

2010 Air Quality Progress Report and Air Quality Action Plan Review for London Borough of Hammersmith & Fulham

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

April 2010

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Executive Summary

The Air Quality Progress Report has found that exceedences of the nitrogen dioxide annual mean and hourly mean objectives continued in 2009 at some locations in the borough, although as expected, breaches of the objectives seem to be more likely at busy roadside locations rather than at background sites. Breaches of the hourly nitrogen dioxide objective are also likely in busy locations alongside very busy 'A' roads and in the town centres. In terms of PM10, no monitoring took place in 2009, but monitoring will begin again in 2010.

The potential for air quality impacts from a range of specified local developments has been considered, concentrating on assessing any new transport, industrial, commercial or domestic sources that were not covered by previous assessments. No significant developments have taken place since the Updating and Screening Assessment in 2009. No further assessments are required at this stage.

The review of the Air Quality Action Plan for the 2009/10 period shows that progress has continued in most areas including the implementation of School Travel Plans, with significant modal shift away from car journeys; the continued popularity of the discount parking permit scheme for low emission vehicles; the installation and use of electric vehicle re-charging points; further public transport improvements, including the new Imperial Wharf train station which opened in late 2009; increasing membership of the airTEXT pollution alert service.

The next stage in terms of air quality review and assessment work is to prepare and submit the next Progress Report, including Action Plan review in April 2011 and then an Updating and Screening Assessment in 2012.

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1 Introduction

1.1 Description of Local Authority Area

The Borough of Hammersmith & Fulham is located on the western edge of inner London in a strategic location on the transport routes between the City and Heathrow. It is the 4th smallest of the London Boroughs in geographical area (1,641 hectares or 6.34 square miles) and has the 3rd smallest population (172,200 (2008 Mid Year Estimates)). It also has the 4th highest population density of any London Borough or indeed Local Authority in England.

Much of Hammersmith & Fulham is residential in character and scale although the northern most part of the borough is more industrial, forming part of the Park Royal industrial estate and also the location for a complex network of railway lines, depots and sidings, including 2 busy rail routes – the Great Western and the West Coast mainlines. There are also a small number of light industrial processes authorised by the council, although most of these are made up of dry cleaners and petrol stations. The borough is also home to Westfield London in Shepherds Bush town centre, one of the largest shopping centres in the UK, to 3 Premiership football teams, 2 large exhibition centres at Earls Court and Olympia and is traversed by the A4 and A40, 2 of the busiest roads in west London.

Main sources of nitrogen oxides and small particle emissions in the borough are road traffic, domestic and commercial gas boilers, trains and small industrial processes.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

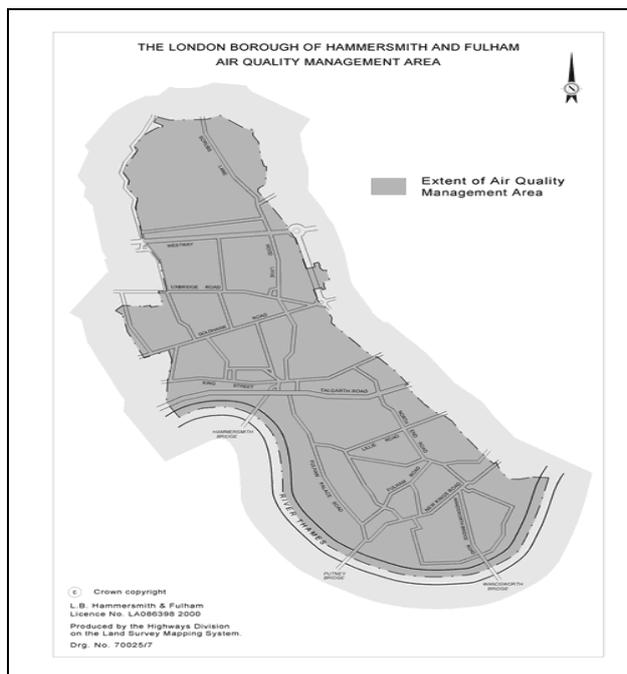
Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM10) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

The whole of Hammersmith & Fulham was designated as an Air Quality Management Area (AQMA) in 2000 for two pollutants – nitrogen dioxide (NO₂) and particles (PM₁₀). This was because the first stage of the review and assessment process had shown that exceedences of the objectives for these pollutants were likely over large areas, particularly next to the busy road network that traverses the borough. There was no need to designate any area as an AQMA for any of the other pollutants as all of the targets for 1,3-butadiene, carbon monoxide, lead, sulphur dioxide and benzene were shown to be likely to be achieved.

Figure 1.1 Map showing the Hammersmith & Fulham AQMA (whole borough)



Having declared the AQMA, a more detailed assessment was carried out in the borough which confirmed the AQMA designation and then work started on drafting and implementing the Air Quality Action Plan (AQAP), which was adopted in April 2003. Progress with the Plan has been reviewed annually since 2004.

Updating and Screening Assessments (USAs) have also been completed (in 2004, 2006 and 2009), all 3 of which concluded that the original whole borough AQMA should remain. The 2004 USA showed that further investigations were necessary for 2 pollutants: (i) benzene (around a service station next to a busy road in Fulham) and (ii) PM₁₀ (in the industrialised part of the borough around Scrubs Lane). Results from these assessments have been reported previously and showed that no further actions were required. The 2006 USA concluded that exceedences of the NO₂ and PM₁₀ objectives were very likely to continue, requiring the AQMA to remain in place, but no Detailed Assessments were required. The 2009 USA concluded that it was appropriate to keep the AQMA in place, although it was recognised that there may be a more consistent level of compliance developing, particularly in relation to the PM₁₀ objectives.

For all other pollutants (1,3-butadiene, Carbon Monoxide, Lead, Sulphur Dioxide), the USAs have concluded that the Air Quality Strategy objectives were likely to be met by the required dates, so no further action was required to control emissions of these pollutants.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Following a review of the council's air quality monitoring work, it was decided to consolidate real-time monitoring of air quality at a single site in the borough. There was also a need to carry out highways improvements works in the locations where the monitoring units had been located for some years and in the case of the Hammersmith Broadway monitoring station, a desire to improve the local pedestrian environment by removing the station. Subsequently, the monitoring stations at the Broadway and Brook Green were closed in January 2009 and removed.

In spring, a new site in Shepherds Bush town centre was part-commissioned, including the installation of a new roadside cabinet enclosure. However, full commissioning was not possible due to delays in installing and connecting a new power supply. The station is now expected to be fully operational in the summer.

