HIGHWAYS AGENCY

M4 Bus Lane Revocation Order

Environmental Assessment Report

May 2013

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Hyder Halcrow Joint Venture

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1 Introduction

1.1 The Project

1.1.1 The M4 Motorway is a national transport link, connecting to the strategic M25 London Orbital Motorway towards central London. From June 1999 until December 2010, the M4 Bus Lane operated eastbound into London for approximately 3.5 miles between Junctions 3 and 2. The Highways Agency (HA) suspended the Bus Lane in 2010 as an Experimental Order under the Road Traffic Regulation Act 1984, and is now proposing the permanent removal of the Bus Lane, through a commitment to a Revocation Order.

Location

1.1.2 The M4 Motorway between Junctions 3 and 2 lies primarily within the London Borough of Hounslow, with a short stretch falling within the boundary of the London Borough of Ealing.

1.2 Purpose of this Report

1.2.1 This report has been prepared to present the findings of the environmental assessment and is referred to as an Environmental Assessment Report (EAR). The environmental assessment has been undertaken to identify the key environmental issues associated with the Project and to determine the need for statutory Environmental Impact Assessment (EIA).

1.3 The Overseeing Organisation

1.3.1 The HA is the Overseeing Organisation. The HA is an Executive Agency of the Department for Transport (DfT) and is responsible for operating, maintaining and improving the strategic road network in England on behalf of the Secretary of State (SoS) for Transport. The contact details for the HA are:

Highways Agency
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2 The Project

2.1 Project Background and Description

2.1.1 The M4 Motorway is a national transport link, connecting to the strategic M25 London Orbital Motorway towards central London. From June 1999 until December 2010, the M4 Bus Lane operated eastbound into London for approximately 3.5 miles between Junctions 3 and 2 terminating just before the start of the elevated 2-lane section. The Bus Lane was the outside lane and was reserved for buses, taxis and motorcycles. The section between Junctions 3 and 2 has a speed limit of 60mph, reducing to 40mph half a mile before the elevated 2-lane section.

2.1.2 The intention of the Bus Lane was to reduce the journey times of buses, coaches and taxis without significantly affecting other vehicles. Since its opening in 1999, the M4 Bus Lane has been heavily criticised by the media and there has been a perception amongst road users that the Bus Lane was not being particularly heavily used by buses or taxis during off peak hours. In addition, the operation of the Bus Lane generated 'shockwaves' (intermittent stop start driving and intermittent queuing) of slow moving traffic extending to the west of Junction 3.

2.1.3 As an Experimental Order, the HA therefore suspended the Bus Lane from December 2010 under the Road Traffic Regulation Act 1984, to determine whether traffic flows would be more even through the use of all three lanes for all traffic travelling eastbound between Junction 3 and 2. No changes were made to the speed limits.

2.1.4 Traffic monitoring was undertaken between October and November in both 2010 (With Bus Lane) and 2011 (Without Bus Lane), and air quality monitoring was undertaken between March and September 2011. The results of the traffic monitoring were compared to data obtained for the corresponding six week period prior to the suspension of the Bus Lane. It was concluded that although traffic flows increased, as did air and noise emissions slightly, overall journey times were quicker, journey reliability was improved, and the number of personal injury accidents between Junction 3 and 2 reduced. In addition, the shockwaves that were occurring with the Bus Lane in place have been absorbed into a single queue on the approach to the elevated section.

2.1.5 The HA is therefore proposing the permanent removal of the Bus Lane, through a commitment to a Revocation Order.

2.2 Land Use Setting and Land Take

2.2.1 The M4 Motorway between Junctions 3 and 2 lies in the majority within the London Borough of Hounslow, with a short length within the boundary of the London Borough of Ealing. It is located within predominantly suburban areas of West London, including the settlements of Norwood Green, North Hyde, Heston and outer areas of Brentford, thereby passing industrial / commercial land uses (including hotels), residential areas, agricultural land and some areas of open space including parks and the Airlinks Golf Course and Driving Range.

2.2.2 According to the Environment Agency website (accessed August 2012), this section of the M4 crosses flood plain associated with the Grand Union Canal.

2.2.3 Within 1km of this section of the M4, six noteworthy designated built heritage and historic

landscape features have been identified (MAGIC, September 2012). These include the Hanwell Flight of Locks and Brick Boundary Wall of St Bernard's Hospital Scheduled Ancient Monument (SAM); the Royal Botanic Gardens, Kew, World Heritage Site; Osterley Park Registered Park and Garden; Gunnersbury Park Registered Park and Garden; the Royal Botanic Gardens, Kew, Registered Park and Garden; and Syon Park Registered Park and Garden.

2.2.4 Within 1km of this section of the M4 is located the Long Wood Local Nature Reserve (LNR) and the Blondin Nature Area LNR (MAGIC, September 2012). In addition, there are numerous wooded areas within 1km that are designated on the National Inventory of Woodland and Trees (England) (MAGIC, September 2012), and some of the agricultural land adjacent to this stretch of the M4 has an Agricultural Land Classification (ALC) of Grade 1 (MAGIC, September 2012). Natural England's Nature on the Map service (accessed August 2012) identifies that there are a number of records of priority Biodiversity Action Plan (BAP) habitats immediately adjacent to his stretch of the M4. These records comprise pockets of deciduous woodland recognised as habitats of principal importance for the purpose of conserving biodiversity in England. According to the NBN Gateway site (accessed August 2012) there are historic records of protected species within the surrounding area of this section of the M4, and particularly records of Hedgehog (*Erinaceus europaeus*) and Harvest Mouse (*Micromys minutes*) within the immediate vicinity.

2.2.5 There are numerous historic landfills and other industrial/commercial land uses within the area around this section of the M4 that have the potential to cause land contamination.

2.2.6 Works required for the permanent removal of the Bus Lane would be within the highway boundary, and would not comprise any significant construction activities.

2.3 Alternatives Considered

2.3.1 The alternative to this proposal would be to reinstate the M4 Bus Lane. However, this would reverse the journey time benefits and reduced person-hours delay experienced during the experimental phase and would therefore not achieve the HA's objective to improve journey time reliability.

2.3.2 The conversion of the Bus Lane into a High Occupancy Vehicle (HOV) lane was suggested by the London Borough of Hounslow in their response to the consultation. However, DfT's current position regarding HOV lanes is directed towards accommodating all types of motorist in the most economically viable way. At a time of austerity in public finance, it is important that the benefits of any investment on the strategic road network can be felt by as many people as possible and, therefore, it is currently not feasible to invest in schemes that will only help one particular type of motorist, in this case only those who have more than one individual in their vehicle. To date only a few car sharing lanes have been installed and limited evaluation is available as to their effectiveness in England, especially with regard to managing air quality.

3 Environmental Assessment Methodology

3.1 Previous Environmental Assessment

3.1.1 Prior to the Experimental Order to suspend the Bus Lane in 2010, an Environmental Assessment Form (EAF)[1] was prepared to consider the likely environmental effects of the construction works required to remove the Bus Lane, and the operational effects of the temporary removal. The construction works included sign face removal and/or replacement; lane and other road markings removal; and lane delineation (road markings and studs installation). The EAF included a desktop study, and scoping of the likely effects, and concluded that further consideration of noise, air quality, and effects on all travellers would be necessary.

3.1.2 During the operation of the Experimental Order the performance of the M4 was monitored and a detailed analysis of the data collected was undertaken to inform the HA's decision regarding the future of the M4 Bus Lane. The performance of the eastbound M4 between October and November 2010, in the six week period before the M4 Bus Lane was suspended, was compared against the corresponding six week period in October and November 2011, exactly 12 months later, using consistent sets of traffic data that were collected in both periods. In addition an assessment was undertaken of air quality, road traffic, noise and accident data, to compare the "before" and "after" scenarios. The results were presented in an analysis report[2].

3.2 Scope of the EAR

3.2.1 The scope of this assessment is limited to the operational effects (i.e. traffic) of the permanent removal of the Bus Lane. The physical works required to remove the Bus Lane have already been assessed, consented, and implemented as described above, and are therefore not assessed here.

3.2.2 The scenarios to be assessed are as follows:

- With Bus Lane (equivalent to the "Do Minimum scenario")
- Without Bus Lane (equivalent to the "Do Something scenario")

3.2.3 The scope of this assessment for the permanent removal is based largely on information provided in the EAF for the Experimental Order, which is provided in Appendix A.

3.2.4 The table below summarises the assessment topics required by the Design Manual for Roads and Bridges (DMRB), the need for inclusion within this EAR, and the reasons behind these decisions.

[1] C10 Environmental Assessment Form, M4 Junction 3 to Junction 2 Removal of Bus Lane (Experimental Order), Connect Plus, 2010

[2] The Analysis of the Impact of the Suspension of the M4 Bus Lane, Hyder Halcrow Joint Venture, April 2012

Table 3-1 DMRB Topic Scoping

Topic	Scoped In/Out	Reason
Air Quality	In	Due to possible changes in traffic as a result of the scheme.
Cultural Heritage	Out	There would be no direct physical impacts upon nearby heritage features. Visible aspects of the works would be minor in the context of the existing infrastructure therefore effect on settings are unlikely to occur
Landscape	Out	Visible aspects of the works would be minor in the context of the existing infrastructure and the limited nature of the works (i.e. changes to white lines and signage), therefore significant landscape or visual effects, are unlikely to occur.
Nature Conservation	Out	There would be no direct physical impacts upon nearby ecological designated sites and habitats. Impacts on protected species is unlikely as changes are limited to changes in traffic.
Geology and Soils	Out	No impacts are anticipated upon geological features or contaminated land.
Materials	Out	No significant construction works are proposed therefore no significant material use or waste production would occur.
Noise	In	Due to possible changes in traffic as a result of the scheme.
Effects on all Travellers	In	Likely long-term, minor beneficial effects
Community and Private Assets	Out	No land outside of the existing highway would be required, therefore there would be no effect on community facilities, private assets or land use.
Road Drainage and the Water Environment	Out	No impacts are anticipated upon flood risk or other water environment attributes.

Assessment of Implications on European Sites

3.2.5 DMRB Volume 11, Section 4, Part 1 (HD 44/09) Assessment of Implications (of Highways and/or Road Projects) on European Sites provides guidance on the assessment of the implications of highway projects on 'European Sites' where such sites are designated for their nature conservation interests (also known as Natura 2000 sites).

3.2.6 Mole Gap to Reigate Escarpment SAC, which has bats as a qualifying feature, is within 30 km of the works. The Rivers Crane and Brent pass under the works area and flow to the River Thames. The River Thames has a number of European Sites in its estuary and is connected to many others through its tributaries. Based on the information provided in the Experimental Order Environmental Assessment Form (which has been checked using magic.gov.uk in =January 2013, and is still up to date), it is not anticipated that the removal of the Bus Lane

will have any significant effect upon any European Sites.

3.3 Methodologies and Constraints

3.3.1 Where further assessment is required following the scoping decisions outlined above, the environmental assessment follows the methodologies outlined in the DMRB Volume 11. Further information on the individual assessment methodologies, including the level of details required, where relevant (e.g. simple or detailed assessment), have been provided in the topic Chapters of this report. The process of defining significance of effect is also described in more detail in each of the topic Chapters.

3.3.2 Traffic data for 2010 (prior to the Experimental Order) and 2011 (during the Experimental Order) was obtained from actual traffic counts available from Motorway Incident Detection and Automatic Signalling (MIDAS) loop detectors. Comparison of this data showed there to be a flow change, and for the purposes of the Environmental Assessment it was assumed that the flow change is attributable to the suspension of the Bus Lane. The Environmental Assessment has therefore been undertaken by directly comparing the 2010 (With Bus Lane) and 2011 (Without Bus Lane) data.

3.3.3 Where relevant, any topic-specific constraints and limitations in undertaking these assessments have been described in the appropriate topic chapter.

4 Air Quality

4.1 Study Area

4.1.1 The study area has been chosen as it contains residential properties which border the M4

4.1.2 where the Bus Lane operated. There are no other areas with properties in close proximity to the M4 Bus Lane. The locations of the nearest sensitive receptors to the Bus Lane and the location of the MIDAS loop (Motorway Incident Detection and Automatic Signalling, which provides information on traffic flows) that was used to provide the traffic data for the Air and Noise assessments are presented in Appendix B Figure 1. The northern section of the study area, around Norwood Green, is located within the London Borough of Ealing (LBE), although, the majority of the study area is within the London Borough of Hounslow (LBH). The section of the M4 within the study area boundary lies entirely within the LBH.

4.2 Legislation, Policy and Guidance

4.2.1 The UK Government and the Devolved Administrations (DAs) published the latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS) in July 2007[3] setting out the Standards and Objectives for a range of air pollutants.

4.2.2 The 'Standards' are set as concentrations below which health effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of a particular pollutant.

4.2.3 The 'Objectives' set out the extent to which the Government expects the Standards to be achieved by a certain date. They take account of the costs, benefits, feasibility and practicality of achieving the Standards. The objectives are prescribed within The Air Quality (England) Regulations 2000[4] and The Air Quality (England) (Amendment) Regulations 2002[5] (together termed the 'Regulations'). Air Quality Objectives included in the Regulations and current legislation which are relevant to the study (Nitrogen Dioxide (NO_2) and particulate matter less than 10 microns (PM_{10})) are presented in Table 4-1. Both NO_2 and PM_{10} were considered in the assessment as they are the key traffic related pollutants.

Table 4-1 Air Quality Strategy Objectives for PM_{10} and NO_2

Pollutant	AQS Objective	
	Concentration (µg/m^3)	Averaging Period
Nitrogen Dioxide (NO_2)	200	1-hour mean; not to be exceeded more than 18 times a year

[3] Defra. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: July 2007

[4] Stationery Office. Air Quality Regulations, 2000, Statutory Instrument 928

[5] Stationery Office. The Air Quality (England) (Amendment) Regulations 2002. Statutory Instrument 3043

Pollutant	AQS Objective	
	Concentration (µg/m^3)	Averaging Period
	40	Annual mean
Particulate Matter (PM_{10})	50	24 Hour mean; not to be exceeded more than 35 times a year
	40	Annual mean

4.2.4 The AQS Objectives take into account EU Directives that set Limit Values, which member states are legally required to achieve by their target dates or apply for a derogation. The UK's AQS Objectives are equal to, or more stringent than, the EU Limit Values (no Member State may promulgate air quality standards that are weaker than the EU Limit Values).

4.2.5 The Environment Act (1995) also provides a legislative framework for a system of Local Air Quality Management (LAQM), which forms an important part of the overall Government strategy to improve air quality. Under Part IV of the Act, local authorities are required to carry out a process of Review and Assessment to identify any areas where the AQS Objectives may not be achieved.

4.2.6 Where it is found that AQS objectives are unlikely to be met, responsible authorities must designate Air Quality Management Areas (AQMAs) and implement Air Quality Action Plans to help achieve the AQS Objectives. LBH Air Quality Action Plan has specific actions in relation to the M4 which include Implementation of high occupancy lanes and freight priority schemes and implement measures to ease congestion such as variable message signing. The Action Plan measures do not specifically relate to the M4 Bus Lane. The London Borough of Ealing (LBE) do not have any specific measures in there Action Plan in relation to the Bus Lane.

4.3 Methodology

4.3.1 LBH has declared an AQMA for NO_2 for the whole Borough, which includes the M4 Bus Lane. LBH currently operates an extensive network of continuous and diffusion tube monitoring sites. However, there are few monitoring sites in close proximity to the M4 within the study area, therefore NO_2 diffusion tube monitoring was undertaken at locations close to the M4 to provide additional information on ambient NO_2 concentrations and to support model verification.

4.3.2 The assessment has been undertaken using the atmospheric dispersion modelling package Atmospheric Dispersion Modelling System (ADMS) Roads (version 3.1), developed by Cambridge Environmental Research Consultants Ltd (CERC), to predict NO_2 concentrations at sensitive receptor locations for the with and without M4 Bus Lane scenarios.

4.3.3 LBH are in the process of declaring an AQMA for PM_{10} along the M4 and A4[6] as a result PM_{10} has been included in the assessment. There are no PM_{10} monitoring stations in this area to verify the modelled concentrations.

[6] http://www.hounslow.gov.uk/index/environment_and_planning/air_quality/aqma.htm

4.3.4 There are no construction impacts as a result of the Bus Lane removal and as a result construction has not been considered further in this assessment.

NO_2 Diffusion Tube Monitoring

4.3.5 An NO_2 diffusion tube survey was undertaken over a six month period, between the 17th of March 2011 and the 13th of September 2011, and consisted of monthly exposure periods. Monitoring locations were selected in accordance with the methodology provided in 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance' produced by AEA Technology on behalf of DEFRA[7].

4.3.6 Monitoring was undertaken at 12 locations in close proximity to the M4 within the study area and one background location, as depicted in Figure 1, Appendix B. A further three diffusion tubes were located at the closest continuous NO_2 analyser located on Heston Road to allow a local bias adjustment factor to be calculated in accordance with Local Air Quality Management (LAQM) guidance LAQM.TG(09)[8]. The diffusion tubes were sent to Staffordshire Scientific Services, a UKAS accredited laboratory, for analysis.

4.3.7 Appendix B contains details of each of the diffusion tube monitoring sites, including the OS grid references of the diffusion tubes, site descriptions and photographs.

4.3.8 Monitoring was undertaken following the closure of the Bus Lane and therefore the concentrations recorded represent the operating regime post Bus Lane closure along the M4 in this location.

Modelling Inputs

4.3.9 The following sections detail the data used in the detailed modelling.

Traffic Data

4.3.10 Traffic data for 2010 (With Bus Lane) and 2011 (Without Bus Lane) has been obtained from actual traffic counts available from Motorway Incident Detection and Automatic Signalling (MIDAS) loop detectors and contains traffic flows for each lane of the M4 carriageway. The traffic data utilised in the ADMS-Roads modelling was extracted from MIDAS loop 2193A and 2193B, which are located just to the west of where the M4 crosses the A3005 Norwood Road.

4.3.11 For the purposes of this assessment the flow changes between 2010 and 2011 were assumed to be attributed to the suspension of the Bus Lane therefore a growth factor was not applied to the 2010 data.

4.3.12 The data comprises traffic flows and average speeds for the four periods of the day for each lane of the motorway. The data was obtained from the MIDAS loops. The traffic data used in the modelling is presented in Appendix C. The traffic data was split into four periods, AM 07:00 to 10:00, inter peak 10:00 to 16:00, PM 16:00 to 19:00 and off peak 19:00 to 07:00.

[7] AEA Technology Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance, 2008

[8] DEFRA Local Air Quality Management (LAQM) Technical Guidance (TG) 2009

Scenarios

4.3.13 Traffic data has been provided for 2010 (With Bus Lane) and 2011 (Without Bus Lane). As discussed previously, it was assumed for the purposes of the AQ assessment that traffic growth between the two years was negligible, therefore the two scenarios, with and without the Bus Lane, have been assessed for 2011. This assumption means that any changes in NO_2 and PM_{10} concentrations at receptor locations between the two scenarios are as a result of the removal of the Bus Lane only, rather than changes in background concentrations or vehicle emission factors which reduce between 2010 and 2011. The year 2011 has been selected rather than 2010, as the NO_2 diffusion tube monitoring was carried out in 2011.

Sensitive Receptors

4.3.14 All receptors within 200m of this section of the M4 were modelled, and the location of these receptors are presented in Appendix E (Table E1 and Figure 2). Worst case sensitive receptors within 200m of the M4 were selected for the purpose of describing the impact of the Bus Lane removal on the receptors that are closest to the M4. These are presented in Appendix B (Figure 1), and detailed in Table 4-2.

Table 4-2 Sensitive Receptor Locations

Sensitive Receptor	Receptor Location	Grid Coordinates	
		X	Y
R1	Residential property off Osterley Lane	514301	178465
R2	Residential property on Oxford Avenue	513036	177995
R3	Residential property on Winchester Avenue	512830	177879
R4	Residential property on The Alders	512634	177905
R5	Residential property on Grange Close	512583	177872
R6	Residential property on Heston Grange	512598	177817

Background Concentrations

4.3.15 A diffusion tube (HS7) was placed at a background location greater than 200m from the M4, and away from major roads. It was therefore used within the modelling as it is representative of the background concentration within the study area. No background PM_{10} monitoring was available and therefore background PM_{10} concentrations were obtained from the DEFRA website[9]. Background concentrations used in the model was 20µg/m³ which were the background concentrations for 2011 from grid 512,500 177,500 which contained the receptors being assessed.

Model Verification

4.3.16 As described previously, monitoring of NO_2 has been undertaken at various locations in close proximity to the M4. The diffusion tube results were used to verify the model results.

[9] http://laqm.defra.gov.uk/maps/maps2010.html

4.3.17 Full details of the verification process are included in Appendix D. The modelled versus monitoring results indicated that there was no need to adjust the modelled results as the model results were within 25% of the monitored concentrations and as a result in accordance with TG(09) did not require further adjustment.

Impact Significance

4.3.18 The HA has provided a draft in advance of publication of the Interim Advice Note (IAN) in relation to evaluating significant effects of road schemes impacts on air quality[10]. The Draft IAN provides advice on how to assess and make an informed professional judgement as to whether the impacts of a road scheme are significant. The significance of the impacts is based around receptors which exceed EU Limit Values/AQS. There are a number of descriptors used in the determination of significance as outlined below;

- Whether the scheme results in a large change classed as 5% change (in relation to the objective for NO_2 this equates to 2µg/m³).
- Whether the scheme worsens air quality for more receptors than it improves where air quality is already above the AQ threshold.
- The frequency distribution of changes in concentrations at receptors which are above the EU Limit Value/AQS Objective in either the Do Minimum or Do Something.
- Number of receptors where the scheme is predicted to create or remove an exceedance of the EU Limit Value /AQS Objective
- Estimated reversibility duration of the schemes impact to return to the Do-Minimum Concentrations (based on advice set out in Defra's note on projecting future NO_2 concentrations[11])

4.3.19 Professional judgement is then applied to determine whether the impacts of the scheme are significant, The HA has provided a checklist to help inform the judgement based on EU advice on evaluating the significance of environmental effects.

4.4 Baseline Conditions

Monitoring Results

4.4.1 Raw monthly NO_2 diffusion tube monitoring results are presented in Table 4-3 below.

[10] Draft in Advance of Publication of Interim Advice Note XX/12, Updated air quality advice on the application of the test for evaluating significant effects; for users of DMRB Volume 11, Section 3, Part 1 'Air Quality'

[11] Defra (2011) Trend in NOx and NO2 emissions and ambient measurements in the UK.

Table 4-3 Nitrogen Dioxide Diffusion Tube Results 2011

Monitoring Location (Figure 1)	NO_2 Concentration (µg/m^3)							Data Capture (%)
	March	April	May	June	July	August	Period Mean	
HS1	63.8	54.0	48.8	50.4	46.5	40.0	50.6	100.0
HS2	64.2	57.0	50.6	51.5	52.1	39.0	52.4	100.0
HS3	64.9	55.7	52.2	44.4	53.0	39.6	51.6	100.0
HS4	59.1	48.7	41.4	43.8	48.2	43.6	47.5	100.0
HS5	-	48.8	47.2	47.5	50.8	43.0	47.5	83.3
HS6	55.6	37.8	31.9	36.9	38.0	33.6	39.0	100.0
HS7*	44.7	32.7	28.9	29.0	28.4	31.7	32.6	100.0
HS8	55.1	47.6	45.7	45.1	43.8	49.2	47.8	100.0
HS9	58.0	44.9	36.3	42.2	41.7	38.4	43.6	100.0
HS10	81.6	79.1	75.0	77.4	80.7	67.8	76.9	100.0
HS11	55.4	43.4	38.3	39.7	37.0	39.3	42.2	100.0
HS12	60.2	47.4	41.9	42.8	42.0	41.5	46.0	100.0
HS13	64.8	-	-	-	47.1	37.4	49.8	50.0
HS14	55.4	45.6	49.6	-	53.0	38.9	48.5	83.3
HS15	45.5	43.0	42.2	41.4	-	40.2	42.5	83.3

- indicates tube missing for that month, *Background monitoring location

Bias Correction

4.4.2 Due to bias (tendency of diffusion tubes to depart from the true value i.e. under or over read relative to the reference method) associated with passive NO_2 diffusion tubes, it is necessary to utilise an adjustment factor which can be applied to the monitored concentration. The factor is derived from co-locating diffusion tubes with an automatic chemiluminescence analyser over the monitoring period. This was undertaken with the monitoring station on Heston Road. The automatic monitoring results were then compared to the triplicate diffusion tube results (HS1 to HS3) to derive a bias adjustment factor of 0.98 (Table 4-4), following the methodology in LAQM.TG(09). The bias adjustment factor was applied to all the diffusion tube results.

Table 4-4 Bias Adjustment Factor NO_2

NO_2 Average Concentration (µg/m^3)		Bias Adjustment Factor
Diffusion Tube Triplicate Mean	Heston Road Monitoring Station Mean for Same Period	
51.5	50.5	0.98

Annual Mean Adjustment

4.4.3 In addition to bias adjustment, the NO_2 concentrations presented in Table 4-3 are the average concentration between March and August 2011. To verify the air quality model and to compare against the AQS Objectives, an annual mean concentration is required. The monitoring results have been adjusted based upon the methodology contained within LAQM.TG(09). This requires the period mean (i.e. the period the diffusion tubes were exposed) to be compared with the annual mean at automatic stations, to determine a ratio which is used to convert the short term diffusion tubes monitoring results into an equivalent 2011 annual average.

4.4.4 LAQM.TG(09) stipulates that background sites should be used to avoid any local effects that may occur at roadside sites, and should, wherever possible lie within a radius of about 50 miles. Table 4-5 presents background monitoring locations, which are within 50 miles of the site, and the relationship between period and annual mean NO_2 concentrations.

4.4.5 Urban background monitoring sites are characterised as urban locations distanced from sources and broadly representative of city-wide background concentrations.

Table 4-5 Period to Annual Mean Factors

Monitoring Site*	NO_2 Concentration ($\mu g/m^3$)		
	2011 Annual Mean	Period Mean (i.e. the period that the diffusion tubes were exposed)	Ratio Annual Mean: Period Mean
Ealing- Southall (urban background monitoring location, 1.13km north-west of the study area)	27.7	23.0	1.2
Ealing Town Hall (urban background monitoring location 3.45km north-east of the study area)	41.8	37.8	1.1
Hounslow Hatton Cross (urban background monitoring location 3.25km south-west of the study area)	33.7	28.2	1.2
Mean Value (adjustment factor)			**1.17**

*Data capture exceeds 90% at all monitoring stations

4.4.6 Applying the calculated annual adjustment factor of 1.17 to the bias adjusted monitoring results provides an estimation of the 2011 annual mean NO_2 concentration, as shown in Table 4-6.

Table 4-6 Adjusted Monitoring Results

Monitoring Location	NO_2 Concentration ($\mu g/m^3$)		
	Period Mean	Bias Adjusted Period Mean	Annual Adjusted 2011 Annual Mean
HS1	50.6	49.6	58.0

Monitoring Location	NO_2 Concentration (µg/m^3)		
	Period Mean	Bias Adjusted Period Mean	Annual Adjusted 2011 Annual Mean
HS2	52.4	51.4	60.0
HS3	51.6	50.6	59.2
HS4	47.5	46.5	54.4
HS5	47.5	46.5	54.4
HS6	39.0	38.2	44.7
HS7	32.6	31.9	37.3
HS8	47.8	46.8	54.7
HS9	43.6	42.7	49.9
HS10	76.9	75.4	88.2
HS11	42.2	41.4	48.3
HS12	46.0	45.1	52.7
HS13*	49.8	48.8	57.0
HS14	48.5	47.6	55.6
HS15	42.5	41.6	48.7

*Data capture is in excess of 80% at all locations, with the exception of HS13, which has a data capture of 50%.

4.4.7 As indicated in Table 4-6, the annual mean NO_2 concentrations at all diffusion tube monitoring locations except HS7 (background Monitoring location, shown on Appendix B Figure 1) exceed the annual mean NO_2 AQS Objective of 40µg/m^3. The highest recorded NO_2 concentration is at HS10, which is located on the A4 Heston Road and adjacent to the M4.

4.5 Design, Mitigation and Enhancement Measures

4.5.1 Although there is predicted to be an increase in pollutant concentrations following the removal of the Bus Lane the increases at receptors are small, concentrations are predicted to return to pre scheme levels within two years at all receptors (the forecast reduction in NO_2 concentrations year on year is based on the rate of reduction in NO_2 concentrations outlined in DEFRA's report[12] on Long Term trends in NO_2. The reduction in NO_2 in this report are much less than the reduction predicted in LAQM.TG(09)).

4.5.2 A paper discussing available mitigation measures is provided in Appendix F. However, the appraisal of feasible mitigation options is still on-going and therefore should be treated as provisional. The assessment is based on no specific mitigation being in place, and thus presents a worst-case scenario.

[12] Defra (2011) Trend in NOx and NO2 emissions and ambient measurements in the UK.

4.6 Magnitude of Impacts (change)

4.6.1 Table 4-7 presents the modelled results for annual mean NO_2, at each of the six worse case receptors, for the with and without M4 Bus Lane scenarios, and the difference between the two scenarios, for 2011.

Table 4-7 Modelled Annual Mean NO_2 Concentrations at Receptor Locations (µg/m³)

Receptor	Annual Mean NO_2 (µg/m^3)		
	With Bus Lane 2011	Without Bus Lane 2011	Difference
R1	44.1	44.4	0.3
R2	50.7	51.4	0.7
R3	49.5	49.8	0.3
R4	48.0	48.6	0.6
R5	54.8	55.9	1.1
R6	50.0	50.3	0.3

4.6.2 As indicated in Table 4-7, the annual mean NO_2 concentrations at all receptor locations exceed the annual mean NO_2 AQS Objective of 40µg/m^3, for both With and Without the Bus Lane scenarios.

4.6.3 LAQM.TG(09) stipulates that "exceedences of the 1-hour mean objective for NO_2 are only likely to occur where annual mean concentrations are 60µg/m^3 or above". All modelled results at receptors are predicted to be lower than 60µg/m³.

4.6.4 The differences in annual mean NO_2 concentrations at receptors between the two scenarios, presented in Table 4-7, indicate that the Without Bus Lane scenario shows an increase in NO_2 concentrations at receptor locations in close proximity to the M4. The largest change in NO_2 is predicted at receptor R5, the receptor is closer to the M4 than the other selected receptors. R1 is the furthest away from the motorway (out of the selected receptors) and exhibits the smallest changes in NO_2 concentrations following the Bus Lane removal. This illustrates the diminishing impact of the road with distance, as a result the background concentrations begin to dominate resulting in smaller overall change in total NO_2 concentration at receptors.

4.6.5 In addition to modelled annual mean NO_2 Table 4-8 present the Annual Mean PM_{10} Modelled Receptor Results.

Table 4-8 Modelled Annual Mean PM_{10} Concentrations at Receptor Locations (µg/m³)

Receptor	Annual Mean PM_{10} (µg/m^3)		
	With Bus Lane	Without Bus Lane	Difference
R1	20.7	20.8	0.1
R2	21.5	21.6	0.1
R3	21.4	21.5	0.1

R4	21.2	21.3	0.1
R5	22.1	22.2	0.1
R6	21.5	21.6	0.1

4.6.6 Table 4-8 illustrates that the modelled PM_{10} concentrations are well below the EU Limit Value/AQS Objectives. There is also a very small change in PM_{10} concentrations following the Bus Lane removal.

4.7 Significant Effects

4.7.1 As there were modelled NO_2 exceedances at the receptors chosen all sensitive receptors (784 receptors) within 200m of the M4 in the study area were modelled. The receptors modelled are presented on Figure 2 (Appendix E), the results are presented in Table E1 Appendix E for the 784 receptors modelled.

4.7.2 Table 4-9 presents the results of the application of the various significance tests to the receptors as described in section 4.3.18. Of the 784 receptors modelled, 450 receptors exceeded the EU Limit Values/AQS Objectives in either scenario. These receptors were used to determine the significance in relation to each of the indicators.

Table 4-9: Receptor indicators for significance

*In accordance with the IAN Concentrations were rounded to the nearest whole number.

	Large Change	Frequency Distribution of the Change				Improvements or worsening*	New or removal of exceedances*	Duration
	Does the scheme result in a 2µg/m³ in NO_2 concentration above the AQ threshold?	Change of more than 2µg/m³ in NO_2 concentrations above the AQ threshold	Change of between 1µg/m³ and 2µg/m³ in NO_2 concentrations above the AQ threshold	Change of between 0.4µg/m³ and 1µg/m³ in NO_2 concentrations above the AQ threshold	Change of less than 0.4µg/m³ in NO_2 concentrations above the AQ threshold	Does the scheme worsen air quality for more receptors than it improves where air quality is already above the AQ threshold.	Does the scheme create new exceedances, remove existing exceedances or makes no change?	What is the length of time for the NO_2 concentrations associated with the scheme to return back to their pre-scheme levels?
Worsen	0	0	1	91		118	35	
Neutral	450				358	332	357	
Improve	0	0	0	0		0	0	
Less than 1 year								285
1 to 3 years								165
3 to 6 years								0
Greater than 6 years								0

4.7.3 Table 4-9 illustrates that following the removal of the Bus Lane, all receptors would experience a deterioration in air quality. Changes in annual mean NO_2 concentrations are small and range between 0.1 and 1.1µg/m³. 75% of the receptors experience a change of less than 0.4µg/m³ following the Bus Lane removal. After the Bus Lane removal thirty five additional receptors (when the concentrations modelled in both scenarios were rounded to the nearest whole number) are predicted to exceed the AQS/EU Limit Value of 40µg/m³. At these receptors, the With Bus Lane concentrations are 40µg/m³ when rounded and the Without Bus Lane concentrations are 41µg/m³. These receptors are located either side of the M4 at a distance of over 100m as presented in Appendix E Figure 3. The actual predicted modelled change in NO_2 concentrations at these receptors was less than 0.2µg/m³. The modelled concentrations at these receptors changed from 40.4µg/m³ in the With Bus Lane Scenario to 40.5 and 40.6µg/m³ in the Without Bus Lane scenario which when rounded leads to a predicted exceedance. Background concentrations in the study area are particularly high (37.3µg/m³, monitoring location HS7) this leads to exceedances of the AQS/EU Limit Value over 150m from the M4.

4.7.4 At 60% of receptors the duration of time it would take for the concentrations to return to the pre scheme levels is less than a year. At the remaining receptors levels would return to pre scheme concentrations within 2 years.

4.7.5 The main causes of the increases in concentrations at receptors are changes in speed profiles and an increase in flows as a result of the Bus Lane removal. The Bus Lane removal allows vehicles to travel faster during peak periods, during weekdays and weekends. This is illustrated in Figures C1 to C6 in Appendix C.

4.7.6 Based on the small change in annual mean NO_2 concentrations at the majority of receptors and as a result of concentrations returning to pre scheme concentrations within 2 years it is considered that the scheme impacts on air quality is not deemed to be significant.

4.8 Conclusions

4.8.1 An air quality assessment to assess the impacts of the removal of the M4 Bus Lane has been undertaken. Pollutant concentrations at all sensitive receptors within 200m of the M4 Bus Lane within the study area have been assessed. Actual traffic counts from MIDAS loops have been used to provide the traffic data for the air quality modelling. As a result of the Bus Lane removal traffic will be redistributed over the lanes on the section of the M4. Traffic speeds were also assumed to have increased as a result of the removal particularly in the peak periods.

4.8.2 In addition to the air quality modelling, an NO_2 diffusion tube survey was undertaken over a six month period at various locations in close proximity to the M4. Monitoring was undertaken following the closure of the Bus Lane and therefore the concentrations recorded represent the current operation of the M4 in this location. The diffusion tube results were bias and annually adjusted and used to verify the air quality model.

4.8.3 The assessment of the impacts of the removal of the M4 Bus Lane has indicated that following the removal of the Bus Lane small increases in both annual mean NO_2 and PM_{10} concentrations at receptors assessed in the study area are predicted. These increases are mainly attributable to the change in speed profiles and the increase in flow that have been recorded on site between the ‘before’ and ‘after’ scenarios. The significance of these impacts have been assessed in accordance with the latest IAN to form a view as to whether the impacts of the Bus Lane removal are significant,

4.8.4 As a result of the predicted small changes in NO_2 concentrations at receptors and the short period of time it is predicted to take for concentrations of NO_2 to return to pre scheme levels it is considered that the impact of the scheme is not significant on air quality.

5 Noise

5.1 Study Area

5.1.1 The Study Area for this assessment includes all dwellings and other noise sensitive receptors within 600m of the Project, in line with the DMRB Volume 11, Part 7, Section 3 – Noise and Vibration[13] methodology. The study area for this assessment considers 3,636 residential dwellings, six schools, three places of worship, two parks, one health centre and one hotel.

5.1.2 Figure 4, Appendix H indicates the boundary of the Study Area in terms of noise and the nine other sensitive receptors within the Study Area.

5.2 Legislation, Policy and Guidance

Noise Policy Statement for England, DEFRA

5.2.1 Defra released the Noise Policy Statement for England[14] (NPSE) in March 2010. The NPSE vision is to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. To achieve this vision the NPSE sets out the following aims for the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to improvement of health and quality of life.

Noise Insulation Regulations (NIR) 1975 (amended 1988)

5.2.2 The Noise Insulation Regulations[15] (NIR) 1975 (amended 1988) provide criteria for assessing the eligibility for noise mitigation or properties based on variations in traffic noise due to a new or improved road project.

5.2.3 The regulations allow provision of noise attenuation measures in the form of secondary glazing and mechanical ventilation to habitable rooms of residential properties affected by road traffic noise from a 'new or altered highway' which meet the following criteria:

- The combined expected maximum traffic noise level, i.e. the relevant noise level, from the new or altered highway together with other traffic in the vicinity must not be less than the specified noise level, 68 dB LA10,18h;
- The relevant noise level is at least 1.0 dB(A) more than the prevailing noise level, i.e. the total traffic noise level existing before the works to construct or improve the highway were begun;

[13] Highways Agency (2011) Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 (HA 213/11)

[14] DEFRA (2010) Noise Policy Statement for England (NPSE)

[15] The Noise Insulation Regulations 1975 (Amendment 1988) HMSO

- The contribution to the increase in the relevant noise level from the new or altered highway must be at least 1.0 dB(A).

