*Contaminated Land*
*Air Quality*
*Environmental Audit*

SMITH GRANT
Environmental
Consultancy
LLP

*Partnership No: OC 300776*

# FERME PARK, HORNSEY
# PROPOSED CONCRETE PLANT
# AIRBORNE DUST ASSESSMENT
# for: LONDON CONCRETE Ltd
# November 2003

**R616-R01**

*Smith Grant LLP, Croesnewydd Hall, Wrexham Technology Park, Wrexham, LL13 7YP*
*tel: 01978 290694 fax: 01978 263452 e-mail: consult@smithgrant.co.uk web: www.smithgrant.co.uk*
*Members: A F Smith (Chairman), A D Grant*

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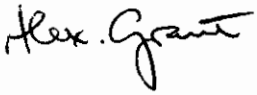
**Report Author:**



**A D Grant, BSc, MSc, FIQ, MIMMM, CEng**

**Checked:**

**R Edwards, BSc, MSc**

## 1 Introduction

1.1 London Concrete Ltd (LC) is preparing a planning application for the erection and operation of a concrete batching plant on railway land at Hornsey, North London.

1.2 Smith Grant LLP (SGP) was instructed by LC to assess the potential impacts due to airborne dust from the proposed batching plant and to provide a report to accompany the planning application.

## 2 Scope of the Assessment

2.1 The assessment was carried out in accordance with the guidance provided in *The Environmental Effects of Dust from Surface Mineral Workings*. The revised consultation paper, *Minerals Policy Statement 2*, effectively reiterates this guidance at Annex 1, *Dust*.

2.2 In undertaking the assessment, the following activities were carried out:

- visit to the application site to view its setting,
- review of wind speed and direction data for Heathrow,
- review of standards and controls,
- assessment of the potential impacts, and
- recommendations for mitigation.

2.3 Adverse impacts due to dust from modern concrete plants of the type operated by LC at Battersea and other locations in London are uncommon. This assessment therefore considers only potential receptors in the immediate vicinity of the proposed development.

## 3 Proposed Development

3.1 The application site occupies the southwest corner of Ferme Park Down Sidings, which extend along the western side of the East Coast Main Line between Hornsey and Harringay stations. Aggregates for the batching plant will be imported by rail via a bottom discharge hopper and stored in overhead storage bins along the western side of the sidings. The importation and storage of aggregates on railway land constitutes permitted development and is not considered further in this assessment.

3.2 Full details of the proposed batching plant, which is similar in essential respects to LC's existing plants at Battersea and elsewhere in London, are provided in the application document and are not repeated here. However, particular features which are relevant to the dust assessment include the use of slurry mixes in the batching process. During the process, cement, sand and water are mixed within an enclosed pan. The resulting mix is then discharged simultaneously with the coarse aggregate into the truck mixer. Some dry batching will also be carried out. The design of the plant will include extraction ducts to carry any dust from the weighing and loading areas into fully enclosed aggregates bins within the plant structure. The truck mixer loading bay will be covered and enclosed on three sides thus providing containment to any dust which might otherwise be released.

3.3 Aggregates will be transferred as necessary from the overhead storage bins to the batching plant by conveyor. The conveyor will be fully enclosed and will run from the hopper up to storage bins contained within the plant.

3.4 Cement and other cementitious materials will be imported to the site by road tanker discharging via a flexible connection into the silos. The silos will be fully enclosed within the plant and will incorporate visible / audible alarms to ensure that over-filling does not occur. A reverse jet filter unit will be fitted to the vent on each silo.

3.5 A pressure relief valve will be fitted at the top of each silo. Should a pressure relief valve lift, a butterfly valve on the inlet line will close automatically. This will then close a pressure-activated valve on the tanker thus stopping the delivery. Standard operating procedures will require the tanker driver to remain by the control valves so that they can be shut immediately in the event of a malfunction.

3.6 The site will be accessed by road from the southern end of Cranford Way. The whole of the yard in which the plant will be located will be surfaced with concrete to facilitate cleaning. It will be washed down and swept regularly.