Figure 2.1 Map showing the Location of the Automatic Monitoring Sites

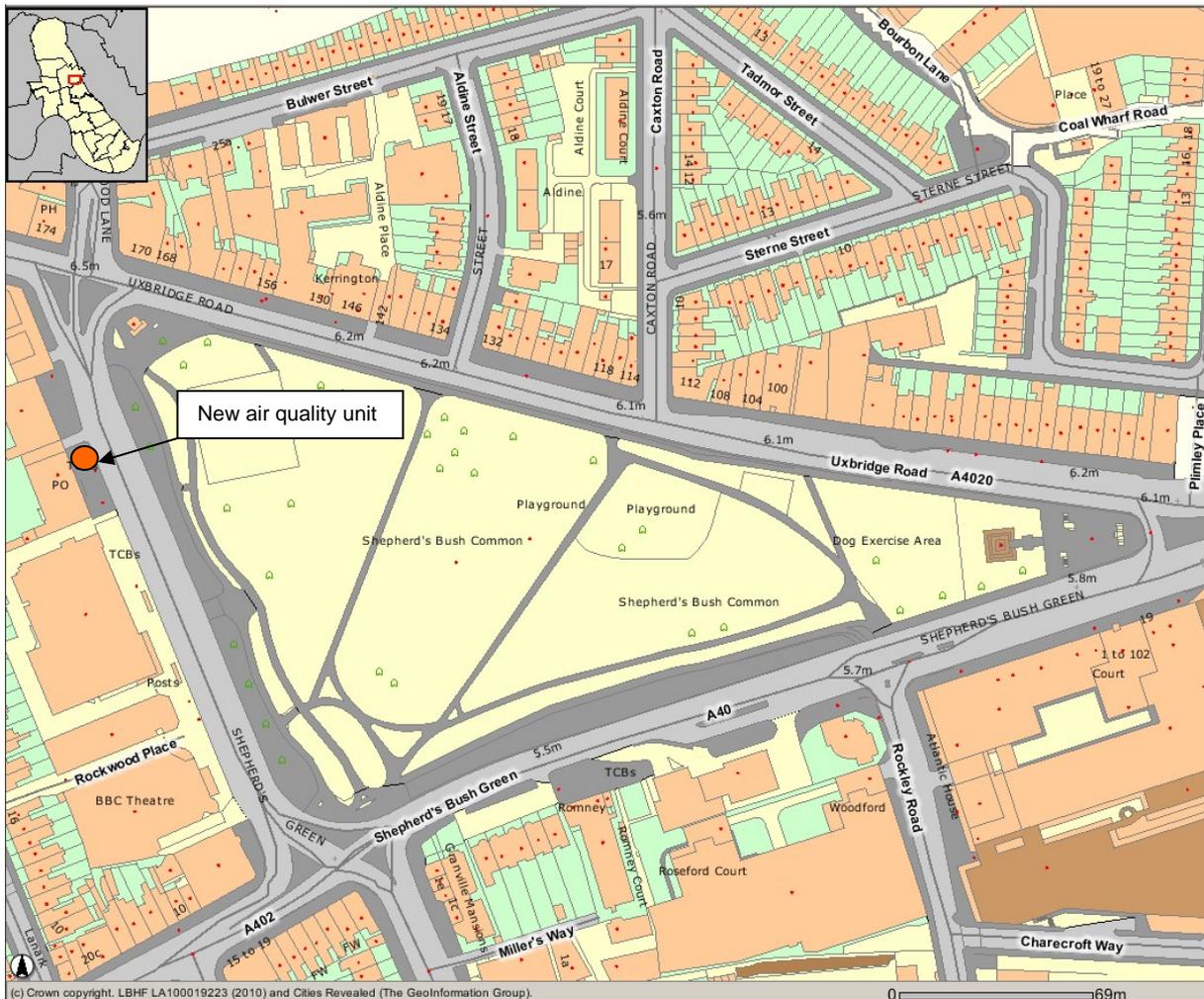


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored /Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Shepherds Bush	Urban Roadside	523313, 179900	NO2 (chemil.) PM10 (TEOM)	Y	Y (2m)	1m	Y

2.1.2 Non-Automatic Monitoring

During 2009, diffusion tubes were used at 10 sites to monitor NO2 levels at 5 roadside sites and 5 background sites, as shown in the map and table below.

Figure 2.2 Map of Non-Automatic Monitoring Sites

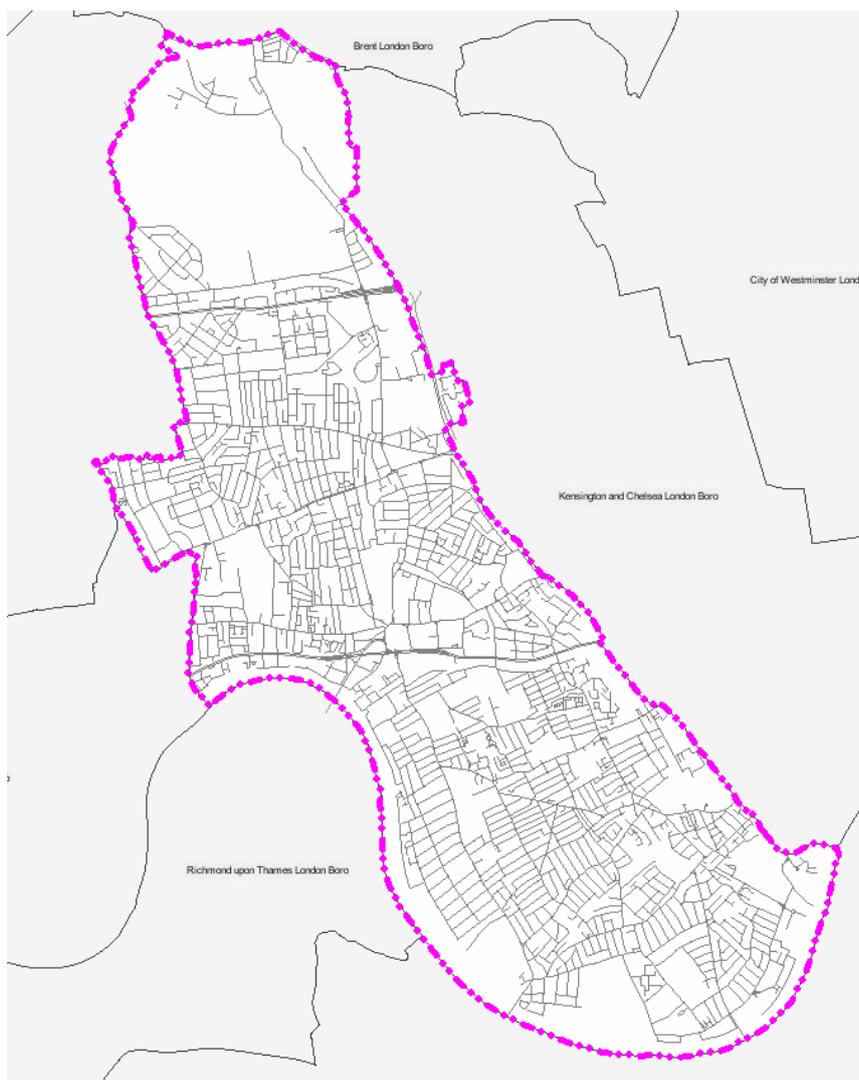


Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
Addison Gardens	Urban Background	523813, 179491	NO2	Y	Y (5m)	1m	N
Bryony Road	Urban Background	522479, 180656	NO2	Y	Y (6m)	1m	N
Eel Brook Common	Urban Background	525413, 176828	NO2	Y	N	50m	N
Fulham Broadway	Urban Roadside	525197, 177302	NO2	Y	Y (15m)	2m	N
H'smith Broadway	Urban Roadside	523327, 178484	NO2	Y	N	4m	Y
Radipole Road	Urban Background	524680, 176880	NO2	Y	Y (4m)	1m	N
Talgarth Road	Urban Roadside	524150, 178363	NO2	Y	Y (14m)	1m	Y
Uxbridge Road	Urban Roadside	522861, 180061	NO2	Y	Y (3m)	1m	N
Westway A40	Urban Roadside	522548, 180960	NO2	Y	Y (20m)	3m	Y
Wulfstan Street	Urban Background	521984, 181132	NO2	Y	Y (13m)	1m	N

The lab supplying and analysing the diffusion tubes is Gradko, who use a 50% TEA in acetone preparation method. Full details of QA/QC procedures are included in Appendix A.

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

No automatic monitoring took place in 2009.

Figure 2.3 shows the annual mean NO₂ concentration trends at the old monitoring sites. It can be seen that the background site (Brook Green) had not exceeded the 40 µg/m³ annual mean objective from 2004 to 2008. The site was established in 2003, when the objective was also met. For the roadside site at Hammersmith Broadway, the objective was exceeded every year that the station was operating. The concentrations measures from 2004 – 2008 and illustrated below are fairly typical of the NO₂ levels monitored at this site since it was first established, with concentrations being approximately double those found at the background site.

Diffusion Tube Monitoring Data

10 sites were monitored with diffusion tubes in 2009.

Figure 2.4 shows the annual mean NO₂ concentration trends at these sites, as well as for 10 other sites that were monitored until 2008. As expected, the lowest concentrations tend to be found each year at the background sites, most of which have met the 40 µg/m³ annual mean objective in recent years. The highest concentrations are found in the town centres

(Hammersmith Broadway and Fulham Broadway) and alongside the busiest roads such as the Westway A40. As well as exceeding the annual mean objective, the hourly objective is also likely to be exceeded at Hammersmith Broadway and the Westway. All sites are representative of relevant public exposure, mostly being residential streets, town centre areas or public park.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites

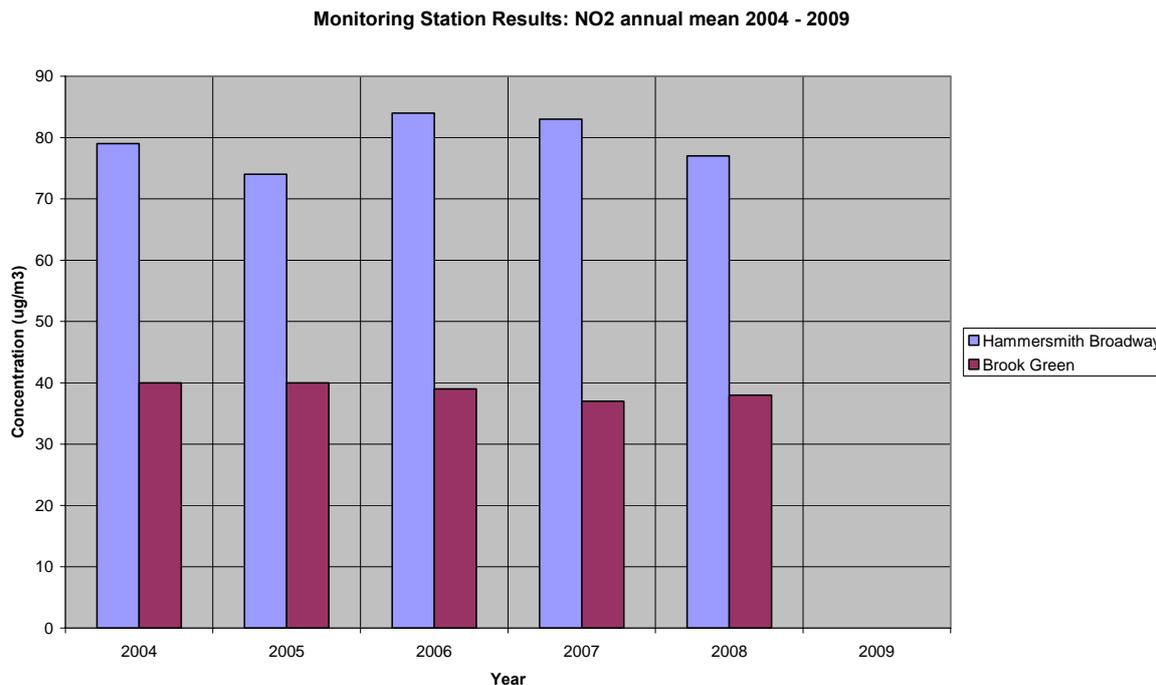


Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites

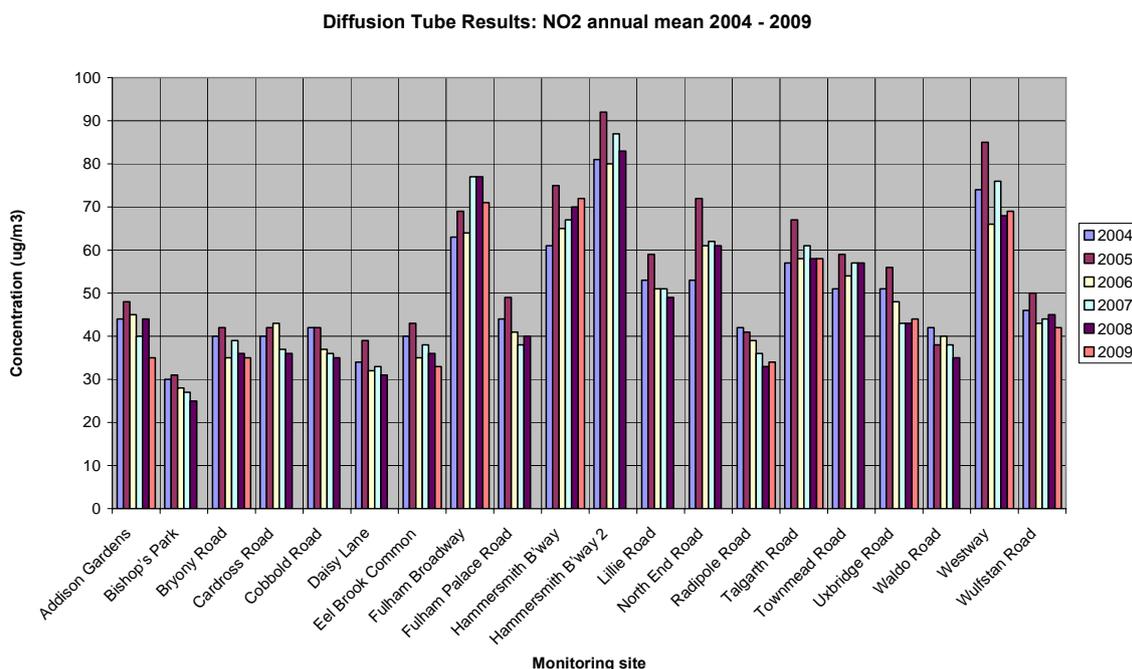


Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period (2009) %	Data Capture for full calendar year 2009 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
					2007	2008	2009
HF53	Addison Gardens	Y	92	92	40	44	35
HF45	Bryony Road	Y	100	100	39	36	35
HF44	Eel Brook Common	Y	92	92	38	36	33
HF50	Fulham B'way	Y	100	100	77*	77*	71*
HF32	H'smith B'way	Y	75	75	67*	70*	72*
HF66	Radipole Road	Y	92	92	36	33	34
HF63	Talgarth Road	Y	100	100	61*	58	58
HF61	Uxbridge Road	Y	100	100	43	43	44
HF54	Westway	Y	100	100	76*	68*	69*
HF47	Wulfstan Road	Y	100	100	44	45	42

(bias adjustment factors used: 2007 – 0.98; 2008 – 0.93; 2009 – 0.92)

Concentrations highlighted in **bold** indicate an exceedence of the annual mean objective; those tagged with a star '*', highlight annual mean results above $60 \mu\text{g}/\text{m}^3$ that indicate a risk that the 1-hour objective may also be exceeded.

2.2.2 PM10

No monitoring of PM10 took place in 2009.

Figure 2.5 shows the annual mean PM10 concentration trends at the old monitoring sites. It can be seen that both the Brook Green background site and the roadside site at Hammersmith Broadway did not exceed the $40 \mu\text{g}/\text{m}^3$ annual mean objective from 2004 to 2008. Pre-2004, there were also no exceedences of this objective.

The 24-hour mean objective of no more than 35 days when PM10 concentrations should exceed $50 \mu\text{g}/\text{m}^3$ was met every year at the Brook Green site. Typically, there were between 10-20 days of exceedences a year, which is well within the 35 day limit.

For the roadside site at Hammersmith Broadway, the objective was exceeded in 2005, but met in other years – though 2008 was a low data capture year. Since 2000, 2 other years showed exceedences: 2001 (37 days) and 2003 (54 days).

It should be noted that there was low data capture for PM10 monitoring in 2008 at Hammersmith Broadway. This is likely to explain the unusual 24-hour objective results shown in the graph where Brook Green measured more exceedences than Hammersmith Broadway.

Figure 2.5 Trends in Annual Mean PM10 Concentration Measured at Automatic Monitoring Sites