5.2.4 In the situation where development leads to traffic growth on existing roads, where there would not be any physical change to the road, as would be the case with the revocation of the M4 bus lane, there is no obligation within the NIR to offer noise insulation where noise levels are raised.

Land Compensation Act, 1973

5.2.5 Part 1 of the Land Compensation Act[16] provides a means by which compensation can be paid to owners of land or property which has experienced a loss in value caused by the use of public works, such as new or improved roads. Noise and vibration are two of the factors which would be considered for any claims for compensation, but the claim must consider all changes and effects, including betterment.

The Highways Noise Payments and Movable Homes Regulations, 2000

5.2.6 The Highways Noise Payments and Moveable Homes Regulations 2000[17], provide highways authorities with a discretionary power to provide a noise payment where new roads are to be constructed or existing ones altered. The Highways Noise Payments and Movable Homes Regulations only apply to caravans and houseboats which have been lawfully stationed and are within 300 metres of the new or altered carriageway.

5.3 Methodology

5.3.1 The DMRB Volume 11 Section 3, Part 7, Simple Environmental Assessment methodology has been followed for the Assessment of operational noise impacts as the threshold values which would require a detailed assessment have not been exceeded. The following sections describe the methodology used for the road traffic noise assessments in more detail.

Road Traffic Noise Predictions

5.3.2 Road traffic noise predictions have been undertaken in accordance with The Calculation of Road Traffic Noise[18] (CRTN) which is the standard UK procedure for measurement and calculation methods for assessing road traffic noise.

5.3.3 The predictions have been carried out using the computer model 'IMMI' (software for modelling and mapping noise from roads, railways, industrial, construction and other open sites).

5.3.4 This is a 3-dimensional computer model with digitised inputs that include road segments, barriers, buildings and the receptor points at which the noise levels are to be calculated. The model's base data includes the following:

[16] Land Compensation Act 1973, HMSO

[17] The Highways Noise Payments and Movable Homes (England) Regulations 2000 (Amendment 2001), HMSO

[18] Department of Transport and Welsh Office (1988) *Calculation of Road Traffic Noise,* HMSO

- Traffic Composition: daytime 18-hour or 1-hour Average Weekly Traffic flows, percentage of Heavy Goods Vehicles (HGV) and traffic speeds for the time period of 0600 to 0000.

- Road Configuration: gradient, surface texture, vertical and horizontal alignment and depth / height of cuttings or embankments; and,

- Receiver Location: distance from road, angle of view, ground absorption and shielding from natural or purpose built barriers.

5.3.5 Hourly traffic data for 2010 (With Bus Lane) and 2011 (Without Bus Lane) has been obtained from actual traffic counts available from Motorway Incident Detection and Automatic Signalling (MIDAS) loop detectors.

5.3.6 Traffic data has been provided for the section of the M4 within the study corridor, between Junction 3 and Junction 2. No other roads were incorporated into the predictions. However, this is considered sufficient to assess the specific impacts of the Bus Lane as the lane's operation is not expected to impact on traffic flows on the local road network within the study area.

5.3.7 Facade noise levels for the first floor of each receptor (height of 4 metres) have been used for the assessment of noise impacts at dwellings in accordance with the DMRB simple assessment criteria.

5.3.8 Details of any existing mitigation within the study area could not be obtained, therefore in both the 'with' and 'without' the bus lane scenarios which have been assessed no noise attenuation from barriers or road surface corrections have been implemented into the model. This approach presents both a consistent and worst case higher noise level, although the relative change in noise level would still be the same as no changes to barriers or road surfaces are included as part of the scheme.

5.3.9 For night-time noise impacts, DMRB recommends that only comparisons in the long term (15 years after opening) are considered and as such a night-time noise assessment has not been undertaken as long term traffic data was unavailable.

Noise Level Assessment

5.3.10 A noise assessment of all dwellings and other sensitive receptors within the Study Area has been carried out. All predictions of traffic noise levels have been made for Do Minimum (with bus lane 2010) and Do Something (without the bus lane 2011).

5.3.11 Following procedures outlined in the DMRB, The number of dwellings and other sensitive receptors subject to the following increases or decreases has been assessed: 0dB (A), 0<1dB (A), 1<3dB (A), 3<5dB (A), and greater than 5dB (A). The results have then been presented in a tabular format as specified DMRB.

5.3.12 The magnitude of noise impacts from the Project have been classified into levels of impact in order to assist with the interpretation of the Project. The magnitude of noise impacts from the Project have been classified against Table 3.1 from DMRB Volume 11, Section 3, Part 7. Table 5-1 presents the magnitude of noise impact in the short term.

Table 5-1 Classification of Magnitude of Short Term Noise Impacts

Noise change, $L_{A10, 18\ hour}$	Magnitude of Impact
0	No change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
>5	Major

5.3.13 For the assessment of noise and vibration covered by DMRB Volume 11 Section 3 Part 7, a classification is only provided for the magnitude of impact, as currently the methodology has not been developed to assign significance according to both the value of a resource and the magnitude of an impact.

5.3.14 Interim Advice Note 125/09 Supplementary Guidance for Users of DMRB Volume 11 'Environmental Assessment' published in October 2009 provides the following guidance – "*It is also recognised that the approach to applying significance criteria given in Section 2, Part 5 may not be applicable to the assessment of particular section 3 topics (e.g. 'Air Quality' and 'Noise and Vibration') for which recent guidance has been published (paragraphs 3.2 and 3.3 in Volume 11, Section 3, Part 7 - Noise and Vibration (HA213/08) should no longer be followed)*".

5.3.15 Given that Interim Advice Note 125/09 suggests that significance based upon professional judgement should not be used, only the magnitude of change has been reported within this noise assessment.

Road Traffic Induced Vibration

5.3.16 Airborne vibration from traffic can be produced by the engines or exhausts of road vehicles with dominant frequencies in the 50-100Hz range. Traffic-induced vibrations from low frequency sound emitted by vehicle engines and exhausts can be a source of annoyance to nearby residents and can occur to some extent along any type of road. Such sound may result in detectable vibrations in building elements e.g. windows and doors.

5.3.17 Ground borne vibration is typically found to be in the 8-20Hz range and is produced by the interaction between rolling wheels and the road surface. Research[19] (cited in DMRB Volume 11, Section 3, Part 7) found no evidence that traffic induced vibration is a source of significant damage to buildings.

5.3.18 An investigation into the percentage of people bothered by low frequency vibration from road traffic noise is not required for a DMRB simple assessment; although the predicted changes of less than 1dB(A) in noise level with and without the bus lane provide a positive indication that there would be no significant change in the percentage of people bothered by low frequency vibration.

[19] Watts, G.R. (1990). Traffic induced vibration in buildings. TRRL RR246, Transport and Road Research Laboratory, Crowthorne

5.4 Design, Mitigation and Enhancement Measures

5.4.1 A noise assessment of the Project and traffic information indicates that there would be no residential dwellings predicted to experience changes in noise levels that would require mitigation measures.

5.5 Magnitude of Impacts (Change)

5.5.1 Using the criteria set out in Table 1, the magnitude of noise impacts as a result of the traffic flow changes has been classified and presented in the following section in accordance with DMRB. Figure 5, Appendix H provides a noise difference contour of the study area.

Noise Level Assessment

5.5.2 After the removal of the bus lane, all identified receptors across the study area are assessed to experience negligible increases in noise level of between 0.4dB(A) and 0.9dB(A) with an average increase across the study area of 0.7dB(A).

5.5.3 A full set of noise level results is presented in accordance with DMRB in Table 5-2 and discussed in the subsequent paragraphs.

Table 5-2 Comparison of With and Without Bus Lane Noise Level Change

Change in Noise Level		Number of Dwellings	Number of Other Sensitive Receptors
Increase in noise level, $L_{A10,18\text{-hour}}$	0.1 - 0.9	3636	13
	1.0 - 2.9	0	0
	2.9 - 4.9	0	0
	>5	0	0
No Change	0	0	0
Decrease in noise level, $L_{A10,18\text{-hour}}$	0.1 - 0.9	0	0
	1.0 - 2.9	0	0
	2.9 - 4.9	0	0
	>5	0	0

5.5.4 Table 5-2 indicates that all receptors considered in the noise assessment would experience an increase of less than 1dB(A). Increases in excess of 1dB(A) are considered to be imperceptible in the short term. These increases in noise level would be considered negligible in magnitude.

5.5.5 The negligible increase in noise level would occur due higher average speeds along the east bound carriage way and approximately 2000 more vehicles using the west bound carriage way between the time period of 0600 to 0000.

5.5.6 The higher increase in noise level of between 0.5dB(A) and 0.9dB(A) would occur at rear of residential properties located within 50m of the eastbound carriage way along Grange Close, The Alders and Durham Avenue.

5.5.7 Table 5-3 presents the predicted noise levels at the 13 identifies other sensitive receptors identified within the noise study area.

Table 5-3 Noise Level Change at Other Sensitive Receptors

Receptor	dB $L_{A10\ 18\ hour}$ with bus lane 2010	dB $L_{A10\ 18\ hour}$ with bus lane 2011	Difference
Nursery on the Green	48.0	48.8	0.8
Norwood Green Junior	55.4	56.0	0.6
Travel Lodge	81.1	82.0	0.9
The Old Rectory Nursery	73.0	73.5	0.5
Heston Park	62.9	63.5	0.6
Norwood Green	62.1	62.8	0.7
7th Day Adventist Church	50.7	51.3	0.6
Cranford Community Collage	65.0	65.6	0.6
Berkeley Primary School	69.8	70.4	0.6
Heston Health Centre	52.4	53.1	0.7
Our Lady Queen Of Apostles	60.8	61.4	0.6
Rosary Catholic Primary School	57.8	58.4	0.6
Parish Church Of Saint Mary	56.4	57.2	0.8

5.5.8 The worst case other sensitive receptor is the travel lodge which is predicted to experience a change of 0.9dB(A). The travel lodge is situated approximately 25 meters to the north of the east bound carriage way and is the worst case receptor identified in the study area. This receptor is the closest to the M4 and provides a good gauge that no adverse increase of greater than 1dB(A) would be expected across the study area.

5.6 Conclusion

5.6.1 A noise assessment to assess the impacts of the traffic changes following the removal of the M4 Bus Lane has been undertaken in accordance with the most relevant standards and guidelines. Noise levels have been predicted at all sensitive receptors within 600m of the M4 Bus Lane. Actual traffic counts from MIDAS loops have been used to provide hourly traffic data for the noise modelling.

5.6.2 No receptors within the study areas are predicted to experience an increase of greater than 1 dB(A). A change in road traffic noise of 1 dB(A) or more in the short term is the smallest that is considered perceptible.

5.6.3 The threshold level of 1dB(A) to progress to a detailed DMRB assessment has not been exceeded and, consequently, a further noise assessment will not be required.

5.6.4 Using the short term magnitude of impact guidance provided in DMRB, all receptors within the study are predicted to have a negligible impact, with the worst case receptor, a roadside hotel, predicted to have a change of 0.9dB(A).

5.6.5 The predicted changes in noise level as a result of the flow changes would not have a significant impact upon the local area.

6 Effects on All Travellers

6.1 Study Area

6.1.1 The study area for the assessment of effects on all travellers comprises mainly the eastbound M4 between Junction 4b (M25 Junction) and Junction 2 (Chiswick).

6.1.2 The study into the impact of the Bus Lane suspension[20] also considered the A4 Great West Road, which runs parallel to the M4 between Junction 3 and Junction 2. The study concluded that there was little change in the traffic flow on the A4 Great West Road following the suspension of the Bus Lane, and that journey times on the A4 were similar before and after. The A4 has therefore not been considered further in this assessment.

6.2 Methodology

6.2.1 The assessment of changes to driver stress has been undertaken using the methodology in Volume 11 Section 3 Part 9 Chapter 4, Assessing Driver Stress. There are no changes proposed that would have an effect on the view from the road, therefore this has not been assessed further. As the study area is limited to the M4, no assessment of effects on Pedestrians, Cyclists and Equestrians is considered necessary.

6.2.2 A three point descriptive scale (Low, Moderate or High) is used to assess driver stress and is based upon the guidance provided in Table 6-1 which is taken from DMRB Volume 11, Section 3, Part 9 Vehicle Travellers.

Table 6-1 Average Peak Hourly Flow and Average Journey Speeds (from DMRB)

Average peak hourly flow per lane, in flow Units*/1 hour	**Average Journey Speed Km/hr**		
	Under 75	**75-95**	**Over 95**
Under 1200	High**	Moderate	Low
1200-1600	High	Moderate	Moderate
Over 1600	High	High	High

* A car or light van equals one flow unit. A commercial vehicle over 1 ½ tons unladen weight or a public service vehicle equals 3 flow units.

**Moderate in urban areas

6.2.3 In addition to the quantitative assessment, the assessment has provided a qualitative assessment of the effects of the scheme taking into consideration knowledge of local conditions.

[20] The Analysis of the Impact of the Suspension of the M4 Bus Lane, Hyder Halcrow Joint Venture, 2012

6.3 Baseline Conditions

6.3.1 The report on the post-opening of M4 Bus Lane[21] identified that the M4 Bus Lane caused intermittent "shockwaves" of slow moving traffic extending to the west of Junction 3. This leads to a high level of driver stress.

6.3.2 The driver stress levels with the Bus Lane in place have been assessed using the traffic data from 2010 explained in Paragraph 3.3.2 of this report, and are presented in Table 6-2.

Table 6-2 Driver Stress Levels in 2010 With Bus Lane

	Average Peak Hourly flow/per lane	Average Weighted Speed (km/hr)	Driver Stress
Eastbound	956	75	Moderate
Westbound	1063	101	Low

Figures extracted from MIDAS loop for 2193B (for eastbound) and 2193A (for westbound)

6.4 Design, Mitigation and Enhancement Measures

6.4.1 The design of the scheme inherently addresses the need to reduce driver stress and frustration associated with the intermittent "shockwaves" of slow moving traffic.

6.5 Magnitude of Impacts (Change)

6.5.1 Table 6-3 presents the recorded average peak hourly flow per lane and average weighted speed during the temporary suspension of the Bus Lane in 2011 as described in Paragraph 3.3.2 of this report.

Table 6-3 Driver Stress Levels in 2011 Without Bus Lane

Scenario	Average Peak Hourly flow/per lane	Average Weighted Speed (km/hr)	Driver Stress
Eastbound	978	88	Moderate
Westbound	1106	103	Low

Figures extracted from MIDAS loop for 2193B (for eastbound) and 2193A (for westbound)

6.6 Significant Effects

6.6.1 From Tables 6-2 and 6-3 above, it is clear that there is no significant change in driver stress as a result of the proposals.

6.7 Conclusion

6.7.1 The conclusion of this assessment is that the proposals have no significant adverse effect on "All Travellers".

[21] PR/T/125/2000 Monitoring of the M4 Bus Lane: The First Year, TRL, 2000

7 Assessment of Cumulative Effects

7.1 Introduction

7.1.1 Cumulative effects are the result of multiple actions on environmental receptors or resources. There are principally two types of cumulative effect to be assessed:

- Type 1 - where different environmental impacts are acting on a given receptor, but are the result of one project; or
- Type 2 - where environmental impacts are the result of multiple projects in combination (including the project being assessed).

7.2 Methodology

7.2.1 The cumulative environmental effects during construction and operation are considered against the significance criteria set out in DMRB Volume 11, Section 2, Part 5 (Table 2.6), as shown in Table 7-1. These criteria could reflect beneficial or adverse effects.

Table 7-1 Significance Criteria – Cumulative Effects

Significance	Effect
Severe	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.
Major	Effects that may become a key decision-making issue.
Moderate	Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance.
Minor	Effects that are locally significant.
Not Significant	Effects that are beyond the current forecasting ability or are within the ability of the resource to absorb such change.

7.3 Cumulative Effects of the Project (Type 1)

7.3.1 This section identifies where receptors may experience multiple effects resulting from different environmental impacts, referring to the specialist environmental chapters of this report where appropriate. The only notable effects are those on noise and air quality as described in the preceding chapters, however both impacts are minor and the cumulation of these impacts on individual human receptors is not expected to be greater than the sum of the individual impacts. Therefore, the cumulative effects are assessed as **not significant.**

7.4 Cumulative Effects of Multiple Projects (Type 2)

7.4.1 Cumulative effects may occur due to the various planned transportation and land development schemes in the vicinity of the Project, however information about them is more limited and it is not possible to accurately forecast the effect of them as part of this assessment. The effects reported in this EAR are not considered significant and are highly localised. Therefore, the cumulative effects are assessed as not significant.

8 Conclusions

8.1.1 This EAR has provided an environmental assessment of the potential effects of the scheme. No significant effects have been found as a result of the study, and therefore no mitigation measures are proposed.

Appendix A

Environmental Assessment Form for the Experimental Order

C10 Environmental Assessment Form

TO AVOID UNNECESSARY DELAYS:
- PLEASE CHECK YOU ARE USING THE LATEST REVISION OF THE C10 (SEE EMS)
- COMPLETE ALL BLUE SECTIONS/QUESTIONS BEFORE SUBMISSION TO THE ENVIRONMENT TEAM
- IF THE SCHEME SCOPE OR DESIGN CHANGES CONTACT THE ENVIRONMENT TEAM IMMEDIATELY
(This tick ✓ can be copied and pasted into the check boxes as required)

Project title	**M4 Junction 3 to Junction 2 Removal of Bus Lane**		
Project no.	515665	**Assessment requested by**	**K WHYTE**
		Date requested	**08/09/10**
Project type: is the project maintenance?		**Yes** ✓	**No, specify type in description of works**
Budget line	£250-500K	**Planned works start date**	**15/11/2010**
Local Authority	Hillingdon, Hounslow & Ealing Councils	**Planned works duration**	3 weeks

Location description (including clear maps or direct link to mapping website)
The works extent lies on the M4 eastbound "B" carriageway between Junction 4 and Junction 2.

Full grid ref	**From (x,y)**	**516996, 178073**	**To (x,y)**	**507334, 178564**
Road name/number		**M4**	**Direction**	**B (eastbound)**
Marker post	**From**	**24/6+70**	**To**	**15/6+70**

Details of works (also to be shown on drawings supplied with this form):
The Environment Team will liaise with the scheme designer to seek further information as necessary for the Environmental Report.

Description of works (i.e. what is being done? Include drawing numbers)	**Overview of all works to be conducted can be summed up as:-** • **Sign face removal and/or replacement** • **Lane & other road markings removal** • **Lane Delineation - Road Markings and Studs installation** **See drawings:** **IMP/515665/DD/1200/001-007**			
Purpose of works (i.e. why is it being done?)	**To improve existing traffic conditions by the removal of existing Bus Lane.**			
If not maintenance then state type of works	**Safety & Improvements**			
Are works subject to a line or side order?		**Yes**	✓	**No**
If land take then confirm dimensions (m^2)	**n/a**	**If excavation then confirm dimensions (area and depth)**	**n/a**	
If ducting then provide details	**n/a**			
If any construction activities (inc storage area) within 5m of a tree then provide details	**Sign face changes on the verge in close proximity to trees, but no tree works planned.**			
If works to drainage then provide details	**n/a**			
If works within 10m of a watercourse then provide details	**Scheme Route runs over the River Crane and River Brent/Grand Union Canal.**			
If trees affected then describe the trees and works to be undertaken	**None**			

If vegetation clearance required other than trees then provide details including dimensions (m^2)	Two small alder shrubs and one small hawthorn shrub will need to be removed at MP 24/7B to ensure sight lines to sign. Removal of shrubs in front of proposed sign at MP 22/0B to restore sight lines, approx 10 m^2.

If required, proposed locations of:
Site compound
Material storage
Welfare facilities

Site access arrangements: from eastbound carriageway

Day / Night works: Night

Any future stages of works at the site proposed as part of the scheme: NO
If YES, please provide details of the works and estimated duration and start date:

Does the scheme require a Site Waste Management Plan (i.e. construction costs are £300,000 or over): YES
If YES then please confirm the proposed date of completion of the SWMP: 8/11/10

Any further information:

Key design dates (e.g. completion of the scheme design): Works Order Package is scheduled for handover by 15/10/2010

Working area				
Total works area exc. traffic management (m^2)?	25,000	inc. traffic management		66,000
Total area of works on soft estate (m^2)?	250			
Area of the improvement element of the project excluding TM unless TM is up continuously for 3 months or more (m^2)?				5,000
Area of works on non client land (i.e. outside client's boundaries)?	✓	None		Yes (m^2)
If yes, has landowner's permission been obtained?		No		Yes
If yes, landowner's contact details (name/no.)				
Do the works need a new access point across the soft estate?	✓	No		Yes (attach drawings)

Approximate timeline for drafting internal briefs, works orders, environmental surveys and/or expected mitigation (if required)

Qualifying Criteria for the Annex II Relevant Project The Determination Process (RoD) will apply if the project meets any of the following criteria *NB: maintenance schemes are usually exempt from the Determination Process* *24 weeks to complete the Determination Process should be allowed for in the project programme*			
Area of the improvement element of the project > 1 hectare (excluding TM unless TM is up continuously for 3 months or more)			
Project is located in a 'sensitive area'			
Other with potential for significant effect (e.g. adjacent to sensitive site)			
'Sensitive Areas'			
AONB	National Park	World Heritage Sites	SAC/cSAC/pSAC
SSSI/ASSI	The Broads	Scheduled Monuments	

Scoping of potential impact and further detailed environmental assessment:	No	Yes	Effect (if yes)
Air Quality	TBD	TBD	Simple Assessment has determined that a Detailed Assessment is required.
Cultural Heritage	✓		
Landscape	✓		
Nature Conservation	✓		
Geology and Soils	✓		
Materials	✓		
Noise and Vibration		✓	Short-term, minor adverse during works.
Effects On All Travellers		✓	Short-term, minor adverse during works. Long-term, minor beneficial.
Community and Private Assets	✓		
Road Drainage and the Water Environment	✓		
Consultation/consents required?	**No**	**Yes**	**Reason**
Determination process (RoD/NoD)	TBD	TBD	A RoD/NoD is not required for the Experimental Order phase of the scheme. HA REA has advised that if no significant adverse environmental effect is identified following the Detailed Air Quality Assessment, Official Notifications and a RoD/NoD will not be required for the Permanent Order.
Official Notifications (works within 100 m of a statutory designation or scheduled monument)	✓		
Appropriate Assessment Screening Matrix		✓	Hydrological connection to European Sites and bat SAC within 30 km
Local Authority consent for tree works	✓		
Infrastructure Planning Committee consent	✓		
Other (e.g. Newt licence, EA consent for works)	✓		
Comments	**No**	**Yes**	**Reason**
More consultation with statutory bodies necessary?			Awaiting air quality Detailed Assessment
Contact local planning authority?			“
Send a letter to residents (air, noise, etc)?			“
Local record search for protected species	✓		
Other?	✓		

Is the environmental assessment to be reviewed at a later stage?	
	No, unless scheme’s design is modified (including access works, starting date, etc.)
✓	Yes, once surveys and/or necessary specialist assessments have been carried out
	Yes, once stakeholder consultation has been carried out (Local Authority, Env. Agency, etc)
	Yes, once client has confirmed/rejected proposed mitigation
	Yes, during the design period and to prepare or finalise Works Order package
	Yes, suggest a “post works” audit is carried out (subject to client’s approval)

Site visits undertaken?	
No, give reason	
Yes, when and who by?	James Brand and Graeme Worsley 30/09/10

Does the scheme present any environmental improvement opportunities?	
No	✓
Yes, give details	

Summary of Environmental Impact:

Temporary (short term)	**Minor adverse effects on noise and vibration and effects on all travellers during the construction phase due to diversion routes and the use of machinery.**		
Permanent (long term)	**Minor beneficial effect upon all travellers following completion of the works through 'modest' improvements to journey times. The long term impact on air quality needs to be assessed through a Detailed Assessment.**		
Assessed by:	**James Brand**	**Date**	**11/11/10**
Reviewed by:	**Graeme Worsley**	**Date**	**12/11/10**

Cumulative Impact of Scheme Effects Upon Specific Receptors													
Could the individual effects identified under each environmental topic combine to have a significant cumulative effect upon any receptors?													
✓	No												
	Yes, complete table below												
	Receptor	Air Quality	Cultural Heritage	Landscape	Nature Conservation	Geology and Soils	Materials	Noise and Vibration	Effects On All Travellers	Community and Private Assets	Road Drainage and the Water Environment	Cumulative effect
1	n/a											
2	n/a											
3	n/a											
4	n/a											
5	n/a											
6	n/a											
7	n/a											
8	n/a											
9	n/a											
10	n/a											
Provide details of cumulative effects against receptors													
n/a													
Assessed by	James Brand												

Cumulative Impact of This Scheme With Other Schemes	
Are there any other schemes known of in this location that could have a cumulative environmental impact with this scheme?	
	No
✓	Yes, detail below
Brief description of schemes that may have a cumulative impact with this one.	
M4 Spur Landscape Enhancement Scheme Phase 3 and 4 (HA PINs 511020 + 513629) – Planting works on M4 Spur M4 Safety Improvement Scheme (HA PIN 513191) – Changes to road signs, extension of anti-skid and installation of a maintenance hard-standing area on M4 Spur.	

M4 J4 to 4b & M4 Heathrow Spur pavement renewal (Project reference number, Pavement Package 7, RWP47-10)					
Receptor (specify or 'all')	**Impact from other schemes**	**Significance of effect**	**Impact from this scheme**	**Significance of effect**	**Cumulative effect**
Air Quality					
All	**None**	**n/a**	**Detailed assessment required.**	**Detailed assessment required.**	**Not significant**
Cultural Heritage					
All	**Temporary negative effect on visual setting of cultural heritage sites during landscape improvement works**	**Minor adverse**	**None**	**n/a**	**Not significant**
Landscape					
All	**Improvement in landscape aesthetics from landscape enhancement scheme**	**Moderate beneficial**	**None**	**n/a**	**Not significant**
Nature Conservation					
All	**Temporary slight adverse whilst planting establishes. Beneficial long-term impact due to the improved diversity and vegetation enhancement.**	**Moderate beneficial**	**None**	**n/a**	**Not significant**
Geology and Soils					
All	**None**	**n/a**	**None**	**n/a**	**Not significant**
Materials					
All	**None**	**n/a**	**None**	**n/a**	**Not significant**
Noise and Vibration					
All	**Minor adverse effect during night works for safety improvement scheme. Landscaping works are day works, which will not have significant noise levels compared to the motorway and adjacent airport.**	**Minor adverse**	**Minor increases in noise at night during works only.**	**Minor adverse**	**Not significant**

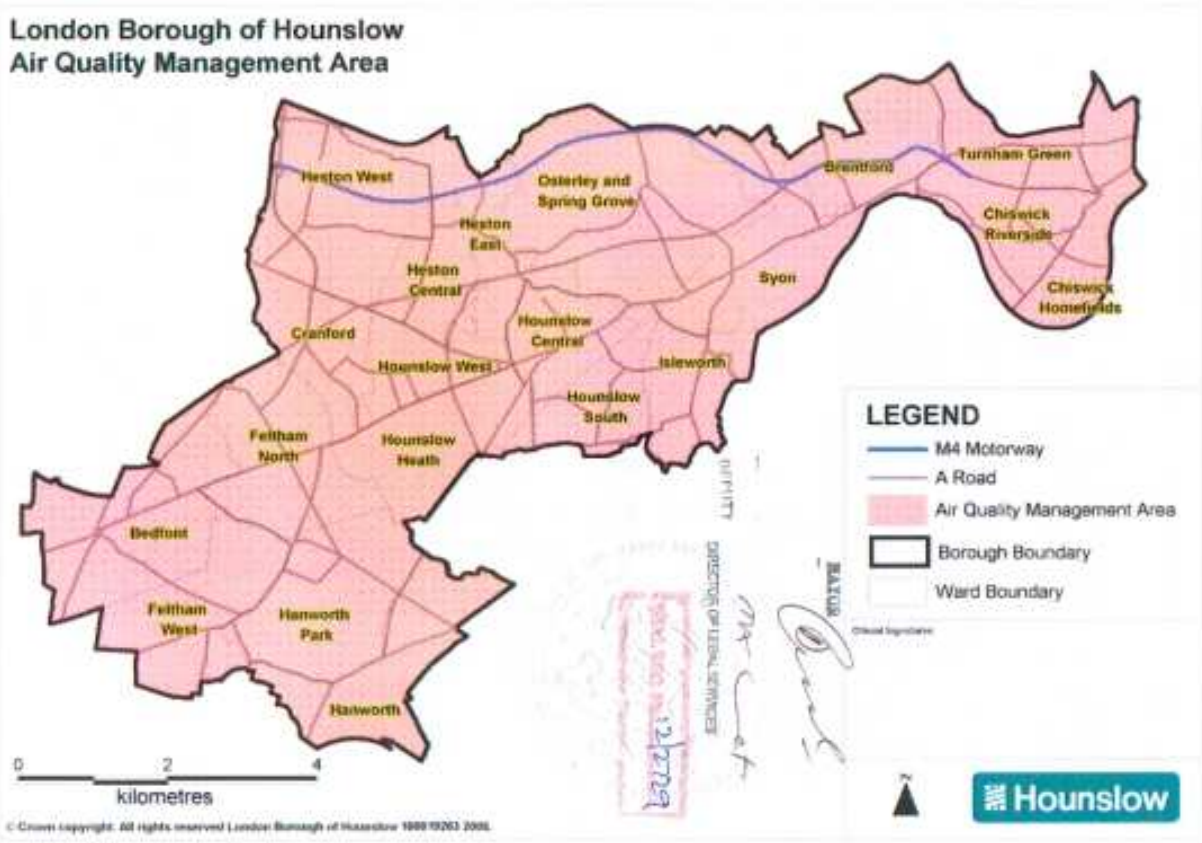
	Disturbance during pavement works from increased noise levels.				
Effects On All Travellers					
All	**Long-term, minor, beneficial from safety improvement scheme. Landscape improvement project- Beneficial long-term impact on journey ambience. Improved journey ambience from surface and road marking improvements from pavement scheme.**	**Minor beneficial**	**Minor adverse effect during works due to traffic management usage. Minor beneficial effect long-term through marginal decreases in journey times.**	**Minor beneficial**	**Minor beneficial**
Community and Private Assets					
All	**Landscape improvement project - Beneficial long-term impact due to the improved screening of the carriageway and aesthetics.**	**Minor beneficial**	**None**	**n/a**	**Not significant**
Road Drainage and the Water Environment					
All	**None**	**n/a**	**None**	**n/a**	**Not significant**
Assessed by	**James Brand**				

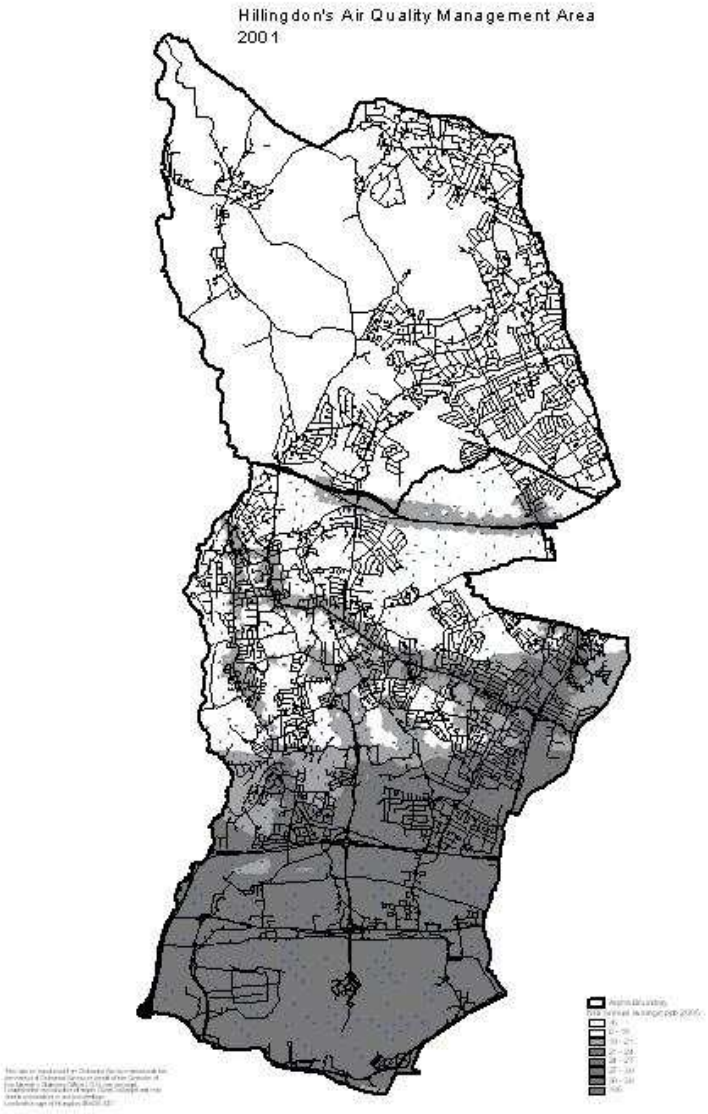
NB Cumulative effect considers whether the combined effect of the schemes will have a more significant environmental impact than the individual elements.

Air Quality (see DMRB Vol. 11, Section 3, Part 1)	
Properties within 200 m of the area affected by works (inc diversion routes)?	
✓	Residential
✓	School
	Hospital
	Designated natural site (SAC, SPA, SSSI, Ramsar, etc, not geological sites)
✓	Others, please specify in notes
	None
Has the Local Authority identified an AQMA?	
	No
✓	Yes, specify details in notes
Is there air quality monitoring data available?	
	No
	No, area monitored is out of the boundary of works with insufficient traffic modelling
✓	Yes, data available
	Yes, data available with appropriate traffic model
Has the Local Authority been consulted regarding air quality?	
See notes	No, not necessary
See notes	No, but will be necessary
See notes	Yes
Will the affected works area cause any of the following traffic/alignment changes? (specify in notes)	
	Change in the road alignment of 5 m or more (specify widening or narrowing)?
	Change in daily traffic flow by 1000 AADT or more (specify amount)?
	Change in the Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more (specify amount)?
	Change in the daily average speed of 10 km/hr or more?
	Change in the peak hour speed of 20 km/hr or more?
✓	None of the above
Are there areas where LONG-TERM air quality could improve/deteriorate as a result of the scheme?	
See notes	No, no changes traffic/alignment changes or no properties within 200 m
See notes	Yes, scoping assessment is required
Are there areas where it is likely that works will TEMPORARILY affect air quality (inc dust)?	
	No
✓	Yes, but not significantly (works last up to 30 days or insignificant changes to traffic)
	Yes
	Send a letter to residents if YES to any of the above.
Will there be a long-term effect on green house gases?	
See notes	No, The works do not impact on traffic flow, emission levels of green house gases will not be significantly affected by the scheme.
See notes	Yes, The works may reduce the emissions of green house gases generated by traffic by improving flow.
See notes	Yes, The works may increase the emissions of green house gases generated by traffic by decreasing flow.
Notes	

The scheme falls within a highly urbanised area with a hotel, a motel, several schools and thousands of residential properties within 200 metres of the works. Works pass through Osterley Park Registered Park and Garden/National Trust Property and close to a Country Park and Local Nature Reserve.

Works pass through Hillingdon and Hounslow AQMAs, details as per the maps below.





The scheme will change a dedicated bus lane into a normal running lane, but it will not change the carriageway width or alignment.

A specialist Air Quality Simple Assessment has been carried out in accordance with the DMRB, see 'M4 J3-2 Bus Lane Removal: Air Quality Impact Assessment' available on OnePlace. This has concluded that a Detailed Assessment of air quality impacts is required.