## 4 Site Setting

4.1 A visit was made to the application site and the surrounding area on 19 February 2003. The weather was dry and sunny with a cool easterly breeze.

4.2 The site setting is urban, with an industrial estate to the north, housing to the west and south across generally open scrub land, a main railway to the east and, beyond that, further housing. There is little effective screening in terms of airborne dust between the application site and the closest potentially sensitive receptors.

4.3 Uplands Road, on the eastern edge of the residential areas of Hornsey Vale and Stroud Green, lies 70m slightly uphill across open scrub land to the west of the application site, and 100m from the actual batching plant.

4.4 Chettle Court, a large block of flats, stands on the crest of a scrub land slope, 100m above and to the south of the application site.

4.5 Wightman Road, on the western edge of the residential area of Harringay, lies 130m to the east across a series of railway tracks and sidings.

4.6 An industrial estate, which largely comprises transport depots and distribution warehouses, extends north from the site entrance on either side of the eastern limb of Cranford Way. BFP Wholesale, a bakery ingredients distributor, lies on the eastern side of Cranford Way, about 100m to the north of the application site. Builders' supplies are distributed from the unit immediately adjacent to the application site.

4.7 During the site visit, loose potentially dusty deposits were noted on the roads and pavements throughout the industrial and residential areas.

## 5 Baseline Conditions

### 5.1 Wind Speed and Direction

5.1.1 The annual wind rose for Heathrow, for the ten years between January 1986 and December 1995, is attached as Appendix A. The weather station lies about 25km southwest of Hornsey. The Met Office advises that this is the most appropriate station as the wind pattern around the London Weather Centre, which is closer to the site, is likely to be distorted by the high rise buildings in the area. The wind rose depicts annual percentage wind speeds and directions at Heathrow and can be considered to be generally representative of the wind pattern in the vicinity of the site. Data derived from the wind rose are summarised in the following table.

| Direction | Annual %age occurrence All winds | Annual %age occurrence Winds >10 knots |
|---|---|---|
| N | 11 | 1 |
| NE | 9 | 2 |
| E | 7 | 1 |
| SE | 6 | 1 |
| S | 15 | 3 |
| SW | 23 | 6 |
| W | 16 | 2 |
| NW | 9 | 1 |

**Table 5.1: Summary wind data, Heathrow**

Note: %age occurrence does not total 100 due to rounding and calm or variable periods

5.1.2 The data show that the prevailing winds blow from the south, southwest and west, for a total 54% of the time annually. Winds greater than 10 knots blow in this sector for 11% of the time.

5.1.3 Winds blow from each of the other 45° sectors for between 6 and 11% of the time with winds greater than 10 knots occurring for between 1 and 2% of the time in each sector.

5.1.4 Wind speeds in excess of 10 knots are important, as the potential onset of airborne dust emissions due to wind blow across bare ground.

## 5.2 Dust Deposition

5.2.1 Typical ambient dust deposition rates are cited in *Environmental Effects of Surface Mineral Workings*. In suburban areas, these range between 30 and 80 mg/m$^2$/day whereas in town centre or industrial areas they are higher, ranging between 80 and 160 mg/m$^2$/day. The presence of busy urban roads and the industrial estate on Cranford Way, with loose potentially dusty deposits throughout, suggests that the dust deposition rates in the area are likely already to be elevated. The deposition rates are likely to lie towards the upper end of the range for suburban areas and the lower end of the range for town centre or industrial areas, and may therefore be of the order of 80 mg/m$^2$/day.

## 5.3 Air Quality

5.3.1 The Air Quality Regulations 2000 (AQR) prescribe National Air Quality Strategy (NAQS) objectives to be achieved for a range of key pollutants. Under AQR, local authorities are required to review the existing and projected airborne concentrations of these pollutants and to compare them with the NAQS objectives. If an exceedance of any NAQS objective appears likely, then an Air Quality Management Area (AQMA) is to be designated with the objective of achieving the standard by the due date. In connection with the proposed batching plant, the pollutants of most concern are emissions of fine particulates less than 10µm (PM10) from the process and emissions of PM10 and nitrogen dioxide ($NO_2$) from the exhausts of HGVs.

