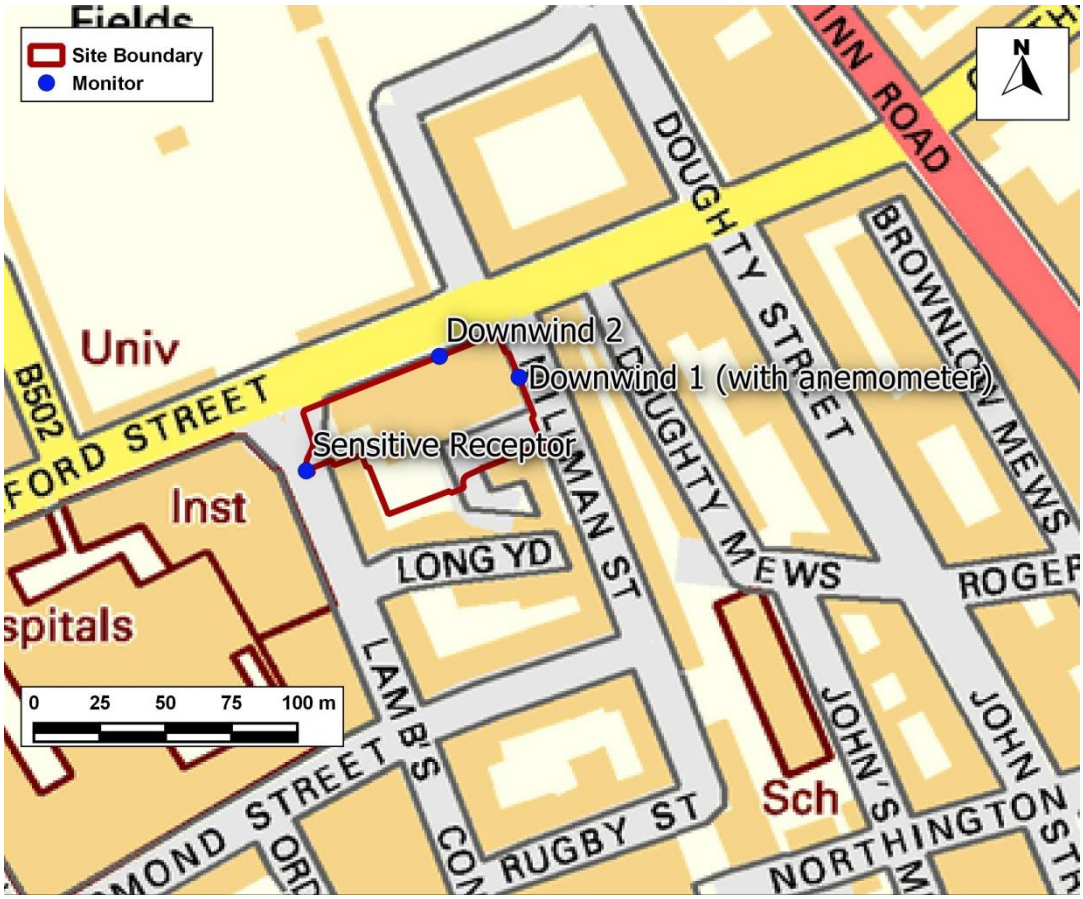

Figure 3: Indicative Locations of Automatic Monitors

5 References

GLA (2006) *The Control of Dust and Emissions from Construction and Demolition: Best Practice Guidance.*, [Online], Available: www.london.gov.uk/mayor/environment/air_quality/construction-dust.jsp.

6 Appendices

A1 Procedure for Site Action Level Exceedences

A1.1 Further to the information detailed in Paragraph 4.6, details of the procedure to be adopted following an exceedence of the SAL are shown in Figure A1.1.

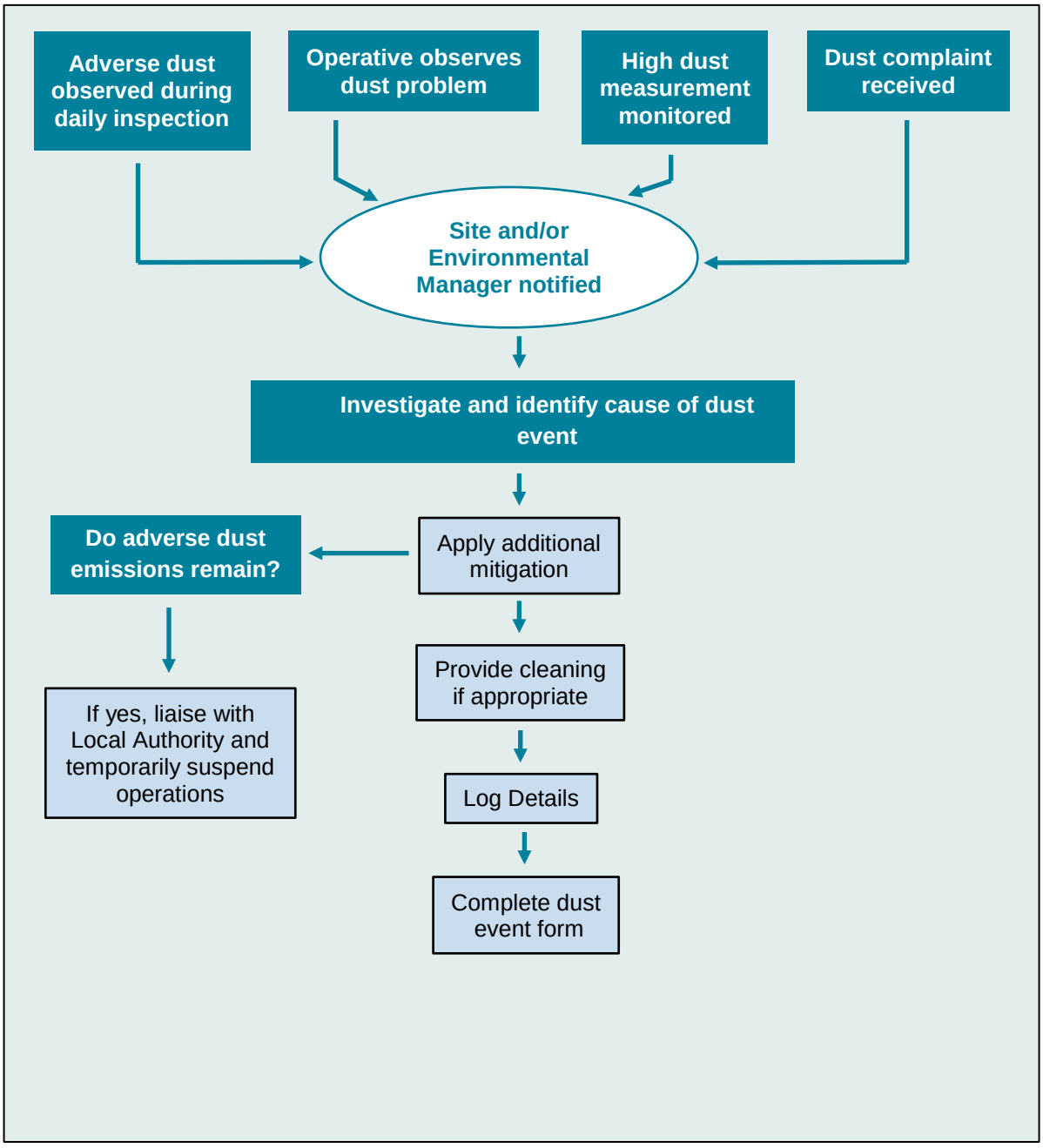

Figure A1.1: Dust Event Response Flowchart