Assessed by?	**James Brand**

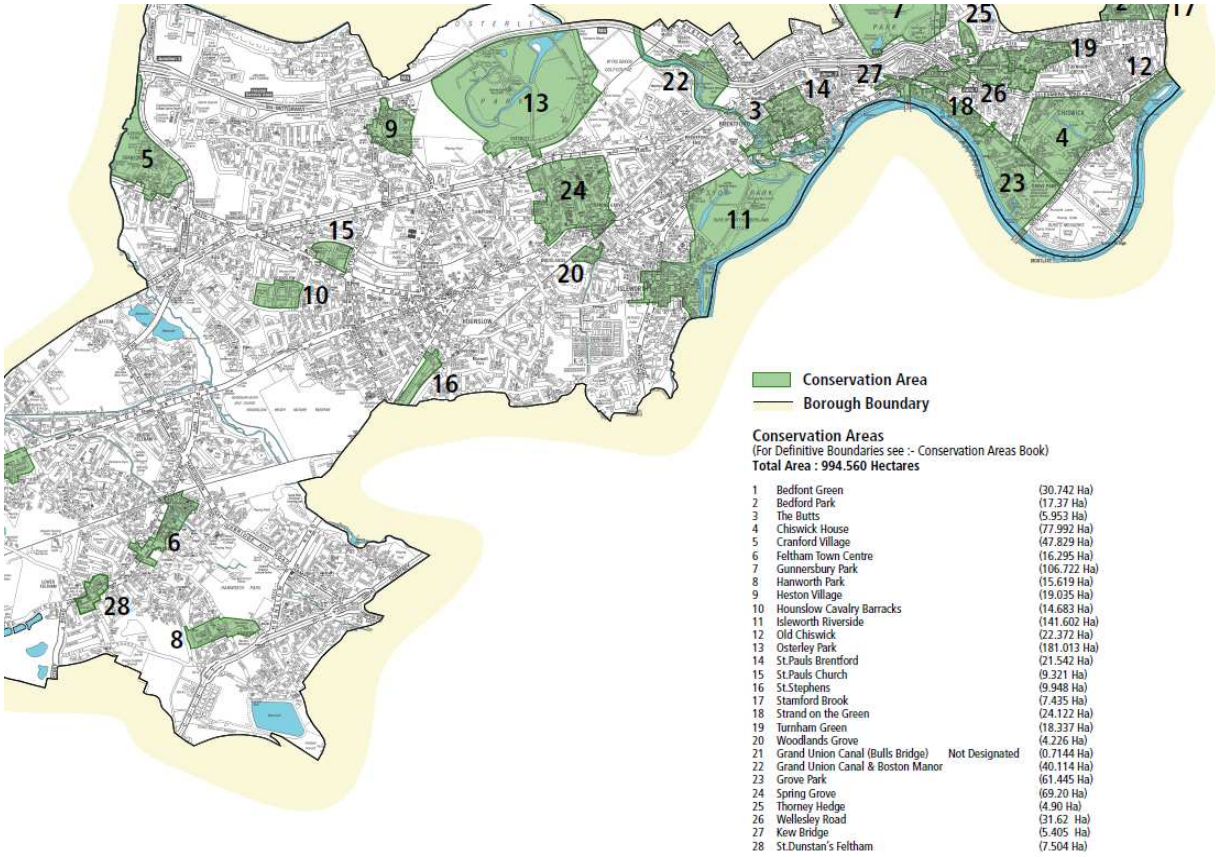
Cultural Heritage (see DMRB Vol. 11, Section 3, Part 2)	
Area of works outside of existing HA boundaries?	
✓	**No**
	Yes – archaeological works may be required
Earthworks affect previously undisturbed/searched areas?	
✓	**No**
	Yes, specify details in notes
Are any of the following within 300 m of the site? (specify details in notes)	
	Scheduled Monuments
✓	**Listed buildings, registered historic parks, gardens and battlefields, Conservation Areas, World**

	Heritage Sites or National Trust inalienable land
✓	**Designated archaeological sites**
	None
Is the setting of one or more of the above sites affected by the works?	**See notes**
Are there any archaeological or historic features that may need to be protected from the works?	
✓	**No**
	Yes, specify details in notes
Has English Heritage or Local Authority SMR/HER been formally consulted?	
✓	**No, not necessary**
	No, but will be necessary
	Yes
Have Official Notifications been sent?	
✓	**No, not necessary**
	No, but will be necessary
	Yes

Notes

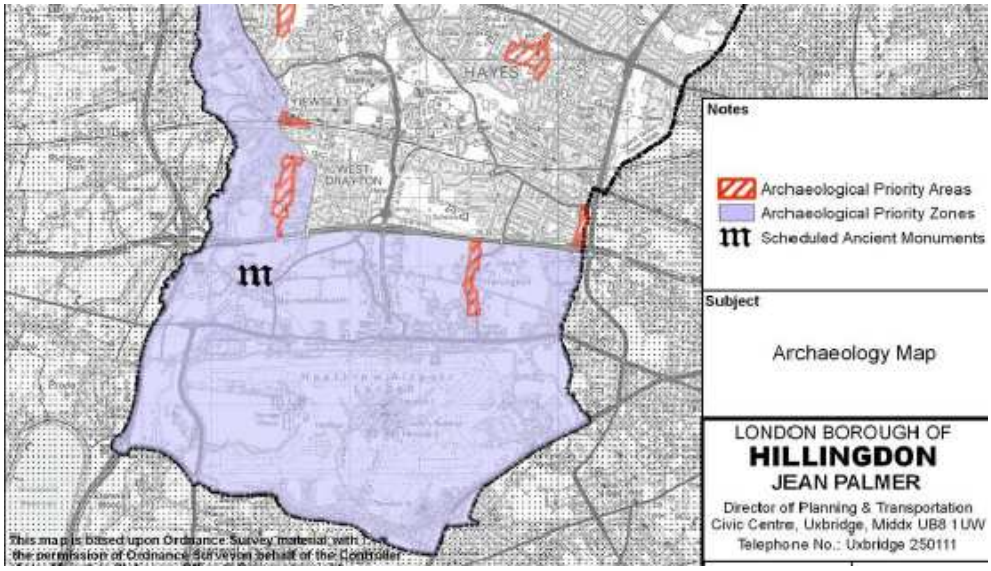
Works pass through Osterley Park National Trust Property (borders HA land on both sides of the carriageway) and Registered Park and Garden (includes the carriageway). Works at this location consist of replacing existing sign plates and changes to carriageway markings and studs. It is not anticipated that these will have any significant effect upon these sites or that any consent will be required.

Cranford Park/Village Conservation Area is on the Hillingdon/Hounslow boundary and is adjacent to the M4 southwest of M4 J3 (area 5 in the picture below). There are a number of Conservation Areas in Hounslow as shown below. It is not anticipated that the works will have any adverse effect on the setting of Conservation Areas as they are screened by vegetation.



The M4 J3 to J4 is situated within an archaeological priority zone, however, works are confined to land previously disturbed for construction of the motorway and no excavation is planned so it is not anticipated the works will have

any effect upon this.



The following Listed Buildings are within 500 metres of the grid squares that the scheme falls within:

506721 WAR MEMORIAL CHERRY LANE CEMETERY, SHEPISTON LANE- HAYESGrade: II NGR: TQ0794478699

202840 THE WHITE HART PUBLIC HOUSE , HIGH STREET, UB3 5DP-HAYESGrade: II NGR: TQ0872977931

202961 CHURCH OF ST PETER AND ST PAUL, ST PETER'S WAY, UB3 5LY-HAYESGrade: I NGR: TQ0880078214

202962 WALLS TO NORTH OF CHURCH OF SAINT PETER AND SAINT PAUL, ST PETER'S WAY, UB3 5LY-HAYESGrade: II NGR: TQ0881078229

202963 WALL TO SOUTH OF CHURCHYARD OF CHURCH OF ST PETER AND ST PAUL, ST PETER'S WAY, UB3 5LY-HAYESGrade: II NGR: TQ0876078213

433241 MONUMENT TO WILLIAM AND ELIZABETH BROOKES IN CHURCHYARD OF CHURCH OF ST PETER AND ST PAUL , ST PETER'S WAY, UB3 5LY-HAYESGrade: II NGR: TQ0877778220

202944 CHURCH OF ST DUNSTAN, ROSEVILLE ROAD-HAYESGrade: II* NGR: TQ1016078181

202945 CRANFORD HOUSE STABLES , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1011378195

202946 CURVED WALL TO SOUTH OF WEST END OF STABLES , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1010378152

202947 WALL TO SOUTH OF EAST END OF STABLES , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1013578176

202948 WALLS TO NORTH OF STABLES , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1011978218

202949 CELLARS OF FORMER CRANFORD HOUSE , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1007778141

202950 GARDEN WALLS TO WEST OF CRANFORD HOUSE STABLES , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1005278232

202951 HA HA WALLS TO SOUTH AND SOUTH WEST OF CRANFORD HOUSE STABLES , ROSEVILLE ROAD-HAYESGrade: II NGR: TQ1010078056

202952 CRANFORD PARK BRIDGE , THE PARKWAY-HAYESGrade: II NGR: TQ1033678108

439196 THE RECTORY 1, CHURCH ROAD, TW5 9RY-HOUNSLOWGrade: II NGR: TQ1069877983

490037 BRENTFORD FOUNTAIN WESTERN INTERNATIONAL MARKET , HAYES ROAD-HOUNSLOWGrade: II NGR: TQ1082978667

490534 HANGAR, HESTON AIR PARKS, AERODROME WAY-HOUNSLOWGrade: II NGR: TQ1138177634

202591 HESTON CHURCH LYCH GATE , HESTON ROAD, TW5 0RQ-HOUNSLOWGrade: II NGR: TQ1309977501

202592 VICARAGE OF ST LEONARDS PARISH CHURCH INCLUDING ST LEONARDS LODGE TO REAR , HESTON ROAD, TW5 0RQ-HOUNSLOWGrade: II NGR: TQ1309277468

202593 133, HESTON ROAD, TW5 0RQ-HOUNSLOWGrade: II NGR: TQ1312477417

200983 FRIARS LAWN , NORWOOD GREEN ROAD, UB2 4LA-SOUTHALLGrade: II NGR: TQ1327178590

202602 OSTERLEY HOUSE, JERSEY ROAD, TW7 6BE-HOUNSLOWGrade: I NGR: TQ1451177997

202603 OSTERLEY HOUSE STABLES, JERSEY ROAD, TW7 6BE-HOUNSLOWGrade: I NGR: TQ1449978104

202604 THE TEMPLE IN OSTERLEY PARK, JERSEY ROAD, TW7 6BE-HOUNSLOWGrade: I NGR: TQ1426678110

202605 AVIARY OR LITTLE ORANGEREY IN OSTERLEY PARK, JERSEY ROAD, TW7 6BE-HOUNSLOWGrade: I NGR: TQ1443278153

439231 GARDEN WALLS TO SOUTH OF OSTERLEY PARK FARMHOUSE, OSTERLEY LANE, TW7 4RB-HOUNSLOWGrade: II NGR: TQ1418378272

439245 OSTERLEY PARK FARMHOUSE, OSTERLEY LANE, TW7 4RB-HOUNSLOWGrade: II NGR: TQ1416678293

439247 GARDEN WALLS TO NORTH OF OSTERLEY PARK FARMHOUSE , OSTERLEY LANE, TW7 4RB-HOUNSLOWGrade: II NGR: TQ1410078383

439050 GALLOWS BRIDGE (OVER BRENTFORD CANAL), GRAND UNION CANAL , GRAND UNION CANAL, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1630478301

488535 BOSTON MANOR UNDERGROUND STATION, BOSTON MANOR ROAD-HOUNSLOWGrade: II NGR: TQ1638978754

202607 ROMAN BRIDGE (THAT PART IN THE LONDON BOROUGH OF HOUNSLOW) , JERSEY ROAD, TW7 6BE-HOUNSLOWGrade: II* NGR: TQ1481478957

202422 BOSTON MANOR HOUSE, BOSTON MANOR PARK , BOSTON MANOR ROAD-HOUNSLOWGrade: I NGR: TQ1683978339

202423 GATEWAY ABOUT 100 YARDS SOUTH OF BOSTON MANOR HOUSE , BOSTON MANOR ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1706778133

202424 STABLES OF BOSTON MANOR HOUSE , BOSTON MANOR ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1683378390

202425 GARDEN WALL, 2 SETS OF IRON GATES GATEPOSTS TO BOSTON MANOR HOUSE , BOSTON MANOR ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1689678336

202428 PROSPECT HOUSE 67, BOSTON MANOR ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1704678168

202429 69 AND 71, BOSTON MANOR ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1705978152

202430 73 AND 75, BOSTON MANOR ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1709478105

202465 19, THE BUTTS, TW8 8BJ-HOUNSLOWGrade: II NGR: TQ1748077556

202466 LINDEN HOUSE 23, THE BUTTS, TW8 8BL-HOUNSLOWGrade: II NGR: TQ1747577549

438729 GLAN HELEN 1, THE UPPER BUTTS, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1746277634

438730 THE CEDARS , THE UPPER BUTTS, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1745377658

439049 17, SOMERSET ROAD, TW8 8BT-HOUNSLOWGrade: II NGR: TQ1744277629

439158 PYRENE FACTORY , GREAT WEST ROAD-HOUNSLOWGrade: DL NGR: TQ1671777564

440172 991, GREAT WEST ROAD, W4 5QJ-HOUNSLOWGrade: II NGR: TQ1687677648

458955 WESTLINK HOUSE , GREAT WEST ROAD, TW7 6BE-HOUNSLOWGrade: II NGR: TQ1672077560

488371 CENTRAL GATES, GATE PIERS AND RAILINGS TO THE FORMER FIRESTONE FACTORY , GREAT WEST ROAD-HOUNSLOWGrade: II NGR: TQ1659577577

202596 ST GEORGES CHURCH HALL , HIGH STREET, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1843577832

439815 BRENTFORD BATHS , CLIFDEN ROAD-HOUNSLOWGrade: II NGR: TQ1765977790

439901 BRENTFORD PUBLIC LIBRARY , BOSTON MANOR ROAD-HOUNSLOWGrade: II NGR: TQ1760977763

439937 SMITHKLINE BEECHAM HOUSE INCLUDING MIDLAND BANK , GREAT WEST ROAD, W4 5QJ-HOUNSLOWGrade: II NGR: TQ1814078276

439938 RAILINGS IN FRONT OF SMITHKLINE BEECHAM HOUSE TERMINATING IN LINE WITH ENTRANCE AT RIGHT (WEST) END OF RIGHT (WEST) WING , GREAT WEST ROAD, W4 5QJ-HOUNSLOWGrade: II NGR: TQ1812378292

202572 GOTHIC BOATHOUSE AND PAVILLION ON SOUTH SHORE OF POTOMAC FISH POND, GUNNERSBURY PARK , GUNNERSBURY AVENUE W3-HOUNSLOWGrade: II NGR: TQ1873478500

202608 METROPOLITAN WATER BOARD PUMP HOUSE TOWER, KEW BRIDGE , KEW BRIDGE ROAD, TW3 1RB-HOUNSLOWGrade: I NGR: TQ1881478028

202609 GREAT ENGINE HOUSE, KEW BRIDGE PUMPING HOUSE , KEW BRIDGE ROAD, TW3 1RB-HOUNSLOWGrade: I NGR: TQ1877978029

202610 BOILER HOUSES COAL STORE, STEAM ENGINE HOUSE AND LINK TO GREAT ENINE HOUSE AT KEW BRIDGE PUMPING STATION , KEW BRIDGE ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1880578049

202611 MAIN BUILDING, KEW BRIDGE PUMPING STATION , KEW BRIDGE ROAD, TW3 1RB-HOUNSLOWGrade: I NGR: TQ1877478059

202612 RAILINGS, TWO SETS OF GATEPIERS AND WALL FRONTING KEW BRIDGE ROAD , KEW BRIDGE ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1880678014

439935 RANGE OF ANCILLARY BUILDINGS INCLUDING FORGE AND WORKSHOPS, AT KEW BRIDGE PUMPING STATION , KEW BRIDGE ROAD, TW3 1RB HOUNSLOWGrade: II NGR: TQ1883778042

439967 KEW BRIDGE STATION , KEW BRIDGE ROAD-HOUNSLOWGrade: II NGR: TQ1900278104

472755 GATEHOUSE AND BOUNDARY WALL AT KEW BRIDGE PUMPING STATION , KEW BRIDGE ROAD, TW3 1RB-HOUNSLOWGrade: II NGR: TQ1874877994

The sign works are removal or replacement of existing sign faces.

It is not anticipated that the scheme will have any significant effect upon cultural heritage sites.

Assessed by?	**James Brand**

Landscape (see DMRB Vol. 11, Section 3, Part 5)			
Are works in, adjacent to or within the visual envelope of any of the following statutory designations? (specify details in notes)			
	National Park		**The Norfolk and Suffolk Broads**
	AONB		**The New Forest Heritage Area**
	Common Land	✓	**Country Parks**
	Limestone Pavement Orders		**Natural Heritage Areas**
✓	**National Trust Property**		**National Scenic Areas**
	Regional Parks		**Regional Scenic Area**
	National Trust Inalienable Land		**None of these**
Are works in, adjacent to or within the visual envelope of any of the following non-statutory designations? (specify details in notes)			
	Heritage Coasts	✓	**Parks and Gardens of Special Historical Interest**
✓	**Green Belts**		**Areas of Great Landscape Value**
	None of these		**Other Local Authority landscape designation**
Works affecting motorway/highway verges? (Including material storage & vegetation removal)			
	No		
✓	**Yes, specify details in notes**		
Works affect visual intrusion? (i.e. will they visually or structurally alter the layout of the area)			
	No		
	Yes, temporary, specify details in notes		
✓	**Yes, permanent, specify details in notes**		
Original landscape mitigation part of a statutory requirement?			
	No/Not relevant as the works do not affect the verges		
	Yes, specify details in notes		
✓	**Unknown**		
Site surveys (mandatory for all projects affecting the landscape designations, verges or visual intrusion)			
Is vegetation removal required?			
	No		

✓	Yes, specify details in notes, including locations and size of areas
Will there be a loss of screening?	
✓	No
	Yes, temporary, specify details in notes, including locations and size of areas
	Yes, permanent, specify details in notes, including locations and size of areas
Will there be a change in established views out? (i.e. will the works change the view for road users or surrounding residents and/or land users)	
✓	No
	Yes, temporary, specify details in notes, including locations
	Yes, permanent, specify details in notes, including locations
Are significant earthworks part of the scheme?	
✓	No
	Yes, specify details in notes, including locations and size of areas
Will mitigation (planting/earthworks) be required?	
✓	No
	Yes, specify details in notes, including locations and size of areas
Does the screening/vegetation need to be replaced?	
✓	No
	Yes
Any possible causes of root damage from construction activities within 5 m of a tree?	
✓	No, no construction activities within 5 m of a tree
	Yes, excavation, specify details in notes, (arboricultural assessment is required)
	Yes, material/machinery/vehicle storage, specify details in notes (arb. assessment is required)
	Yes, other, specify details in notes (arboricultural assessment is required)
Any possible need for tree works (branch removal/canopy reduction/felling) for construction?	
✓	No, no construction activities within 5 m of a tree
	Yes, visibility, specify details in notes, (arboricultural assessment is required)
	Yes, safety, specify details in notes (arb. assessment is required)
	Yes, other, specify details in notes (arboricultural assessment is required)
Works affecting trees/areas subject to a preservation order?	
✓	No, no trees affected
	No, trees affected but no preservation orders in place
	Yes, specify details in notes (Local Authority consent may be required)
Works affecting trees within/on the boundary of a Conservation Area?	
✓	No, no trees affected
	No, trees affected but not within/on the boundary of a Conservation Area
	Yes, specify details in notes (Local Authority consent may be required)
Works affecting trees within/on the boundary of a SNCI?	
✓	No, no trees affected
	No, trees affected but not within/on the boundary of a SNCI
	Yes, specify details in notes (Local Authority consent may be required)
Has the Condition Team surveyed trees at this location?	
✓	No
	Yes, specify details in notes

Arboricultural assessment

Species	Age	DBH	Category	Issue e.g. root	Management	Root protection

				damage, visibility	recommendations	zone requirements

Category:

Trees to be considered for retention

A: high quality and value i.e. particularly good examples of the species; makes a substantial landscape &/or cultural contribution

B: moderate quality and value i.e. good example of species but in impaired condition; makes a substantial landscape &/or cultural contribution

C: low quality and value; low / temporary screening benefit, very limited conservation or cultural benefit (NB Category C trees will usually not be retained where they impose a significant constraint on development; young tree with a diameter of less than 150 mm should be considered for relocation)

Trees for removal

R: in such a condition that any existing value would be lost within 10 years and which should be removed for sound arboricultural management reasons (e.g. trees with serious defects / decline, dead, infected)

Road Lighting

Is there existing street lighting?		Is new lighting proposed?	
	No	✓	No
	Yes, SOX		Yes, SOX
	Yes, SON		Yes, SON
33	Column spacing in metres?		Column spacing in metres?
12	Column height in metres?		Column height in metres?
	Old/present wattage?		New/proposed wattage?
Y/N	Old lanterns 'fully cut off'?	Y/N	New lanterns 'fully cut off'?

If column spacing is increasing will this be compensated for by improved light spread?	n/a

Has Natural England been formally consulted?	
See notes	No, not necessary
	No, but will be necessary
	Yes

Have Official Notifications been sent?	
See notes	No, not necessary
	No, but will be necessary
	Yes

Notes

Cranford Countryside Park is adjacent to the M4 southwest of M4 J3. Works pass through Osterley Park National Trust Property (borders HA land on both sides of the carriageway) and Registered Park and Garden (includes the carriageway). Works at this location consist of replacing existing sign plates and changes to carriageway markings and studs. It is not anticipated that these will have any significant effect upon these sites or that any consent will be required. Works fall within Hillingdon and Hounslow Greenbelts.

Two small alder shrubs and one small hawthorn shrub will need to be removed at MP24/7 to ensure sight lines to sign. Approximately 10 m^2 of elm and thorn scrub will need to be removed at MP22/0 to ensure sight lines to sign.

Where signs are being removed their lights will be turned off. The signs being installed for the scheme will reuse existing posts and will not have any significant effect upon the landscape.

Assessed by?	James Brand

Nature Conservation (see DMRB Vol. 11, Section 3, Part 1)					
Are any of the following statutory designations within ____ of the site? (specify in notes)					
100 m	500 m		100 m	500 m	
		SSSI			Ramsar
		ASSI			SPA/pSPA

		National Nature Reserve			SAC/cSAC/pSAC
		National Park (World Heritage)			Area of Special Protection for Birds
		Marine Nature Reserve			Natural Heritage Area
✓		Local nature reserves			None of these
Are any of the following non-statutory designations within ____ of the site? (specify details in notes)					
100 m	500 m				
		Ancient Woodland			
		Regional Parks			
		Non-statutory Nature Reserves (e.g. RSPB reserves, wildlife trust sites)			
		Non-statutory Sites of importance for Nature Conservation (see local plans)			
		Forest Nature Reserves			
✓		None of these			
Will the works require the removal of any sections of hedgerows?					
✓	No				
	Yes, specify details in notes				
Will the works cause habitat fragmentation and/or isolation?					
✓	No				
	Yes, specify details in notes (including who by and when)				
Will the work affect water or drainage systems (including ditches)?					
✓	No				
	Yes, specify details in notes				
Has a habitat survey been previously undertaken?					
✓	No				
	Yes, specify details in notes (including who by and when)				
Are there records of protected species in the area?					
	No				
✓	Yes, specify details in notes				
	Is a search of protected species records from a local record centre required?				
Are there records of noxious/invasive weeds in the area?					
✓	No				
	Yes, specify details in notes				
Are there records of BAP habitats or species in the area?					
✓	No				
	Yes, HA BAP habitats, specify details in notes				
	Yes, non-HA BAP habitats, specify details in notes				
Could storage of materials pose a threat to ecologically valuable land?					
✓	No				
	Yes, specify details in notes				
Are there any ecological features that may need to be protected from the works?					
✓	No				
	Yes, specify details in notes				
Are new site specific surveys required?					
	No				
✓	No, a walkover survey has been conducted by the Environment Team and it has been determined that detailed habitat surveys are not required				

	Yes, specify details in notes, inc. survey times and special requirements (e.g. bat detector)

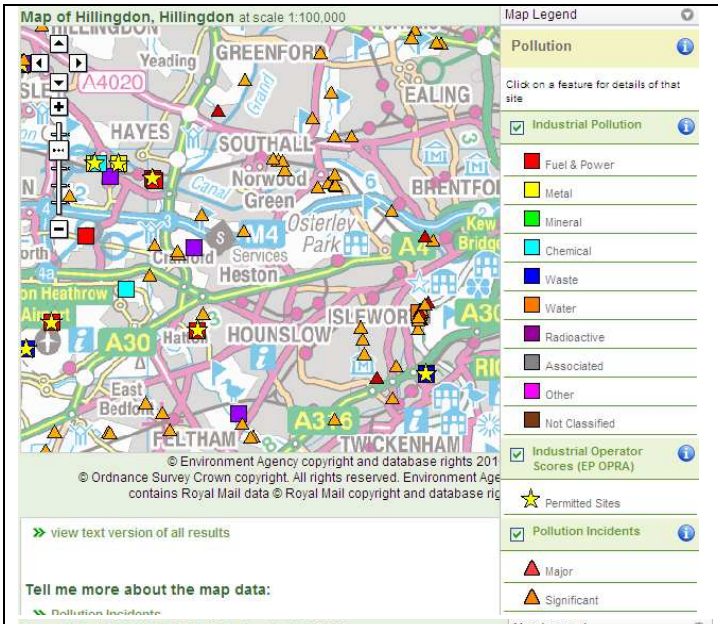
Potential of site for protected species						
Species	High	Medium	Low	Very low	Potential impact? (Y/N detail in notes)	Mitigation required? (Y/N detail in notes)
Amphibians			✓		N	N
Bats		✓			N	Y
Badgers				✓	N	N
Dormice				✓	N	N
GCN			✓		N	N
Nesting birds	✓				N	Y
Otters				✓	N	N
Reptiles		✓			N	Y
Water voles				✓	N	N
White-clawed crayfish				✓	N	N
Other:						

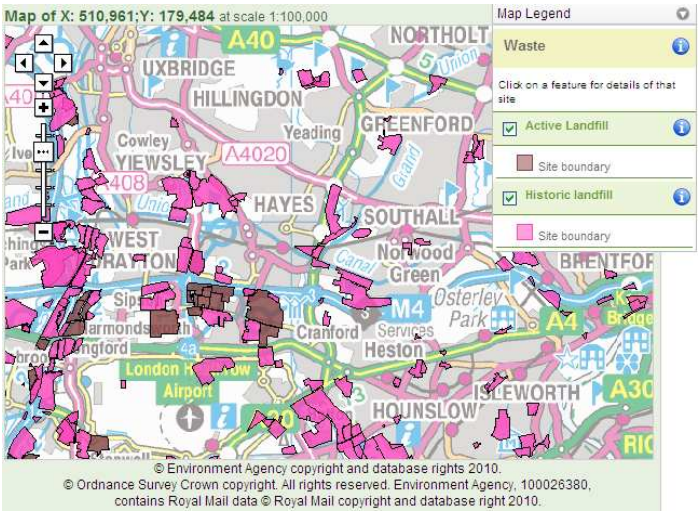
Will active rabbit burrows be affected by works?	
✓	No
	Yes, specify details in notes
Have any Statutory Bodies been formally consulted?	
✓	No, not necessary
	No, but will be necessary
	Yes
Have Official Notifications been sent?	
✓	No, not necessary
	No, but will be necessary
	Yes
Notes	
Long Wood Local Nature Reserve is adjacent to the HA north boundary between MP 16/6 and 16/4 NBN Gateway records badgers and bats in the TQ17 10km square. The works are considered to be of a low risk to the protected species identified above due to their limited nature. Mitigation required is only that of a Tool-box talk to ensure contractors are aware of the potential presence of the species and how to react if any are found during works. It is not anticipated that there will be any significant effect upon nature conservation from the scheme as the works in the soft estate consist only of removing or replacing sign faces and removing a very limited amount of vegetation to create sight lines.	
Assessed by?	James Brand

Appropriate Assessment (see DMRB Vol. 11, Section 4, Part 1)			
Are any of the following	in the works?	within 2 km?	Details
Ramsar			
SPA/pSPA			
SAC/cSAC/pSAC			
None	✓		
Are the works within 30 km of any SAC/cSAC/pSAC where bats are one of the qualifying interests?			
	No		

✓	Yes, specify details in notes
Is the scheme crossing/adjacent to upstream of, or downstream of, (or connected via drainage to) watercourses designated in part or wholly as SACs, cSACs, pSACs, SPAs, pSPAs or RAMSAR sites?	
	No
✓	Yes, upstream, specify details in notes
	Yes, downstream, specify details in notes
Has the Joint Nature Conservation Council been formally consulted?	
✓	No, not necessary
	No, but will be necessary, see notes
	Yes
Notes	
Mole Gap to Reigate Escarpment SAC, which has bats as a qualifying feature, is within 30 km of the works. The Rivers Crane and Brent pass under the works area and flow to the River Thames. The River Thames has a number of European Sites in its estuary and is connected to many others through its tributaries. It is not anticipated that these works will have any significant effect upon any European Sites and it is therefore recommended that screening goes direct to a FNSER and the HA REA has agreed with this recommendation. As a FNSER is agreed JNCC consultation is not required.	
Assessed by?	**James Brand**

Geology and Soils (see DMRB Vol. 11, Section 3, Part 11)	
Are there any geological ASSI/SSSIs within 50 m of the site?	
✓	No
	Yes, specify details in notes
Are there any Regionally Important Geological Sites within 50 m of the site?	
✓	No
	Yes, specify details in notes (NB this is a non-statutory designation)
Are there any contaminated sites within 50 m on client land?	
	No
✓	Yes, specify details in notes
Are there any contaminated sites within 50 m outside of client land?	
	No
✓	Yes, specify details in notes
What is the underlying geology of the area?	**London Clay**
Notes	
EA maps record a number of pollution incidents close to, but outside of, HA land. Its maps also record a number of active and historic landfill sites bordering the carriageway. As works include minimal disturbance of land for vegetation removal and are on land previously disturbed for the construction of the motorway it is not anticipated that there will be any significant risk posed by these sites. It is also not anticipated that the scheme will have any significant effect upon Geology or Soils.	





Assessed by?	**James Brand**

Materials section 1 (was sustainability)	
Are any of the materials used in the scheme reclaimed/recycled?	
✓	**No, please specify why not in notes**
	Yes, please specify which materials and quantities in notes
If recycled materials are being used will certification be supplied?	
✓	**No**
	Yes
Are there any plans to recycle materials from site?	
	No
	Yes, onsite, specify details in notes
✓	**Yes, offsite, specify details in notes**
Has a preference been shown to source local materials?	
✓	**No**
	Yes, specify details of saved mileage in notes
Are there any environmental specifications detailed in the construction design?	

✓	No
	Yes
Notes (inc types of materials to be recycled/reclaimed & percentage weight/volume)	
No materials in use on the scheme are suitable for specifying use from recycled/reclaimed sources. Signs removed from site are to be stored for reuse in the future, any signs that cannot be reused will be sent for recycling.	
Assessed by?	Ken Whyte/James Brand

Materials section 2 (was waste management, controlled waste only - reuse/recycling/disposal)	
Type of waste generated by the works (describe types and quantities in notes)	
✓	Biodegradable waste (vegetation, wood, etc)
✓	Other non-special waste
	Special/hazardous waste (see www.netregs.gov.uk for guidance)
Do the works involve disturbance of materials that may contain asbestos?	
✓	No, construction was in or after year 2000
	No, site is listed in the Asbestos Action Plan and does not contain asbestos
	Not known, site must be checked by suitably qualified specialist prior to works
	Yes, specialist contractors must be used for asbestos works
Reuse, recycling and disposal of material (controlled waste only)	
	Re-cycled materials to be used for construction (detail type, amount and reasons in notes)
	Specifications to contractor as to disposal of waste to be included in Works Orders
✓	Waste disposal is left to the contractor(s) to decide, in compliance with existing regulation.
Is a site waste management plan legally required?	
	No, project build cost is less than £300,000 (ex VAT). SWMP is still advisable as best practice
✓	Yes, project build cost is at least £300,000 (ex VAT)
Notes (including description of existing environment, impacts and mitigation (with outline budget) where relevant)	
Signs removed from site are to be stored for reuse in the future, any signs that cannot be reused will be sent for recycling. There will be some vegetation waste where sight lines are being cut. Arisings from the vegetation removal will be taken off site for safety and aesthetic reasons as the work is being carried out on a steep grass embankment between the main carriageway and slip road.	
Assessed by?	Ken Whyte/James Brand

Noise and Vibration (see DMRB Vol. 11, Section 3, Part 7)	
Noise/vibration sensitive locations within 300 m of the area affected by works (inc diversion routes)?	
✓	Residential
✓	School
	Hospital
✓	Designated areas (e.g. AONB, National Park, SAC, SPA, SSSI, etc)
✓	Others, please specify in notes
	None
Un-known	Have residents previously queried/complained about noise?
Noise/vibration sensitive locations within 2 km of the area affected by works (inc diversion routes)?	
	No
✓	Yes, specify details in notes
Will the scheme generate a change in traffic flow?	
✓	No

	Yes, specify details in notes
Will the scheme generate a change in average speed of more than 10 kph?	
✓	No
	Yes, increase, specify details in notes
	Yes, decrease, specify details in notes
Will the scheme generate a change in road layout?	
	No
✓	Yes (specify changes in notes, inc no. of lanes, elevation, etc)
Will the scheme modify existing noise mitigation? (Fences, earth bunds, etc)	
✓	No
	Yes, removal of mitigation features, specify details in notes
	Yes, provision of new mitigation features, specify details in notes
Does the scheme include resurfacing?	
✓	No
	Yes, no change to surface type
	Yes, new quiet surface. Expected reduction in noise levels of at least 2.5 dB(A)
Will there be any night works?	
	No
✓	Yes, specify details in notes

Traffic data			
Existing traffic?		**Forecast traffic with scheme?**	
AADT	**See notes**	**AADT**	**See notes**
%HGV		**%HGV**	
AADT data 1 way or 2 way?		**AADT data 1 way or 2 way?**	
Existing speed (kph)?		**Existing speed (kph)?**	

Are there areas where it is likely that works will temporarily affect noise/vibration?	
	No, no impact or no noise/vibration sensitive areas within 300 m
✓	Yes, but not significantly (works last max 30 days, no additional traffic on local roads, no earthworks, piling, etc)
	Yes, significantly
Is further assessment required?	
	No, no noise/vibration sensitive sites within 2 km or no changes that may affect noise/vibration
✓	Yes, to be carried out
	Yes, completed, see notes
Has the Local Authority been formally consulted?	
✓	No, not necessary
	No, but will be necessary
	Yes

Notes (see HA 213/08 figure 3.1 to determine further assessment requirements)

The scheme falls within a highly urbanised area with a hotel, a motel, several schools and thousands of residential properties within 300 metres of the works. Works pass through Osterley Park Registered Park and Garden/National Trust Property and close to a Country Park and Local Nature Reserve.

The scheme will be installed during night hours over a three weeks period.

The existing bus lane will be removed and the lane used instead as a normal running lane.

The traffic modelling data received suggests that there will not a change in traffic flow or speed significant enough to trigger any further assessment of noise or vibration based on DMRB requirements. It is not anticipated that the scheme will have any significant effect on noise or vibration long-term. There may be a minor adverse effect during construction only.

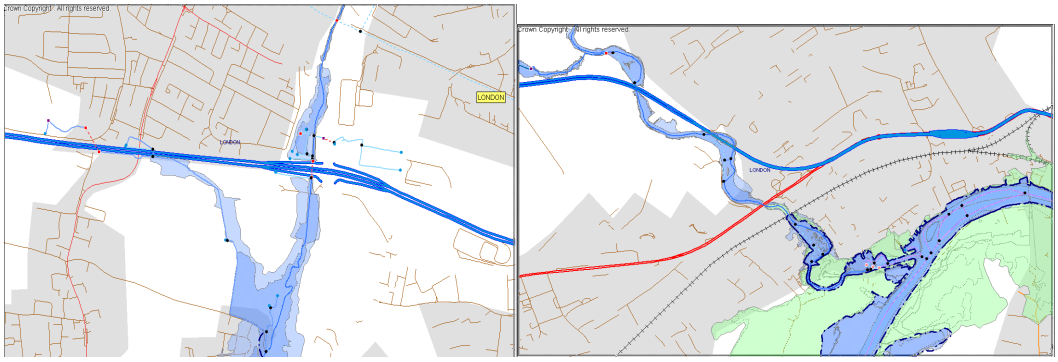
Assessed by?	James Brand

Effects on All Travellers - Vehicle Travellers (see DMRB Vol. 11, Section 3, Part 9)	
Are driver stress levels likely to increase during the works due to frustration, fear of potential accidents or uncertainty relating to the route being followed?	
✓	**No**
	Yes, specify details in notes
How long will traffic management be in place?	Three weeks at nights
What sort of traffic management will be implemented?	
	Hard shoulder closure
✓	**Lane closure**
✓	**Overnight working**
	Contra-flow
✓	**Other, specify details in notes**
	None required
Will there be diversions during the works?	
	No, not necessary
	Yes, Highways network, specify details in notes
✓	**Yes, local roads, specify details in notes**
Will journey times be increased during the works?	
	No
✓	**Yes, specify details in notes**
Will the scheme generate any long-term benefit to vehicle travellers?	
	No
✓	**Yes, specify details in notes**
Effects on All Travellers – Pedestrians, Cyclists and Equestrians (see DMRB Vol. 11, Section 3, Part 8)	
Will the works restrict access to/lengthen pedestrian routes to community facilities?	
✓	**No, no long-term restrictions**
	Yes, a pedestrian crossing will be installed/removed, specify details in notes
	Yes, a bridge or subway will be installed/removed, specify details in notes
	Yes, journeys will be lengthened, specify distance in notes
Are pedestrian routes or other public rights of way adjacent to the scheme?	
✓	**No**
	Yes, specify details in notes
Will access to the site impact on local roads, footpaths or bridleways?	
✓	**No**
	Yes, specify details in notes
Have the Local Authority and/or NMU groups been formally consulted?	
	No, not necessary
✓	**No, but will be necessary**
	Yes
Notes	
There will be 10 nights of full closures J3-2 with diversions being via the A312 and A4Slip road. The Local Authority will be consulted regarding any diversion routes using local roads. **Traffic modelling data supplied shows 'very modest savings in journey time (increases in speed) between Junction 4 and Junction 3 and that these are during the middle part of the three hour peak periods.**	

Modest savings in journey time (increases in speed) between Junction 3 and Junction 2 were noted. The results for Junction 2 to Junction 1 were less clear cut with no discernable pattern emerging'. **During the construction works there may be a minor adverse effect on vehicle travellers due to the traffic management and diversions being used. Long-term it is likely that there will be a minor, beneficial effect on vehicle travellers.**	
Assessed by?	**James Brand**

Community and Private Assets - Policies and Plans (see DMRB Vol. 11 Section 3 Part 12)				
Does the scheme fall within or adjacent to (local, regional, national) policies and/or plans that could be affected by the scheme: (e.g. Green Belts, Community Forests, etc).				
	No			
✓	**Yes, specify details in notes**			
Community and Private Assets - Land Use (see DMRB Vol. 11, Section 3, Part 6)				
Does scheme change the land use type?	✓	**No**		**Yes**
NB Use of common land, town/village greens, allotments, public open spaces may require land exchange				
Additional land required for the scheme?	✓	**No**		**Yes (area?)**
Notes				
Works fall within Hillingdon and Hounslow Greenbelts. It is not anticipated that the scheme will have any significant effect upon these or any other policies or plans.				
Assessed by?	**James Brand**			

Road Drainage and the Water Environment (see DMRB Vol. 11, Section 3, Part 10)	
Drainage system	
Will the works affect the drainage system?	
✓	**No, no change to drainage system and no change to road or land drainage catchment areas**
	Yes, road or land drainage catchment area changing, specify details in notes
	Yes, change to discharge feature and/or volume, specify details in notes
	Yes, change to containment and/or treatment systems, specify details in notes
	Yes, other, specify details in notes
What is the existing drainage system?	
	Direct discharge to surface water
	Direct discharge to ground water
	Containment only before discharge (e.g. balancing pond)
	Containment and / treatment before discharge (e.g. treatment pond)
✓	**Unknown**
Is there room for drainage improvement (containment/treatment) including maintenance operation in the area of works?	
✓	**No**
	Yes, specify details in notes
Will the project increase traffic flow by more than 20%?	
✓	**No**
	Yes, specify details in notes
Will the project change the number or type of junctions?	
✓	**No**
	Yes, specify details in notes
Surface water	
The scheme is within the catchment of the River	**Crane and Brent then Thames**

Are any aspects of the works within 16 m of the tidal Thames or 10 m of any other watercourse (inc. rivers, streams, land drains, etc)?	
	No
✓	**Yes, specify details in notes**
Is the scheme located in or adjacent to an indicated floodplain?	
	No
✓	**Yes, specify details in notes, inc EA map**
Is the scheme located with 10 m of a flood defence?	
✓	**No**
	Yes, specify details in notes, inc EA map
Will the scheme affect discharge to surface water (including sediment load)?	
✓	**No, no changes to road or natural land drainage catchments, or discharge is to groundwater**
	Yes, temporarily during construction or maintenance, specify details in notes
	Yes, long-term change to drainage/catchment, specify details in notes
Is the scheme upstream of a designated site?	
	No
✓	**Yes, specify details in notes**
Groundwater	
Is the scheme located in a groundwater source protection zone?	
✓	**No**
	Yes
Will the scheme affect discharge to groundwater?	
✓	**No, no changes to road or natural land drainage catchments, or discharge is to surface water**
	Yes, temporarily during construction or maintenance, specify details in notes
	Yes, long-term change to drainage/catchment, specify details in notes
What is the maximum depth of any excavation/boring work?	**2 metres**
Could storage of materials pose a risk to watercourses/water features?	
	No
✓	**Yes**
Has the Environment Agency been formally consulted?	
✓	**No, not necessary**
	No, but will be necessary
	Yes
Notes (inc maps where appropriate)	
Works are over the Rivers Crane and Brent and fall within their floodplains, see maps below. Works within the floodplains and over the rivers consist of carriageway markings and stud replacements, sign plate removals or replacements. This type of work does not require Environment Agency consent.  **It is not anticipated that there will be any significant effect upon the water environment or drainage from**	

the scheme.	
Assessed by?	**James Brand**

Drawings

See OnePlace scheme folder.