5.3.2 The NAQS objectives for PM10, to be achieved by 31 December 2004, are:

- 40 µg/m$^3$, expressed as an annual mean, and
- 50 µg/m$^3$, expressed as a 24 hour mean, not to be exceeded more than 35 times per annum.

5.3.3 Mapped data from the Local Air Quality Management (LAQM) web-site indicate that in 2001 the estimated mean PM10 concentration in the vicinity of the site was 25 µg/m$^3$, ie, just over 60% of the NAQS annual objective for 2004. This is predicted to fall to 23.9 µg/m$^3$ by 2005 and to 21.6 µg/m$^3$ by 2010.

5.3.4 The PM10 concentrations measured at an Automatic Urban and Rural Network (AURN) station, described as "Haringey roadside" and located about 3.5km northeast of the application site, were 28, 27 and 27 µg/m$^3$ in the years 1999, 2000 and 2001 respectively, ie, about 70% of the NAQS objective.

5.3.5 The NAQS objectives for $NO_2$, to be achieved by 31 December 2005, are:

- 40 µg/m$^3$, expressed as an annual mean, and
- 200 µg/m$^3$, expressed as a 1 hour mean, not to be exceeded more than 18 times per annum.

5.3.6 Mapped data from the LAQM web-site indicate that in 2001 the mean $NO_2$ concentration in the vicinity of the site was 40.7 µg/m$^3$, ie, slightly more than the NAQS annual objective. This is predicted to fall to 37.4 µg/m$^3$ by 2005 and to 32.5 µg/m$^3$ by 2010, ie, 94% and 81% respectively of the NAQS objective.

5.3.7 The $NO_2$ concentrations measured at Haringey roadside, were 51, 51 and 48 $\mu g/m^3$ in the years 1999, 2000 and 2001 respectively, ie, an exceedance by about 25% of the NAQS objective. Applying the correction factors published in LAQM.TG(03), the roadside $NO_2$ concentrations in Haringey are predicted to fall to 43 $\mu g/m^3$ by the year 2005 and to 35 $\mu g/m^3$ by 2010. This latter concentration equates to about 88% of the NAQS objective. The data show that roadside $NO_2$ concentrations in Haringey will exceed the NAQS objective until about 2007.

5.3.8 Although the mapped data do not indicate any requirement to declare an AQMA, on the basis of the results of the AURN monitoring, Haringey Council has declared a borough-wide AQMA. Consequently the Council has produced a draft Air Quality Action Plan containing 37 proposals. With regard to the proposed batching plant, these include the promotion of a Low Emission Zone for London and improved enforcement of Part B processes, which include concrete batching.

## 6 Standards and Controls

### 6.1 Airborne Dust

6.1.1 Public concerns in relation to dust include the rate of deposition and/or the level of dustiness. Nuisance may be alleged when the dust coverage on surfaces is visible in contrast with other cleaner areas, especially if it occurs regularly. Severe nuisance is likely to be alleged when dust is perceptible without reference to a clean surface.

6.1.2 There are no UK statutory or recommended levels of dust deposition which constitute an acknowledged nuisance. The possible onset of nuisance from a particular source is said to occur when dust deposition becomes noticeable, typically at a level which is 2 - 3 times background levels.

6.1.3 On the basis of the existing dust deposition rates in the area, the potential onset of nuisance may occur when dust deposition exceeds 200 $mg/m^2/day$. This is the level at which the need for cleaning is said to become excessive and which has been adopted in the past as a guide or standard by some Mineral Planning Authorities (MPAs).

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## 6.2 Planning and Pollution Control

6.2.1 Planning consents for industrial developments generally include conditions to prevent or control environmental impacts, including where appropriate conditions relating to airborne dust. These afford Local Planning Authorities (LPAs) the powers to ensure that adequate measures are taken to minimise and mitigate the impact of airborne dust beyond the site boundaries. Typical modern conditions now include a requirement to submit a programme of measures for the suppression of dust during processes, such as concrete batching, which might give rise to dust.