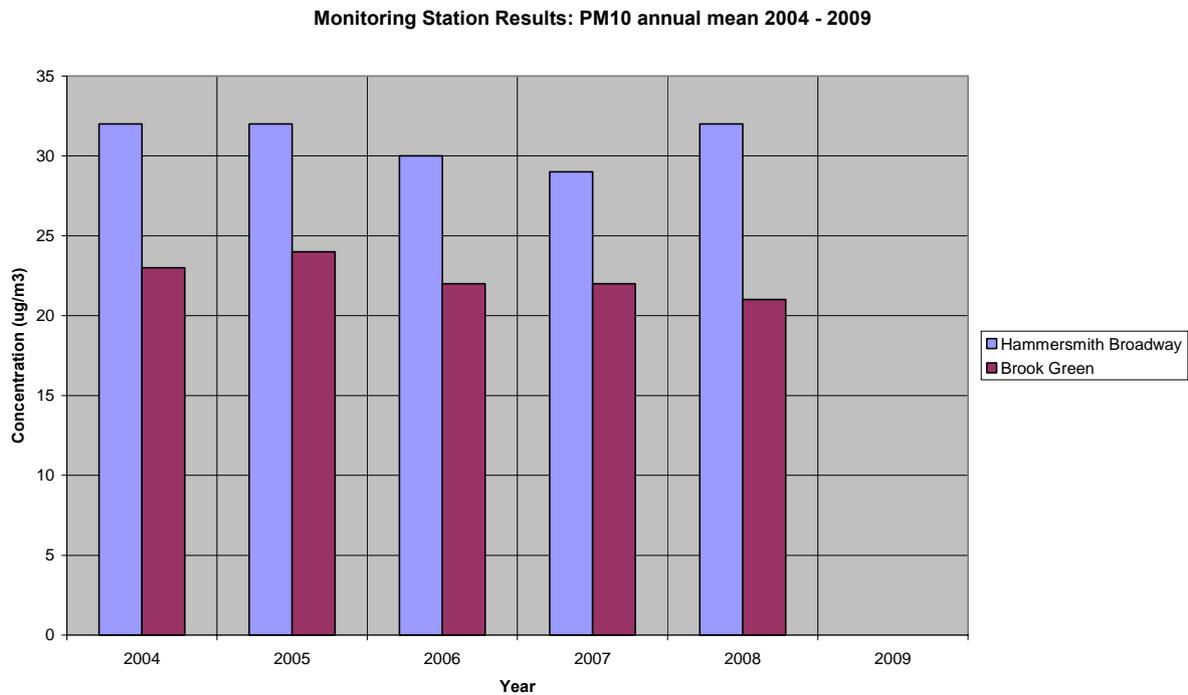
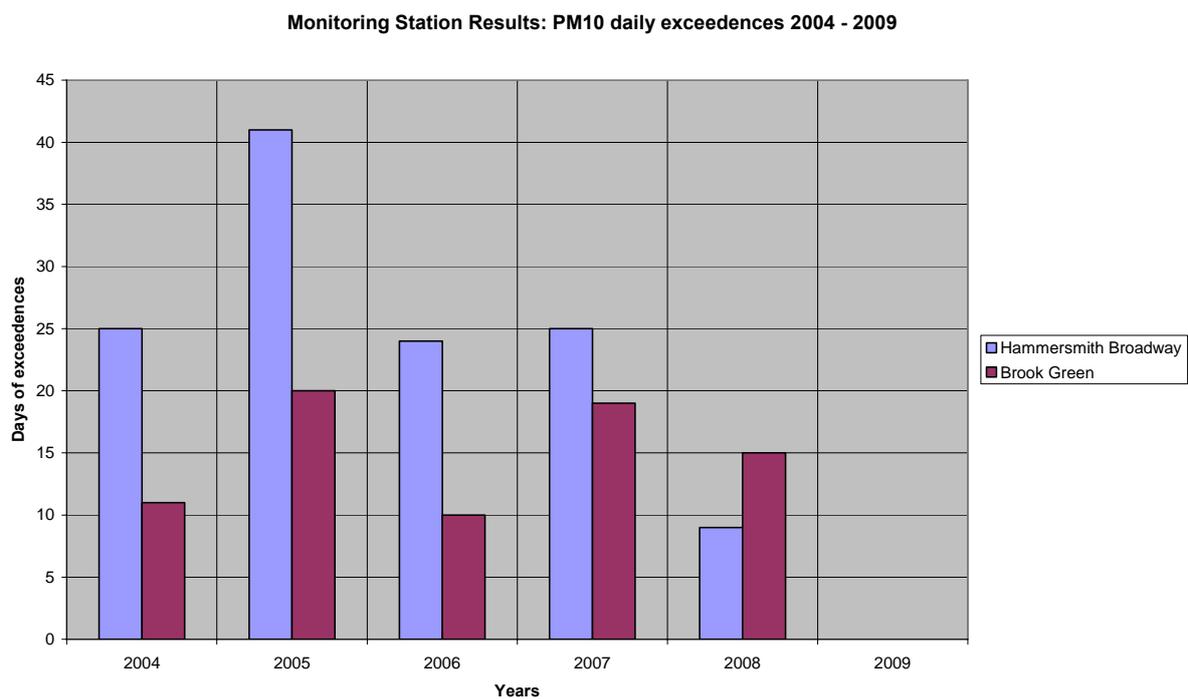


Figure 2.6 Trends in 24-hour Mean PM10 Concentration Measured at Automatic Monitoring Sites



2.2.3 Sulphur Dioxide

There was no sulphur dioxide monitoring in Hammersmith & Fulham in 2009.

2.2.4 Benzene

There was no benzene monitoring in Hammersmith & Fulham in 2009.

2.2.5 Other pollutants monitored

No other pollutants were monitored in Hammersmith & Fulham in 2009.

Summary of Compliance with AQS Objectives

Hammersmith & Fulham council has examined the results from monitoring in the borough.

Although no monitoring took place in 2009, in recent years, the PM10 annual mean objective has been met at both the background and roadside sites. The daily mean objective has occasionally been exceeded at the roadside site, but it has been met in most years since 2000.

For NO₂, exceedences of the annual mean objective continue at all roadside sites being monitored, with the hourly mean also likely to be exceeded at the very busiest locations. Background levels of NO₂ tend to be just below the objective level.

3 New Local Developments

3.1 Road Traffic Sources

Since the Updating and Screening Assessment report was published in 2009, there have been no new developments that have introduced any of the following:

- Narrow congested streets with residential properties close to the kerb
- Busy streets where people may spend one hour or more close to traffic
- Roads with a high flow of buses and/or HGVs
- Junctions
- New roads constructed or proposed since the last Updating and Screening Assessment
- Roads with significantly changed traffic flows
- Bus or coach stations

3.2 Other Transport Sources

Since the Updating and Screening Assessment report was published in 2009, there have been no new developments that have introduced any of the following:

- Airports
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m
- Ports for shipping

3.3 Industrial Sources

Since the Updating and Screening Assessment report was published in 2009, there have been no new developments that have introduced any of the following:

- **Industrial installations:** new or proposed installations for which an air quality assessment has been carried out
- **Industrial installations:** existing installations where emissions have increased substantially or new relevant exposure has been introduced
- **Industrial installations:** new or significantly changed installations with no previous air quality assessment
- Major fuel storage depots storing petrol
- Petrol stations
- Poultry farms

3.4 Commercial and Domestic Sources

Since the Updating and Screening Assessment report was published in 2009, there have been no new developments that have introduced any of the following:

- Biomass combustion plant – individual installations
- Areas where the combined impact of several biomass combustion sources may be relevant
- Areas where domestic solid fuel burning may be relevant

3.5 New Developments with Fugitive or Uncontrolled Sources

Since the Updating and Screening Assessment report was published in 2009, there have been no new developments that have introduced any of the following:

- Landfill sites
- Quarries
- Unmade haulage roads on industrial sites
- Waste transfer stations etc
- Other potential sources of fugitive particulate emissions

Summary of New Local Developments

Hammersmith & Fulham council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Implementation of Action Plans

Progress has continued with the Air Quality Action Plan in most areas. Full details are presented in the following table.

Of particular note are the following:

- School Travel Plans continue to be implemented with significant modal shift away from car journeys
- The number of workplace travel plans in place also continues to increase
- The discount parking permit scheme for low emission vehicles continues to encourage the use of these vehicles, now with almost 600 permits issued
- The electric vehicle re-charging points are proving to be popular and new sites have been installed
- Public transport improvements have continued with the new Imperial Wharf train station opening in late 2009
- More than 100 borough residents have now signed up to the airTEXT pollution alert service (over 6,000 in London in total)

Table 4.1 Action Plan Progress 2009/10

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
REDUCING EMISSIONS AT SOURCE				
1. Encourage improved availability of alternative fuels	Summer 2003	<p>a) Originally the plan was to incorporate guidance on providing facilities for alternative fuels into a new Supplementary Planning Document (SPD) on Sustainable Design and Construction. However, when the document was finally published, the focus was on the construction process rather than development design features and availability of alternative fuels was not covered.</p> <p>b) LBHF is part of a SWELTRAC project assessing the feasibility of providing charging points for electric vehicles. Provision of electric vehicle charging points on the public highway has been investigated in LBHF, but was not regarded as feasible.</p> <p>c) All diesel vehicles in the council fleet switched to a 5% biodiesel mix in early 2006.</p>	<p>a) The SPD was adopted in November 2007, but no guidance was included on alternative fuel infrastructure.</p> <p>There continues to be 2 service stations in the borough where forecourt LPG is available – BP Connect on Talgarth Road by Hammersmith Flyover and BP Connect Shepherd's Bush Green.</p> <p>b) Six electric vehicle charging points are in operation at three different sites, Hammersmith Hospital, Charing Cross Hospital and Kings Mall Shopping Centre.</p> <p>In 2008, a residential development was proposed with off-street charging points for electric vehicles – the first proposal of this kind in LBHF, but it was refused on unrelated grounds.</p> <p>c) Diesel vehicles continue to use 5% biodiesel fuel with fuel additive. Fleet MOT emissions tests have shown reduction in smoke emissions.</p>	<p>a) A policy has been included in the draft replacement London Plan that requires 1 in 5 parking spaces in new developments to provide an electrical charging point to encourage the uptake of electric vehicles.</p> <p>b) 30 electric vehicle charging points have also been installed in the Westfield Car Park in Shepherds Bush and 2 points installed at the King's Mall Car Park in Hammersmith town centre.</p> <p>c) 5% biodiesel continues to be used at the council's fuel depot.</p>
2. Provide incentives for use of alternative fuels	From Summer 2003 onwards	<p>a) Continued to publicise information on the location of LPG refuelling stations in the borough and details of grant schemes.</p> <p>b) The council introduced a discount parking permit scheme for low emission vehicles in autumn 2007.</p>	<p>a) Impacts are difficult to assess – BP does not like to provide sales figures for LPG or any off their fuels due to commercial confidentiality.</p> <p>b) By 2008/09 almost 500 (498) parking permits had issued for electric, gas or dual fuel cars in the borough. This represented about 1% of total permits issued.</p>	<p>a) As previously reported. No new activities for this measure.</p> <p>b) In 2009/10, a further 74 permits were issued for low emission vehicles, bringing the total to 572, just over 1% of the total permits issued.</p>
3. Promote travel plans to encourage a switch to low emission vehicles	Ongoing from 2002 for the duration of the AQAP	<p>a) Low-emission vehicles are promoted through the travel planning process, particularly with businesses. Emphasis so far has been on alternative modes of transport. The council uses its own rickshaw as an example of what kinds of alternative vehicles are available.</p>	<p>a) By 2008/09, 57 workplace travel plans were listed on iTrace for the borough. The first 4 voluntary workplace travel plans had also been completed. A snap shot survey in November 2007 had the following modal split results: Motorcycle 2% - Car share 3% - Car 15% - Rail 12% - Tube 32% - Bus 14% - Bike 9% - Walk 13%.</p>	<p>a) By 2009/10, 78 Workplace Travel Plans were being monitored on iTrace.</p> <p>A travel plan network for Hammersmith has been developed and consists of seven firms, including Disney, Coca-cola and the NHS Trust and Primary Care Trust.</p>