Site location plan

Relevant photographs

Environmental Mitigation Requirements for Works

The Environmental Works Information must be included in the Works Information package supplied to the Contractor.

Environmental Input for Works Information

Series 100 - Preliminaries

1/7 Site Extent and Limitations on Use

Site extent

The site shall be defined as the area of completed works together with any area occupied during the period of construction or improvement by requisite apparatus, equipment, machinery, materials, plant, spoil heaps, storage compounds or other such facilities and access routes. The Environment Team shall confirm the extent of site and access routes with the Site Team and Contractor before works commence.

Limitations on use of the site

No personnel, vehicle, machinery or material storage or use shall occur outside the extent of site. Vehicles and machinery shall use existing hard-standing areas where possible and movement of machinery shall be minimised within the site. Vehicles and machinery shall be turned off when not in use. Works shall stop immediately if features of archaeological interest are found and the Environment Team be contacted for advice.

1/9 Control of Noise & Vibration

Maximum permissible noise levels for works must be agreed with the Local Authority prior to works commencing and must be adhered to.

Series 200 – Site Clearance

All clearance involving vegetated areas and tree works shall be conducted in accordance with Series 3000.

Series 3000 – Landscape and Ecology

30/1 General Requirements

Works shall adhere to best practice as specified in 'CIRIA C650 EUU Environmental Good Practice on Site'. Metal posts, wood and other materials shall be disposed of at recycling facilities where appropriate and licensed tips where not.

30/10 Maintenance of established trees and shrubs

The Contractor shall note the following:

- All works should be undertaken in accordance with BS 5837:2005 'Trees in Relation to Construction', including the establishment of adequate root protection zones where excavations occur within proximity of trees.
- No storage of machinery or equipment shall be undertaken under the canopy of any tree.
- Arisings from vegetation clearance shall be removed from site.
- Roots of retained trees will be protected in accordance with BS5837.

30/12 Special Ecological Measures

Inductions

The Contractor shall ensure that all site personnel have attended an environmental toolbox talk before works commence, which shall be given by a member of the Environment Team or

appropriately trained construction supervisor. The toolbox talk shall include an induction on the procedures to follow in the event that environmental issues arise during works.

Protected species site check

Prior to works commencing the Environment Team or inducted personnel shall conduct a check of the site and immediate surrounds for protected species / signs.

Ecological Watching Brief

The Ecologist shall maintain a watching brief as required during all stages of the works.

Nesting bird survey

If any works are being carried out during the nesting season (March to July) prior to works commencing the Environment Team or inducted personnel shall conduct a nesting bird survey of the site and immediate surrounds.

Active nesting birds

Should any active bird nests be found on site or within 5 m of the site during works, the Contractor shall cease work immediately, if safe to do so, and inform the Environment Team. No further works shall be undertaken until confirmation has been received from the Environment Team, which may include installation of a minimum 3 m buffer zone around the active bird nests for no works to occur within the buffer zone.

Bat Mitigation

Lighting for night works shall be directional to minimise splay into the surrounding landscape. Trees/shrubs must be inspected for signs of bats prior to any works being carried out upon them.

Badger Mitigation

The Contractor shall ensure that all food/rubbish are stored securely in containers at all times. Lighting for night works shall be directional to minimise splay into the surrounding landscape.

Protected Species/Invasive Species

Should any protected species/signs or invasive pest species be found during works the contractor shall cease work immediately and inform the Environment Team. No further works shall be undertaken until permission has been received from the Environment Team. The contractor shall note that works shall not continue if works cause risk of disturbing hibernating animals.

Protected species licence risk

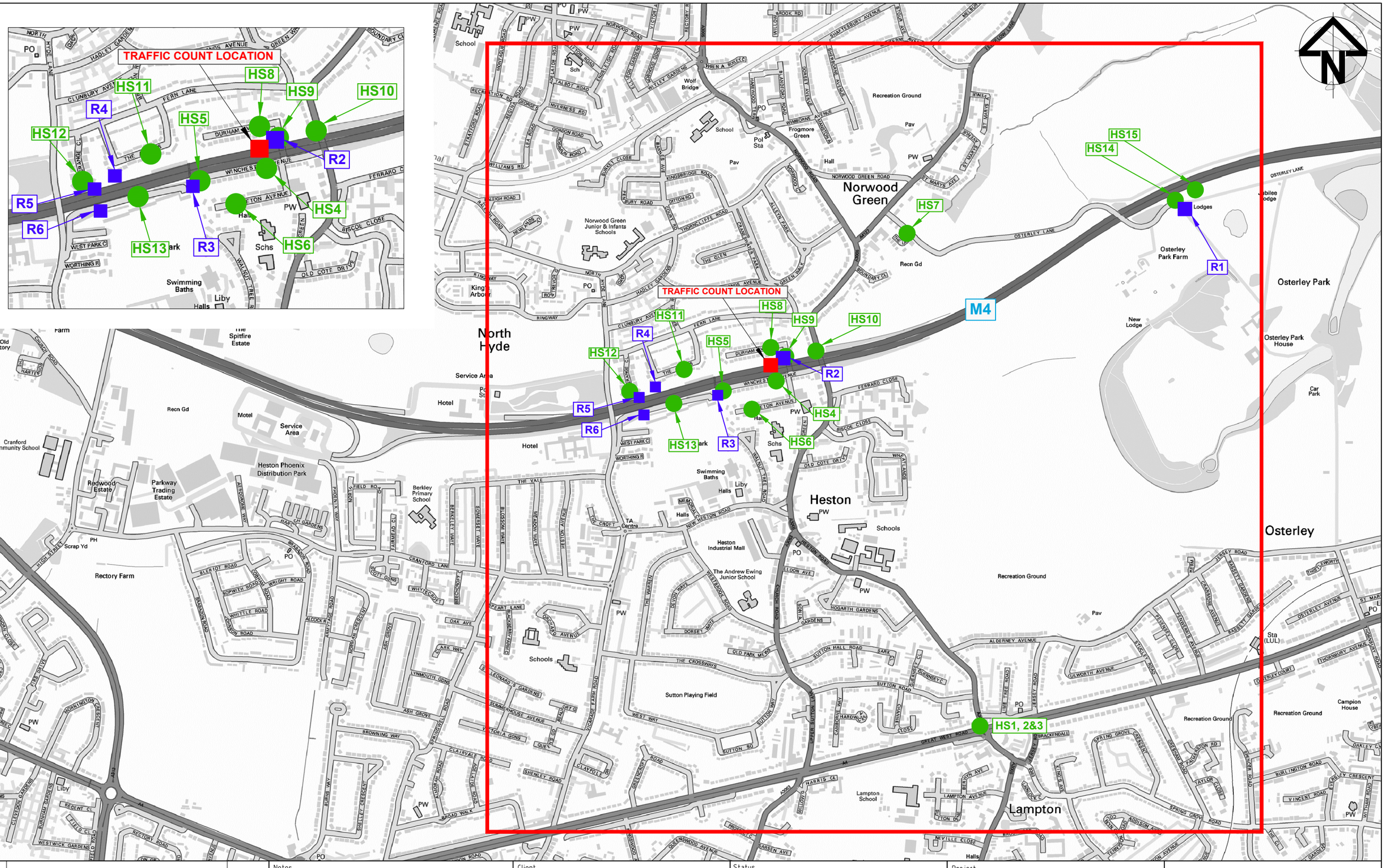
In the event that a protected species licence is required for works, as confirmed by the Environment Team, works shall cease immediately and not re-commence until the licence has been obtained and confirmation received from the Environment Team.

Compiled by?	**James Brand**

Copies of pollution response plans if available
None available for this location.

Appendix B

Air Quality Monitoring Locations



01		JAN 12
Issue	Description	Date

50mm on Original

Notes

- STUDY AREA
- DIFFUSION TUBE LOCATIONS
- RECEPTOR LOCATIONS
- TRAFFIC COUNT LOCATION

Client

HIGHWAYS AGENCY

Status

Scales	N.T.S	Current Issue Signatures	
		Author J.NORMAN	
Original Size	A3	Checker H.BESWICK	
Datum	DATUM	Approver S.PYATT	
Grid	GRID	© Copyright reserved	
Filename	001-UA003263-UE31D-01-STUDY-DIFF-REC-LOC.DWG		

Project

M4 BUS LANE
AIR QUALITY STUDY

Title

FIGURE 1 - STUDY AREA, DIFFUSION TUBE LOCATIONS AND RECEPTOR LOCATIONS

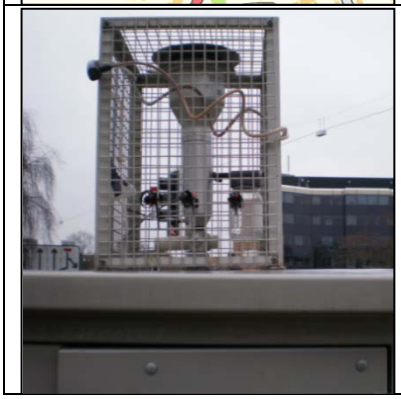
Halcrow Hyder Joint Venture

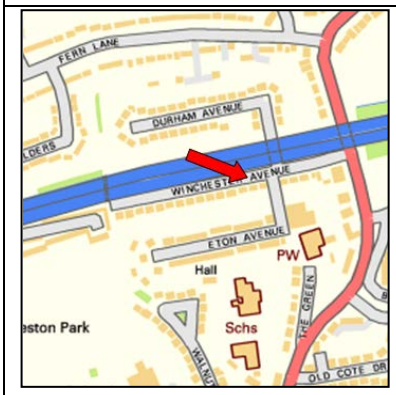
Hyder Consulting (UK) Limited
330 Firecrest Court
Centre Park
Warrington
WA1 1RG
Tel: +44 (0)1925 800700
Fax: +44 (0)1925 572462

Drawing No.	Project No.	Issue
001	UA003263	01

Plot Date: 17/Jan/2012 10:38:13 AM File Location: K:\PROJECTS\UA003263-M4-BUS-LANE\E-OUR-DRAWINGS\001-UA003263-UE31D-01-STUDY-DIFF-REC-LOC.DWG VER

Monitoring Locations

Site Details	Diffusion Tube ID	HS1, HS2 and HS3
	**Site Name**	Heston Road Triplicate
	Grid Reference	513655,176837
	Site Description	Co-located with the CMS at Heston Rd/ A4 junction.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	HS1 = 50.6 HS2 = 52.4 HS3 = 51.6

Site Details	Diffusion Tube ID	HS4
	**Site Name**	Winchester Avenue (1)
	Grid Reference	513014,177923
	Site Description	Lamp post on Winchester Avenue (East)
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	47.5

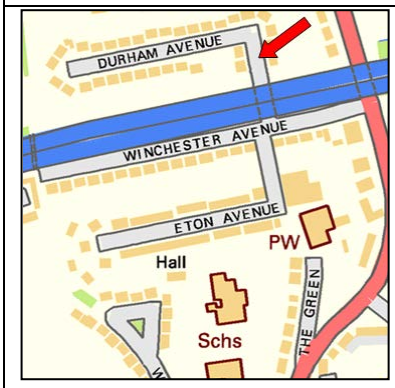
Site Details	Diffusion Tube ID	HS5

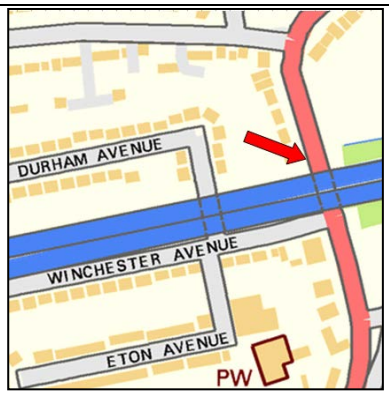
	**Site Name**	Winchester Avenue (2)
	Grid Reference	512850,177890
	Site Description	Lamp post on Winchester Avenue (West)
	**Data Capture**	83%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	47.5

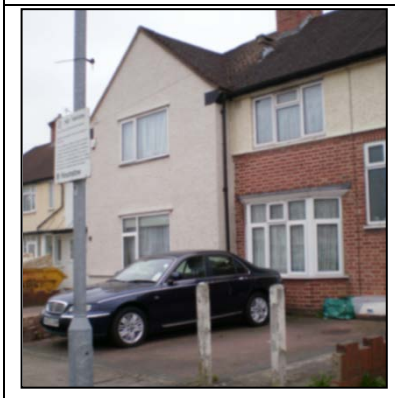
Site Details	**Diffusion Tube ID**	HS6
	**Site Name**	Eton Avenue
	Grid Reference	512938,177833
	Site Description	Lamp post on south facing side of the street.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	39.0
Site Details	**Diffusion Tube ID**	HS7

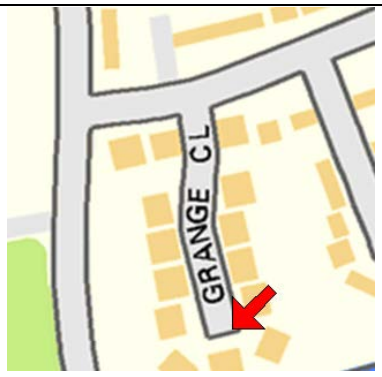
	**Site Name**	Osterley Lane (background)
	Grid Reference	513425,178387
	Site Description	Lamp post at junction of Osterley Lane/ The Lawn outside residential property.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	32.6

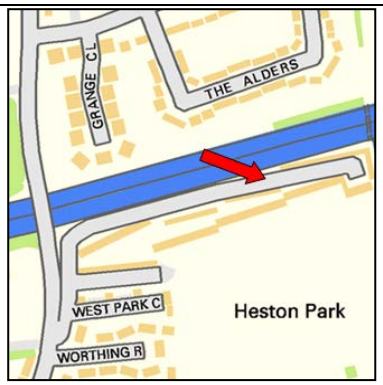
Site Details	**Diffusion Tube ID**	HS8
	**Site Name**	Durham Avenue (1)
	Grid Reference	512997,178029
	Site Description	Lamp post on north facing side of the street.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	47.8

Site Details	Diffusion Tube ID	HS9
	**Site Name**	Oxford Avenue
	Grid Reference	513044,178000
	Site Description	Lamp post on west facing side of the street.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) ($\mu g/m^3$)	43.6

Site Details	Diffusion Tube ID	HS10
	**Site Name**	Heston Road
	Grid Reference	513139,178017
	Site Description	Lamp post on west facing side of street approximately 20m from the M4 flyover.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) ($\mu g/m^3$)	76.9

Site Details	Diffusion Tube ID	HS11
	**Site Name**	The Alders
	Grid Reference	512723,177960
	Site Description	Lamp post on south facing side of street.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	42.2

Site Details	Diffusion Tube ID	HS12
	**Site Name**	Grange Close
	Grid Reference	512553,177891
	Site Description	Lamp post at end of street nearest to M4.
	**Data Capture**	100%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	46.0

Site Details	Diffusion Tube ID	HS13
	**Site Name**	Heston Grange Lane
	Grid Reference	512691,177853
	Site Description	Lamp post adjacent to M4 boundary fence.
	**Data Capture**	50%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	49.8

Site Details	Diffusion Tube ID	HS14
	**Site Name**	Osterley Lane M4 (1)
	Grid Reference	514269,178492
	Site Description	Mounted on fence of footpath/ track approximately 50m from M4.
	**Data Capture**	83%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) (µg/m^3)	48.5

Site Details	Diffusion Tube ID	HS15
	**Site Name**	Osterley Lane M4 (2)
	Grid Reference	514333,178525
	Site Description	Mounted on fence of footpath/ track approximately 10m from M4.
	**Data Capture**	83%
	Sampler	NO_2 Diffusion Tube
	Commissioned	17/03/2011
	Decommissioned	13/09/2011
	Average NO_2 Concentration (raw data) ($\mu g/m^3$)	42.5

Appendix C

Air Quality Modelling Traffic Data

Traffic Flow Data

The traffic data used in the assessment is presented in Tables A1 and A2, the Links are presented in Figure C1.

Table C1 2010 Traffic Data – With Bus Lane

Road Link	Day(s) Data Applies to	Time Period Data Applies to	Traffic Flow	HDV Proportion of Fleet (%)	Speed (km/hr)
Link1	Weekday	AM	7314	6.9	55.2
Link1	Weekday	IP	14339	6.0	88.1
Link1	Weekday	PM	8677	1.7	71.6
Link1	Weekday	OP	13399	9.0	90.7
Link1	Saturday	AM	6913	4.8	91.0
Link1	Saturday	IP	15887	2.0	77.6
Link1	Saturday	PM	7956	1.6	70.5
Link1	Saturday	OP	11542	6.6	92.6
Link1	Sunday	AM	5706	3.3	93.5
Link1	Sunday	IP	14860	1.1	70.8
Link1	Sunday	PM	7828	0.5	48.2
Link1	Sunday	OP	13323	3.8	90.2
Link2	Weekday	AM	1279	14.0	84.9
Link2	Weekday	IP	1458	14.0	96.7
Link2	Weekday	PM	832	14.0	90.7
Link2	Weekday	OP	1273	14.0	97.4
Link2	Saturday	AM	740	13.0	98.2
Link2	Saturday	IP	1586	13.0	93.7
Link2	Saturday	PM	750	13.0	90.9
Link2	Saturday	OP	788	13.0	99.6
Link2	Sunday	AM	697	13.0	99.9
Link2	Sunday	IP	1744	13.0	92.4
Link2	Sunday	PM	1151	13.0	82.8
Link2	Sunday	OP	1308	13.0	98.0
Link3	Weekday	AM	10359	5.1	102.1
Link3	Weekday	IP	18064	8.8	105.5
Link3	Weekday	PM	10337	4.5	102.6
Link3	Weekday	OP	15963	8.0	108.3

Road Link	Day(s) Data Applies to	Time Period Data Applies to	Traffic Flow	HDV Proportion of Fleet (%)	Speed (km/hr)
Link3	Saturday	AM	8034	4.7	106.4
Link3	Saturday	IP	19441	3.4	106.9
Link3	Saturday	PM	9285	2.7	103.5
Link3	Saturday	OP	14951	5.5	106.1
Link3	Sunday	AM	6446	3.3	108.4
Link3	Sunday	IP	18293	2.4	106.2
Link3	Sunday	PM	9799	2.4	101.3
Link3	Sunday	OP	16405	3.7	107.1

Note: Link 1 represents the first two lanes of the eastbound carriageway, link 2 represents the Bus Lane, link 3 represents the three lanes going westbound.

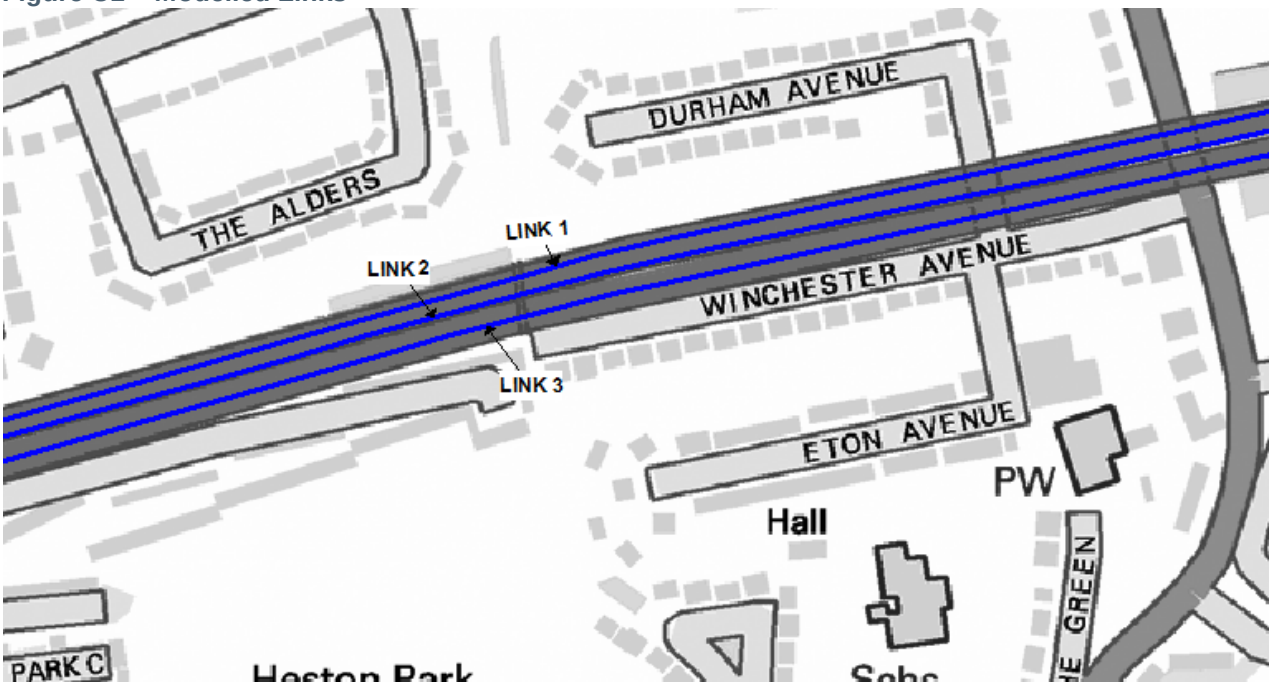
Table C2 2011 Traffic Data – Without Bus Lane

Road Link	Day(s) Data Applies to	Time Period Data Applies to	Traffic Flow	HDV Proportion of Fleet (%)	Speed (km/hr)
Link1	Weekday	AM	6008	13.6	71.7
Link1	Weekday	IP	12618	9.6	93.0
Link1	Weekday	PM	6633	4.3	89.6
Link1	Weekday	OP	11567	13.2	94.2
Link1	Saturday	AM	5897	8.8	94.0
Link1	Saturday	IP	13603	4.4	93.6
Link1	Saturday	PM	6600	3.6	90.3
Link1	Saturday	OP	10625	9.0	95.0
Link1	Sunday	AM	5076	6.2	94.7
Link1	Sunday	IP	14294	3.4	93.3
Link1	Sunday	PM	6700	3.6	76.8
Link1	Sunday	OP	11515	6.3	91.5
Link2	Weekday	AM	2642	0.0	82.5
Link2	Weekday	IP	3236	0.0	110.6
Link2	Weekday	PM	3144	0.0	103.7
Link2	Weekday	OP	3719	0.0	110.7
Link2	Saturday	AM	1835	0.0	110.5
Link2	Saturday	IP	3687	0.0	110.9
Link2	Saturday	PM	2340	0.0	106.1

Road Link	Day(s) Data Applies to	Time Period Data Applies to	Traffic Flow	HDV Proportion of Fleet (%)	Speed (km/hr)
Link2	Saturday	OP	2256	0.0	112.5
Link2	Sunday	AM	1309	0.0	111.9
Link2	Sunday	IP	4528	0.0	109.6
Link2	Sunday	PM	3027	0.0	88.6
Link2	Sunday	OP	3569	0.0	106.6
Link3	Weekday	AM	10539	4.5	106.4
Link3	Weekday	IP	18726	7.9	106.8
Link3	Weekday	PM	11010	3.8	103.8
Link3	Weekday	OP	16339	6.7	107.9
Link3	Saturday	AM	8100	4.1	108.4
Link3	Saturday	IP	19624	3.2	108.2
Link3	Saturday	PM	9656	3.1	103.0
Link3	Saturday	OP	14733	4.8	108.1
Link3	Sunday	AM	6847	3.2	109.0
Link3	Sunday	IP	19108	2.4	107.8
Link3	Sunday	PM	10248	2.3	101.7
Link3	Sunday	OP	16434	3.4	107.8

Note: Link 1 represents the first two lanes of the eastbound carriageway, link 2 represents the Bus Lane, link 3 represents the three lanes going westbound.

Figure C1 – Modelled Links

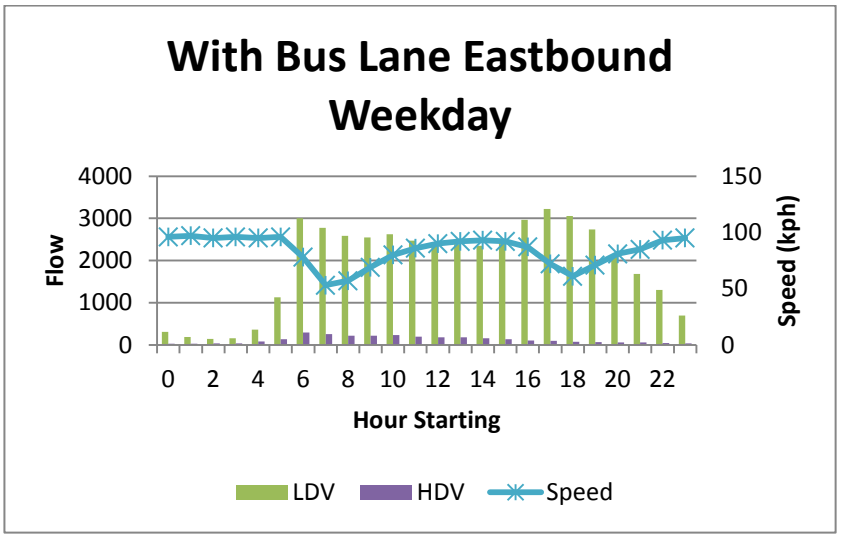


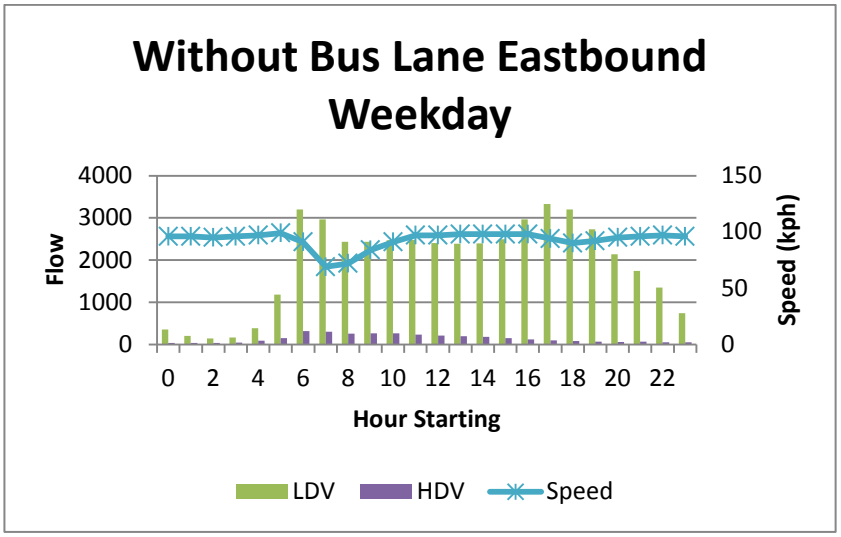
To further illustrate the impact of the bus lane on traffic flows, graphs showing the flows and speeds for each hour during the weekday and Saturday and Sunday were compiled and presented in the following sections.

Weekday Flows

Figure C2 illustrate the traffic flows on the Eastbound carriageway (where the Bus lane is located) during the weekday (i.e. an average of the flows between Monday and Friday), with and without the Bus Lane.

Figure C2 – Weekday With and Without Bus Lane Traffic Flows Eastbound Carriageway

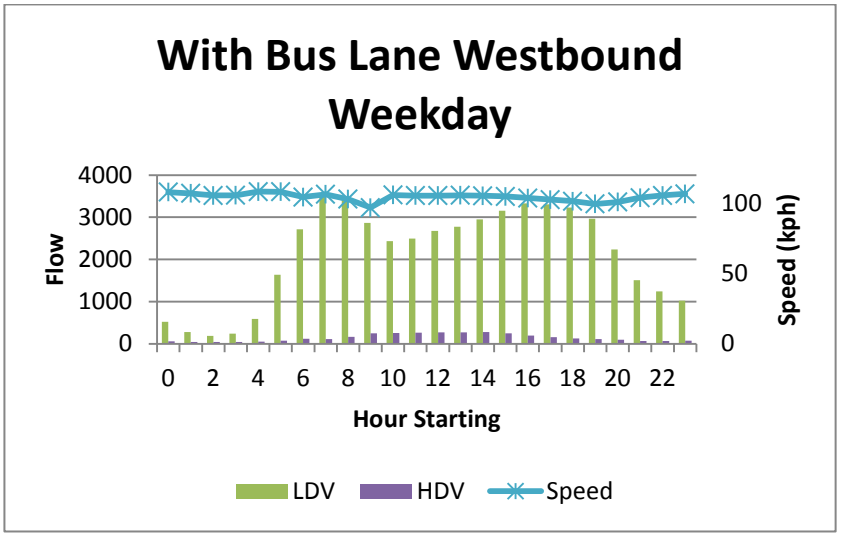


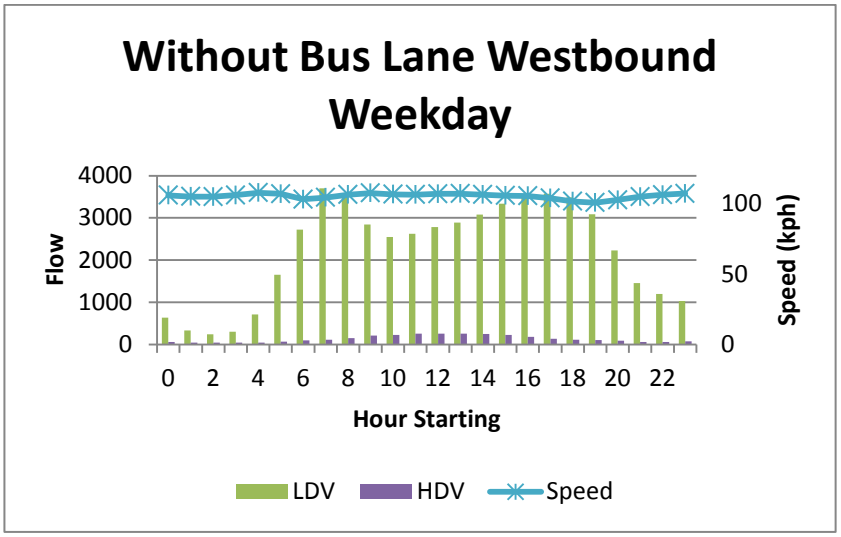


The figures illustrate that flows with and without the Bus Lane are similar both for Light Duty Vehicles (LDV) (cars and vans) and HDV (Heavy Goods Vehicles and buses/coaches). Conversely speeds do show a different pattern between the two sets of traffic data. Speeds during rush hour are lower in both the morning and evening rush hour periods with the bus lane.

Figure C3 illustrates the traffic flows on the Westbound carriageway both with and without the Bus Lane.

Figure C3 – Weekday With and Without Bus Lane Traffic Flows Westbound Carriageway



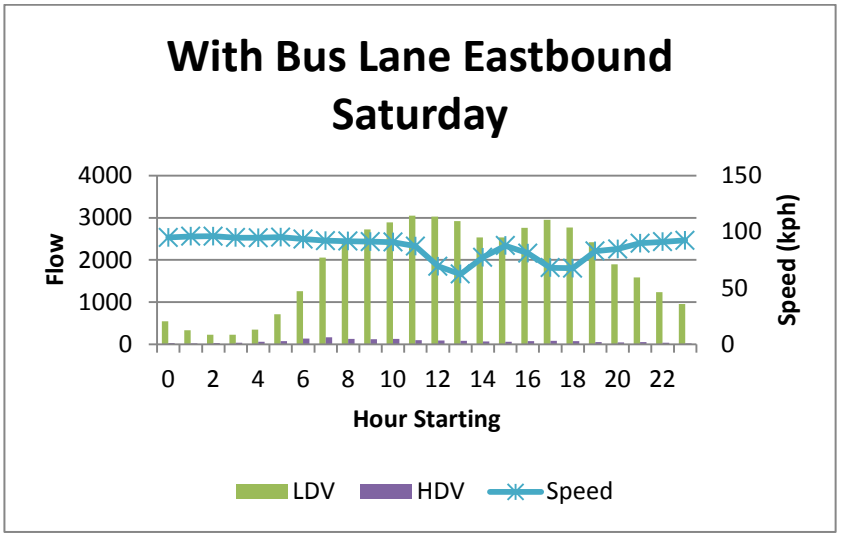


As expected Figure C3 illustrates that there is very little change in traffic flows on the Westbound carriageway as a result of the bus lane removal.

Saturday Flows

Figure C4 illustrates the Saturday flows on the Eastbound carriageway both with and without the Bus Lane.

Figure C4 – Saturday With and Without Bus Lane Traffic Flows Eastbound Carriageway



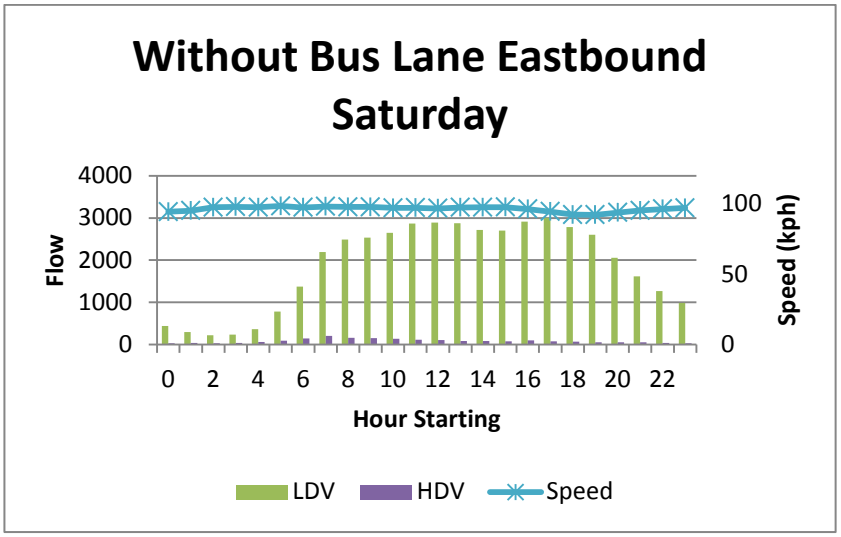
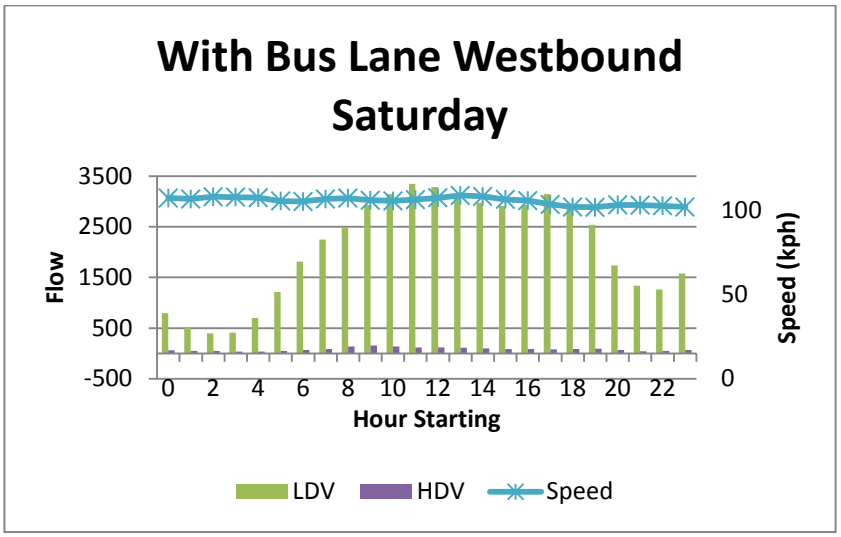
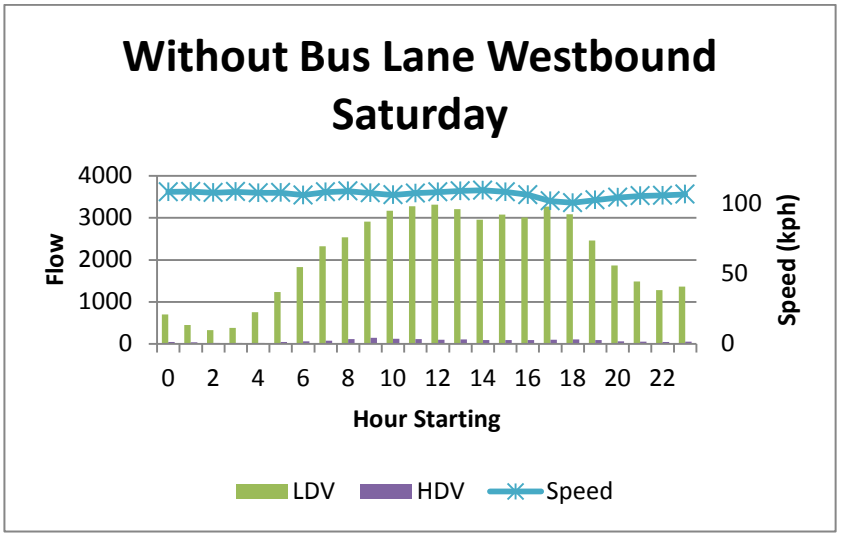


Figure C4 illustrates that the most notable change between the with and without Bus Lane scenarios relates to the speeds between 10:00 and 19:00 hrs.