6.2.2 The operation of the proposed concrete plant will be subject to Local Air Pollution Control (LAPC). Under LAPC, operating and management procedures are specified in accordance with the Secretary of State's Guidance Note PG3/1(95), *Blending, Packing, Loading and Use of Bulk Cement.* The plant will not be allowed to operate without a valid LAPC permit. Permits are reviewed at least once in every four years and may be modified to take account of the performance of a given site or the increased understanding of a particular process.

6.2.3 LAPC will be succeeded in due course by the Local Air Pollution Prevention and Control (LAPPC) regime. The revised PG3/1(2002), which has been issued as a draft for consultation, indicates that the requirements will be tightened in a number of respects to reduce emissions. These include:

- no visible emission across the site boundary,
- no visible emission from silo inlets and outlets,
- new silo filtration plant to meet an emission standard of 10 $mg/m^3$ or less,
- new silos to be fitted with automatic protection systems, and
- tankers to be fitted with on-board relief valves and filtration equipment within 36 months.

6.2.4 With regard to a programme of measures for the suppression of dust, the draft guidance in PG3/1(2002) also notes the desirability of a structured approach to environmental management.

## 7 Assessment of Impacts

### 7.1 Dust from Concrete Plants

7.1.1 In assessing the likely impacts of airborne dust due to batching plants, SGP has previously undertaken a programme of dust monitoring at an older wet batch plant owned and operated by another company. In contrast with the modern enclosed aggregates handling and storage facilities planned at Hornsey, less protection was provided in this respect at the older plant. The deposition rates at the older plant for undissolved solids, recorded over a period of twelve weeks, averaged about 25 $mg/m^2/day$, with a maximum of about 50 $mg/m^2/day$.

7.1.2 The observations made previously at LC's existing Battersea batching plant, with its enclosed aggregates hoppers, conveyor and storage bins, and the dust extraction systems fitted to the mixing and discharge areas, indicate that its performance is considerably better than that at the older plant. There was no visible evidence of airborne dust from the Battersea plant and average deposition rates for undissolved solids due to the plant appear unlikely to exceed 20 $mg/m^2/day$ at the site boundary. It is anticipated that the proposed batching plant at Hornsey, which will be of a similar design but with the further improvements as already noted, will achieve this standard.

7.1.3 A dust deposition rate of 20 $mg/m^2/day$ is one quarter of the likely background rate in the area, and only 10% of the suggested rate at which complaints about dust might be expected. Operation of the proposed batching plant is therefore unlikely to produce any discernible dust-related impact in the vicinity of the site.

### 7.2 Fugitive and Wind Blown Dust

7.2.1 In carrying out the assessment of impact due to dust, recognition is given to two different mechanisms.

7.2.2 Fugitive dust is that which escapes from a process or operation, or is raised by the passage of vehicles, and may then be carried towards a receptor by winds of any strength. Fugitive dust will tend to settle close to the source in light winds whereas stronger winds will carry any dust further. However, this latter impact will be countered by increased dispersion of the dust in the greater airflow.

7.2.3 Wind blown dust is raised from loose material on the ground or in stockpiles by winds greater than 10 knots. Increased wind speeds will generally result in greater wind blown dust emissions.

## 7.3 Site Assessment

7.3.1 Winds blow from the northeast and east, from the site towards Uplands Road, for 16% of the time annually. Winds greater than 10 knots blow in this direction for 3% of the time. Any fugitive dust which may be raised on the site will be carried occasionally towards Uplands Road, whereas any wind blown dust from the site will be carried towards the area only infrequently. Dust emissions from the site will attenuate over the intervening distance and adverse impacts are unlikely to be caused on Uplands Road.