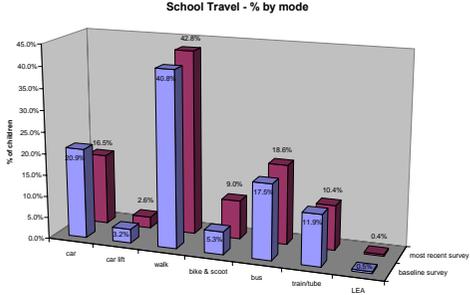
Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
4. Reduce emissions from the council fleet	Ongoing from 2002	a) As mentioned above, biodiesel has been adopted for use by the council's fleet. A fuel additive is also used to further improve efficiency and reduce emissions. The fleet has been reducing in size in recent years, with a proportional decrease in alternatively fuelled vehicles. All HGV classified vehicles meet the LEZ emission requirements.	a) Use of biodiesel and fuel additive continues to help emissions from the council's diesel vehicles to be as low as possible. The number of vehicles in the council fleet continues to reduce as services are contracted out.	a) As previously reported. Also, the council's bus fleet is part-way through replacement with new buses that utilise Mercedes' 'stop/start' technology – i.e. the engine is automatically switched off when the vehicle is stationary and re-starts automatically. 10 buses replaced so far with a further 20 to be replaced in 2010. The council has signed up to TfL's Freight Operators Recognition Scheme (Bronze level) which offers training and guidance in a number of areas relating to vehicle and fleet management.
5. Seek a reduction in emissions from the bus fleet	To be agreed with TfL and bus operators	a) Council officers continue to liaise regularly with TfL representatives and bus operators.	a) TfL continues to trial buses running on alternative fuels such as electric-diesel, but none of the bus routes running in LBHF are using hybrid buses, so there are no direct local emissions improvements from the trials. Bus companies are contacted when complaints are received about emissions at bus stands where engines are kept running unnecessarily.	a) As previously reported.
6. Encourage the use of vehicles with smaller, more efficient engines	From Summer 2003 onwards	a) Produced a public information leaflet (Drive Down Pollution) which included information on benefits of smaller vehicles. Information also appeared in HFM, the council web site and information poster. Also distributed at events such as the west London Green Festival etc. b) The Environment Services Department has use of a Smart car for council business which is used for site visits etc.	a) The information leaflet encourages people to consider smaller, more fuel efficient cars. b) The Smart car is a visual reminder to people that such small, efficient cars are ideal for city driving conditions.	a) As previously reported. See above (action 2) for update on discount parking permit scheme. b) As previously reported.
7. Seek to reduce emissions from larger vehicles (Low Emission Zone)	The report on the outcome of the LEZ study is due in mid 2003. Any scheme would need to be co-ordinated with other boroughs etc	a) The council submitted a full consultation response to TfL on their LEZ proposals. Concerns were raised about the potentially high costs that could be incurred in achieving relatively modest air quality benefits.	a) The first phase of the LEZ was introduced in February 2008. Phase 2 of the LEZ was introduced in July 2008. Most vehicles are complying with the LEZ requirements and emissions from HGVs (over 3.5t), buses and coaches are expected to be reducing in London as a result. All council vehicles comply with the LEZ emission standards as required.	a) As previously reported. No recent changes in the running of the LEZ scheme. The next phase of the LEZ was planned for 2010 when large vans and mini-buses were due to be included in LEZ scheme, but their inclusion has been put back to 2012 by the Mayor of London.
8. Seek to reduce emissions from badly maintained vehicles	Roadside testing is likely to start in 2003; to be co-ordinated with other participating	a) LBHF carried out roadside tests as part of the London-wide vehicle emission testing scheme in 2003/04. However, the scheme was not funded to continue beyond that and no further testing has been carried out.	a) During 2003/04, 468 vehicles were tested, out of which 12 failed the emissions test. No test since then.	a) No further vehicle emission testing carried out.

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
	boroughs			
9. Encourage more environmentally friendly driving behaviour	Implementation to be co-ordinated with other participating boroughs. Aim for summer 2003	<p>a) Complaints about bus drivers unnecessarily running vehicle's engine whilst parked are investigated as and they are made by residents.</p> <p>Our public information leaflet includes information on reducing emissions through improved driving style such as switching the engine off to avoid unnecessary idling.</p>	<p>a) Opening of the extension to Hammersmith bus station in March 2008 has removed buses from an on-street bus stand where buses had on occasion been seen with engines running unnecessarily whilst parked.</p>	<p>a) No recent complaints received about emissions from buses stationary at bus stands.</p>
10. Seek a reduction in emissions of small particles from construction sites	Ongoing from 2002 for the duration of the AQAP	<p>a) Complaints of dust nuisance investigated as and when reported.</p> <p>b) Large scale developments are required to submit a construction code of practice, which will include measures on minimising dust emissions. SPD on Sustainable Construction adopted in November 2007 to provide advice on how to reduce dust and pollution impacts during construction /demolition works on large sites.</p>	<p>a) Complaints continue to be investigated as required. 17 complaints received in 08/09 about construction/demolition dust. Informal warning/ advice is usually effective in securing improvements. No notices served.</p> <p>b) Developers are advised to follow guidance in the council's SPD on Sustainable Construction and submit details on how dust/PM10 emissions will be minimised. The GLA/London Councils Best Practice Guidance on Control of Dust and Emissions from Construction and Demolition is also recommended.</p>	<p>a) Complaints continue to be investigated as required. 18 complaints received in 09/10 about construction / demolition dust. Informal warning/advice usually effective in securing improvements. No notices served.</p> <p>b) We continue to require a construction management plan for major development sites, including measures to minimise dust emissions and advised to follow SPD/BPG guidance.</p>
11. Seek a reduction in emissions from domestic and commercial properties	Ongoing from 2002 for the duration of the AQAP	<p>a) Annual home composter promotions and the garden waste collection scheme continue to divert waste from landfill and prevent disposal by bonfire.</p> <p>b) Complaints about smoke from domestic /commercial properties are investigated as and when they are received.</p> <p>c) The council continues to use 'green electricity' contracts to reduce emissions from council buildings, particularly of CO₂. Took part in CIBSE awareness raising campaign on energy use and</p>	<p>a) More than 3,000 home composters have been distributed in total since the composter promotions were first launched. In 2008/09, 1,034 tonnes of household waste were composted – including 379 tonnes of garden waste, 605 tonnes of other household green waste and 50 tonnes of xmas trees. 37 tonnes of green waste from the council's parks were also sent for composting.</p> <p>b) Informal warning/advice usually effective in securing improvements. 14 complaints about smoke from bonfires in 2008/09. Advice was given and improvements secured. 2 notices were served. No complaints received about smoke from commercial chimney installations.</p> <p>c) Energy efficiency improvements continued in 2008/09, although we no longer use 'green electricity'. For example, works included improving lagging on pipework, leak detection and water</p>	<p>a) In 2009/10, 319 tonnes of household waste were composted – including 284 tonnes of other household green waste (leaf fall etc) and 35 tonnes of xmas trees. 395 tonnes of green waste from the council's parks were also sent for composting. Promotion of home composting continued in 2009/10, with approximately 1500 free or heavily subsidised home composters being provided to residents. We also ran home composting workshops and a home composting stall at the farmers market last year, so that residents could learn how to use their new compost bin.</p> <p>b) 24 complaints received about smoke from bonfires in 2009/10. 4 notices served.</p> <p>c) The council' Carbon Management Plan was adopted in April 2010 and this outlines a number of energy efficiency saving projects which will reduce energy use and associated emissions, including local emissions as</p>