Figure C5 illustrates the Westbound carriageway traffic flows both with and without the Bus Lane.

Figure C5 – Saturday With and Without Bus Lane Traffic Flows Westbound Carriageway



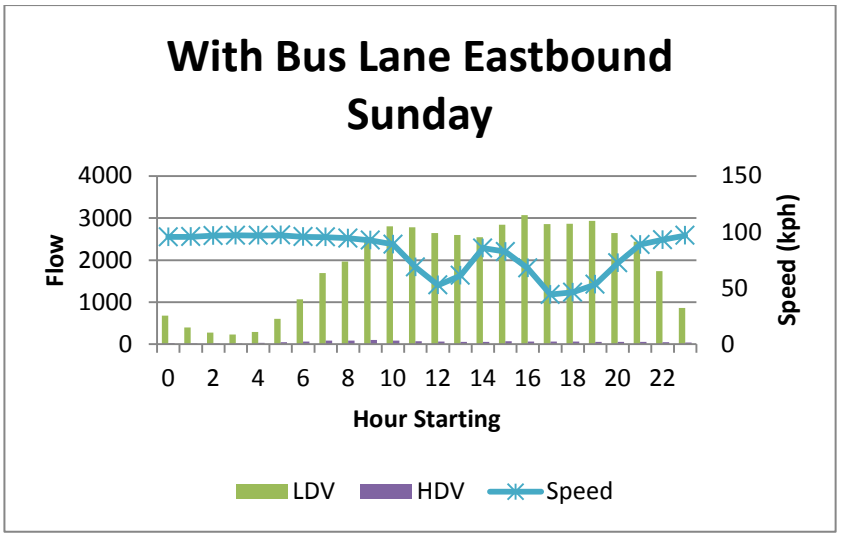


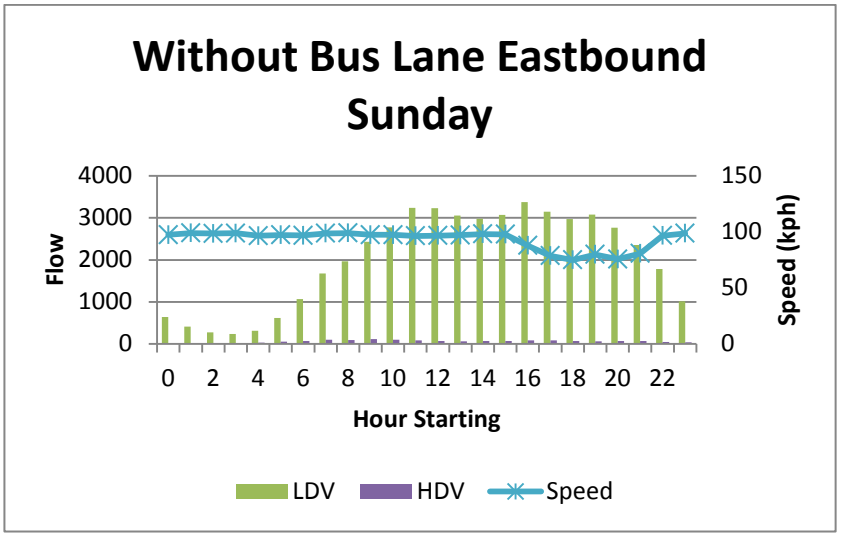
As with the weekday traffic flows the Saturday westbound flows are not significantly affected by the removal of the Bus Lane.

Sunday Flows

Figure C6 illustrates the Sunday flows on the Eastbound carriageway both with and without the bus lane.

Figure C6 – Sunday With and Without Bus Lane Traffic Flows Eastbound Carriageway

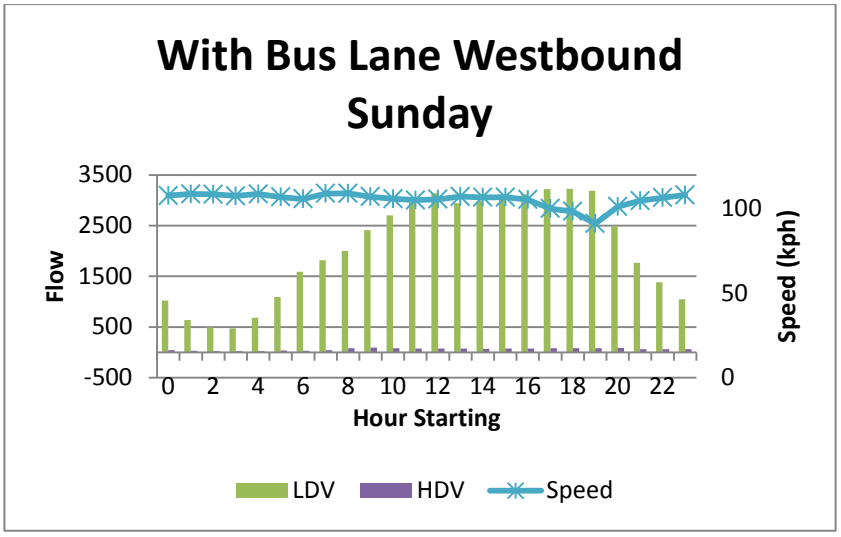


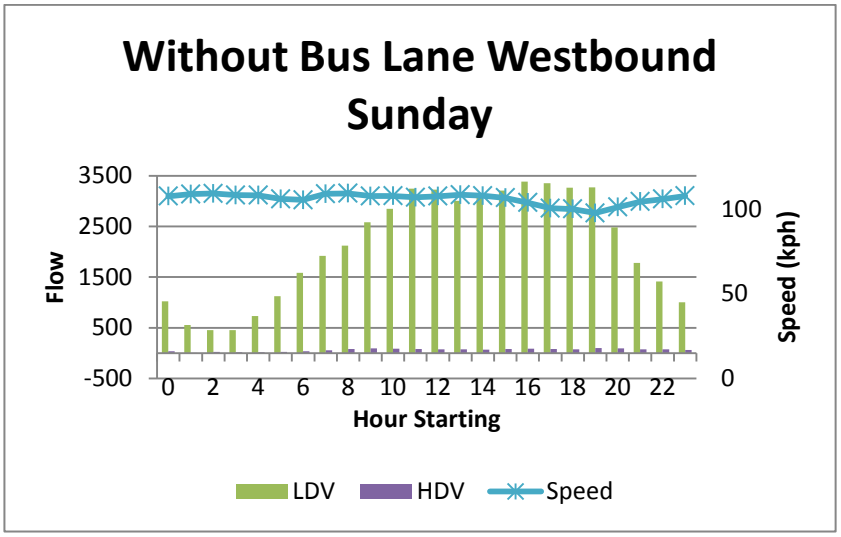


As with the Saturday traffic flows, the speeds as a result of the Bus Lane removal are affected on the eastbound carriageway. The removal of the Bus Lane allows traffic to flow at a higher speed.

Figure C7 illustrates the Westbound carriageway traffic flows both with and without the bus lane.

Figure C7 – Sunday With and Without Bus Lane Traffic Flows Westbound Carriageway





As with the Saturday and weekday flows the westbound traffic flows are not significantly affected by the removal of the bus lane.

Appendix D

Air Quality Model Verification

Emission Factors

The variation in emissions was taken into account in the model by using a fac-file for links the Eastbound and Westbound M4 carriageway. The emission factor toolkit v4.2.2 were used to calculate emission rates for each period during the weekday, Saturday and Sunday, for the with and without Bus Lane scenarios. These were incorporated into a fac-file to ensure that the variation in emission rates was accounted for in the model.

Meteorological Data

Meteorological data used in this assessment was taken from Heathrow meteorological station over the period 1st January 2011 to 31st December 2011 (inclusive). Heathrow observation station is located at National Grid Reference (NGR): 507800, 176700 which is approximately 4.25km west of the study area. LAQM.TG(09) recommends meteorological stations within 30km of an assessment area as being suitable for use in detailed modelling.

Figure D1 presents the wind rose for the Heathrow station for 2011.

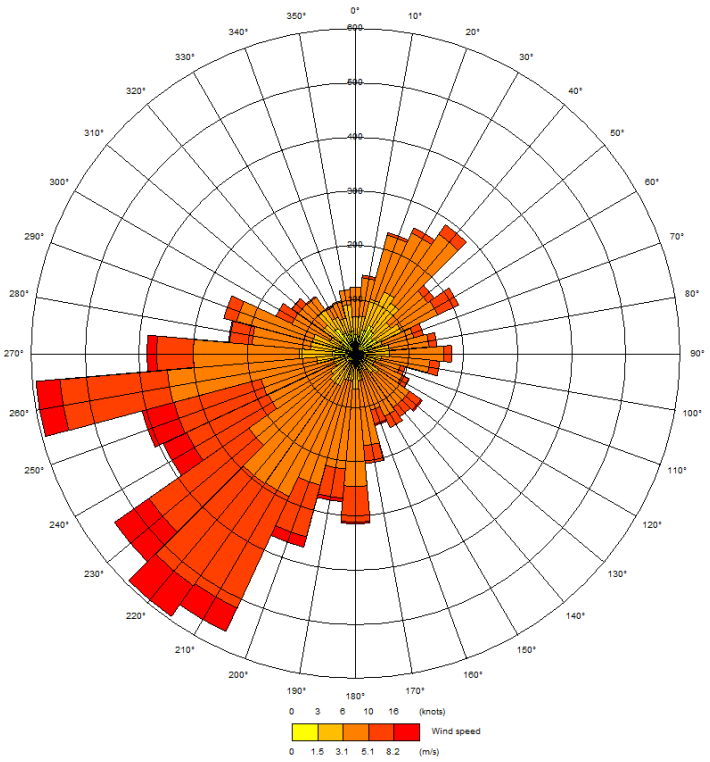


Figure D1 2011 Wind Rose for Heathrow

Roughness Length

A roughness length (z_0) of 0.5m was used, which was considered appropriate for the morphology of the dispersion modelling assessment area and is suggested within ADMS-Roads as being suitable for 'open suburbia'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A Monin-Obukhov length of 100m was used in this dispersion modelling study for all study areas. This value is considered appropriate for nature of the assessment area and is suggested within ADMS-Roads as being suitable for 'large conurbations with a population of greater than a million'.

Background Concentrations

As stated previously, the bias and annually adjusted HS7 diffusion tube concentration was used within the modelling as a background concentration.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations from the dispersion modelling were converted to NO_2 concentrations using version 2.1 of the NO_x to NO_2 spreadsheet provided by DEFRA.

Model Verification

The systematic and random error in the raw outputs from the ADMS-Roads dispersion modelling study was assessed through verification with local monitoring results. The without Bus Lane scenario was run for 2011 (i.e. the situation that existed during the diffusion tube monitoring) using the input data previously detailed and compared with the monitoring results shown in Table D1. The NO_2 concentrations measured by the diffusion tubes as sites appropriate for model verification were compared to the modelled NO_2 concentrations presented in Table D1.

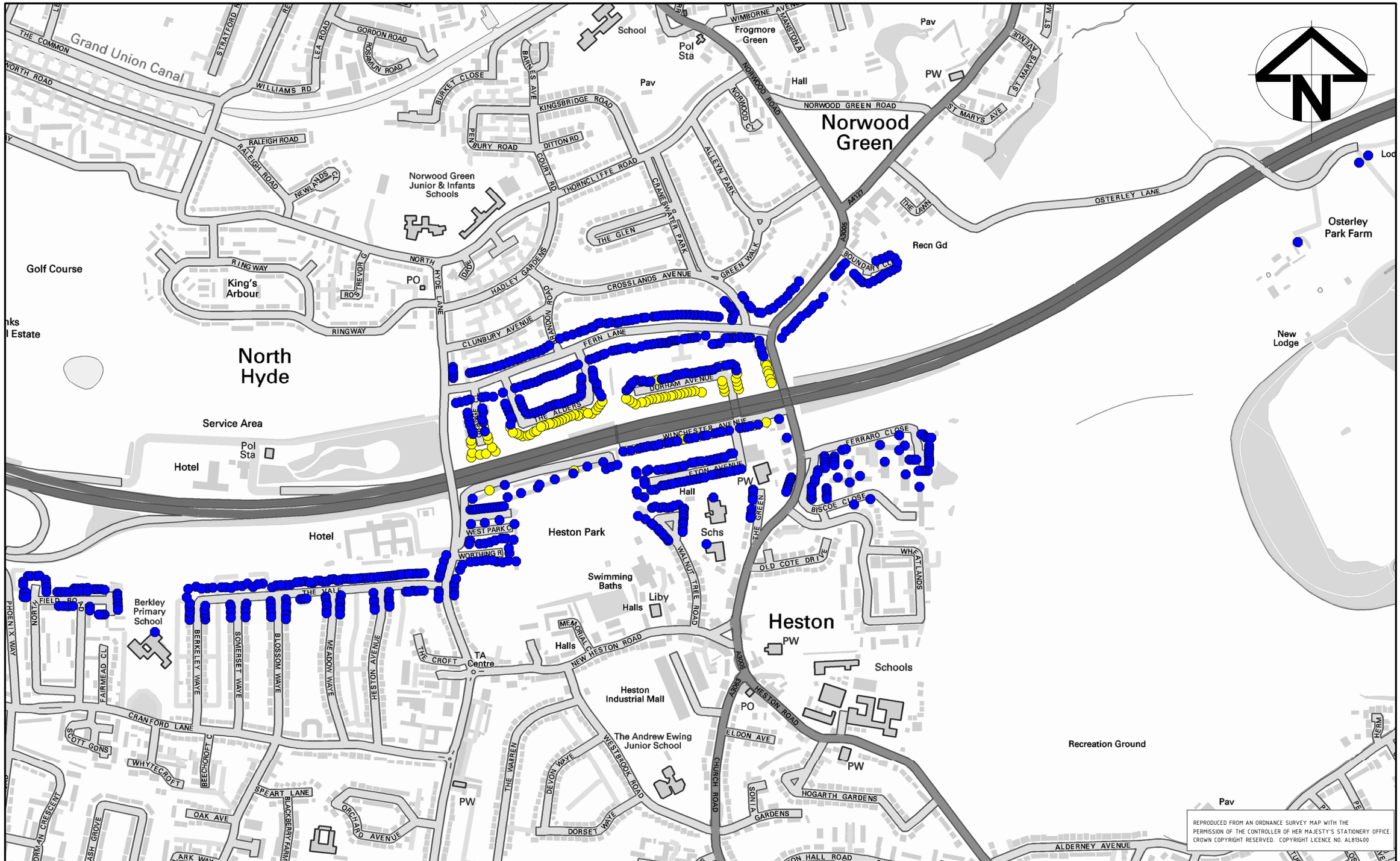
Table D1 Monitoring and Adjusted Modelled Results – NO_2

Site ID	Monitored* Total NO_2 (µg/m³)	Modelled Total NO_2 (µg/m³)	% Difference
HS4	54.4	50.5	7.2
HS5	54.4	52.1	4.3
HS6	44.7	41.9	6.2
HS7	37.3	39.0	-4.5
HS8	54.7	44.1	19.5
HS9	49.9	50.1	-0.3
HS11	48.3	44.2	8.6
HS12	52.7	46.6	11.5
HS13	57.0	54.2	5.0
HS14	55.6	52.6	5.4
HS15	48.7	56.2	-15.5
HS4	54.4	50.5	7.2

Table D1 indicates that the model is performing well, with the difference between modelled and monitored NO_2 being within 25%, therefore the results require no further adjustment, as advocated by LAQM.TG(09).

Appendix E

Additional Air Quality Receptor Results



Change in Nitrogen Dioxide Concentration (Without Bus Lane)

- 0 - 0.39 µg/m³ (<1 percent of AQ threshold)
- 0.4 - 1 µg/m³ (1 - 2.5 percent of AQ threshold)

Issue	Description	Date
01		OCT12

50mm on Original

Client: HIGHWAYS AGENCY

Status

Scales	1:10000	Current Issue Signatures	
		Author	T.Wright
Original Size	A3	Checker	S.Pyatt
Datum		Approver	S.Pyatt
Grid		© Copyright reserved	

Filename:

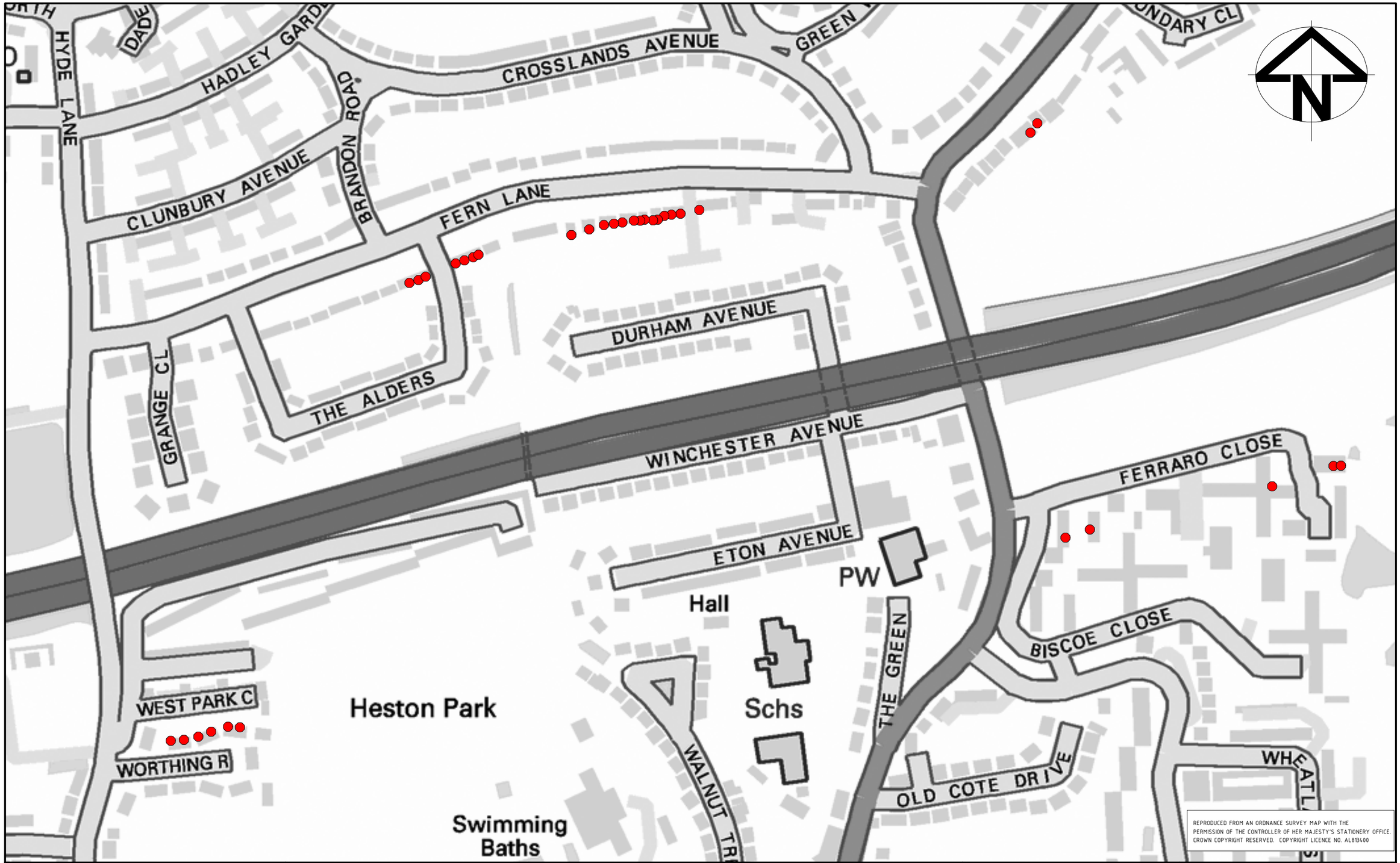
Project: M4 BUS LANE AIR QUALITY STUDY

Title: FIGURE 2 AIR QUALITY: MODELLED EXTRA RECEPTORS

Halcrow Hyder Joint Venture

Hyder Consulting (UK) Limited
330 Firecrest Court
Centre Park
Warrington
WA1 1RG
Tel: +44 (0)870 000 3008
Fax: +44 (0)870 000 3908

Drawing No.	Project No.	Issue
002	UA003269	01



Issue	Description	Date
01		OCT12

50mm on Original

Predicted Additional Receptor Exceedance (When Concentration Rounded) Without Bus Lane

Client: HIGHWAYS AGENCY

Status

Scales	1:10000	Current Issue Signatures	
		Author	T.Wright
Original Size	A3	Checker	S.Pyatt
Datum		Approver	S.Pyatt
Grid		© Copyright reserved	

Filename:

Project: M4 BUS LANE AIR QUALITY STUDY

Title: FIGURE 3 AIR QUALITY: ADDITIONAL RECEPTOR EXCEEDANCES

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Drawing No.	Project No.	Issue
003	UA003269	01

Table E1 - Additional Receptor Results

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R1	511660.5	177638.7	38.1	38.2	0.1
R2	511665.6	177638.7	38.2	38.2	0
R3	511671.3	177638.7	38.2	38.2	0
R4	511677	177638.8	38.2	38.3	0.1
R5	511682.9	177639	38.2	38.3	0.1
R6	511695.7	177631	38.3	38.3	0
R7	511696	177623.3	38.3	38.3	0
R8	511696.4	177616.3	38.2	38.3	0.1
R9	511696.7	177606.8	38.2	38.3	0.1
R10	511650.9	177627.7	38.1	38.1	0
R11	511651.2	177621.1	38.1	38.1	0
R12	511651.9	177605.9	38.1	38.1	0
R13	511657.1	177605.7	38.1	38.1	0
R14	511651.5	177597	38	38.1	0.1
R15	511657.3	177596.7	38.1	38.1	0
R16	511718.3	177607.1	38.3	38.4	0.1
R17	511725.5	177606.9	38.3	38.4	0.1
R18	511733.8	177606.9	38.4	38.4	0
R19	511743.1	177607.1	38.4	38.5	0.1
R20	511721.4	177579.1	38.2	38.3	0.1
R21	511731.2	177579.1	38.3	38.3	0
R22	511739.8	177578.9	38.3	38.3	0
R23	511749.3	177579.1	38.3	38.4	0.1
R24	511782.3	177578.4	38.4	38.5	0.1
R25	511782.3	177570.6	38.4	38.4	0
R26	511751.4	177614	38.5	38.5	0
R27	511751.4	177609.5	38.5	38.5	0
R28	511758.3	177614	38.5	38.6	0.1
R29	511758.5	177608.6	38.5	38.5	0

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R30	511767.8	177614.5	38.6	38.6	0
R31	511767.8	177609.3	38.5	38.6	0.1
R32	511777.8	177615	38.6	38.7	0.1
R33	511778.3	177608.8	38.6	38.6	0
R34	511791.1	177612.6	38.7	38.7	0
R35	511797	177612.8	38.7	38.7	0
R36	511804.6	177612.4	38.7	38.8	0.1
R37	511811.5	177611.7	38.7	38.8	0.1
R38	511836.4	177604.3	38.8	38.8	0
R39	511836.7	177598.8	38.7	38.8	0.1
R40	511836.9	177592.6	38.7	38.7	0
R41	511837.4	177585.1	38.6	38.7	0.1
R42	511837.6	177578.6	38.6	38.6	0
R43	511837.9	177571.7	38.5	38.6	0.1
R44	511910.3	177528.3	38.4	38.5	0.1
R45	511811	177562.7	38.4	38.5	0.1
R46	511805.9	177562.5	38.4	38.5	0.1
R47	511800	177562.5	38.4	38.4	0
R48	511979	177552	38.7	38.7	0
R49	511978.8	177559.3	38.7	38.8	0.1
R50	511979.5	177566.2	38.8	38.9	0.1
R51	511979.5	177572.9	38.9	38.9	0
R52	511979	177578.4	38.9	39	0.1
R53	511979.3	177584.1	39	39	0
R54	511973.3	177596.9	39.1	39.2	0.1
R55	511976.4	177613.3	39.3	39.4	0.1
R56	512009.4	177552.7	38.7	38.8	0.1
R57	512008.9	177559.3	38.8	38.8	0
R58	512008.9	177565.3	38.8	38.9	0.1
R59	512008.7	177571.7	38.9	39	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R60	512009.4	177580	39	39	0
R61	511992.1	177617.6	39.4	39.5	0.1
R62	512002.1	177614	39.4	39.5	0.1
R63	512013.9	177614.5	39.4	39.5	0.1
R64	512025.3	177615.7	39.4	39.5	0.1
R65	512041.5	177616.1	39.5	39.6	0.1
R66	512051	177616.6	39.5	39.6	0.1
R67	512061.5	177615	39.5	39.6	0.1
R68	512070.7	177619.2	39.6	39.7	0.1
R69	512082.4	177618.8	39.6	39.7	0.1
R70	512092.8	177623.5	39.7	39.8	0.1
R71	512141.3	177616.1	39.6	39.7	0.1
R72	512103.8	177617	39.6	39.7	0.1
R73	512113.3	177622.2	39.7	39.8	0.1
R74	512123.3	177623.7	39.7	39.8	0.1
R75	512090.9	177584.2	39.1	39.2	0.1
R76	512059.1	177582.3	39.1	39.1	0
R77	512060.5	177576.6	39	39.1	0.1
R78	512060	177567.1	38.9	39	0.1
R79	512089	177575.7	39	39.1	0.1
R80	512089	177567.6	38.9	39	0.1
R81	512060.5	177556.6	38.8	38.9	0.1
R82	512089	177557.1	38.8	38.9	0.1
R83	512138.4	177589.4	39.2	39.3	0.1
R84	512168.9	177592.8	39.3	39.3	0
R85	512169.3	177584.2	39.1	39.2	0.1
R86	512138.9	177582.8	39.1	39.2	0.1
R87	512139.4	177575.7	39	39.1	0.1
R88	512168.9	177576.6	39.1	39.1	0
R89	512169.3	177568.1	39	39.1	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R90	512139.9	177566.2	39	39	0
R91	512139.9	177557.6	38.9	38.9	0
R92	512168.9	177561.4	38.9	39	0.1
R93	512168.9	177553.3	38.9	38.9	0
R94	512197.1	177593.1	39.3	39.3	0
R95	512203.1	177593.8	39.3	39.3	0
R96	512209.5	177594.3	39.3	39.4	0.1
R97	512206.2	177627.8	39.8	39.9	0.1
R98	512197.1	177626.8	39.8	39.9	0.1
R99	512189.5	177626.1	39.8	39.9	0.1
R100	512178.1	177621.2	39.7	39.8	0.1
R101	512169.3	177620.4	39.7	39.8	0.1
R102	512149.6	177620	39.6	39.7	0.1
R103	512158.9	177620.9	39.7	39.8	0.1
R104	512215.4	177625.4	39.7	39.8	0.1
R105	512221.8	177625.2	39.7	39.8	0.1
R106	512229	177629.2	39.8	39.9	0.1
R107	512235.6	177629	39.8	39.9	0.1
R108	512242.8	177627.6	39.8	39.9	0.1
R109	512250.1	177628.1	39.8	39.9	0.1
R110	512277.4	177600.5	39.3	39.4	0.1
R111	512247	177597.6	39.3	39.4	0.1
R112	512247.8	177593.3	39.2	39.3	0.1
R113	512248.7	177584.8	39.1	39.2	0.1
R114	512249.2	177579.8	39.1	39.2	0.1
R115	512275.3	177590.7	39.2	39.3	0.1
R116	512275.8	177585.3	39.1	39.2	0.1
R117	512248.7	177571.3	39	39.1	0.1
R118	512248.9	177565.3	39	39	0
R119	512275.1	177576.7	39	39.1	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R120	512275.3	177572	39	39.1	0.1
R121	512275.1	177562.7	38.9	39	0.1
R122	512257	177631.8	39.8	39.9	0.1
R123	512263.2	177632.6	39.8	39.9	0.1
R124	512270.1	177630.2	39.8	39.9	0.1
R125	512275.8	177630.4	39.8	39.9	0.1
R126	512283.2	177633	39.8	39.9	0.1
R127	512290	177633.3	39.8	39.9	0.1
R128	512296.7	177632.1	39.8	39.9	0.1
R129	512304.5	177632.8	39.8	39.9	0.1
R130	512310.9	177633.5	39.8	39.9	0.1
R131	512317.1	177634	39.8	39.9	0.1
R132	512372.3	177607.4	39.3	39.4	0.1
R133	512341.6	177605	39.3	39.4	0.1
R134	512323.6	177634.5	39.8	39.9	0.1
R135	512329.5	177634.7	39.8	39.9	0.1
R136	512336.1	177635.4	39.8	39.9	0.1
R137	512342.8	177635.4	39.7	39.8	0.1
R138	512351.3	177636.6	39.7	39.8	0.1
R139	512358.7	177637.1	39.7	39.8	0.1
R140	512366.6	177638	39.7	39.8	0.1
R141	512372.3	177638.5	39.7	39.8	0.1
R142	512378.9	177639	39.7	39.8	0.1
R143	512384.1	177639.7	39.7	39.8	0.1
R144	512342.6	177591.9	39.2	39.2	0
R145	512342.6	177586.7	39.1	39.2	0.1
R146	512371.8	177596.9	39.2	39.3	0.1
R147	512371.8	177591.2	39.1	39.2	0.1
R148	512344	177577.2	39	39.1	0.1
R149	512344	177572.2	39	39	0

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R150	512372.5	177583.6	39	39.1	0.1
R151	512372.8	177578.4	39	39.1	0.1
R152	512391	177641.1	39.7	39.8	0.1
R153	512396.7	177641.6	39.7	39.8	0.1
R154	512404.1	177642.3	39.7	39.8	0.1
R155	512411.2	177642.8	39.7	39.8	0.1
R156	512418.4	177643	39.7	39.8	0.1
R157	512426.2	177643.3	39.7	39.8	0.1
R158	512433.8	177643.7	39.7	39.8	0.1
R159	512441.6	177644	39.7	39.8	0.1
R160	512405.3	177607.6	39.2	39.3	0.1
R161	512411.5	177607.8	39.2	39.3	0.1
R162	512418.8	177609.3	39.2	39.3	0.1
R163	512425.3	177609	39.2	39.3	0.1
R164	512431.7	177609.3	39.2	39.3	0.1
R165	512440.4	177609.3	39.2	39.3	0.1
R166	512469.9	177608.8	39.2	39.2	0
R167	512470.4	177603.8	39.1	39.2	0.1
R168	512469.7	177594.1	39	39.1	0.1
R169	512500.1	177623.3	39.3	39.3	0
R170	512500.1	177617.3	39.2	39.3	0.1
R171	512500.3	177606.9	39.1	39.2	0.1
R172	512500.6	177600.2	39	39.1	0.1
R173	512503.9	177633.1	39.4	39.5	0.1
R174	512512.2	177650.9	39.6	39.7	0.1
R175	512516.3	177659.9	39.7	39.8	0.1
R176	512470.6	177635.7	39.5	39.6	0.1
R177	512472.8	177640.4	39.5	39.6	0.1
R178	512474.4	177648.8	39.7	39.7	0
R179	512476.6	177655.4	39.8	39.9	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R180	512480.1	177668.2	40	40.1	0.1
R181	512484.9	177679.9	40.2	40.3	0.1
R182	512532.4	177666.1	39.8	39.9	0.1
R183	512543.6	177667.5	39.7	39.8	0.1
R184	512555.2	177668.5	39.7	39.8	0.1
R185	512564.7	177669.7	39.7	39.8	0.1
R186	512576.1	177669.4	39.7	39.8	0.1
R187	512584.4	177667.1	39.6	39.7	0.1
R188	512596.1	177665.8	39.6	39.7	0.1
R189	512607	177668.9	39.6	39.7	0.1
R190	512622.2	177667.5	39.5	39.6	0.1
R191	512609.6	177683.7	39.8	39.9	0.1
R192	512608.4	177693.4	39.9	40.1	0.2
R193	512531.7	177709.1	40.7	40.8	0.1
R194	512529.8	177701.3	40.5	40.6	0.1
R195	512550.5	177702	40.4	40.5	0.1
R196	512560.4	177702.7	40.3	40.5	0.2
R197	512571.4	177705.1	40.3	40.5	0.2
R198	512581.1	177708.9	40.4	40.5	0.1
R199	512593.9	177712.7	40.4	40.5	0.1
R200	512603	177712.2	40.3	40.5	0.2
R201	512617.5	177710.1	40.2	40.3	0.1
R202	512532.4	177769	43.7	43.9	0.2
R203	512537.2	177769.2	43.6	43.8	0.2
R204	512542.2	177769.7	43.5	43.8	0.3
R205	512546.9	177770.4	43.5	43.7	0.2
R206	512552.6	177770.9	43.4	43.6	0.2
R207	512558.3	177771.6	43.3	43.6	0.3
R208	512564.5	177772.3	43.3	43.5	0.2
R209	512569.9	177772.8	43.2	43.4	0.2

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R210	512574.9	177773.5	43.2	43.4	0.2
R211	512581.1	177774.2	43.1	43.3	0.2
R212	512587.3	177774.9	43	43.3	0.3
R213	512593	177775.4	43	43.2	0.2
R214	512598.5	177776.1	42.9	43.1	0.2
R215	512533.8	177740.7	41.8	42	0.2
R216	512560.4	177743.6	41.6	41.8	0.2
R217	512589.7	177748.8	41.6	41.7	0.1
R218	512619.1	177740.9	41	41.2	0.2
R219	512833.7	177883.9	48.8	49.1	0.3
R220	512842	177885.3	48.6	49	0.4
R221	512848.7	177886	48.4	48.7	0.3
R222	512855.6	177887.4	48.3	48.7	0.4
R223	512863.9	177889.3	48.3	48.6	0.3
R224	512870.1	177891	48.4	48.7	0.3
R225	512877.2	177892.7	48.4	48.7	0.3
R226	512883.1	177894.1	48.4	48.7	0.3
R227	512892.9	177894.8	48.9	48.9	0
R228	512898.1	177895.5	47.9	48.2	0.3
R229	512905.2	177898.1	48.2	48.5	0.3
R230	512912.1	177899.6	48.1	48.5	0.4
R231	512919.3	177901	48.1	48.4	0.3
R232	512925.2	177901.7	48	48.3	0.3
R233	512934	177903.3	47.9	48.2	0.3
R234	512940.4	177904.3	47.8	48.1	0.3
R235	512947.8	177906.4	47.9	48.3	0.4
R236	512953.4	177908.1	48	48.4	0.4
R237	512961.3	177908.8	47.8	48.1	0.3
R238	512967	177909.8	47.8	48.1	0.3
R239	512975.3	177911.7	47.8	48.1	0.3

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R240	512981.3	177913.1	47.8	48.2	0.4
R241	512990.8	177914.5	47.7	48	0.3
R242	512998.6	177915.9	47.7	48	0.3
R243	513007.2	177918.1	47.7	48.1	0.4
R244	513014.5	177919.5	47.7	48	0.3
R245	513021.4	177921.2	47.8	48.1	0.3
R246	513028.1	177922.6	47.8	48.1	0.3
R247	513036.1	177924.5	47.8	48.2	0.4
R248	513041.8	177925.2	47.7	48	0.3
R249	512922.8	177708.3	39.2	39.3	0.1
R250	512920.2	177711.9	39.3	39.4	0.1
R251	512913.8	177717.8	39.3	39.4	0.1
R252	512910.7	177722.6	39.4	39.5	0.1
R253	512905	177727.6	39.5	39.6	0.1
R254	512901.9	177731.8	39.5	39.6	0.1
R255	512892.9	177738.7	39.6	39.7	0.1
R256	512889.3	177741.8	39.7	39.8	0.1
R257	512877.4	177750.6	39.8	39.9	0.1
R258	512862.9	177757.1	40	40.1	0.1
R259	512890.3	177773.2	40.2	40.3	0.1
R260	512896.7	177775.1	40.2	40.3	0.1
R261	512905.5	177773.2	40.1	40.2	0.1
R262	512912.8	177774.1	40.1	40.2	0.1
R263	512920.2	177772.7	40	40.2	0.2
R264	512927.8	177773.9	40	40.1	0.1
R265	512934.4	177777.2	40.1	40.2	0.1
R266	512942.8	177779.1	40.1	40.2	0.1
R267	512953.2	177771.8	39.9	40	0.1
R268	512953	177766.6	39.8	39.9	0.1
R269	512952.8	177758.7	39.7	39.8	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R270	512952.5	177753.5	39.7	39.7	0
R271	512951.6	177744.9	39.5	39.6	0.1
R272	512951.8	177740.6	39.5	39.6	0.1
R273	512951.1	177731.6	39.4	39.5	0.1
R274	512950.6	177725.4	39.3	39.4	0.1
R275	513011.4	177793.2	40	40.2	0.2
R276	512997.7	177701.3	39	39.1	0.1
R277	512897.1	177808.5	40.9	41.1	0.2
R278	512889.5	177807.8	41	41.1	0.1
R279	512875	177794	40.7	40.8	0.1
R280	512862.2	177799	40.9	41	0.1
R281	512860.3	177805.4	41.1	41.3	0.2
R282	512875	177826.3	41.7	41.9	0.2
R283	512876	177819.7	41.5	41.6	0.1
R284	512859.1	177845.3	42.9	43.1	0.2
R285	512859.8	177838.9	42.5	42.7	0.2
R286	512884.6	177847.9	42.7	42.9	0.2
R287	512879.6	177844.8	42.6	42.8	0.2
R288	512901.4	177847.2	42.4	42.6	0.2
R289	512910.7	177848.6	42.4	42.6	0.2
R290	512921.4	177849.6	42.3	42.5	0.2
R291	512927.1	177850.5	42.3	42.5	0.2
R292	512933.5	177852	42.3	42.5	0.2
R293	512939.9	177853.2	42.3	42.5	0.2
R294	512946.8	177854.3	42.3	42.4	0.1
R295	512953.9	177856	42.3	42.5	0.2
R296	512967.3	177861.5	42.4	42.6	0.2
R297	512973.7	177862.4	42.4	42.6	0.2
R298	512980.6	177863.8	42.4	42.6	0.2
R299	512987.7	177865	42.4	42.6	0.2