7.3.2 Winds blow from the north, from the site towards Chettle Court, for 11% of the time annually. Winds greater than 10 knots blow in this direction for 1% of the time annually. Any fugitive dust which may be raised on the site will be carried occasionally towards Chettle Court, whereas any wind blown dust from the site will be carried towards the area very infrequently. Dust emissions from the site will attenuate over the intervening distance and are less likely to be carried up the slope. Adverse impacts are unlikely to be caused at Chettle Court.

7.3.3 Winds blow from the southwest and west, from the site towards Wightman Road, for 39% of the time. Winds greater than 10 knots blow in this direction for 8% of the time annually. Any fugitive dust which may be raised on the site may be carried for more extended periods towards Wightman Road. Any wind blown dust from the site will occasionally be carried towards the area. However, dust emissions from the site will attenuate significantly over the intervening distance and the magnitude of any emissions is likely to be small. The increased frequency of wind in this direction indicates a slight risk of adverse impact on Wightman Road.

7.3.4 Winds blow from the southeast, from the site towards BFP Wholesale, for 6% of the time annually. Winds greater than 10 knots blow in this direction for 1% of the time annually. Any fugitive dust which may be raised on the site will be carried infrequently towards the warehouse, and any wind blown dust from the site will be carried only very infrequently in this direction. Dust emissions from the site will attenuate over the intervening distance, which includes a builders merchants' unit containing potentially dusty materials. It is apparent from the observations of the area that the background dust levels are already occasionally elevated. It is

unlikely therefore that adverse impacts due to dust from the proposed batching plant will occur at the wholesalers.

7.3.5 Dust may also be raised by the passage of truck mixers and other vehicles along Cranford Way and the local road network. There are already many HGV movements in and out of the various depots on Cranford Way and it is unlikely that the additional movements will cause any discernible impact.

## 7.4 Traffic Emissions

7.4.1 PM10 and $NO_2$ emissions from HGVs associated with the proposed batching plant were estimated using the screening model, version 1.01, of the Design Manual for Roads and Bridges (DMRB), Highways Agency, 2003. This version of the DMRB model is considered to provide a slightly conservative assessment of impact in most cases. The use of the model is recommended in LAQM.TG(03) guidance to local authorities for carrying out air quality reviews and assessments.

7.4.2 Traffic will access the batching plant via the eastern limb of Cranford Way. This joins the public highway network on Tottenham Lane, which is one-way southbound as part of the traffic gyratory to the west of Hornsey Station. The number of traffic movements at any point on Tottenham Lane will therefore be half the total movements associated with the batching plant. Allowing for the supply of concrete and deliveries of cement, the number of daily HGV movements will be some 56 movements on average. The average number of HGV movements associated with the batching plant will therefore be 28 per day on any part of the one-way system. It is anticipated that the batching plant will give rise to no more than 20 car movements per day, which will equate to 10 movements on any part of the one-way system.

7.4.3 Incremental pollutant concentrations were estimated for movements in Tottenham Lane on the following basis:

- 28 HGVs per day, of which 3 will be articulated,
- 10 cars per day,
- 6m from house front to the centreline of the HGVs, and
- 36 kph (20 mph).

7.4.4 A spreadsheet was prepared for the year 2005, the first full year that the batching plant is likely to be operational, and for 2010, and is attached as Appendix A. A summary of the results is presented in the following table.

| Year | Pollutant contribution (µg/m$^3$) | |
|---|---|---|
| | PM10 | $NO_2$ |
| 2005 | 0.08 | 0.41 |
| 2010 | 0.04 | 0.28 |

**Table 7.1: Maximum contribution from HGVs associated with batching plant**

7.4.5 The estimated incremental PM10 concentrations are very low and will not result in any exceedance of the NAQS objective for PM10.

7.4.6 Advice is provided in the DMRB guidance to the effect that, if the predicted increase in $NO_2$ concentration is more than 4 µg/m$^3$ and / or the mean $NO_2$ concentrations breach the NAQS objective, then a qualitative assessment should be made. In Haringey, the NAQS objective for $NO_2$ will almost certainly be breached in 2005, irrespective of the present proposed development, but is unlikely to be breached in 2010.