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
		energy efficiency and plan to carry out energy audits at the 10 main council offices. d) The council is part of the Carbon Trust Local Authority Carbon Management Programme, Phase 7.	savings, lighting works, boiler controls, low energy lamps etc. A solar thermal hot water system was installed at Flora Gardens Children's Centre. As of April 2009, the solar panels on the town hall roof had reduced CO2 emissions by 7.5 tonnes. We have Display Energy Certificates for all our corporate buildings and most of the schools. d) Work has started work on National Indicator 185 and the Carbon Reduction Commitment.	well as CO2. For example, the council has implemented improved energy monitoring through an Energy Management System; Improved asset and facilities management which combined with Smart Working is rationalising and reducing the number of buildings used to deliver council services and improving energy management; Corporate Planned Maintenance Programme, which provides funds for energy initiatives; Carbon reduction initiatives in the council's IT strategy; The Building Schools for the Future programme is well underway and will incorporate carbon reduction measures in the new and refurbished schools. d) The baseline NI 185 data showed that the council's estates and operations were responsible for 24,443 tonnes of CO2 emissions in 2008/09. A Carbon Management Plan has been developed to reduce these emissions by an aspirational target of 40% by 2016.
12. Seek to control and minimise emissions from industrial premises	Ongoing from 2002 for the duration of the AQAP	a) Complaints of smoke emissions investigated when reported. Authorised processes inspected in line with DEFRA requirements.	a) Continued regulation and reduction of emissions to atmosphere through the LAPPC regime and clean air regulations. No complaints were received in 2008/2009 regarding emissions from industrial sites.	a) Continued regulation duties. 5 complaints were received in 2009/10 regarding emissions from industrial sites regulated by the council. No evidence found of non-compliance.
REDUCING THE NEED TO TRAVEL				
13. To sustain and improve town and local centres, local facilities and employment areas	UDP review to be complete in 2003	a) UDP alterations adopted in August 2003. The Mayor's altered London Plan was adopted in February 2008.	a) Work has started on the Local Development Framework which will replace the UDP. In 2008/09, the Council continued to review and refine its proposed LDF Core Strategy with the intention of further public consultation on the vision, strategic objectives and options for the borough in May 2009. Reducing traffic congestion and the need to travel remain strategic objectives.	a) Core Strategy options consultation was in June and July 2009. This document includes spatial vision for the borough and identification of preferred approach for regeneration areas, including town centres. Work has also progressed on planning frameworks for individual regeneration areas. The documents have a strategic objective to encourage and promote healthier lifestyles and reduce health inequalities. The programme for 2010 includes further consultation on the above mentioned documents.
14. Seek to reduce the air quality impact of new development	Ongoing from 2002 for the duration of the AQAP	a) UDP policies are applied as and when required to ensure developments to not have any adverse impacts on local air quality. Where necessary conditions have been attached to planning approvals or s.106 agreements made to require Travel Plans or improve public transport facilities.	a) Air quality assessments are carried out for major developments and mitigation measures proposed if there is a need to reduce impacts.	a) As previously reported.

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
		b) Air quality and land use guidance has been prepared for internal use by Development Control.	b) LBHF guidance is in use by Development Control officers.	b) As previously reported.
ENCOURAGING A SWITCH TO LESS POLLUTING FORMS OF TRANSPORT				
15. Promotion of bus services	Ongoing from 2002 for the duration of the AQAP	a) Continuing liaison with TfL on the provision of new bus services in the borough. The council continues its involvement with the London Bus Priority Network and will further facilitate its continued success by preparing, or assisting in the preparation of bids for funding.	a) Bus service improvements during 2008/09: Route 316 (Cricklewood-Kilburn-Queens Park-North Kensington) has been extended from North Kensington to White City, via the Edward Woods estate, from November 2008. New route 228 (Park Royal- Harlesden – White City – Notting Hill- Kensal rise was introduced January 2009. (Both in association with Westfield). All buses operating in the borough are now accessible.	a) As previously reported. A new Sunday service was introduced on route 607 from 11th April 2010.
16. Promotion of other forms of public transport	Ongoing from 2002 for the duration of the AQAP	a) Continued to work in partnership with TfL on the development of the West London Tram scheme and with rail operators on new West London Line stations at Shepherd's Bush and Imperial Wharf.	a) Shepherds Bush rail station opened in September 2008 and a new tube station at Wood Lane opened in October 2008. Imperial Wharf station is expected to open in late 2009. The council is promoting a Crossrail interchange station with the West London Line in the Old Oak Common/Mitre Bridge area, linked to a possible High Speed Rail hub station. We are currently in discussion with key stakeholders such as HS2.	a) Imperial Wharf station was opened in September 2009. The government has included the proposals for a High Speed Rail/Crossrail interchange at Old Oak Common in its Command Paper on HS2.
17. Promotion of cycling	Ongoing from 2002 for the duration of the AQAP	a) The council has continued its involvement and co-operation with LCN+ and LCN, and will continue to consider the needs of cyclists with respect to any new development.	a) In 2008/09, £765,000 was spent on LCN plus routes and £60,000 on cycle training for children and adults. Schools are encouraged through the Travel Plan programme to promote cycle training. Between September 2007 and March 2009, 568 pupils have received some level of cycle training. In 2007/08 training was provided for 32 schools, and so far in 2008/09 22 schools have been visited. 31 schools have been successful in receiving new cycle storage from the Mayor of London's Cycling Initiative between 2004/05 and 2008/09. A further 20 schools have been offered / invited to apply for cycle storage through the Mayors scheme in 2009/2010. The Sustrans Bike It project has been running in	a) In 2009/10, £372,000 was spent on LCN plus routes and £60,000 on cycle training for children and adults. From April 2010, the London Cycle Network will no longer be promoted or funded. Cycling improvements on the highway will be introduced through the boroughs Corridor and Neighbourhoods budgets. The UDP has cycle parking standards to ensure new developments provide adequate provision for cycle parking/storage. In 2009/10, a total of 251 children were trained. 88 were trained to Bikeability level 1 (38 of which achieved 2.7). 163 children were trained to level 2.8 and above. A total of 187 adults received individual training.

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
			<p>the borough since 2007. The project has tackled low bike ownership and improved the road worthiness of pupils' cycles, through the provision of Dr Bike Days and the organisation of bike pools.</p> <p>The UDP has cycle parking standards to ensure new developments provide adequate provision for cycle parking/storage.</p>	
18. Promotion of Walking	Ongoing from 2002 for the duration of the AQAP.	a) Walking Strategy now adopted and in the transport Local Implementation Plan. The council continues to promote walking as a viable means of travel through the provision of further improvements to facilities for pedestrians. This includes consideration of streetworks guidance, further traffic management measures i.e. Home Zones and a range of other measures aimed at providing an environment that is accessible, and highly conducive to the needs of all pedestrians.	<p>a) The council promoted the 'Walking Works' activities, with again more than 1,000 individuals taking part. We also promoted walking at the Grand Union Canal Fest.</p> <p>Council Road Safety Officers visit infant, junior and secondary schools throughout the borough to raise awareness of road safety and provide training. 32 schools were visited between September 2008 and March 2009, with approximately 2,880 pupils benefiting from this work. 17,010 pupils have received road safety education from the team in the last 3 years. Road Safety Officers also organise school community awareness raising events to which the whole school community is invited, pupils, staff, parents and carers, and the general public/ local residents.</p>	a) Grand Union canal fest was repeated in 2009 and continued to promote walking, as did the West London Greenfest (June 2009). Schools in the borough participate in Walk to School Week and Walk on Wednesdays.
19. Encourage a reduction in car use for the journey to school	Ongoing from 2002 for the duration of the AQAP	a) Funding for the Travel Plan Co-ordinator post has been extended. Continued to promote school travel plans through the work of the Travel Plan Co-ordinator and encourage cycling/walking to school through highways improvements.	a) By the end of 2008/09, a total of 59 schools (78%) had Travel Plans, with 52 (61%) of these being 'valid' (i.e. established and being regularly reviewed). A further 15 schools were engaged in the process and aiming for Travel Plan approval in 2009. Only 2 out of 76 schools in total had not started work on their Travel Plan.	a) By 2009/10, a total of 77 schools (98%) have school travel plans (STPs), with 53 (69%) of these being 'valid' (i.e. established and annually reviewed). One further school is engaged in the process and aiming for STP approval in 2010. Only one out of 79 schools in the borough total has not yet started work on its STP. Over 17,000 pupils surveyed at 68 schools shows the following modal shift over the last 5 years:

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
				 <p>The significant mode shifts are:</p> <ul style="list-style-type: none"> • Car use down from 21% to 17% • Cycling & scootering up from 5% to 9% • Walking up from 41% to 43%
<p>20. Encourage a reduction in car use for the journey to work and business trips</p>	<p>Ongoing from 2002 for the duration of the AQAP</p>	<p>a) As above: Funding for the Travel Plan Co-ordinator post has been extended.</p>	<p>a) By 2007/08 there were 47 travel plan processes listed on iTrace. The iTRACE system is used by the council, allowing more effective management of business travel plans that have been secured through the planning process. The first four voluntary workplace travel plans have been completed in the last financial year. A snap shot survey in November 2007 had the following modal split results: Motorcycle 2%; Car share 3%; Car 15%; Rail 12%; Tube 32%; Bus 14%; Bike 9%; Walk 13%.</p> <p>A Travel Plan business network is developing in Hammersmith Town Centre.</p>	<p>a) See measure 3. Also, TfL has published new guidance for development control related travel plans.</p>
<p>21. Control provision of on and off street parking to deter car commuting into and within the borough</p>	<p>Ongoing – parking best value review to be complete by mid 2003</p>	<p>a) On street parking controls extended and now there are Controlled Parking Zones in all but the far north of the borough.</p> <p>b) Off street parking controlled by parking standards</p>	<p>a) The council monitored the effects of the congestion charge western extension on parking demand in the borough and subsequently made changes in November 2008 to deter commuter parking. Sunday controls were introduced in the areas near Westfield in December 2008 and consultation on longer term changes in the wider Westfield area was undertaken in January and February 2009. Consultations have also been held on further match day parking controls around Chelsea and Fulham football grounds.</p> <p>b) Parking standards applied to new</p>	<p>a) Further strengthening of the parking controls in the area around Westfield were introduced in December 2010.</p> <p>b) As previously reported.</p>

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
		in the revised UDP.	developments to ensure adequate provision without increasing 'parking stress'.	
22. Encourage freight to be transported in a sustainable manner	2004	<p>a) The council continues to work with the West London Freight Quality Partnership with a view to improving sustainability in the freight transport sector.</p> <p>b) Peter Brett Associates were commissioned to carry out a general freight study and a Home Delivery Scheme feasibility study.</p> <p>c) As part of the Clear Zone project, a survey is being carried out into demand for sustainable home deliveries in the Brook Green / Addison wards.</p>	<p>a) The council started planning a freight/delivery map for Hammersmith & Fulham together with the Metropolitan Police. A pilot map for North End Rd will be produced with the aim of reducing congestion and accidents.</p> <p>b) The home delivery scheme is included in the WLFQP three years programme; we will follow this up together with the partnership.</p> <p>c) 3 bicycle rickshaws have been purchased for potential use in such a scheme. Rickshaws have already been used by the council to transport mail/ goods and for local school deliveries.</p>	<p>a) A review of waiting and loading restrictions is to be carried out later this year in advance of production of the map.</p> <p>b) A delivery scheme using the council owned freight rickshaws is about to start under the auspices of the Hammersmith Business Improvement District.</p> <p>c) see above.</p>
MAKING MORE EFFICIENT USE OF ROAD TRANSPORT				
23. Encourage car sharing	From Summer 2003 onwards	a) Signed up to SWELTRAC and WLTS 'Share the Car' scheme. Car clubs are starting to set up in the borough with cars stationed at a number of locations – e.g. Fulham Broadway.	a) Share the car software installed Spring 2004. Car share scheme is up and running. We now have 3 Car Clubs operating in Hammersmith & Fulham: City Car Club, Zipcar and Streetcar. Transport officers have been working with the council's parking team to progress the introduction of on street car club bays, but with no results at the moment. However as this is one of the Mayoral priorities, we will continue to focus on this in 2009/10.	a) Questions on car club bays were included in recent CPZ consultations, with the identification of areas of high demand and possible site for implementation in 2010/11.
24. Discourage short journeys	From Summer 2003 onwards	a) See 21 above. Also participated in regular annual events such as the West London Green Festival and the Good Going week where information and advice on other forms of transport has been made available.	a) The "small zone" system mentioned under action 21 discourages intra-borough car journeys. Discouragement of short journeys is at the heart of the travel planning process. The school travel planning process has generated a positive modal shift with fewer short journeys being reported after a year of implementation.	a) As previously reported. See also updates for measures 19, 20 and 21.
OTHER MEASURES TO REDUCE ROAD TRAFFIC AND EMISSIONS				
25. Reduce the amount of road traffic in residential areas and town centres	Ongoing from 2002 for the duration of the AQAP	a) Continued implementation of Home Zones and pedestrianisation schemes. A bid for funding from TfL has been made in the council's BSP to set up other Home Zone schemes in other parts of the borough.	a) There are now fifteen 20mph zones in the borough. NDC North Fulham, North End Road East and Thornfield Road schemes reviewed and completed in 2008/9. The innovative "drive over chicane" in the North End Road East zone was Highly Commended at the London Transport	a) An additional 20mph zone was introduced in the Loftus Road area in 2009/10.

Action Plan Measure	Original Timescale	Previously reported Progress	Previously Reported Outcomes	New Progress, Outcomes and Additional Comments for 2009/10
		b) UDP has policies on car parking, plot ratio and density designed to limit the amount parking in new developments.	Awards 2009. b) The UDP no longer has policies/standards on plot ratio and density – these expired in September 2007. We rely on London Plan for density and plot ratio. Policies being applied as and when appropriate.	b) As previously reported.
26. Promote the use of trees to help improve local air quality	Work on the Biodiversity Action Plan will begin in early 2003	a) The Biodiversity Action Plan (BAP) was adopted in May 2004. The UDP also has a tree planting policy which seeks to ensure that the council will endeavour to plant new trees whenever possible and will expect developers to plant trees where appropriate.	a) 210 trees were planted in 2008/09. For some development sites, where planting etc is planned as part of the soft landscaping developers may be advised to investigate the use of vegetation/trees as a barrier helping to filter out pollution.	a) 329 trees were planted in 2008/09. Planting in new developments continues as previously reported.
27. Reduce the amount of traffic on the A4 and A40	From Summer 2003	a) Previously liaised with GLA/TfL on this issue to clarify if the A4 and A40 are regarded as priority roads for traffic reduction measures. TfL are concentrating on their 'network management duty' which relates more to keeping traffic moving rather than reducing traffic flows.	a) Partner in a bid for 'Greening the A4' project funding with Hounslow, Kensington & Chelsea and others. Bid includes travel demand management, alternative fuels, and road safety measures. TfL was due to consult the council on plans for the A4, but this has been delayed due to TfL reorganisations.	a) There has been no progress in this area.
MEASURES TO RAISE AWARENESS OF THE LINKS BETWEEN AIR QUALITY AND HEALTH				
28. Provide information to allow people to make informed choices about travel behaviour	From Summer 2003 onwards	a) Produced 'Drive Down Pollution' leaflet on cutting pollution from car use and other publicity material.	a) As previously reported. AirTEXT information distributed and presentations given to school nurses group and local breathe easy group. 102 people have now signed up for pollution alerts. No other new publicity produced in 08/09.	a) As previously reported. 113 Hammersmith & Fulham residents have now signed up for AirTEXT pollution alerts.
29. Provide information to allow people to make informed choices about reducing pollution from domestic activities	From Summer 2003 onwards	a) Originally intended to combine information on pollution from domestic activity with pollution from car use, but these 2 issues were separated.	a) A leaflet on cutting pollution from car use was produced, but production of domestic emissions information leaflet was delayed and not carried out.	a) No new publicity material produced.
30. Continue to monitor air quality and make information available	Ongoing from 2002 for the duration of the AQAP	a) Monitoring continues to be carried out in the borough, with the focus on the 2 key pollutants of NO2 and PM10.	a) The annual NO2 objective continued to be exceeded in 08/09 at a number of sites across the borough. The PM10 objectives were met this year. Both real-time air quality monitoring stations were closed in early 2009 with the intention to establish monitoring of NO2 and PM10 at a new roadside location.	a) During 2009, the annual NO2 objective was exceeded at 6 sites out of 10, mainly at the roadside sites. No PM10 monitoring took place during 2009. Further information on how current levels compare to past measurements is included in the council's Air Quality reports or via the London Air Quality Network website: www.londonair.org.uk .