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R300	513000.3	177865.8	42.2	42.4	0.2
R301	513007.4	177867.2	42.2	42.4	0.2
R302	513015.5	177869.1	42.3	42.5	0.2
R303	513021.4	177870.3	42.3	42.4	0.1
R304	513028.8	177871.9	42.3	42.5	0.2
R305	513034.3	177872.9	42.3	42.4	0.1
R306	513044.7	177879.5	42.5	42.7	0.2
R307	513050.4	177880.2	42.5	42.7	0.2
R308	512600.1	177818	50	50.3	0.3
R309	512569.7	177807.2	47.8	48.2	0.4
R310	512536.7	177790.6	46.2	46.5	0.3
R311	512605.7	177793.6	44.2	44.5	0.3
R312	512632.1	177801.7	44.3	44.6	0.3
R313	512665.8	177813	44.5	44.8	0.3
R314	512668.7	177818.7	45.1	45.4	0.3
R315	512699	177828.7	45.3	45.6	0.3
R316	512735.1	177840.7	45.6	45.9	0.3
R317	512737.1	177846.3	46.3	46.7	0.4
R318	512763.1	177854.2	46.5	46.8	0.3
R319	512794.5	177862.8	46.5	46.8	0.3
R320	512799.8	177849.6	44.5	44.8	0.3
R321	512810.5	177853.6	44.6	44.9	0.3
R322	512821.9	177857.2	44.7	45	0.3
R323	513066.9	177849.4	41.1	41.2	0.1
R324	513027.9	177842	41.1	41.2	0.1
R325	513021.5	177840.3	41.1	41.2	0.1
R326	513015.1	177838.9	41.1	41.2	0.1
R327	513008.2	177837.5	41.1	41.2	0.1
R328	512910.3	177816.6	41.1	41.2	0.1
R329	512916.5	177817.5	41.1	41.2	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R330	512924.3	177819	41.1	41.2	0.1
R331	512931.3	177820.1	41	41.2	0.2
R332	512938.6	177822.1	41.1	41.2	0.1
R333	512945.5	177823.5	41.1	41.2	0.1
R334	512953.6	177824.9	41	41.2	0.2
R335	512961.2	177826.3	41	41.2	0.2
R336	512968.5	177827.7	41	41.2	0.2
R337	512974.7	177829.2	41	41.2	0.2
R338	512982.1	177830.4	41	41.2	0.2
R339	512988	177831.8	41	41.2	0.2
R340	512994.9	177833	41	41.2	0.2
R341	513034.6	177842.7	41.1	41.2	0.1
R342	513042	177844.1	41.1	41.2	0.1
R343	513050.8	177845.8	41	41.2	0.2
R344	513059.1	177847.7	41.1	41.2	0.1
R345	513089.7	177809	40	40.2	0.2
R346	513089.7	177803.7	40	40.1	0.1
R347	513089	177794	39.8	39.9	0.1
R348	513089	177789	39.7	39.8	0.1
R349	513086.6	177770.5	39.5	39.6	0.1
R350	513085.2	177759.8	39.4	39.5	0.1
R351	513084.7	177753.1	39.3	39.4	0.1
R352	513063.8	177930	47.8	48.1	0.3
R353	513071.2	177931.2	47.7	48	0.3
R354	513076.9	177932.1	47.6	47.9	0.3
R355	513084.3	177933.6	47.6	47.9	0.3
R356	513091.4	177935.2	47.6	48	0.4
R357	513099.5	177936.6	47.6	47.9	0.3
R358	513115.6	177940.9	47.7	48.1	0.4
R359	513140.8	177947.8	48.1	48.4	0.3

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R360	513156.3	177911.2	43	43.2	0.2
R361	513164.6	177832.6	40.2	40.3	0.1
R362	513163.2	177828.3	40.1	40.2	0.1
R363	513161.5	177823.8	40	40.2	0.2
R364	513159.8	177818.8	40	40.1	0.1
R365	513158.2	177813.6	39.9	40	0.1
R366	513156.8	177809.6	39.8	39.9	0.1
R367	513154.8	177804.6	39.8	39.9	0.1
R368	513205.2	177790.4	39.5	39.6	0.1
R369	513205	177797.3	39.5	39.6	0.1
R370	513204.7	177805.1	39.6	39.7	0.1
R371	513205	177813.9	39.7	39.9	0.2
R372	513211.1	177823.4	39.9	40	0.1
R373	513211.6	177829.8	40	40.1	0.1
R374	513234.4	177811.8	39.6	39.7	0.1
R375	513234.7	177806.8	39.6	39.7	0.1
R376	513234.9	177800.1	39.5	39.6	0.1
R377	513234.7	177795.4	39.4	39.5	0.1
R378	513234.9	177790.9	39.4	39.5	0.1
R379	513250.1	177873.8	40.7	40.8	0.1
R380	513249.9	177867.8	40.5	40.7	0.2
R381	513249.9	177862.6	40.4	40.5	0.1
R382	513249.9	177856.4	40.3	40.4	0.1
R383	513230.4	177874.7	40.8	40.9	0.1
R384	513230.9	177868.8	40.6	40.8	0.2
R385	513230.6	177862.4	40.5	40.6	0.1
R386	513231.3	177856.4	40.4	40.5	0.1
R387	513231.3	177851.4	40.3	40.4	0.1
R388	513218	177847.2	40.2	40.4	0.2
R389	513216.6	177841	40.1	40.2	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R390	513265.1	177886.8	40.9	41.1	0.2
R391	513272.4	177888.5	40.9	41.1	0.2
R392	513421.4	177917.9	40.7	40.8	0.1
R393	513424.8	177917.9	40.7	40.8	0.1
R394	513430	177911.5	40.5	40.6	0.1
R395	513435.2	177910.8	40.4	40.6	0.2
R396	513440.9	177911	40.4	40.5	0.1
R397	513436.6	177894.9	40.1	40.2	0.1
R398	513436.4	177888.7	40	40.1	0.1
R399	513436.2	177882.1	39.9	40	0.1
R400	513436.2	177875.4	39.8	39.9	0.1
R401	513436.4	177869.7	39.7	39.8	0.1
R402	513436.4	177864.9	39.7	39.8	0.1
R403	513436.6	177859.9	39.6	39.7	0.1
R404	513434	177845.7	39.4	39.5	0.1
R405	513427.1	177845.4	39.5	39.6	0.1
R406	513421.7	177845.7	39.5	39.6	0.1
R407	513415.7	177845.9	39.5	39.6	0.1
R408	513397.9	177868	39.9	40	0.1
R409	513405.3	177868	39.8	39.9	0.1
R410	513411.4	177868	39.8	39.9	0.1
R411	513288.6	177780	39.2	39.3	0.1
R412	513320.4	177790.2	39.2	39.3	0.1
R413	513417.4	177814.2	39.2	39.3	0.1
R414	513390.3	177839.1	39.5	39.6	0.1
R415	513349.2	177863.6	40	40.1	0.1
R416	513280.1	177822.8	39.6	39.7	0.1
R417	513256.5	177832.5	39.9	40	0.1
R418	513300.5	177835.6	39.8	39.9	0.1
R419	513277.7	177858.6	40.2	40.3	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R420	513339.7	177896.7	40.7	40.9	0.2
R421	513377.2	177915.9	41	41.1	0.1
R422	513388.4	177895.5	40.4	40.5	0.1
R423	513377.2	177886.2	40.3	40.4	0.1
R424	512534.2	177871.9	54.8	55.9	1.1
R425	512536.3	177881.4	48.7	49.3	0.6
R426	512551.3	177877.4	51	51.9	0.9
R427	512562.9	177879.8	51.3	52.1	0.8
R428	512581.7	177883.8	51.7	52.6	0.9
R429	512574.8	177891.9	48.6	49.2	0.6
R430	512567.4	177907.1	45.5	46	0.5
R431	512565.8	177914.5	44.6	45	0.4
R432	512535.1	177898.1	45.6	46	0.4
R433	512533.7	177905.4	44.7	45.1	0.4
R434	512537.1	177918.3	43.6	43.9	0.3
R435	512535.4	177925.6	43	43.3	0.3
R436	512561	177923.5	43.7	44	0.3
R437	512558.9	177931.3	43	43.4	0.4
R438	512531.6	177935.1	42.4	42.7	0.3
R439	512530.2	177942.7	42	42.3	0.3
R440	512557.9	177942	42.4	42.7	0.3
R441	512555.3	177948.7	42	42.3	0.3
R442	512557.9	177961.5	41.6	41.8	0.2
R443	512556.1	177969.1	41.3	41.5	0.2
R444	512527.8	177953.4	41.6	41.8	0.2
R445	512527.1	177960.3	41.3	41.5	0.2
R446	512556.1	177990.7	40.7	40.8	0.1
R447	512563.7	177991.9	40.7	40.9	0.2
R448	512531.3	177986	40.6	40.8	0.2
R449	512523.5	177983.8	40.6	40.8	0.2

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R450	512513.3	177981.2	40.6	40.8	0.2
R451	512504	177979.1	40.6	40.8	0.2
R452	512498.8	178028.8	39.7	39.8	0.1
R453	512498.6	178033.8	39.7	39.8	0.1
R454	512498.3	178039	39.6	39.7	0.1
R455	512498.1	178044.7	39.5	39.6	0.1
R456	512498.1	178050.1	39.5	39.6	0.1
R457	512581.9	178051.1	39.7	39.8	0.1
R458	512588.8	178052.8	39.7	39.9	0.2
R459	512596.4	178055.4	39.7	39.8	0.1
R460	512605.9	178058.7	39.7	39.8	0.1
R461	512531.3	178038.5	39.7	39.8	0.1
R462	512537.3	178039.7	39.7	39.8	0.1
R463	512543.2	178041.1	39.7	39.8	0.1
R464	512549.4	178042.3	39.7	39.8	0.1
R465	512555.3	178044	39.7	39.8	0.1
R466	512560.8	178044.7	39.7	39.9	0.2
R467	512566.8	178046.3	39.7	39.9	0.2
R468	512572.4	178047.8	39.7	39.9	0.2
R469	512614	178061.8	39.7	39.8	0.1
R470	512622.8	178064.9	39.7	39.8	0.1
R471	512629.7	178067.7	39.7	39.8	0.1
R472	512637.3	178070.3	39.7	39.8	0.1
R473	512646.8	178074.4	39.7	39.8	0.1
R474	512654.7	178076.8	39.7	39.8	0.1
R475	512663.4	178079.6	39.7	39.8	0.1
R476	512673	178083.4	39.6	39.8	0.2
R477	512680.3	178088.2	39.6	39.7	0.1
R478	512687.4	178092.7	39.6	39.7	0.1
R479	512577.7	177991.9	40.8	41	0.2

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R480	512596.2	178000	40.7	40.9	0.2
R481	512620.7	178008.8	40.7	40.8	0.1
R482	512629.9	178011.4	40.7	40.8	0.1
R483	512639.4	178015	40.6	40.8	0.2
R484	512646.1	178016.4	40.6	40.8	0.2
R485	512653	178018.6	40.6	40.8	0.2
R486	512661.3	178020.9	40.6	40.8	0.2
R487	512668.2	178024	40.6	40.8	0.2
R488	512673.9	178027.6	40.6	40.7	0.1
R489	512679.8	178029.7	40.6	40.7	0.1
R490	512685.8	178032.1	40.5	40.7	0.2
R491	512691.3	178033.8	40.5	40.7	0.2
R492	512699.3	178035.4	40.6	40.7	0.1
R493	512706.5	178038.5	40.5	40.7	0.2
R494	512712.6	178041.1	40.5	40.7	0.2
R495	512719.3	178044.2	40.5	40.6	0.1
R496	512725.7	178047.5	40.5	40.6	0.1
R497	512732.1	178050.1	40.4	40.6	0.2
R498	512739	178052.3	40.4	40.6	0.2
R499	512744.5	178054.9	40.4	40.6	0.2
R500	512708.8	178106.6	39.5	39.6	0.1
R501	512720.7	178110.4	39.5	39.6	0.1
R502	512733.8	178114.7	39.5	39.6	0.1
R503	512746.4	178118.9	39.5	39.6	0.1
R504	512753.5	178121.8	39.5	39.6	0.1
R505	512759.4	178123.2	39.5	39.6	0.1
R506	512770.1	178128.2	39.4	39.6	0.2
R507	512775.4	178129.4	39.5	39.6	0.1
R508	512783.9	178136.1	39.4	39.5	0.1
R509	512789.6	178137	39.4	39.5	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R510	512801.5	178135.8	39.5	39.6	0.1
R511	512809.1	178138.4	39.5	39.6	0.1
R512	512820	178137	39.5	39.6	0.1
R513	512826	178138.7	39.5	39.6	0.1
R514	512767.3	178064.8	40.3	40.5	0.2
R515	512773.9	178067.1	40.3	40.5	0.2
R516	512780.6	178069.5	40.3	40.5	0.2
R517	512784.6	178071.4	40.3	40.5	0.2
R518	512792.7	178074.3	40.3	40.4	0.1
R519	512797.7	178076.4	40.3	40.4	0.1
R520	512812.4	178082.6	40.2	40.4	0.2
R521	512819.3	178083.8	40.2	40.4	0.2
R522	512826	178085	40.2	40.4	0.2
R523	512831.9	178086.4	40.3	40.4	0.1
R524	512837.6	178087.3	40.3	40.4	0.1
R525	512843.3	178088.5	40.3	40.4	0.1
R526	512636.1	177969.7	42.1	42.4	0.3
R527	512633.5	177975.3	41.8	42.1	0.3
R528	512630.9	177982	41.5	41.8	0.3
R529	512629.2	177986.8	41.4	41.6	0.2
R530	512608.6	177959.7	42.2	42.5	0.3
R531	512606.2	177965.4	41.9	42.2	0.3
R532	512603.3	177971.8	41.6	41.9	0.3
R533	512601	177978.2	41.4	41.6	0.2
R534	512614.5	177946.6	43.1	43.4	0.3
R535	512611.9	177952.1	42.7	43	0.3
R536	512611.2	177930.9	44.2	44.6	0.4
R537	512611.2	177937.1	43.7	44	0.3
R538	512635.4	177913.8	47.5	48.1	0.6
R539	512628.8	177917.1	46.6	47.1	0.5

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R540	512623.3	177919.8	45.9	46.4	0.5
R541	512616.2	177921.7	45.4	45.8	0.4
R542	512645.6	177915.5	47.8	48.4	0.6
R543	512650.9	177916.9	47.8	48.4	0.6
R544	512658	177922.6	47.1	47.6	0.5
R545	512663.2	177924.5	47	47.5	0.5
R546	512757.1	177961.1	45.4	45.8	0.4
R547	512749.9	177957.1	45.7	46.1	0.4
R548	512744.3	177954.2	45.8	46.3	0.5
R549	512737.3	177956.3	45.3	45.8	0.5
R550	512730.5	177953.3	45.5	45.9	0.4
R551	512723.3	177950.9	45.5	46	0.5
R552	512718.6	177948.7	45.6	46.1	0.5
R553	512712.4	177945.4	45.8	46.3	0.5
R554	512706.5	177943.3	45.9	46.4	0.5
R555	512700.8	177941.1	46	46.5	0.5
R556	512694.6	177938.5	46.1	46.6	0.5
R557	512688.4	177938.5	45.9	46.4	0.5
R558	512683.2	177936.4	46	46.4	0.4
R559	512677	177934.5	46	46.5	0.5
R560	512671.5	177932.6	46	46.5	0.5
R561	512771.8	177958.3	46.4	46.9	0.5
R562	512764.4	177959	46	46.5	0.5
R563	512781.1	177965.6	45.7	46.1	0.4
R564	512785.3	177971.8	45	45.5	0.5
R565	512788.9	177977	44.6	45	0.4
R566	512792.3	177982.5	44.1	44.5	0.4
R567	512641.3	177960.4	42.7	43	0.3
R568	512647.8	177957.8	42.9	43.2	0.3
R569	512657	177959.7	43	43.3	0.3

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R570	512663.4	177961.8	43	43.3	0.3
R571	512670.1	177963.7	43	43.3	0.3
R572	512675.8	177965.8	42.9	43.2	0.3
R573	512683.9	177971.1	42.7	43	0.3
R574	512691	177973.5	42.7	43	0.3
R575	512697	177975.6	42.7	43	0.3
R576	512700.8	177976.8	42.7	43	0.3
R577	512706.9	177977.3	42.8	43.1	0.3
R578	512713.8	177978.9	42.8	43.1	0.3
R579	512719.5	177981.5	42.7	43	0.3
R580	512725.9	177983.4	42.7	43	0.3
R581	512732.6	177986.5	42.6	42.9	0.3
R582	512739	177988.4	42.6	42.9	0.3
R583	512782	178006.7	42.3	42.5	0.2
R584	512781.3	178013.8	41.9	42.2	0.3
R585	512780.6	178019.1	41.7	41.9	0.2
R586	512790.3	177992.5	43.3	43.6	0.3
R587	512787.3	177999.3	42.8	43.1	0.3
R588	512748	177993.2	42.5	42.8	0.3
R589	512750.7	177998.4	42.3	42.5	0.2
R590	512751.1	178009.1	41.8	42	0.2
R591	512750.9	178013.8	41.6	41.8	0.2
R592	512751.4	178024.6	41.2	41.4	0.2
R593	512751.1	178029.3	41.1	41.3	0.2
R594	512775.1	178026.4	41.4	41.6	0.2
R595	512774.4	178032.6	41.2	41.4	0.2
R596	512773.9	178038.8	41	41.2	0.2
R597	512773.7	178043.8	40.9	41	0.1
R598	512858.8	178024.6	42.4	42.7	0.3
R599	513033.2	178001.3	50.4	51.2	0.8

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R600	513032	178007.7	48.5	49.2	0.7
R601	513061.4	178006.8	50.5	51.3	0.8
R602	513059.6	178013.2	48.5	49.2	0.7
R603	513030.1	178016.1	46.7	47.3	0.6
R604	513028.4	178022.7	45.7	46.2	0.5
R605	513057.4	178021	46.8	47.4	0.6
R606	513056	178028.2	45.7	46.2	0.5
R607	513058.4	178037.2	44.7	45.1	0.4
R608	513056.9	178043.4	44.1	44.4	0.3
R609	513054.6	178052.4	43.3	43.6	0.3
R610	513049.1	178055.7	43	43.3	0.3
R611	513042.4	178055.3	43	43.3	0.3
R612	513034.8	178053.6	43	43.3	0.3
R613	513026	178051.9	42.9	43.3	0.4
R614	513019.6	178050.3	43	43.3	0.3
R615	513012	178045.3	43.2	43.5	0.3
R616	513006.6	178044.3	43.2	43.5	0.3
R617	512999.2	178043.6	43.1	43.4	0.3
R618	512993.3	178042.4	43.1	43.4	0.3
R619	512985.2	178041.5	43.1	43.4	0.3
R620	512979.9	178040.1	43.1	43.4	0.3
R621	512971.9	178038.4	43.1	43.4	0.3
R622	512966.2	178037.4	43.1	43.4	0.3
R623	512988.5	178000.6	48.1	48.7	0.6
R624	512981.1	177999.4	48.9	48.6	-0.3
R625	512974.3	178003	47	47.6	0.6
R626	512967.3	178001.3	47	47.6	0.6
R627	512959.8	178000.1	47	47.5	0.5
R628	512953.6	177998.9	46.9	47.5	0.6
R629	512946.2	177996.8	47.1	47.6	0.5

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R630	512939.3	177996.1	46.9	47.5	0.6
R631	512931.9	177994	47	47.6	0.6
R632	512927.2	177993	47	47.6	0.6
R633	512917.2	177991.6	46.9	47.4	0.5
R634	512912.2	177990.4	46.9	47.5	0.6
R635	512904.6	177989	46.8	47.4	0.6
R636	512898.9	177988.3	46.8	47.3	0.5
R637	512889.7	177986.8	46.6	47.2	0.6
R638	512884	177985.2	46.7	47.3	0.6
R639	512877.5	177981.1	47.2	47.8	0.6
R640	512870.4	177980.4	47	47.6	0.6
R641	512857.6	177976.8	47.1	47.7	0.6
R642	512851.9	177980.4	46.2	46.8	0.6
R643	512845.5	177984.7	45.4	45.9	0.5
R644	512839.5	177987.8	44.9	45.3	0.4
R645	512840.2	178003.9	43.4	43.7	0.3
R646	512844.5	178008.2	43.2	43.5	0.3
R647	512848.6	178015.6	42.8	43	0.2
R648	512852.6	178019.4	42.6	42.9	0.3
R649	512868.3	178022.2	42.6	42.9	0.3
R650	512873	178022.9	42.7	43	0.3
R651	512882.1	178020.8	42.9	43.2	0.3
R652	512887.3	178022.2	42.9	43.2	0.3
R653	512894.9	178023.4	42.9	43.3	0.4
R654	512901.3	178024.8	42.9	43.3	0.4
R655	512909.8	178026.5	43	43.3	0.3
R656	512915.1	178027.2	43	43.3	0.3
R657	512923.4	178028.4	43	43.3	0.3
R658	512929.3	178030.1	43	43.3	0.3
R659	512936.9	178035.1	42.8	43.1	0.3

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R660	512942.4	178035.8	42.8	43.1	0.3
R661	512951.4	178037.2	42.9	43.2	0.3
R662	512957.8	178038.4	42.9	43.2	0.3
R663	513102.1	178101.8	41.4	41.6	0.2
R664	513102.6	178093	41.7	42	0.3
R665	513106.1	178084.7	42.1	42.4	0.3
R666	513107.6	178076.2	42.6	42.8	0.2
R667	513109.9	178071.2	42.9	43.2	0.3
R668	513113.7	178058.3	43.8	44.2	0.4
R669	513116.1	178053.1	44.3	44.7	0.4
R670	513118.3	178042.4	45.6	46	0.4
R671	513120.4	178036.5	46.5	47	0.5
R672	513123.7	178026	48.7	49.4	0.7
R673	513126.1	178018.9	51	51.8	0.8
R674	513083.8	178108.5	41.1	41.3	0.2
R675	513079	178108.5	41.1	41.2	0.1
R676	513072.4	178106.8	41.1	41.3	0.2
R677	513063.8	178108.7	41	41.1	0.1
R678	513052.2	178107.5	40.9	41.1	0.2
R679	513046.3	178107.5	40.9	41.1	0.2
R680	513040.5	178107.5	40.9	41	0.1
R681	513035.6	178107.1	40.8	41	0.2
R682	513024.2	178097.1	41	41.2	0.2
R683	513014.9	178095.9	41	41.2	0.2
R684	513009.2	178095.4	41	41.2	0.2
R685	512996.1	178111.8	40.5	40.7	0.2
R686	512978.3	178109	40.5	40.7	0.2
R687	512970.7	178107.3	40.5	40.7	0.2
R688	512963.8	178106.8	40.5	40.6	0.1
R689	512957.8	178106.1	40.5	40.6	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R690	512952.6	178105.4	40.4	40.6	0.2
R691	512938.4	178102.6	40.4	40.6	0.2
R692	512931.5	178101.8	40.4	40.6	0.2
R693	512926	178100.9	40.4	40.6	0.2
R694	512921	178098	40.4	40.6	0.2
R695	512917.5	178097.6	40.4	40.6	0.2
R696	512911	178098	40.4	40.6	0.2
R697	512907.7	178097.3	40.4	40.6	0.2
R698	512903	178097.3	40.4	40.5	0.1
R699	512894.2	178095.9	40.4	40.5	0.1
R700	512887.8	178094.9	40.4	40.5	0.1
R701	512879.9	178094	40.3	40.5	0.2
R702	512868.8	178090.7	40.3	40.5	0.2
R703	512855.2	178086.4	40.4	40.5	0.1
R704	513048.4	178142.8	40.2	40.3	0.1
R705	513050.2	178150.2	40	40.2	0.2
R706	513053.1	178156.8	40	40.1	0.1
R707	513046.5	178165.2	39.8	39.9	0.1
R708	513044.7	178169.2	39.8	39.9	0.1
R709	513036.6	178176.3	39.7	39.8	0.1
R710	513033.5	178180.1	39.6	39.7	0.1
R711	513085.8	178166.2	39.9	40.1	0.2
R712	513081.6	178170.8	39.9	40	0.1
R713	513072	178184.7	39.7	39.8	0.1
R714	513068.7	178190.1	39.6	39.7	0.1
R715	513022	178149	40	40.1	0.1
R716	513014.8	178149.8	39.9	40.1	0.2
R717	513008.2	178150.4	39.9	40	0.1
R718	512999.3	178151.6	39.9	40	0.1
R719	512989.2	178151.8	39.8	39.9	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R720	512979.1	178152.6	39.8	39.9	0.1
R721	512972.5	178152.8	39.8	39.9	0.1
R722	512965.2	178153.2	39.7	39.8	0.1
R723	512957.1	178153.4	39.7	39.8	0.1
R724	512948.8	178153.4	39.7	39.8	0.1
R725	512940.3	178153.2	39.7	39.8	0.1
R726	512931.9	178152.7	39.6	39.8	0.2
R727	512923.4	178152.2	39.6	39.7	0.1
R728	512915.6	178152	39.6	39.7	0.1
R729	512908.2	178151.3	39.6	39.7	0.1
R730	512900.1	178150.3	39.6	39.7	0.1
R731	512893.2	178149.6	39.6	39.7	0.1
R732	512835.7	178140.8	39.5	39.6	0.1
R733	512841.7	178141.8	39.5	39.6	0.1
R734	512850.2	178142.7	39.5	39.6	0.1
R735	512859	178144.4	39.5	39.6	0.1
R736	512871.4	178146.8	39.5	39.6	0.1
R737	512877.8	178147.5	39.5	39.7	0.2
R738	513100.9	178157.6	40.1	40.3	0.2
R739	513107.1	178157.2	40.1	40.3	0.2
R740	513121.3	178162.9	40.1	40.2	0.1
R741	513129.4	178166.7	40.1	40.2	0.1
R742	513140.3	178176.2	40	40.1	0.1
R743	513148.4	178182.3	39.9	40	0.1
R744	513157.4	178190.9	39.8	39.9	0.1
R745	513164.1	178200.4	39.7	39.8	0.1
R746	513172.2	178207.1	39.7	39.8	0.1
R747	513180.3	178218.9	39.6	39.7	0.1
R748	513146.5	178107.7	41.5	41.8	0.3
R749	513154.6	178120.6	41.2	41.4	0.2

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R750	513165.1	178127.2	41.1	41.3	0.2
R751	513171.2	178135.3	40.9	41.1	0.2
R752	513176	178141.5	40.8	40.9	0.1
R753	513184.5	178150	40.6	40.8	0.2
R754	513195.9	178156.7	40.5	40.7	0.2
R755	513204.5	178164.3	40.4	40.6	0.2
R756	513209.7	178171.4	40.3	40.5	0.2
R757	513219.2	178174.7	40.3	40.4	0.1
R758	513228.3	178188.5	40.1	40.2	0.1
R759	513264.4	178248.9	39.5	39.6	0.1
R760	513271	178254.1	39.5	39.6	0.1
R761	513250.6	178229.4	39.7	39.8	0.1
R762	513255.3	178234.6	39.6	39.7	0.1
R763	513261	178239.8	39.6	39.7	0.1
R764	513305.3	178217.2	40	40.1	0.1
R765	513299.8	178222.4	39.9	40	0.1
R766	513294.5	178228.6	39.8	39.9	0.1
R767	513288.8	178234	39.7	39.8	0.1
R768	513317.8	178214.6	40.1	40.2	0.1
R769	513327.8	178219.5	40.1	40.2	0.1
R770	513337.1	178225	40	40.1	0.1
R771	513342.3	178228.3	40	40.1	0.1
R772	513347.8	178232.8	40	40.1	0.1
R773	513357	178237.1	39.9	40.1	0.2
R774	513365.1	178241.4	39.9	40	0.1
R775	513372.7	178245.7	39.9	40	0.1
R776	513359.2	178270.4	39.6	39.7	0.1
R777	513352	178266.3	39.6	39.7	0.1
R778	513342.5	178263	39.6	39.7	0.1
R779	513332.3	178259.2	39.6	39.7	0.1

Receptor (Figure 2)	X	Y	NO_2 Concentration (µg/m³)		
			With Bus Lane	Without Bus Lane	Difference
R780	513368.7	178264.9	39.7	39.8	0.1
R781	513373.9	178256.1	39.8	39.9	0.1
R782	514163.5	178296	40.4	40.6	0.2
R783	514284.2	178452.8	43.5	43.8	0.3
R784	514301.8	178467.1	44	44.3	0.3

Appendix F

Air Quality Mitigation Paper

M4 Bus Lane
Evaluation of Possible AQ Mitigation Measures

Three main contributory factors to the increase in NO_2 concentrations (in order of priority):

1. Increase in traffic speeds
2. Increase in flows
3. Re-distribution of HDVs

No	Description of Mitigation	Advantages	Disadvantages	Risks	Conclusion
Speed-reducing measures					
1	Reduce the fixed speed limit to a staggered 60-50-40mph speed limit	Assuming compliance and no change in traffic flow other than speed, this would be the most effective measure to reduce NO_x emissions Would flatten traffic flow out before the elevated E/B M4 with less queuing. Enforcement possible as static cameras already in place (LSCP). Likely to result in fewer collisions & less delay.	The journey time benefits yielded by removing the Bus Lane could be reduced. The speeds in the peak periods with the Bus Lane suspended are already below 50mph. Requires effective enforcement to ensure compliance.	Non-compliance. Reduced J/T reliability. DfT's business case for reducing fixed speeds is currently based on improving safety. Whilst Collision rates have reduced following the suspension of the Bus Lane , poor driver behaviour can result in lane hopping, non-injury collisions and stop-start traffic which contribute to further delays.	Impact Assessed and quantified **(with assumption that speeds are =<50mph following implementation of the speed limit).**
2	Introduce Variable Speed Limit (VSL)	Speeds managed and intensity of downstream queuing reduced.	VSL responds to prevailing traffic conditions; therefore speeds would need to be below 60mph before VSL kicks in. The speeds in the peak periods with the Bus Lane suspended are already below 50mph; therefore it is probable that there would be limited impact in the peak periods for reducing NO_2 emissions. There has been some suggestion by TfL that use of VSLs when AQ is at its poorest, would prove beneficial in the Greater London area. Implementation of VSLs for "Smog Episodes" (Mayor's AQ Strategy.)	DfT'S business case for introducing VSL is currently based on improving safety. Accidents have reduced following the suspension of the Bus Lane. VSLs for AQ purposes during periods of poor AQ & "Smog Episodes" has not been specifically trialled and evaluated.	Not Feasible at this stage, requires detailed traffic data

No	Description of Mitigation	Advantages	Disadvantages	Risks	Conclusion
Flow-reducing measures					
3	Introduce an HOV Lane.	Would encourage car sharing and hence overall number of cars on this part of the M4.	Usually ineffective unless complementary measures are in place to encourage a seamless transfer to shared use. Any reduction in traffic flows may release suppressed demand (which fills the vacated car trips). Current DfT policy is about maximising road capacity for all vehicles.	Insufficient impact on traffic volumes, unless commensurate demand management measures are also in place, which is likely to create environmental problems elsewhere.	Not feasible
4	Introduce an HGV ban in peak periods	Would reduce pollutants from HGVs in the peak periods and improve the overall JT of HGVs along this part of the M4.	Unless enforceable network-wide, would result in HGV trips elsewhere with consequential environmental impacts. May also result in the release of suppressed demand by other vehicles. Risk of greater numbers of HGVs being displaced onto local roads. Safety, congestion & poorer local AQ are all significant risks.	Impacts on business and end-customer service. Impacts on all categories of road user and local residents.	Not feasible
5	Introduce demand management measures at Junction 3 and at junctions farther west.	Could be managed so that traffic volumes are reduced so that AQ emissions are no worse than before	To be effective this would need demand management of the M25 to M4 movement, which would have a major impact in terms of traffic congestion (and hence AQ) and would affect traffic not intending to travel between J3 and J2 especially Heathrow-bound traffic). Would have AQ impact at junction 3 Likely to increase flows elsewhere on the road network. Risk of greater numbers of HGVs being displaced onto local roads. Safety, congestion & poorer local AQ are all significant risks.	Significantly more negative impact than positive. Impacts on all categories of road user and local residents which will include: safety concerns; impact on J/T reliability& deterioration in local AQ where traffic is displaced.	Not feasible as part of this scheme.

No	Description of Mitigation	Advantages	Disadvantages	Risks	Conclusion
Redistribution of HDVs measures					
6	Introduce a permanent HGV Lane	Relocates HGVs further away from sensitive receptors and gives priority to HGV traffic over other road users	This would effectively reinstate the Bus Lane (but also with permitted use by HGVs) and consequently result in increased JTs for other road users compared with the 'before' scenario.	May also worsen AQ impact.	Not Feasible
7	Introduce an HGV Lane in peak periods	Relocates HGVs further away from sensitive receptors at peak periods and gives priority to HGV traffic over other road users	Would impact on other road users when traffic levels are at their worst, which would result in increased JTs for other road users during these periods compared with the 'before' scenario and. Would have no impact on HGVs polluting outside peak periods and hence unlikely to reduce NO_2 emissions to 'with Bus Lane' levels. Changing lane operation would be confusing for other road users.	May also worsen AQ impact. Possible safety risk Impacts on all categories of road user and local residents which will include: impact on J/T reliability& deterioration in local AQ . The current Bus Lane removal has led to an improvement in safety and reduction in RTCs.	Not Feasible
Re-active Measures					
8	TiO2 coated Barriers	Potential to reduce concentrations of pollutants behind the barrier.	Limited field research has been undertaken in this area that suggests that barriers could impact on air quality, by reducing concentrations of pollutants behind the barrier. A study carried out on the M60 using a TiO2 coated barrier in 2009 found that whilst 80% effective in laboratory conditions, meteorological factors led to the barrier only having limited effectiveness as optimum lab conditions are rarely replicable. (TRL)	Costly and not enough information on how effective TiO2 coated barriers may be as a mitigation measure but early tests have not been favourable in the on- road environment	Already acoustic barriers close along section of M4 providing some noise mitigation. TiO2 barriers need far greater research but currently not cost effective due to maintenance needs and UK weather conditions.