7.4.7 In this instance, the predicted increase in $NO_2$ concentration in Tottenham Lane is estimated at less than 0.5 µg/m$^3$ and is unlikely to be discernible in the context of the existing air quality and daily variation. LC uses a modern fleet of truck mixers which are replaced on a regular basis. By the year 2005, the likely first full year of operation for the batching plant, most of the vehicles, if not all, will comply with Euro III emission standards. This accords with the objectives of any Low Emission Zone which may be promoted in London in due course. The actual impact will therefore be less than was estimated by the model, which allows for a typical mix of modern and older, more polluting, vehicles. HGVs associated with the batching plant will not therefore have a significant impact on local air quality.

7.4.8 Depending on the actual output, the supply of aggregates to the batching plant by rail will result in a reduction per annum of about 4000 HGVs carrying aggregates in and around London, ie, a reduction of 8000 movements per annum. In the context of the drive to reduce freight movements generally, this will make a positive contribution to the air quality action plans being developed by Haringey Council and other London Boroughs.

7.5 Summary Assessment

7.5.1 A slight risk of adverse impact has been identified at Wightman Road, due primarily to the high frequency of winds from the southwest and west, but overall the operation of the proposed batching plant is unlikely to have a significant impact on dust levels and air quality in the vicinity of the site. This evaluation is consistent with the advice provided in *The Environmental Effects of Dust from Surface Mineral Workings*, to the effect that batching plants have *LOW emission potential (with mitigation)*.

7.5.2 This is also consistent with LC's operating experience at its existing batching plants. These are generally similar to that proposed at Hornsey and have been in operation for more than five years without giving rise to complaints about dust.

7.5.3 This is illustrated by the fact that the Environmental Health Officer at Greenwich Council has in the past obtained LC's permission to invite representatives from other concrete suppliers to visit the batching plant there to demonstrate that, with the right equipment and management controls, such sites can be operated without causing adverse impact.

## 8 Mitigation

8.1 Standard good practices, complying with best available techniques not entailing excessive cost (BATNEEC), as detailed in the Secretary of State's Guidance Note PG3/1(95) and in the Best Practice Guide appended to *The Environmental Effects of Dust from Surface Mineral Workings*, will be adopted by LC for the proposed development. These measures are likely to be hardened to Best Available Techniques when LAPPC is introduced for batching plants and the draft PG3/1(2002) is finalised.

8.2 It is LC's policy to minimise the impact of its operations on the environment, as is evidenced by the operation of the company's plants at Battersea and elsewhere in London. The site manager will be required to undertake daily inspections with specific reference to dust control and to take any necessary action to prevent visible dust emissions beyond the site boundaries or from the cement silos.

8.3 Strict adherence will made in respect of any programme of dust suppression measures which may be agreed with the Local Planning Authority and the conditions attached to the authorisation issued under LAPC and the successor LAPPC regime.