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

Hammersmith & Fulham council has examined the results from monitoring in the borough.

In recent years, the PM10 annual mean objective has been met at both the background and roadside sites. The daily mean objective has occasionally been exceeded at the roadside site, but it has been met in most years since 2000.

For NO₂, exceedences of the annual mean objective continue at all roadside sites being monitored, with the hourly mean also likely to be exceeded at the very busiest locations. Background levels of NO₂ tend to be just below the objective level.

5.2 Conclusions relating to New Local Developments

Hammersmith & Fulham council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

5.3 Proposed Actions

The Progress Report has identified that there is currently no need to proceed to a Detailed Assessment for NO₂ or PM10 and the whole borough Air Quality Management Area can remain in place.

The next stage in terms of air quality review and assessment work is to prepare and submit the next Progress Report, including AQAP review in April 2011, followed by the next Updating and Screening Assessment in 2012.

If the next round of assessments shows that the PM10 24-hour objective is consistently being met and that this is forecast to continue into the future, then a Detailed Assessment may also be required in order to support the variation of the AQMA order to apply only to NO₂.

6 References

Local Air Quality Management Technical Guidance (LAQM.TG(09)), DEFRA, 2009.

Air Quality Strategy, DEFRA, 2007.

Air Quality (England) Regulations 2000 (SI 928).

Air Quality (England) (Amendment) Regulations 2002 (SI 3043).

Air Quality Progress Report, LBHF, 2005, 2007, 2008.

Updating and Screening Assessment, LBHF, 2009.

Updating and Screening Assessment, LBHF, 2006.

Updating and Screening Assessment, LBHF, 2004.

Detailed Assessment, LBHF, 2006.

Air Quality Action Plan, 2003-05, LBHF, 2003.

London Air Quality Network, <http://www.londonair.org.uk>

Air Quality Management Area Order, LBHF, 2000.

Stage 1 Air Quality Review and Assessment, LBHF, 1998.

Stage 2 Air Quality Review and Assessment, LBHF, 1999.

Stage 3 Air Quality Review and Assessment, LBHF, 2000.

Stage 4 Air Quality Review and Assessment, LBHF, 2003.

Appendices

Appendix 1: QA/QC of Monitoring Data

Appendix 2: 2009 NO₂ Diffusion Tube Results

Appendix 1: QA/QC of Monitoring Data

Diffusion Tube Bias Adjustment Factors

The NO₂ diffusion tubes used for the passive monitoring work are supplied by Bureau Veritas and analysed by Gradko International Ltd. The preparation method used is 50% TEA v/v in Acetone. The bias adjustment factor for the 2009 data is 0.92; 2008 – 0.94; 2007 – 0.99.

Factor from Local Co-location Studies (if available)

There were no co-location studies carried out in 2009.

Discussion of Choice of Factor to Use

National bias adjustment factors have been used in this report as there are no local factors available.

PM Monitoring Adjustment

All PM₁₀ data in this report are taken from the London Air Quality Network website (www.londonair.org.uk). PM₁₀ data is corrected using the Volatile Correction Model (VCM) which has been developed for Defra at King's to allow measurements of PM₁₀ from TEOM instruments to be converted to reference equivalent.

It uses the measurements of volatile PM made using nearby FDMS instruments to correct the measurements made by the TEOM. It passed the equivalence testing using the same methodology used in the Defra trials and is now the recommended method for correcting TEOM measurements (Defra, 2009).

Short-term to Long-term Data adjustment

No data adjustment of this type is included in this report.

QA/QC of automatic monitoring

The council's automatic monitoring stations are part of the London Air Quality Network (LAQN), which is run by the Environmental Research Group at King's College London. All real-time data from the monitoring stations is therefore independently collected and validated on a daily basis. A combination of automatic and manual checks is used to assess data, identify and diagnose potential equipment faults and adjust data to take account of calibration tests. Automatic overnight calibrations are supplemented with regular manual calibrations of analysers. The procedures used conform to the requirements of the UK Automatic Urban and Rural Network Management and Co-ordination Units.

All data is also formally ratified. During this process the validation decisions can be ratified with the benefit of hindsight and using greater information, such as service records,

calibration records and the results of station audits. Station audits are carried out every 6 months by the National Physical Laboratory, which is UKCAS (United Kingdom Accreditation Service) accredited.

QA/QC of diffusion tube monitoring

Diffusion tube analysis is carried out in Gradko's UKAS accredited laboratory. Laboratory preparation and analysis of the tubes is strictly controlled and Gradko participate in 2 major independent schemes to assess their performance.

1) Workplace Analysis Scheme for Proficiency (WASP)

Gradko participates in the WASP NO₂ diffusion tube scheme on a monthly basis. This is a recognised performance-testing programme for labs undertaking NO₂ diffusion tube analysis as part of the UK NO₂ monitoring network. The scheme is designed to help laboratories meet the European Standard EN482. The lab performance for 2009 is shown below:

Month	Set	Spike Value (µg)	Measured Value (µg)	Z score	Rating
February	1	2.02	1.85	-0.7	Satisfactory
	2	1.22	1.20	-0.1	Satisfactory
April	1	1.68	1.62	-0.4	Satisfactory
	2	0.96	0.92	-0.5	Satisfactory
July	1	1.84	1.88	0.3	Satisfactory
	2	1.42	1.34	-0.8	Satisfactory
October	1	2.03	1.87	-1.1	Satisfactory
	2	2.20	1.99	-1.4	Satisfactory

The criteria for Z-Scores awarded are: Z Score of $< \pm 2$ - Satisfactory Result; Z Score of $> \pm 2$ - and $< \pm 3$: Questionable (Warning) Results; Z Score of $> \pm 3$ Unsatisfactory Result. These criteria have been set by HSL and AEA and as from Round 111, the performance scores will be based on Rolling Performance Index (RPI) and not Z-Scores.

2) Network Field Inter-comparison Exercise

This exercise tests the performance of the diffusion tubes and lab analysis procedures and involves the regular exposure of a triplet of tubes at an Automatic Urban Network (AUN) site where real-time NO₂ levels are also measured using a chemiluminescent analyser. Gradko operates well within the required level of performance in terms of accuracy and precision, as shown by the results below. In 2009, the uncertainty of measurement for Gradko's analysis of diffusion tubes has been calculated at $\pm 5.98\%$, which is regarded as a good performance, signifying a high level of accuracy.

Table showing 2009 Network Field Inter-comparison results

Annual Mean Bias		Precision	
Performance Target	Gradko Performance	Performance Target	Gradko Performance
$\pm 25\%$	-0.9%	10%	4%

Appendix 2: 2009 NO2 Diffusion Tube Results

Table showing monthly NO2 results for all diffusion tubes sites in 2009 (unadjusted data)

Site ID	Location	Monthly concentrations ($\mu\text{g}/\text{m}^3$)											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
HF53	Addison Gardens	n/d	48.63	46.11	42.34	28.87	35.97	25.93	25.38	36.04	43.88	38.47	48.26
HF45	Bryony Road	53.65	48.82	38.43	44.43	27.30	36.06	25.93	23.70	30.28	41.76	39.03	48.04
HF44	Eel Brook Common	50.36	49.56	34.68	38.01	23.44	n/d	23.06	21.09	27.88	39.96	34.17	48.89
HF50	Fulham Broadway	76.10	89.41	84.50	65.07	64.79	74.78	85.19	72.93	68.50	78.15	84.68	78.44
HF32	H'smith Broadway	n/d	67.99	58.41	93.02	71.37	n/d	85.69	n/d	72.85	81.60	91.63	82.13
HF66	Radipole Road	50.97	53.18	37.92	40.71	27.07	31.31	23.12	24.58	31.86	n/d	36.76	47.27
HF63	Talgarth Road	70.42	80.86	59.55	75.70	56.74	73.85	49.11	44.85	55.71	64.49	54.88	68.49
HF61	Uxbridge Road	56.75	61.66	48.83	48.85	40.39	52.53	41.24	32.59	40.97	50.38	44.57	55.84
HF54	Westway A40	79.73	84.52	79.97	87.93	64.13	96.60	61.24	47.67	85.55	75.24	61.30	80.62
HF47	Wulfstan Street	59.68	62.96	53.55	46.63	40.42	44.75	42.48	23.69	35.22	48.06	48.79	51.13

n/d – no data (tube missing)