Appendix G

CRTN Calculation Results

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
1	66.0	66.5	68	54.3	54.9	135	59.7	60.4	202	60.0	60.7	269	57.1	57.8
2	66.9	67.4	69	65.1	65.8	136	65.7	66.3	203	67.4	68.0	270	57.2	57.9
3	61.4	62.0	70	58.6	59.2	137	67.3	67.9	204	60.7	61.4	271	57.3	58.0
4	68.3	68.8	71	55.4	55.9	138	57.2	57.8	205	60.8	61.5	272	62.9	63.5
5	67.2	67.7	72	65.3	65.9	139	65.8	66.5	206	67.1	67.8	273	57.3	57.9
6	72.8	73.3	73	54.9	55.5	140	60.8	61.4	207	59.4	60.0	274	55.5	56.2
7	66.7	67.2	74	65.6	66.2	141	66.1	66.8	208	59.4	60.1	275	55.6	56.3
8	67.4	68.0	75	53.3	53.9	142	68.0	68.6	209	64.9	65.6	276	55.9	56.5
9	70.7	71.3	76	58.9	59.5	143	66.3	66.9	210	65.0	65.7	277	62.7	63.3
10	72.6	73.1	77	60.3	61.0	144	57.1	57.7	211	65.2	65.8	278	56.0	56.6
11	66.6	67.2	78	66.1	66.8	145	66.4	67.1	212	65.2	65.9	279	56.1	56.8
12	67.3	67.9	79	57.7	58.3	146	60.2	60.8	213	65.7	66.3	280	56.0	56.7
13	71.0	71.6	80	55.4	56.1	147	66.5	67.1	214	65.5	66.2	281	62.4	63.1
14	67.8	68.4	81	60.0	60.6	148	68.4	69.0	215	67.6	68.3	282	62.3	63.0
15	72.9	73.5	82	55.4	56.0	149	58.1	58.8	216	66.6	67.2	283	62.2	62.8
16	61.5	62.1	83	55.1	55.8	150	68.5	69.1	217	64.5	65.2	284	62.1	62.7
17	71.8	72.4	84	55.4	56.1	151	57.6	58.2	218	63.7	64.4	285	56.5	57.2
18	69.3	70.0	85	57.2	57.8	152	59.4	60.0	219	63.7	64.3	286	61.5	62.1
19	70.2	70.8	86	57.8	58.5	153	59.6	60.2	220	63.6	64.2	287	56.5	57.2
20	70.4	71.0	87	51.1	51.7	154	59.7	60.3	221	63.4	64.1	288	60.8	61.5
21	71.9	72.6	88	64.1	64.7	155	68.5	69.1	222	62.5	63.2	289	56.6	57.2
22	64.0	64.6	89	51.1	51.8	156	59.9	60.5	223	63.5	64.1	290	57.3	58.0
23	64.2	64.8	90	56.9	57.6	157	58.2	58.8	224	63.8	64.4	291	56.5	57.2
24	64.2	64.7	91	64.2	64.8	158	60.1	60.7	225	63.8	64.5	292	60.1	60.7
25	59.1	59.7	92	57.8	58.4	159	60.3	61.0	226	63.8	64.5	293	56.8	57.4
26	59.1	59.8	93	57.2	57.9	160	60.7	61.3	227	63.8	64.5	294	57.1	57.7
27	60.6	61.2	94	57.4	58.0	161	58.9	59.5	228	63.8	64.5	295	59.4	60.0
28	63.7	64.3	95	51.1	51.8	162	66.7	67.4	229	63.8	64.5	296	56.7	57.4
29	57.4	58.1	96	66.0	66.6	163	67.1	67.8	230	63.7	64.4	297	54.8	55.5
30	59.1	59.7	97	56.2	56.9	164	59.2	59.8	231	58.4	59.0	298	58.2	58.8
31	55.3	55.9	98	55.2	55.8	165	59.4	60.1	232	63.7	64.3	299	56.7	57.3
32	55.4	56.0	99	64.0	64.6	166	59.7	60.3	233	57.5	58.2	300	58.1	58.8
33	55.4	56.1	100	53.0	53.6	167	60.3	60.9	234	63.7	64.3	301	56.8	57.5
34	55.5	56.2	101	66.2	66.8	168	61.1	61.7	235	57.6	58.2	302	58.1	58.8
35	58.4	58.9	102	56.5	57.1	169	55.8	56.5	236	57.5	58.2	303	56.4	57.0
36	55.6	56.3	103	52.6	53.2	170	63.8	64.4	237	63.6	64.3	304	56.9	57.5
37	54.9	55.4	104	66.3	67.0	171	55.8	56.4	238	63.6	64.2	305	58.2	58.8
38	57.1	57.8	105	57.0	57.7	172	55.8	56.4	239	57.6	58.3	306	56.8	57.5
39	58.6	59.3	106	51.1	51.8	173	66.1	66.8	240	57.7	58.3	307	55.9	56.6
40	59.0	59.6	107	55.0	55.5	174	54.5	55.1	241	63.5	64.1	308	58.6	59.3
41	55.9	56.5	108	66.5	67.2	175	55.9	56.5	242	57.8	58.4	309	59.1	59.7
42	59.3	59.9	109	63.2	63.9	176	54.5	55.1	243	63.4	64.1	310	56.9	57.5
43	59.3	60.0	110	67.1	67.8	177	55.9	56.6	244	63.4	64.0	311	55.9	56.6
44	59.4	60.0	111	55.1	55.7	178	54.6	55.2	245	56.8	57.5	312	59.3	60.0
45	58.9	59.5	112	56.1	56.8	179	55.9	56.6	246	63.2	63.8	313	59.3	60.0
46	56.6	57.2	113	51.1	51.8	180	54.7	55.3	247	57.5	58.1	314	56.9	57.5
47	57.8	58.5	114	60.5	61.1	181	53.6	54.2	248	63.5	64.1	315	55.9	56.6
48	55.9	56.5	115	55.7	56.2	182	57.2	57.8	249	58.3	59.0	316	59.1	59.8
49	63.5	64.1	116	55.6	56.3	183	54.7	55.3	250	56.2	56.8	317	56.8	57.5
50	58.6	59.0	117	61.8	62.5	184	54.6	55.3	251	63.5	64.1	318	58.9	59.6
51	54.2	54.8	118	55.8	56.4	185	54.6	55.2	252	57.7	58.4	319	56.0	56.6

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
52	57.6	58.3	119	57.2	57.8	186	54.7	55.3	253	57.3	58.0	320	56.7	57.4
53	60.9	61.4	120	57.7	58.3	187	54.9	55.5	254	63.4	64.1	321	56.1	56.7
54	63.7	64.3	121	56.3	57.0	188	62.0	62.7	255	58.0	58.7	322	56.1	56.8
55	63.8	64.4	122	56.8	57.5	189	62.1	62.7	256	56.7	57.3	323	56.6	57.3
56	57.7	58.3	123	60.9	61.6	190	51.0	51.6	257	63.3	63.9	324	56.6	57.2
57	63.9	64.5	124	57.8	58.4	191	58.0	58.6	258	56.6	57.3	325	57.2	57.9
58	63.9	64.5	125	57.0	57.6	192	67.2	67.8	259	63.1	63.7	326	55.2	55.8
59	57.8	58.4	126	66.8	67.4	193	58.0	58.6	260	56.5	57.2	327	57.1	57.8
60	64.0	64.6	127	67.0	67.6	194	59.7	60.4	261	63.0	63.6	328	56.9	57.6
61	62.8	63.4	128	64.0	64.6	195	67.2	67.9	262	56.8	57.5	329	56.9	57.6
62	55.1	55.7	129	59.4	60.1	196	60.7	61.3	263	56.9	57.6	330	54.8	55.5
63	59.5	60.2	130	60.5	61.1	197	67.3	67.9	264	56.9	57.5	331	52.7	53.4
64	59.6	60.0	131	67.2	67.9	198	54.4	55.0	265	55.6	56.3	332	55.0	55.7
65	52.9	53.5	132	57.1	57.8	199	59.1	59.7	266	56.7	57.3	333	58.4	59.1
66	60.2	60.9	133	60.0	60.7	200	61.5	62.1	267	56.8	57.5	334	56.3	57.0
67	65.0	65.6	134	67.4	68.0	201	67.3	68.0	268	57.0	57.7	335	56.4	57.0
336	56.1	56.8	403	56.4	57.1	470	57.8	58.5	537	54.1	54.8	604	56.2	56.9
337	55.6	56.3	404	56.0	56.6	471	57.6	58.2	538	56.0	56.7	605	56.9	57.6
338	55.8	56.5	405	55.0	55.6	472	58.5	59.1	539	58.9	59.6	606	73.7	74.3
339	60.1	60.7	406	58.1	58.8	473	73.4	74.0	540	57.9	58.6	607	55.2	55.9
340	61.5	62.2	407	56.4	57.1	474	71.5	72.1	541	56.3	57.0	608	61.8	62.4
341	62.2	62.9	408	56.6	57.2	475	71.2	71.8	542	58.4	59.1	609	65.4	66.1
342	60.9	61.6	409	61.3	62.1	476	71.0	71.7	543	54.2	54.8	610	56.2	56.9
343	61.8	62.3	410	59.5	60.1	477	58.1	58.7	544	53.0	53.6	611	65.3	66.0
344	57.5	58.2	411	55.3	56.0	478	56.8	57.5	545	65.1	65.7	612	57.9	58.6
345	61.5	62.0	412	59.9	60.6	479	66.4	67.1	546	60.1	60.7	613	57.0	57.6
346	57.2	57.9	413	55.5	56.2	480	55.7	56.3	547	54.2	54.9	614	55.8	56.5
347	54.1	54.8	414	56.8	57.4	481	56.3	57.0	548	54.2	54.9	615	73.7	74.3
348	54.3	55.0	415	58.8	59.5	482	56.7	57.4	549	54.5	55.1	616	58.1	58.7
349	57.3	58.0	416	56.2	56.8	483	56.9	57.5	550	73.5	74.1	617	65.2	65.8
350	60.6	61.1	417	60.6	61.3	484	56.8	57.5	551	56.7	57.3	618	57.0	57.7
351	54.5	55.1	418	57.0	57.7	485	56.9	57.6	552	56.4	57.0	619	56.0	56.7
352	54.4	55.1	419	72.3	72.9	486	58.5	59.1	553	58.5	59.2	620	66.8	67.4
353	54.3	54.9	420	61.2	61.9	487	56.9	57.5	554	59.1	59.7	621	73.7	74.3
354	53.9	54.6	421	56.1	56.8	488	56.8	57.5	555	60.0	60.6	622	58.1	58.7
355	54.4	55.0	422	61.8	62.4	489	56.8	57.4	556	56.4	57.1	623	57.5	58.2
356	53.9	54.5	423	62.4	63.0	490	58.1	58.7	557	56.5	57.2	624	55.8	56.5
357	54.4	55.1	424	62.4	63.1	491	54.1	54.7	558	58.1	58.7	625	56.3	57.0
358	61.2	61.8	425	63.1	63.7	492	49.0	49.6	559	73.5	74.1	626	58.2	58.9
359	54.5	55.1	426	61.4	62.0	493	54.0	54.7	560	56.4	57.1	627	60.2	60.8
360	54.4	55.1	427	61.8	62.5	494	53.9	54.5	561	55.9	56.6	628	67.2	67.8
361	54.4	55.1	428	73.1	73.7	495	54.2	54.8	562	58.1	58.7	629	59.8	60.5
362	54.3	55.0	429	73.0	73.6	496	56.0	56.7	563	56.5	57.2	630	58.7	59.3
363	54.5	55.2	430	64.3	64.9	497	56.7	57.4	564	73.5	74.2	631	54.5	55.2
364	57.3	57.9	431	64.4	65.0	498	66.2	66.8	565	57.9	58.6	632	56.4	57.1
365	60.8	61.5	432	64.1	64.8	499	58.7	59.4	566	55.1	55.7	633	60.9	61.6
366	61.1	61.7	433	63.8	64.4	500	58.7	59.4	567	58.9	59.5	634	56.3	57.0
367	61.4	62.0	434	57.4	58.1	501	64.7	65.3	568	56.4	57.0	635	56.6	57.3
368	60.4	61.1	435	63.7	64.3	502	72.7	73.3	569	55.0	55.6	636	61.1	61.8
369	57.6	58.2	436	63.4	64.0	503	56.5	57.1	570	54.8	55.4	637	61.1	61.7
370	61.0	61.7	437	63.2	63.8	504	58.7	59.4	571	55.0	55.7	638	57.8	58.5

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
371	60.4	61.1	438	56.1	56.8	505	63.6	64.2	572	56.8	57.4	639	58.3	58.9
372	57.6	58.3	439	63.1	63.8	506	55.1	55.8	573	57.7	58.4	640	58.0	58.6
373	59.5	60.2	440	63.3	63.9	507	55.0	55.7	574	59.9	60.5	641	62.0	62.7
374	54.3	54.9	441	59.4	60.1	508	55.2	55.9	575	57.3	57.9	642	60.1	60.8
375	57.6	58.3	442	59.2	59.8	509	55.4	56.1	576	63.6	64.3	643	55.3	55.9
376	54.5	55.2	443	62.4	63.1	510	55.9	56.6	577	58.7	59.3	644	63.2	63.9
377	54.5	55.2	444	61.5	62.2	511	72.9	73.5	578	57.3	57.9	645	62.8	63.5
378	58.1	58.8	445	59.3	59.9	512	55.1	55.7	579	73.6	74.2	646	54.8	55.5
379	54.7	55.4	446	60.8	61.4	513	54.9	55.6	580	62.2	62.8	647	56.3	57.0
380	54.9	55.5	447	58.7	59.4	514	58.1	58.7	581	63.1	63.7	648	68.0	68.6
381	54.8	55.5	448	60.6	61.2	515	54.1	54.8	582	63.5	64.2	649	54.7	55.4
382	54.9	55.6	449	59.5	60.2	516	58.8	59.5	583	64.0	64.7	650	54.5	55.1
383	57.9	58.5	450	58.2	58.9	517	54.2	54.9	584	64.4	65.1	651	57.2	57.9
384	55.0	55.7	451	57.6	58.3	518	63.6	64.1	585	65.0	65.6	652	64.7	65.3
385	49.5	50.1	452	58.1	58.7	519	72.5	73.1	586	64.8	65.4	653	64.8	65.4
386	58.0	58.6	453	58.0	58.7	520	56.2	56.9	587	58.0	58.7	654	54.1	54.8
387	58.0	58.6	454	56.1	56.8	521	58.8	59.4	588	60.3	60.9	655	56.8	57.5
388	55.3	56.0	455	73.2	73.8	522	56.3	56.9	589	64.2	64.8	656	58.3	58.9
389	55.5	56.2	456	57.1	57.7	523	58.3	58.9	590	56.0	56.7	657	54.0	54.7
390	54.9	55.5	457	56.2	56.9	524	58.2	58.9	591	54.4	55.0	658	58.3	59.0
391	58.1	58.7	458	73.2	73.9	525	59.7	60.4	592	58.0	58.6	659	67.9	68.5
392	55.6	56.3	459	58.4	59.1	526	61.0	61.6	593	54.5	55.1	660	58.5	59.1
393	55.6	56.3	460	57.1	57.7	527	64.3	64.9	594	56.3	57.0	661	66.5	67.2
394	55.7	56.3	461	56.1	56.7	528	72.0	72.6	595	60.5	61.2	662	66.6	67.3
395	58.2	58.9	462	58.3	59.0	529	56.5	57.2	596	56.0	56.7	663	56.3	57.0
396	56.0	56.7	463	60.8	61.4	530	56.3	57.0	597	73.7	74.3	664	56.3	57.0
397	55.8	56.4	464	60.3	61.0	531	58.7	59.4	598	57.4	58.0	665	58.4	59.1
398	58.2	58.9	465	57.0	57.7	532	54.1	54.8	599	57.9	58.5	666	58.7	59.3
399	58.1	58.7	466	59.9	60.6	533	56.3	56.9	600	64.7	65.4	667	56.5	57.2
400	57.7	58.3	467	66.5	67.1	534	57.6	58.2	601	51.7	52.3	668	73.5	74.1
401	61.2	61.8	468	56.1	56.8	535	51.9	52.6	602	58.1	58.7	669	71.5	72.2
402	56.1	56.8	469	59.5	60.2	536	56.4	57.0	603	57.9	58.5	670	71.1	71.8
671	70.8	71.5	738	58.5	59.2	805	65.4	66.1	872	60.9	61.6	939	58.5	59.2
672	70.6	71.3	739	55.8	56.4	806	65.8	66.4	873	58.2	58.9	940	55.9	56.5
673	70.4	71.1	740	56.5	57.2	807	67.5	68.1	874	57.2	57.8	941	58.1	58.8
674	60.3	60.9	741	60.7	61.3	808	68.7	69.3	875	69.7	70.3	942	59.8	60.5
675	70.1	70.8	742	68.4	69.1	809	69.0	69.7	876	58.6	59.3	943	56.9	57.6
676	56.9	57.5	743	56.6	57.2	810	68.9	69.6	877	58.8	59.4	944	58.6	59.2
677	57.0	57.7	744	60.8	61.5	811	64.2	64.9	878	59.2	59.8	945	74.5	75.1
678	57.2	57.8	745	58.9	59.5	812	64.9	65.6	879	62.2	62.9	946	58.2	58.9
679	57.1	57.8	746	68.5	69.2	813	66.4	67.1	880	59.4	60.1	947	57.7	58.4
680	57.6	58.3	747	56.6	57.2	814	68.3	69.0	881	59.7	60.3	948	56.9	57.6
681	57.5	58.1	748	58.7	59.3	815	68.4	69.1	882	60.0	60.7	949	59.1	59.8
682	56.1	56.7	749	59.5	60.2	816	64.0	64.6	883	60.9	61.6	950	58.5	59.1
683	56.3	57.0	750	57.7	58.4	817	64.6	65.3	884	61.1	61.8	951	56.1	56.8
684	59.4	60.0	751	56.6	57.3	818	68.1	68.7	885	57.8	58.5	952	55.8	56.5
685	56.3	56.9	752	69.0	69.6	819	68.8	69.4	886	60.5	61.1	953	57.5	58.1
686	56.7	57.4	753	59.6	60.3	820	69.0	69.6	887	58.8	59.5	954	58.6	59.3
687	56.1	56.7	754	60.3	61.0	821	62.0	62.6	888	60.8	61.4	955	59.5	60.1
688	56.2	56.9	755	59.6	60.3	822	62.2	62.8	889	57.4	58.0	956	56.9	57.6
689	56.4	57.0	756	56.7	57.3	823	62.6	63.2	890	57.6	58.2	957	55.7	56.4

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
690	56.0	56.6	757	58.2	58.9	824	62.8	63.5	891	57.7	58.3	958	58.3	58.9
691	58.4	59.1	758	52.4	53.0	825	67.8	68.4	892	57.7	58.4	959	59.0	59.7
692	56.7	57.3	759	55.1	55.8	826	68.9	69.6	893	57.8	58.4	960	59.1	59.7
693	56.1	56.7	760	59.2	59.9	827	63.2	63.9	894	57.8	58.5	961	57.6	58.2
694	56.0	56.6	761	56.7	57.3	828	63.6	64.2	895	58.5	59.1	962	59.0	59.6
695	56.6	57.3	762	69.5	70.1	829	58.4	59.1	896	57.5	58.2	963	59.1	59.8
696	56.1	56.8	763	58.0	58.7	830	57.2	57.9	897	55.8	56.5	964	59.1	59.8
697	58.3	58.9	764	53.9	54.6	831	58.3	58.9	898	57.0	57.6	965	58.6	59.3
698	53.5	54.2	765	54.0	54.7	832	59.4	60.1	899	57.2	57.8	966	57.6	58.2
699	56.5	57.1	766	59.2	59.9	833	69.6	70.3	900	57.3	57.9	967	59.4	60.1
700	56.2	56.9	767	54.1	54.8	834	58.4	59.1	901	58.0	58.6	968	74.5	75.1
701	53.5	54.2	768	58.8	59.5	835	58.6	59.2	902	57.1	57.7	969	59.8	60.4
702	56.0	56.7	769	54.2	54.8	836	59.3	60.0	903	58.2	58.8	970	69.3	70.0
703	55.8	56.5	770	59.7	60.4	837	56.0	56.7	904	56.8	57.4	971	61.0	61.7
704	58.2	58.9	771	60.8	61.4	838	55.2	55.9	905	56.9	57.5	972	60.2	60.8
705	62.6	63.3	772	56.3	56.9	839	55.1	55.8	906	58.2	58.8	973	55.4	56.1
706	66.7	67.4	773	69.5	70.2	840	58.1	58.7	907	58.3	58.9	974	56.9	57.6
707	55.7	56.4	774	56.0	56.7	841	55.3	56.0	908	58.3	59.0	975	58.1	58.7
708	56.2	56.9	775	57.5	58.2	842	55.3	56.0	909	57.3	57.9	976	57.8	58.4
709	61.2	61.9	776	61.1	61.8	843	57.4	58.0	910	58.0	58.6	977	58.3	58.9
710	66.7	67.4	777	57.4	58.0	844	55.5	56.2	911	58.5	59.2	978	59.2	59.9
711	58.2	58.8	778	61.2	61.8	845	58.6	59.2	912	59.1	59.8	979	60.3	61.0
712	55.8	56.4	779	69.5	70.2	846	74.4	75.0	913	58.1	58.8	980	59.8	60.4
713	66.8	67.4	780	56.0	56.7	847	59.2	59.9	914	74.4	75.0	981	59.4	60.1
714	60.4	61.1	781	54.2	54.9	848	58.9	59.6	915	55.7	56.4	982	60.3	60.9
715	56.1	56.8	782	58.2	58.9	849	69.6	70.3	916	61.3	61.9	983	60.5	61.1
716	59.6	60.3	783	60.7	61.3	850	55.2	55.8	917	69.5	70.2	984	59.2	59.9
717	66.8	67.5	784	57.8	58.5	851	55.9	56.5	918	58.8	59.4	985	60.1	60.7
718	60.1	60.7	785	61.4	62.0	852	55.3	56.0	919	58.6	59.3	986	59.8	60.5
719	56.1	56.7	786	58.1	58.8	853	55.5	56.2	920	55.8	56.5	987	58.4	59.1
720	58.3	59.0	787	58.1	58.8	854	59.4	60.0	921	58.2	58.8	988	59.7	60.3
721	55.5	56.2	788	69.5	70.2	855	57.4	58.1	922	54.1	54.8	989	59.0	59.7
722	55.8	56.5	789	56.0	56.7	856	55.2	55.9	923	54.4	55.0	990	58.7	59.3
723	56.6	57.2	790	70.3	71.0	857	59.5	60.2	924	54.6	55.3	991	58.9	59.5
724	56.5	57.1	791	56.8	57.5	858	69.6	70.3	925	54.2	54.9	992	58.5	59.2
725	55.7	56.4	792	57.3	58.0	859	55.5	56.2	926	54.4	55.1	993	58.1	58.8
726	65.9	66.6	793	58.3	58.9	860	55.9	56.6	927	54.5	55.1	994	59.5	60.2
727	66.7	67.4	794	59.3	59.9	861	57.4	58.1	928	58.7	59.3	995	57.8	58.5
728	55.8	56.4	795	61.5	62.1	862	57.4	58.1	929	54.7	55.3	996	56.8	57.4
729	66.8	67.5	796	69.5	70.2	863	74.4	75.0	930	58.8	59.5	997	57.3	58.0
730	67.0	67.6	797	59.9	60.6	864	59.0	59.7	931	58.6	59.3	998	57.4	58.0
731	58.1	58.8	798	56.1	56.7	865	58.7	59.4	932	60.6	61.3	999	57.2	57.8
732	56.4	57.1	799	67.3	67.9	866	57.9	58.5	933	74.5	75.1	1000	74.2	74.9
733	67.3	68.0	800	66.8	67.5	867	58.6	59.2	934	58.0	58.7	1001	58.2	58.9
734	56.5	57.2	801	67.0	67.6	868	59.3	60.0	935	69.4	70.1	1002	57.0	57.6
735	56.5	57.1	802	67.0	67.7	869	55.6	56.2	936	55.8	56.5	1003	58.5	59.1
736	68.3	69.0	803	66.3	66.9	870	55.8	56.5	937	57.0	57.6	1004	55.5	56.1
737	64.3	65.0	804	68.6	69.2	871	55.8	56.5	938	58.7	59.3	1005	58.4	59.0
1006	57.0	57.7	1073	58.0	58.7	1140	55.8	56.5	1207	60.0	60.6	1274	57.1	57.7
1007	55.5	56.1	1074	58.4	59.0	1141	57.7	58.3	1208	59.4	60.0	1275	56.9	57.6
1008	74.6	75.2	1075	74.7	75.3	1142	58.3	58.9	1209	58.0	58.6	1276	57.1	57.8

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
1009	58.5	59.1	1076	56.8	57.5	1143	60.0	60.7	1210	58.1	58.7	1277	57.2	57.9
1010	55.5	56.2	1077	59.5	60.2	1144	57.9	58.5	1211	56.2	56.8	1278	57.4	58.1
1011	55.6	56.3	1078	60.9	61.6	1145	69.2	69.8	1212	69.3	70.0	1279	57.4	58.1
1012	57.9	58.5	1079	68.5	69.2	1146	56.4	57.0	1213	55.4	56.1	1280	57.6	58.2
1013	57.1	57.7	1080	59.5	60.2	1147	58.3	59.0	1214	60.5	61.2	1281	57.7	58.3
1014	55.7	56.3	1081	59.6	60.3	1148	59.8	60.5	1215	59.7	60.4	1282	57.8	58.4
1015	58.5	59.1	1082	59.7	60.3	1149	55.7	56.3	1216	74.6	75.2	1283	59.2	59.8
1016	57.1	57.8	1083	59.7	60.3	1150	55.7	56.4	1217	57.7	58.3	1284	57.9	58.6
1017	57.9	58.5	1084	58.1	58.8	1151	74.6	75.2	1218	55.3	56.0	1285	58.1	58.7
1018	74.6	75.2	1085	58.4	59.0	1152	69.2	69.9	1219	69.4	70.0	1286	62.6	63.3
1019	55.8	56.4	1086	56.8	57.4	1153	58.3	59.0	1220	57.5	58.1	1287	74.5	75.1
1020	58.5	59.1	1087	59.2	59.9	1154	55.8	56.4	1221	56.8	57.5	1288	58.2	58.9
1021	55.8	56.5	1088	58.3	58.9	1155	58.3	58.9	1222	57.0	57.6	1289	67.4	68.1
1022	57.2	57.9	1089	60.4	61.0	1156	55.8	56.5	1223	56.1	56.8	1290	58.5	59.2
1023	57.8	58.4	1090	68.9	69.6	1157	60.3	60.9	1224	74.6	75.2	1291	57.4	58.1
1024	55.8	56.5	1091	74.7	75.3	1158	60.0	60.6	1225	57.4	58.0	1292	59.4	60.0
1025	60.0	60.6	1092	58.0	58.6	1159	56.3	56.9	1226	62.4	63.0	1293	60.6	61.2
1026	59.9	60.5	1093	58.3	58.9	1160	58.4	59.0	1227	61.4	62.0	1294	56.5	57.2
1027	57.9	58.6	1094	55.4	56.1	1161	69.2	69.9	1228	64.0	64.7	1295	59.9	60.6
1028	59.6	60.3	1095	56.7	57.4	1162	55.5	56.2	1229	55.4	56.0	1296	60.3	60.9
1029	59.5	60.1	1096	59.8	60.4	1163	58.0	58.6	1230	65.1	65.8	1297	54.8	55.5
1030	58.1	58.7	1097	58.0	58.7	1164	74.6	75.2	1231	64.5	65.2	1298	56.4	57.1
1031	57.9	58.5	1098	55.4	56.0	1165	58.6	59.3	1232	69.5	70.1	1299	57.3	58.0
1032	59.3	60.0	1099	58.4	59.1	1166	56.0	56.6	1233	63.4	64.0	1300	57.1	57.7
1033	59.1	59.7	1100	58.3	58.9	1167	58.7	59.3	1234	57.5	58.1	1301	57.1	57.7
1034	58.4	59.1	1101	69.1	69.8	1168	55.5	56.2	1235	57.4	58.0	1302	56.8	57.5
1035	58.9	59.5	1102	55.6	56.2	1169	57.7	58.4	1236	62.6	63.3	1303	56.7	57.4
1036	58.7	59.3	1103	57.0	57.7	1170	69.2	69.9	1237	60.7	61.4	1304	56.6	57.2
1037	58.4	59.1	1104	61.4	62.0	1171	61.7	62.4	1238	74.7	75.3	1305	56.6	57.2
1038	58.5	59.2	1105	59.5	60.2	1172	58.4	59.1	1239	56.1	56.8	1306	53.5	54.2
1039	58.2	58.9	1106	60.0	60.6	1173	57.8	58.4	1240	57.5	58.2	1307	56.5	57.2
1040	57.6	58.2	1107	57.9	58.6	1174	74.6	75.2	1241	55.4	56.1	1308	56.5	57.2
1041	57.5	58.1	1108	59.1	59.8	1175	60.1	60.8	1242	56.5	57.2	1309	74.3	74.9
1042	57.3	58.0	1109	57.2	57.9	1176	61.2	61.8	1243	63.2	63.8	1310	66.7	67.4
1043	74.7	75.3	1110	58.2	58.9	1177	61.8	62.4	1244	60.2	60.9	1311	67.7	68.3
1044	55.8	56.5	1111	55.8	56.5	1178	59.4	60.1	1245	56.5	57.2	1312	56.4	57.1
1045	57.2	57.8	1112	57.8	58.4	1179	59.4	60.0	1246	74.5	75.2	1313	55.2	55.9
1046	57.0	57.7	1113	60.3	61.0	1180	60.4	61.0	1247	58.3	58.9	1314	56.9	57.6
1047	57.1	57.8	1114	56.3	57.0	1181	58.8	59.4	1248	56.1	56.8	1315	59.0	59.7
1048	56.7	57.4	1115	56.6	57.2	1182	59.3	59.9	1249	74.5	75.2	1316	56.5	57.1
1049	56.8	57.5	1116	59.8	60.4	1183	60.2	60.9	1250	61.4	62.1	1317	55.3	56.0
1050	56.6	57.2	1117	60.1	60.7	1184	59.8	60.5	1251	57.0	57.7	1318	56.0	56.6
1051	56.4	57.1	1118	59.4	60.0	1185	60.1	60.7	1252	55.4	56.1	1319	57.2	57.8
1052	56.9	57.5	1119	58.9	59.6	1186	56.9	57.6	1253	56.3	57.0	1320	58.8	59.4
1053	54.5	55.2	1120	58.0	58.7	1187	59.2	59.8	1254	56.5	57.2	1321	56.4	57.0
1054	55.8	56.4	1121	58.4	59.0	1188	56.8	57.5	1255	57.4	58.1	1322	56.5	57.2
1055	58.0	58.6	1122	58.6	59.3	1189	58.6	59.3	1256	56.2	56.8	1323	55.8	56.5
1056	58.1	58.8	1123	58.2	58.9	1190	57.7	58.4	1257	57.7	58.4	1324	73.6	74.3
1057	58.4	59.0	1124	56.0	56.6	1191	55.8	56.5	1258	54.9	55.6	1325	56.3	57.1
1058	54.5	55.1	1125	57.8	58.4	1192	56.9	57.6	1259	74.6	75.2	1326	56.9	57.5
1059	55.7	56.3	1126	58.4	59.0	1193	58.0	58.6	1260	54.6	55.3	1327	57.6	58.3

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
1060	54.3	55.0	1127	58.1	58.8	1194	56.5	57.2	1261	63.4	64.1	1328	56.2	56.8
1061	56.8	57.5	1128	57.4	58.1	1195	57.0	57.6	1262	56.1	56.8	1329	69.1	69.8
1062	55.8	56.4	1129	57.6	58.3	1196	59.1	59.8	1263	60.8	61.4	1330	56.0	56.7
1063	54.5	55.1	1130	57.2	57.8	1197	56.6	57.3	1264	61.0	61.7	1331	57.7	58.4
1064	54.7	55.3	1131	74.7	75.3	1198	56.0	56.7	1265	59.5	60.1	1332	74.5	75.1
1065	73.0	73.6	1132	56.8	57.4	1199	55.8	56.5	1266	60.2	60.8	1333	56.6	57.3
1066	58.0	58.7	1133	56.8	57.4	1200	58.3	59.0	1267	60.0	60.7	1334	55.9	56.6
1067	58.4	59.0	1134	56.9	57.5	1201	57.5	58.1	1268	54.5	55.2	1335	55.6	56.2
1068	54.8	55.4	1135	56.2	56.9	1202	62.7	63.4	1269	59.1	59.7	1336	57.1	57.8
1069	56.9	57.6	1136	56.1	56.7	1203	57.8	58.5	1270	56.5	57.1	1337	55.1	55.7
1070	55.0	55.7	1137	55.9	56.5	1204	69.3	70.0	1271	73.6	74.3	1338	55.9	56.6
1071	58.1	58.8	1138	55.7	56.4	1205	59.7	60.4	1272	56.9	57.5	1339	69.0	69.7
1072	55.6	56.3	1139	61.5	62.2	1206	74.6	75.2	1273	57.0	57.6	1340	55.2	55.8
1341	57.5	58.2	1408	74.3	74.9	1475	59.0	59.6	1542	56.8	57.5	1609	73.1	73.7
1342	57.5	58.1	1409	56.7	57.3	1476	60.3	61.0	1543	58.8	59.4	1610	64.6	65.3
1343	57.6	58.2	1410	55.1	55.8	1477	57.9	58.5	1544	67.3	68.0	1611	62.7	63.4
1344	56.9	57.6	1411	61.4	62.0	1478	73.4	74.0	1545	58.3	59.0	1612	56.5	57.1
1345	57.3	58.0	1412	69.0	69.7	1479	58.6	59.3	1546	58.6	59.3	1613	57.8	58.5
1346	57.6	58.3	1413	55.0	55.7	1480	55.0	55.7	1547	61.8	62.5	1614	62.7	63.3
1347	56.9	57.5	1414	56.9	57.5	1481	60.8	61.4	1548	72.9	73.5	1615	56.5	57.2
1348	57.1	57.8	1415	74.2	74.9	1482	60.6	61.3	1549	56.2	56.9	1616	62.1	62.7
1349	57.8	58.5	1416	56.3	57.0	1483	59.3	60.0	1550	58.8	59.5	1617	62.6	63.2
1350	74.4	75.0	1417	61.0	61.6	1484	60.1	60.7	1551	60.4	61.1	1618	57.9	58.5
1351	57.0	57.7	1418	61.1	61.8	1485	59.8	60.5	1552	59.1	59.7	1619	61.8	62.5
1352	57.8	58.4	1419	56.0	56.7	1486	57.8	58.5	1553	59.9	60.5	1620	72.8	73.5
1353	56.8	57.5	1420	69.0	69.7	1487	73.2	73.9	1554	57.6	58.2	1621	58.1	58.8
1354	57.8	58.5	1421	74.1	74.8	1488	55.9	56.6	1555	59.3	59.9	1622	54.8	55.5
1355	56.8	57.5	1422	56.5	57.1	1489	68.8	69.4	1556	59.3	60.0	1623	62.6	63.3
1356	57.8	58.5	1423	57.0	57.7	1490	56.5	57.2	1557	55.9	56.6	1624	64.1	64.7
1357	56.8	57.5	1424	56.4	57.1	1491	59.1	59.8	1558	66.6	67.3	1625	55.7	56.4
1358	57.9	58.6	1425	56.4	57.0	1492	59.7	60.4	1559	58.8	59.5	1626	64.6	65.3
1359	56.8	57.5	1426	56.2	56.9	1493	56.3	57.0	1560	56.8	57.5	1627	57.8	58.4
1360	58.0	58.6	1427	56.4	57.1	1494	56.7	57.4	1561	56.4	57.1	1628	72.9	73.5
1361	58.0	58.6	1428	56.2	56.8	1495	53.3	54.0	1562	73.0	73.7	1629	58.1	58.8
1362	57.1	57.7	1429	56.2	56.9	1496	58.3	59.0	1563	58.4	59.1	1630	56.4	57.1
1363	59.4	60.0	1430	56.2	56.9	1497	55.9	56.6	1564	57.9	58.6	1631	59.3	60.0
1364	56.5	57.2	1431	56.1	56.7	1498	58.4	59.1	1565	58.2	58.9	1632	61.1	61.8
1365	59.0	59.7	1432	56.1	56.7	1499	56.5	57.1	1566	55.9	56.6	1633	59.8	60.4
1366	74.4	75.0	1433	55.9	56.6	1500	73.0	73.6	1567	56.8	57.5	1634	61.7	62.4
1367	61.7	62.3	1434	56.2	56.8	1501	67.7	68.4	1568	59.4	60.0	1635	61.0	61.7
1368	59.9	60.6	1435	55.1	55.7	1502	56.4	57.0	1569	73.1	73.7	1636	56.4	57.1
1369	57.6	58.5	1436	69.0	69.7	1503	56.4	57.0	1570	55.9	56.5	1637	58.3	58.9
1370	59.4	60.0	1437	55.8	56.5	1504	55.3	56.0	1571	59.0	59.7	1638	56.2	56.9
1371	59.5	60.2	1438	74.1	74.8	1505	56.2	56.9	1572	56.5	57.1	1639	57.7	58.4
1372	59.5	60.2	1439	56.3	56.9	1506	56.6	57.3	1573	58.3	59.0	1640	57.2	57.9
1373	59.6	60.3	1440	55.7	56.4	1507	56.6	57.3	1574	60.6	61.2	1641	56.4	57.0
1374	59.5	60.2	1441	56.3	57.0	1508	56.3	57.0	1575	68.9	69.6	1642	58.0	58.7
1375	69.0	69.7	1442	55.2	55.9	1509	56.4	57.1	1576	72.2	72.8	1643	56.2	56.9
1376	57.6	58.5	1443	55.6	56.3	1510	56.5	57.1	1577	73.2	73.8	1644	57.2	57.9
1377	55.9	56.6	1444	55.5	56.2	1511	56.4	57.1	1578	55.1	55.8	1645	68.3	69.0
1378	56.8	57.5	1445	56.5	57.1	1512	56.5	57.1	1579	58.8	59.4	1646	66.9	67.6