## 9 Conclusions

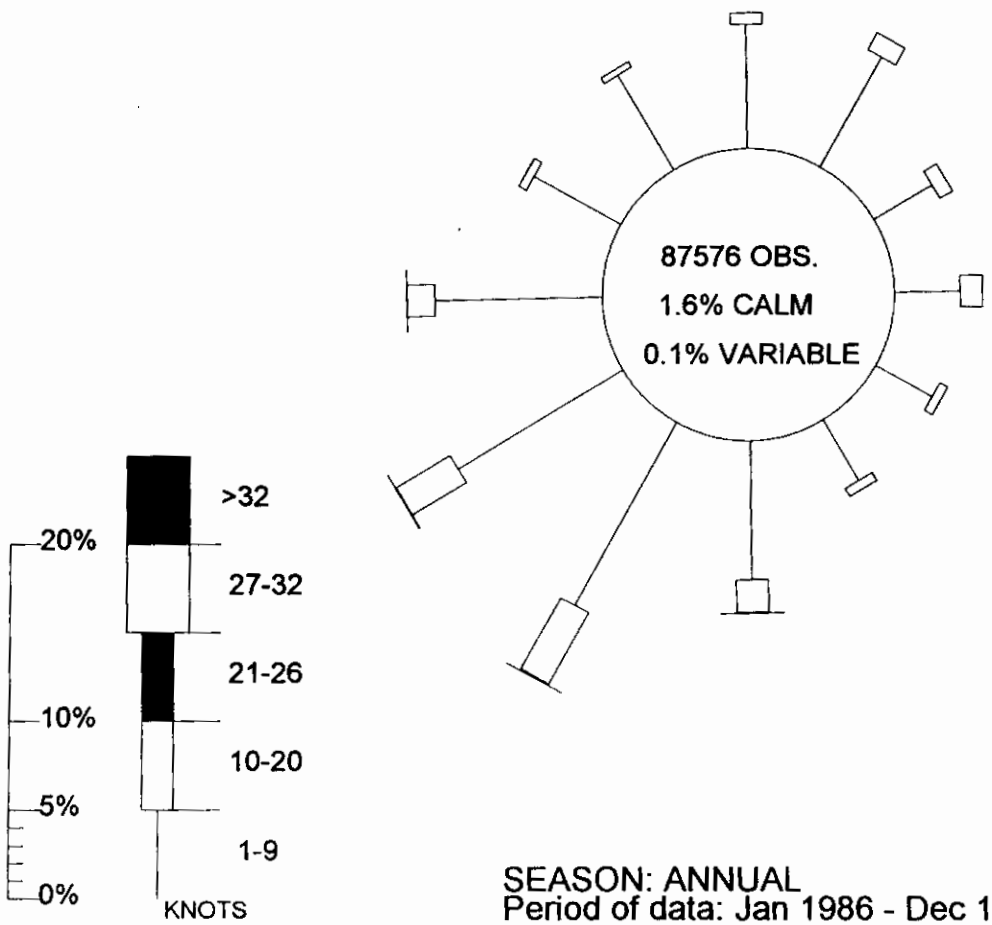
9.1 This assessment has reviewed the salient matters affecting the probable incidence of airborne dust emissions due to the proposed concrete batching plant at Hornsey, and the likely effects on the surrounding area.

9.2 It is unlikely that the operation of the proposed plant will cause harmful impacts due to airborne dust at any potentially sensitive receptor in the vicinity of the site.

9.3 The impact of HGV emissions will not be discernible and the importation of aggregates by rail confers a general benefit in terms of a reduction in the number of HGVs which would otherwise transport these materials in and around London.

# WIND ROSE FOR HEATHROW

N.G.R: 5077E 1767N ALTITUDE: 25 metres a.m.s.l.




SEASON: ANNUAL
Period of data: Jan 1986 - Dec 1995

# *DMRB: Assessment of Local Air Quality*

## OUTPUT SHEET

### Current receptor

| | | | |
|---|---|---|---|
| | | | |
| | | | |

### Results

| Pollutant | Annual mean | | | | Percentage of Air Quality Standard (%) | | |
|---|---|---|---|---|---|---|---|
| | Background Concentration | Contribution | PEC | Units | Value | Code | Units |
| CO | | | | | | | |
| Benzene | | | | | | | |
| 1,3-Butadiene | | | | | | | |
| $PM_{10}$ | | | | | | | |
| $NO_2$ | | | | | | | |
| Benzo(a)pyrene | | | | | | | |

* See Footnote 4 in DMRB Volume 11 Chapter 3

### Contribution of each link to annual mean

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### All receptors

| | | | Pollutant concentrations at receptor | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| | Receptor 1 | 2005 | 0.00 | 0.00 | 0.00 | 0.74 | 0.41 | 0.08 | 0.00 |
| | Receptor 1 | 2010 | 0.00 | 0.00 | 0.00 | 0.48 | 0.28 | 0.04 | 0.00 |
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* See Footnote 4 in DMRB Volume 11 Chapter 3