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
1379	56.4	57.1	1446	56.7	57.4	1513	56.3	57.0	1580	56.4	57.1	1647	66.3	67.0
1380	57.5	58.3	1447	56.3	57.0	1514	56.5	57.1	1581	56.4	57.1	1648	58.6	59.2
1381	57.3	58.2	1448	55.5	56.1	1515	56.4	57.1	1582	58.6	59.3	1649	55.7	56.4
1382	56.0	56.7	1449	61.0	61.7	1516	56.1	56.8	1583	73.2	73.8	1650	56.2	56.9
1383	57.2	58.1	1450	55.4	56.0	1517	72.8	73.5	1584	68.8	69.5	1651	49.0	49.7
1384	74.4	75.0	1451	55.5	56.2	1518	56.0	56.7	1585	61.0	61.6	1652	54.7	55.3
1385	62.3	63.0	1452	56.5	57.2	1519	56.0	56.7	1586	55.6	56.3	1653	59.7	60.3
1386	69.1	69.8	1453	56.5	57.1	1520	55.7	56.3	1587	62.2	62.8	1654	57.2	57.9
1387	60.3	60.9	1454	56.6	57.3	1521	56.6	57.2	1588	57.9	58.6	1655	54.6	55.3
1388	57.1	58.0	1455	56.4	57.1	1522	55.5	56.2	1589	73.0	73.6	1656	55.6	56.2
1389	59.0	59.7	1456	55.2	55.9	1523	56.6	57.3	1590	56.4	57.1	1657	54.9	55.6
1390	56.4	57.0	1457	54.9	55.6	1524	54.9	55.5	1591	61.7	62.3	1658	55.2	55.9
1391	57.0	57.9	1458	56.3	57.0	1525	56.5	57.2	1592	55.9	56.6	1659	60.6	61.3
1392	56.8	57.5	1459	56.6	57.2	1526	55.2	55.8	1593	61.9	62.6	1660	61.1	61.8
1393	73.2	73.9	1460	59.2	59.8	1527	55.2	55.9	1594	68.8	69.4	1661	57.8	58.5
1394	58.2	58.9	1461	54.9	55.6	1528	55.2	55.8	1595	72.9	73.5	1662	61.3	62.0
1395	62.3	63.0	1462	56.0	56.7	1529	56.8	57.4	1596	58.2	58.8	1663	66.8	67.4
1396	59.0	59.6	1463	55.0	55.7	1530	57.0	57.6	1597	56.4	57.1	1664	61.3	62.0
1397	56.4	57.0	1464	56.9	57.6	1531	67.5	68.2	1598	54.5	55.2	1665	61.3	61.9
1398	69.0	69.7	1465	72.4	73.0	1532	55.1	55.7	1599	58.8	59.4	1666	59.9	60.6
1399	74.3	74.9	1466	56.4	57.0	1533	56.8	57.4	1600	62.4	63.1	1667	52.6	53.3
1400	57.8	58.5	1467	56.7	57.4	1534	58.7	59.4	1601	58.7	59.4	1668	61.4	62.1
1401	56.0	56.7	1468	56.8	57.4	1535	56.4	57.1	1602	61.3	62.0	1669	60.1	60.7
1402	57.2	57.9	1469	56.1	56.7	1536	57.1	57.7	1603	63.5	64.1	1670	60.2	60.9
1403	56.5	57.2	1470	56.3	57.0	1537	56.0	56.6	1604	68.7	69.4	1671	61.4	62.0
1404	55.6	56.2	1471	56.7	57.4	1538	57.2	57.8	1605	57.9	58.5	1672	52.5	53.2
1405	56.4	57.1	1472	61.9	62.6	1539	72.8	73.5	1606	57.0	57.6	1673	55.5	56.2
1406	56.4	57.1	1473	55.3	56.0	1540	57.2	57.9	1607	58.1	58.8	1674	60.3	60.9
1407	57.0	57.7	1474	69.0	69.7	1541	57.2	57.9	1608	62.7	63.4	1675	59.8	60.5
1676	57.5	58.2	1743	58.1	58.7	1810	65.6	66.3	1877	58.4	59.0	1944	58.1	58.7
1677	59.8	60.5	1744	55.7	56.3	1811	54.5	55.2	1878	60.1	60.8	1945	60.3	61.0
1678	73.6	74.2	1745	70.1	70.8	1812	60.3	60.9	1879	69.7	70.3	1946	57.2	57.9
1679	57.1	57.8	1746	55.4	56.0	1813	58.8	59.5	1880	68.9	69.5	1947	55.3	56.0
1680	61.6	62.3	1747	58.0	58.7	1814	59.5	60.2	1881	60.8	61.4	1948	67.3	67.9
1681	55.0	55.7	1748	70.5	71.1	1815	59.6	60.3	1882	57.8	58.4	1949	66.9	67.5
1682	61.9	62.5	1749	58.5	59.1	1816	63.4	64.1	1883	61.0	61.7	1950	63.1	63.8
1683	61.0	61.7	1750	58.1	58.8	1817	56.9	57.6	1884	72.2	72.8	1951	57.6	58.3
1684	61.1	61.7	1751	55.4	56.1	1818	62.0	62.6	1885	80.8	81.6	1952	55.6	56.3
1685	63.5	64.1	1752	54.9	55.5	1819	70.7	71.4	1886	56.7	57.4	1953	57.0	57.6
1686	57.1	57.7	1753	71.9	72.6	1820	73.9	74.5	1887	67.8	68.5	1954	60.2	60.9
1687	63.5	64.2	1754	58.4	59.0	1821	58.8	59.5	1888	67.6	68.3	1955	59.6	60.2
1688	60.7	61.4	1755	72.2	72.9	1822	56.3	56.9	1889	58.3	58.9	1956	67.3	68.0
1689	63.4	64.1	1756	55.7	56.4	1823	60.6	61.3	1890	58.3	59.0	1957	66.8	67.2
1690	63.5	64.2	1757	58.7	59.3	1824	54.7	55.3	1891	60.1	60.8	1958	58.1	58.8
1691	58.5	59.2	1758	58.5	59.2	1825	59.6	60.2	1892	67.6	68.3	1959	66.4	67.0
1692	60.3	60.9	1759	58.8	59.4	1826	63.3	64.0	1893	79.3	80.1	1960	57.3	57.9
1693	65.7	66.4	1760	56.4	57.0	1827	61.7	62.4	1894	61.3	61.9	1961	55.8	56.4
1694	60.0	60.7	1761	69.2	69.9	1828	57.8	58.4	1895	57.0	57.7	1962	67.3	68.0
1695	66.2	66.9	1762	72.7	73.4	1829	65.5	66.2	1896	69.5	70.1	1963	69.0	69.7
1696	66.6	67.3	1763	58.1	58.8	1830	56.8	57.4	1897	69.1	69.7	1964	64.2	64.8
1697	66.9	67.6	1764	58.0	58.7	1831	60.8	61.4	1898	60.4	61.0	1965	56.9	57.6

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
1698	54.7	55.4	1765	58.8	59.5	1832	73.3	73.8	1899	58.3	58.9	1966	56.3	57.0
1699	54.7	55.4	1766	63.2	63.9	1833	58.7	59.4	1900	72.0	72.6	1967	58.1	58.7
1700	57.3	58.0	1767	72.9	73.6	1834	81.6	82.4	1901	64.8	65.5	1968	60.1	60.8
1701	67.4	68.1	1768	74.6	75.3	1835	63.2	63.8	1902	64.9	65.5	1969	56.8	57.4
1702	54.8	55.5	1769	60.7	61.4	1836	68.2	68.8	1903	61.1	61.7	1970	60.3	61.0
1703	67.8	68.5	1770	56.8	57.5	1837	67.3	68.0	1904	60.3	60.9	1971	59.4	60.1
1704	67.9	68.6	1771	74.9	75.7	1838	58.5	59.1	1905	56.2	56.9	1972	59.5	60.1
1705	57.6	58.2	1772	72.9	73.6	1839	61.6	62.3	1906	63.9	64.6	1973	68.7	69.4
1706	55.2	55.8	1773	56.9	57.6	1840	65.0	65.7	1907	71.7	72.2	1974	57.6	58.2
1707	59.5	60.2	1774	57.2	57.9	1841	57.8	58.5	1908	58.3	58.9	1975	73.4	74.1
1708	68.0	68.7	1775	58.6	59.2	1842	56.8	57.5	1909	60.0	60.7	1976	59.8	60.5
1709	68.1	68.8	1776	78.9	79.7	1843	65.5	66.2	1910	68.6	69.2	1977	64.4	65.1
1710	68.2	68.9	1777	63.1	63.7	1844	69.3	69.9	1911	60.2	60.9	1978	56.1	56.8
1711	59.2	59.8	1778	56.7	57.4	1845	59.9	60.5	1912	57.1	57.8	1979	62.5	63.2
1712	68.7	69.3	1779	72.4	73.1	1846	72.8	73.4	1913	60.7	61.4	1980	59.4	60.0
1713	58.8	59.4	1780	56.6	57.3	1847	58.5	59.2	1914	66.3	67.0	1981	57.2	57.9
1714	68.7	69.4	1781	68.1	68.7	1848	56.9	57.6	1915	54.6	55.2	1982	60.0	60.7
1715	68.9	69.6	1782	60.8	61.5	1849	60.9	61.6	1916	58.2	58.8	1983	56.8	57.5
1716	69.0	69.7	1783	57.2	57.9	1850	81.6	82.5	1917	54.6	55.3	1984	58.1	58.7
1717	69.1	69.8	1784	58.8	59.4	1851	62.0	62.7	1918	70.9	71.5	1985	57.2	57.9
1718	58.6	59.2	1785	56.6	57.3	1852	57.5	58.2	1919	60.0	60.6	1986	77.2	78.0
1719	69.2	69.9	1786	73.1	73.8	1853	58.3	58.9	1920	57.2	57.9	1987	65.9	66.6
1720	69.5	70.1	1787	63.0	63.7	1854	68.6	69.2	1921	67.8	68.4	1988	56.4	57.1
1721	69.6	70.3	1788	76.4	76.9	1855	68.7	69.4	1922	67.5	68.1	1989	67.3	67.9
1722	57.3	58.0	1789	56.7	57.4	1856	67.7	68.4	1923	57.0	57.6	1990	57.3	58.0
1723	57.5	58.1	1790	62.8	63.4	1857	71.0	71.6	1924	54.5	55.2	1991	62.3	63.0
1724	58.0	58.6	1791	66.4	67.1	1858	70.6	71.2	1925	54.7	55.4	1992	59.3	59.9
1725	57.6	58.3	1792	73.3	73.9	1859	72.5	73.1	1926	54.4	55.1	1993	56.8	57.5
1726	55.0	55.7	1793	74.1	74.7	1860	58.5	59.2	1927	57.7	58.4	1994	58.0	58.6
1727	57.9	58.5	1794	81.6	82.5	1861	60.9	61.6	1928	54.8	55.5	1995	63.0	63.7
1728	71.3	72.0	1795	56.7	57.3	1862	64.3	64.9	1929	60.5	61.1	1996	56.5	57.1
1729	57.9	58.6	1796	59.5	60.1	1863	68.8	69.4	1930	54.9	55.6	1997	59.9	60.5
1730	58.2	58.8	1797	71.2	71.8	1864	61.6	62.3	1931	58.1	58.8	1998	55.7	56.4
1731	55.2	55.9	1798	57.5	58.1	1865	57.0	57.7	1932	64.5	65.1	1999	56.8	57.4
1732	58.2	58.8	1799	56.5	57.1	1866	58.2	58.9	1933	55.0	55.7	2000	77.4	78.2
1733	55.2	55.9	1800	58.8	59.5	1867	60.0	60.6	1934	56.9	57.5	2001	59.2	59.8
1734	58.1	58.8	1801	60.2	60.9	1868	55.9	56.5	1935	63.5	64.2	2002	59.9	60.5
1735	58.0	58.6	1802	56.4	57.1	1869	57.8	58.4	1936	66.8	67.4	2003	57.3	57.9
1736	55.3	55.9	1803	63.2	63.9	1870	58.4	59.1	1937	55.1	55.8	2004	58.0	58.6
1737	58.1	58.8	1804	54.6	55.3	1871	60.8	61.5	1938	55.3	55.9	2005	67.1	67.7
1738	55.3	55.9	1805	62.2	62.9	1872	72.3	72.9	1939	57.1	57.7	2006	62.0	62.6
1739	55.3	56.0	1806	57.1	57.8	1873	62.1	62.7	1940	69.4	70.0	2007	59.8	60.4
1740	71.1	71.8	1807	54.4	55.0	1874	58.2	58.9	1941	60.3	61.0	2008	54.0	54.7
1741	58.1	58.7	1808	75.1	75.7	1875	56.8	57.5	1942	55.3	56.0	2009	56.5	57.2
1742	55.8	56.4	1809	57.9	58.5	1876	64.9	65.6	1943	59.7	60.3	2010	59.6	60.2
2011	58.0	58.6	2078	62.2	62.9	2145	56.7	57.3	2212	59.2	59.8	2279	55.3	56.0
2012	54.0	54.7	2079	56.3	57.0	2146	65.1	65.7	2213	56.7	57.3	2280	63.6	64.3
2013	57.9	58.5	2080	59.0	59.7	2147	62.9	63.6	2214	58.0	58.6	2281	56.9	57.6
2014	78.1	78.9	2081	55.6	56.3	2148	60.3	61.0	2215	60.3	61.0	2282	67.2	67.9
2015	62.1	62.8	2082	57.1	57.7	2149	55.8	56.5	2216	57.5	58.1	2283	54.9	55.6
2016	57.2	57.9	2083	56.9	57.5	2150	58.0	58.7	2217	78.8	79.5	2284	64.6	65.3

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
2017	54.1	54.8	2084	79.3	80.1	2151	79.0	79.8	2218	57.8	58.5	2285	65.4	66.1
2018	62.9	63.5	2085	57.0	57.6	2152	54.8	55.5	2219	55.7	56.4	2286	57.6	58.3
2019	57.6	58.2	2086	56.6	57.2	2153	57.3	57.9	2220	62.0	62.6	2287	57.4	58.0
2020	59.9	60.6	2087	57.4	58.0	2154	55.8	56.5	2221	59.3	60.0	2288	55.2	55.9
2021	59.7	60.4	2088	59.1	59.8	2155	57.5	58.2	2222	56.0	56.7	2289	61.6	62.3
2022	56.7	57.4	2089	64.9	65.6	2156	64.5	65.2	2223	57.1	57.7	2290	59.4	60.0
2023	54.1	54.8	2090	55.6	56.3	2157	55.3	56.0	2224	60.4	61.1	2291	56.9	57.5
2024	54.2	54.9	2091	61.7	62.3	2158	57.2	57.9	2225	59.2	59.8	2292	55.0	55.7
2025	56.4	57.1	2092	56.6	57.2	2159	56.6	57.3	2226	64.2	64.9	2293	78.4	79.2
2026	62.6	63.3	2093	62.9	63.5	2160	55.0	55.7	2227	56.3	57.0	2294	56.6	57.2
2027	62.5	63.2	2094	57.0	57.7	2161	62.1	62.8	2228	78.7	79.5	2295	55.5	56.2
2028	54.2	54.9	2095	58.0	58.7	2162	57.2	57.8	2229	56.7	57.4	2296	57.4	58.1
2029	59.1	59.7	2096	79.4	80.2	2163	58.1	58.8	2230	58.3	58.9	2297	56.9	57.5
2030	58.0	58.6	2097	56.6	57.3	2164	79.1	79.9	2231	57.0	57.7	2298	58.7	59.3
2031	54.3	55.0	2098	64.4	65.1	2165	55.1	55.8	2232	59.9	60.6	2299	61.3	62.0
2032	57.2	57.9	2099	56.5	57.2	2166	55.3	56.0	2233	57.4	58.0	2300	59.0	59.7
2033	58.4	59.0	2100	58.8	59.4	2167	56.0	56.6	2234	55.9	56.6	2301	55.2	55.9
2034	54.1	54.8	2101	56.8	57.5	2168	64.4	65.1	2235	55.6	56.3	2302	59.7	60.3
2035	54.6	55.3	2102	56.4	57.1	2169	57.5	58.1	2236	60.5	61.1	2303	57.6	58.2
2036	78.8	79.6	2103	57.1	57.8	2170	57.1	57.7	2237	64.6	65.3	2304	56.3	56.9
2037	59.8	60.5	2104	62.2	62.9	2171	56.5	57.2	2238	62.1	62.7	2305	56.9	57.5
2038	62.9	63.5	2105	56.7	57.4	2172	56.5	57.2	2239	59.1	59.8	2306	57.6	58.3
2039	62.0	62.7	2106	57.7	58.4	2173	58.1	58.7	2240	59.9	60.6	2307	54.6	55.2
2040	59.6	60.3	2107	56.2	56.9	2174	57.0	57.7	2241	56.7	57.4	2308	55.2	55.9
2041	56.6	57.3	2108	55.7	56.4	2175	62.2	62.9	2242	57.4	58.1	2309	58.8	59.4
2042	64.3	65.0	2109	58.9	59.6	2176	79.1	79.9	2243	58.3	59.0	2310	58.8	59.4
2043	57.9	58.6	2110	56.2	56.8	2177	57.6	58.2	2244	55.6	56.3	2311	57.6	58.2
2044	59.1	59.7	2111	58.0	58.7	2178	56.0	56.6	2245	78.5	79.3	2312	56.0	56.6
2045	54.8	55.5	2112	78.6	79.4	2179	57.6	58.2	2246	57.0	57.7	2313	59.5	60.2
2046	56.7	57.3	2113	58.5	59.2	2180	58.4	59.1	2247	61.7	62.4	2314	79.0	79.8
2047	62.2	62.8	2114	56.9	57.5	2181	56.7	57.3	2248	54.7	55.3	2315	57.9	58.6
2048	56.8	57.5	2115	58.1	58.8	2182	57.0	57.6	2249	60.1	60.8	2316	64.3	65.0
2049	54.8	55.5	2116	57.7	58.4	2183	55.4	56.0	2250	65.8	66.5	2317	59.7	60.4
2050	59.6	60.2	2117	56.2	56.9	2184	56.8	57.5	2251	78.1	78.9	2318	55.1	55.8
2051	66.4	67.1	2118	64.4	65.1	2185	59.0	59.6	2252	57.0	57.7	2319	61.4	62.1
2052	56.9	57.5	2119	61.5	62.1	2186	59.4	60.0	2253	60.9	61.5	2320	57.6	58.3
2053	59.0	59.7	2120	58.2	58.8	2187	62.0	62.7	2254	55.5	56.2	2321	56.8	57.5
2054	56.9	57.6	2121	55.7	56.4	2188	56.6	57.3	2255	60.5	61.2	2322	57.6	58.2
2055	57.6	58.3	2122	58.7	59.4	2189	58.0	58.7	2256	55.6	56.3	2323	59.4	60.1
2056	60.2	60.8	2123	57.6	58.3	2190	55.6	56.3	2257	54.7	55.4	2324	67.0	67.7
2057	55.1	55.8	2124	57.1	57.8	2191	79.0	79.8	2258	61.8	62.5	2325	55.2	55.9
2058	56.8	57.5	2125	57.0	57.7	2192	57.1	57.8	2259	56.7	57.4	2326	79.4	80.2
2059	79.8	80.6	2126	62.2	62.9	2193	56.5	57.2	2260	65.5	66.2	2327	59.0	59.6
2060	57.5	58.1	2127	78.8	79.6	2194	58.7	59.3	2261	59.8	60.4	2328	58.8	59.4
2061	61.9	62.5	2128	56.0	56.6	2195	64.7	65.4	2262	58.6	59.3	2329	61.1	61.8
2062	57.5	58.1	2129	55.7	56.4	2196	56.1	56.7	2263	55.3	56.0	2330	54.9	55.6
2063	57.4	58.1	2130	60.8	61.5	2197	56.4	57.0	2264	59.2	59.8	2331	68.4	69.1
2064	57.5	58.2	2131	64.8	65.5	2198	56.6	57.2	2265	55.6	56.2	2332	56.8	57.5
2065	59.0	59.7	2132	55.8	56.4	2199	56.3	56.9	2266	61.3	61.9	2333	59.7	60.3
2066	62.5	63.2	2133	56.8	57.5	2200	56.3	57.0	2267	57.4	58.0	2334	68.6	69.3
2067	66.2	66.9	2134	55.7	56.3	2201	57.8	58.4	2268	54.7	55.4	2335	67.5	68.2

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
2068	55.1	55.8	2135	57.3	58.0	2202	60.4	61.0	2269	62.0	62.7	2336	68.5	69.2
2069	56.1	56.8	2136	55.6	56.2	2203	56.3	56.9	2270	79.0	79.7	2337	67.3	68.0
2070	58.4	59.1	2137	55.4	56.0	2204	57.5	58.1	2271	55.2	55.9	2338	59.8	60.5
2071	57.3	57.9	2138	55.6	56.3	2205	56.3	56.9	2272	56.5	57.2	2339	78.1	78.9
2072	79.7	80.4	2139	62.0	62.7	2206	79.0	79.8	2273	56.9	57.6	2340	57.9	58.5
2073	57.9	58.6	2140	78.9	79.7	2207	58.1	58.7	2274	66.4	67.1	2341	57.9	58.5
2074	56.8	57.5	2141	55.8	56.4	2208	57.2	57.8	2275	58.6	59.3	2342	61.7	62.4
2075	61.8	62.4	2142	60.3	61.0	2209	62.0	62.7	2276	63.0	63.7	2343	70.2	70.9
2076	57.4	58.0	2143	57.2	57.8	2210	64.1	64.8	2277	59.5	60.2	2344	59.1	59.7
2077	57.2	57.8	2144	57.5	58.1	2211	55.6	56.3	2278	78.8	79.6	2345	77.5	78.3
2346	70.4	71.1	2413	60.8	61.4	2480	60.3	61.0	2547	59.7	60.3	2614	57.8	58.5
2347	60.9	61.6	2414	60.3	60.9	2481	58.0	58.7	2548	78.9	79.7	2615	58.6	59.3
2348	58.6	59.3	2415	57.4	58.0	2482	60.9	61.6	2549	69.0	69.6	2616	56.3	56.9
2349	63.3	64.0	2416	56.9	57.6	2483	81.9	82.4	2550	56.6	57.3	2617	55.8	56.5
2350	56.8	57.5	2417	58.0	58.7	2484	61.2	61.9	2551	81.7	82.2	2618	79.0	79.8
2351	59.7	60.4	2418	67.0	67.6	2485	79.3	80.1	2552	63.5	64.2	2619	57.7	58.4
2352	67.5	68.2	2419	58.9	59.6	2486	64.6	65.3	2553	59.1	59.7	2620	62.6	63.3
2353	77.0	77.8	2420	59.8	60.4	2487	65.5	66.2	2554	58.8	59.5	2621	81.6	82.1
2354	57.6	58.2	2421	60.5	61.1	2488	55.8	56.5	2555	62.5	63.2	2622	61.2	61.9
2355	57.9	58.6	2422	58.5	59.2	2489	65.6	66.2	2556	59.8	60.5	2623	67.7	68.3
2356	76.6	77.3	2423	58.0	58.7	2490	64.4	65.0	2557	65.7	66.3	2624	67.4	68.1
2357	56.8	57.5	2424	66.7	67.4	2491	58.5	59.2	2558	61.1	61.7	2625	58.9	59.5
2358	55.7	56.4	2425	57.0	57.6	2492	68.7	69.5	2559	69.0	69.6	2626	56.9	57.6
2359	71.6	72.4	2426	60.7	61.4	2493	57.0	57.7	2560	57.5	58.2	2627	57.3	58.0
2360	58.6	59.3	2427	57.3	57.9	2494	60.1	60.8	2561	58.7	59.4	2628	56.2	56.8
2361	62.7	63.4	2428	82.1	82.6	2495	60.7	61.3	2562	79.2	79.9	2629	56.0	56.6
2362	73.9	74.6	2429	70.4	71.1	2496	59.0	59.6	2563	81.7	82.2	2630	61.9	62.6
2363	58.9	59.6	2430	60.6	61.2	2497	79.4	80.2	2564	56.5	57.2	2631	60.9	61.6
2364	67.6	68.2	2431	69.0	69.8	2498	59.8	60.5	2565	63.2	63.9	2632	58.6	59.3
2365	59.9	60.6	2432	58.6	59.2	2499	55.9	56.5	2566	62.4	63.1	2633	79.0	79.7
2366	53.1	53.8	2433	76.6	77.4	2500	81.8	82.3	2567	58.6	59.3	2634	59.8	60.5
2367	60.7	61.4	2434	57.0	57.6	2501	55.9	56.6	2568	55.4	56.1	2635	57.3	58.0
2368	57.2	57.8	2435	66.4	67.1	2502	64.8	65.4	2569	66.2	66.9	2636	56.7	57.4
2369	58.0	58.6	2436	57.2	57.8	2503	59.9	60.6	2570	59.0	59.7	2637	56.1	56.7
2370	49.9	50.5	2437	60.7	61.4	2504	58.3	58.9	2571	59.8	60.5	2638	81.6	82.1
2371	53.2	53.9	2438	82.1	82.6	2505	70.4	71.0	2572	79.1	79.9	2639	62.8	63.4
2372	56.8	57.5	2439	59.0	59.6	2506	66.4	67.1	2573	58.4	59.1	2640	59.0	59.7
2373	67.7	68.3	2440	59.8	60.4	2507	59.0	59.6	2574	60.8	61.5	2641	61.9	62.6
2374	59.9	60.6	2441	77.3	78.1	2508	59.8	60.5	2575	62.5	63.1	2642	56.6	57.3
2375	55.5	56.2	2442	68.1	68.8	2509	57.0	57.6	2576	55.6	56.2	2643	68.2	68.9
2376	58.9	59.6	2443	58.0	58.7	2510	78.7	79.5	2577	62.8	63.5	2644	56.2	56.9
2377	57.4	58.1	2444	55.2	55.9	2511	81.8	82.3	2578	56.4	57.0	2645	58.2	58.9
2378	59.8	60.4	2445	67.6	68.3	2512	55.8	56.5	2579	81.6	82.1	2646	58.2	58.8
2379	63.8	64.5	2446	60.1	60.8	2513	70.4	71.0	2580	68.4	69.0	2647	59.8	60.5
2380	56.8	57.5	2447	66.6	67.2	2514	64.8	65.5	2581	62.1	62.8	2648	61.1	61.8
2381	58.6	59.3	2448	59.0	59.6	2515	60.9	61.5	2582	56.9	57.5	2649	67.5	68.1
2382	55.0	55.7	2449	59.8	60.4	2516	66.6	67.3	2583	66.3	66.9	2650	56.6	57.2
2383	50.3	50.9	2450	60.7	61.3	2517	58.4	59.0	2584	55.8	56.5	2651	58.3	59.0
2384	58.0	58.6	2451	54.4	55.0	2518	59.4	60.1	2585	58.2	58.9	2652	79.1	79.9
2385	59.9	60.6	2452	82.0	82.5	2519	57.2	57.9	2586	79.1	79.9	2653	58.4	59.1
2386	58.9	59.6	2453	58.6	59.2	2520	58.1	58.7	2587	81.6	82.1	2654	81.6	82.1

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
2387	62.8	63.5	2454	58.0	58.7	2521	79.1	79.9	2588	68.3	68.9	2655	58.5	59.2
2388	57.4	58.1	2455	77.6	78.3	2522	56.9	57.6	2589	59.8	60.4	2656	58.6	59.3
2389	58.6	59.3	2456	54.9	55.5	2523	59.0	59.7	2590	60.9	61.5	2657	58.6	59.3
2390	56.8	57.5	2457	60.1	60.8	2524	61.1	61.8	2591	56.4	57.1	2658	58.3	59.0
2391	59.8	60.4	2458	66.1	66.7	2525	59.3	60.0	2592	55.6	56.2	2659	61.4	62.1
2392	59.9	60.6	2459	68.1	68.8	2526	81.7	82.2	2593	58.7	59.4	2660	58.3	58.9
2393	58.0	58.7	2460	82.0	82.4	2527	60.7	61.3	2594	62.4	63.0	2661	62.5	63.1
2394	57.5	58.1	2461	58.6	59.2	2528	59.8	60.5	2595	61.0	61.6	2662	59.2	59.9
2395	67.4	68.1	2462	78.8	79.5	2529	57.4	58.1	2596	62.0	62.6	2663	68.8	69.5
2396	56.9	57.5	2463	72.0	72.6	2530	64.0	64.6	2597	66.8	67.5	2664	54.7	55.4
2397	58.9	59.6	2464	61.1	61.8	2531	65.9	66.6	2598	58.4	59.1	2665	54.7	55.4
2398	58.3	58.9	2465	59.0	59.6	2532	64.7	65.3	2599	79.2	79.9	2666	56.8	57.4
2399	60.2	60.9	2466	59.8	60.4	2533	56.9	57.5	2600	56.3	56.9	2667	56.0	56.6
2400	54.8	55.5	2467	67.5	68.2	2534	56.8	57.4	2601	56.4	57.0	2668	55.9	56.6
2401	60.9	61.5	2468	72.2	72.8	2535	59.5	60.1	2602	55.8	56.5	2669	66.4	67.0
2402	67.4	68.1	2469	60.3	61.0	2536	79.0	79.8	2603	59.2	59.8	2670	79.0	79.8
2403	58.0	58.7	2470	63.5	64.2	2537	81.7	82.2	2604	59.8	60.5	2671	62.6	63.3
2404	55.0	55.7	2471	58.1	58.7	2538	59.0	59.7	2605	62.0	62.7	2672	58.4	59.1
2405	60.2	60.8	2472	58.4	59.1	2539	59.8	60.5	2606	62.8	63.4	2673	56.1	56.8
2406	57.4	58.1	2473	81.9	82.4	2540	59.6	60.2	2607	81.6	82.1	2674	55.7	56.4
2407	56.9	57.5	2474	59.0	59.6	2541	54.0	54.7	2608	58.7	59.4	2675	56.7	57.4
2408	54.3	54.9	2475	59.8	60.4	2542	61.1	61.8	2609	60.9	61.6	2676	55.6	56.3
2409	58.5	59.1	2476	65.6	66.2	2543	62.2	62.8	2610	59.7	60.4	2677	61.2	61.9
2410	58.9	59.6	2477	55.5	56.2	2544	66.1	66.8	2611	61.5	62.2	2678	55.6	56.3
2411	67.2	67.9	2478	69.1	69.8	2545	63.8	64.5	2612	66.9	67.6	2679	55.0	55.7
2412	59.7	60.4	2479	57.1	57.8	2546	60.7	61.3	2613	67.8	68.5	2680	62.4	63.0
2681	81.6	82.1	2748	55.7	56.3	2815	55.1	55.8	2882	56.3	57.0	2949	68.8	69.5
2682	56.7	57.4	2749	56.4	57.1	2816	50.3	51.0	2883	58.6	59.3	2950	57.8	58.4
2683	55.4	56.1	2750	71.9	72.7	2817	72.6	73.3	2884	61.9	62.5	2951	55.3	55.9
2684	55.3	56.0	2751	57.5	58.2	2818	54.5	55.2	2885	59.8	60.5	2952	55.3	56.0
2685	54.9	55.5	2752	63.3	64.0	2819	55.6	56.3	2886	58.6	59.3	2953	61.8	62.5
2686	55.2	55.8	2753	63.0	63.7	2820	74.9	75.6	2887	58.7	59.4	2954	58.7	59.4
2687	62.9	63.5	2754	62.4	63.1	2821	62.1	62.8	2888	55.5	56.2	2955	59.3	60.0
2688	59.8	60.5	2755	81.5	82.0	2822	54.3	55.0	2889	58.2	58.8	2956	55.8	56.5
2689	58.2	58.9	2756	72.0	72.8	2823	54.4	55.1	2890	70.0	70.7	2957	69.9	70.6
2690	69.5	70.2	2757	72.0	72.7	2824	75.8	76.6	2891	73.4	74.2	2958	81.4	81.9
2691	79.2	79.9	2758	62.9	63.5	2825	54.3	54.9	2892	58.9	59.5	2959	57.8	58.5
2692	56.9	57.6	2759	55.5	56.2	2826	56.9	57.6	2893	62.9	63.6	2960	70.5	71.2
2693	81.6	82.1	2760	56.5	57.2	2827	54.3	54.9	2894	58.7	59.3	2961	58.3	59.0
2694	67.3	67.9	2761	68.0	68.7	2828	81.5	82.0	2895	69.3	70.0	2962	61.9	62.6
2695	56.5	57.1	2762	61.1	61.8	2829	77.2	78.0	2896	74.7	75.5	2963	55.1	55.8
2696	63.2	63.9	2763	59.6	60.3	2830	56.2	56.9	2897	62.6	63.3	2964	59.1	59.8
2697	58.2	58.8	2764	58.9	59.4	2831	81.1	81.9	2898	56.0	56.7	2965	81.4	81.9
2698	70.4	71.1	2765	55.7	56.4	2832	68.9	69.6	2899	76.4	77.2	2966	68.0	68.7
2699	56.7	57.4	2766	55.4	56.0	2833	56.1	56.7	2900	55.4	56.1	2967	58.7	59.4
2700	59.8	60.4	2767	56.6	57.2	2834	59.5	60.1	2901	78.1	78.9	2968	57.9	58.5
2701	61.5	62.2	2768	57.4	58.0	2835	71.8	72.5	2902	68.4	69.1	2969	71.1	71.8
2702	78.4	79.2	2769	62.0	62.7	2836	67.0	67.7	2903	59.5	60.1	2970	61.2	61.9
2703	56.9	57.5	2770	67.6	68.2	2837	55.8	56.4	2904	56.9	57.5	2971	54.7	55.4
2704	58.4	59.1	2771	55.5	56.2	2838	54.7	55.3	2905	81.5	82.0	2972	59.2	59.8
2705	65.9	66.5	2772	62.6	63.3	2839	50.3	51.0	2906	56.6	57.2	2973	58.8	59.5

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
2706	56.3	57.0	2773	56.0	56.6	2840	53.0	53.6	2907	58.1	58.7	2974	59.4	60.1
2707	56.7	57.4	2774	72.1	72.8	2841	68.4	69.0	2908	57.2	57.9	2975	56.9	57.5
2708	62.3	63.0	2775	59.7	60.4	2842	55.8	56.5	2909	68.5	69.2	2976	70.9	71.6
2709	81.6	82.1	2776	81.6	82.1	2843	59.5	60.2	2910	66.0	66.6	2977	56.0	56.6
2710	57.1	57.7	2777	64.5	65.1	2844	81.5	82.0	2911	58.5	59.2	2978	61.0	61.7
2711	62.2	62.9	2778	55.4	56.1	2845	62.8	63.5	2912	62.6	63.2	2979	60.2	60.9
2712	71.2	72.0	2779	57.1	57.8	2846	64.4	65.1	2913	56.6	57.2	2980	67.6	68.3
2713	63.9	64.6	2780	62.0	62.6	2847	56.4	57.1	2914	57.6	58.2	2981	54.7	55.4
2714	56.4	57.0	2781	53.9	54.5	2848	55.9	56.6	2915	81.5	82.0	2982	59.7	60.3
2715	57.0	57.7	2782	54.0	54.7	2849	71.3	72.0	2916	57.7	58.4	2983	56.8	57.5
2716	62.3	63.0	2783	55.4	56.1	2850	67.6	68.2	2917	63.3	64.0	2984	81.4	81.9
2717	56.4	57.1	2784	62.5	63.1	2851	62.1	62.8	2918	57.9	58.6	2985	72.8	73.5
2718	56.5	57.2	2785	72.4	73.2	2852	81.5	82.0	2919	58.0	58.7	2986	59.6	60.3
2719	81.6	82.1	2786	54.1	54.8	2853	56.1	56.8	2920	57.5	58.2	2987	56.2	56.9
2720	79.6	80.5	2787	57.0	57.7	2854	59.1	59.8	2921	58.5	59.2	2988	56.9	57.6
2721	76.8	77.6	2788	56.5	57.2	2855	60.6	61.2	2922	68.8	69.5	2989	73.0	73.7
2722	55.5	56.1	2789	81.5	82.1	2856	55.8	56.5	2923	57.0	57.7	2990	62.3	63.0
2723	57.0	57.7	2790	55.8	56.5	2857	69.5	70.1	2924	58.9	59.6	2991	58.7	59.3
2724	59.7	60.4	2791	68.3	68.9	2858	68.1	68.8	2925	56.1	56.7	2992	74.7	75.5
2725	66.2	66.9	2792	55.4	56.1	2859	54.3	55.0	2926	58.3	58.9	2993	54.8	55.5
2726	71.7	72.4	2793	64.2	64.8	2860	64.8	65.5	2927	58.7	59.4	2994	58.3	59.0
2727	55.6	56.3	2794	61.2	61.9	2861	53.2	53.8	2928	58.0	58.7	2995	55.7	56.3
2728	57.0	57.6	2795	59.6	60.3	2862	56.1	56.7	2929	58.7	59.4	2996	59.9	60.5
2729	57.1	57.8	2796	54.1	54.7	2863	61.9	62.6	2930	56.9	57.5	2997	75.1	75.9
2730	62.3	63.0	2797	56.4	57.1	2864	59.8	60.5	2931	81.4	81.9	2998	77.2	78.1
2731	79.3	80.1	2798	56.9	57.6	2865	59.9	60.6	2932	55.5	56.2	2999	59.9	60.6
2732	56.1	56.7	2799	54.2	54.8	2866	57.8	58.5	2933	58.8	59.5	3000	59.6	60.3
2733	56.0	56.7	2800	54.1	54.7	2867	54.4	55.0	2934	65.5	66.2	3001	63.7	64.4
2734	55.9	56.6	2801	72.6	73.3	2868	70.6	71.3	2935	59.0	59.6	3002	59.8	60.5
2735	57.3	57.9	2802	56.1	56.8	2869	56.0	56.7	2936	68.7	69.4	3003	58.6	59.3
2736	67.0	67.7	2803	56.0	56.7	2870	62.4	63.1	2937	59.0	59.7	3004	66.4	67.0
2737	56.4	57.1	2804	67.9	68.5	2871	56.9	57.6	2938	61.7	62.3	3005	59.4	60.1
2738	55.6	56.3	2805	57.5	58.2	2872	56.5	57.1	2939	58.5	59.2	3006	76.9	77.7
2739	59.7	60.4	2806	64.5	65.2	2873	64.7	65.3	2940	62.8	63.4	3007	58.0	58.6
2740	55.6	56.3	2807	56.9	57.5	2874	54.4	55.0	2941	55.3	55.9	3008	56.4	57.1
2741	62.3	62.9	2808	62.0	62.6	2875	68.3	69.0	2942	81.4	81.9	3009	65.7	66.4
2742	81.5	82.0	2809	62.7	63.4	2876	56.7	57.4	2943	61.6	62.2	3010	62.5	63.1
2743	57.6	58.2	2810	81.5	82.0	2877	57.3	58.0	2944	60.2	60.9	3011	58.4	59.0
2744	55.4	56.1	2811	59.6	60.3	2878	54.3	55.0	2945	66.2	66.9	3012	59.1	59.8
2745	55.6	56.3	2812	60.7	61.4	2879	69.9	70.6	2946	58.0	58.7	3013	58.0	58.6
2746	55.6	56.3	2813	54.3	55.0	2880	56.2	56.8	2947	57.6	58.3	3014	63.1	63.8
2747	55.6	56.3	2814	54.2	54.9	2881	54.3	55.0	2948	59.4	60.1	3015	58.4	59.0
3016	58.0	58.7	3083	61.1	61.7	3150	72.2	72.9	3217	61.7	62.3	3284	58.6	59.2
3017	59.6	60.2	3084	56.9	57.5	3151	64.4	65.1	3218	64.0	64.7	3285	59.7	60.4
3018	59.3	60.0	3085	62.2	62.9	3152	57.7	58.3	3219	55.6	56.3	3286	60.6	61.2
3019	62.9	63.5	3086	63.2	63.8	3153	74.9	75.5	3220	56.6	57.3	3287	61.0	61.7
3020	63.5	64.2	3087	69.4	70.0	3154	61.5	62.2	3221	69.2	69.9	3288	60.1	60.7
3021	58.4	59.0	3088	61.4	62.1	3155	58.3	59.0	3222	74.1	74.7	3289	66.5	67.2
3022	58.1	58.7	3089	58.5	59.1	3156	67.2	67.9	3223	56.0	56.7	3290	67.8	68.5
3023	59.5	60.2	3090	72.3	72.9	3157	67.5	68.2	3224	73.3	74.0	3291	61.4	62.1
3024	63.2	63.9	3091	70.9	71.6	3158	72.7	73.4	3225	63.8	64.5	3292	55.4	56.1

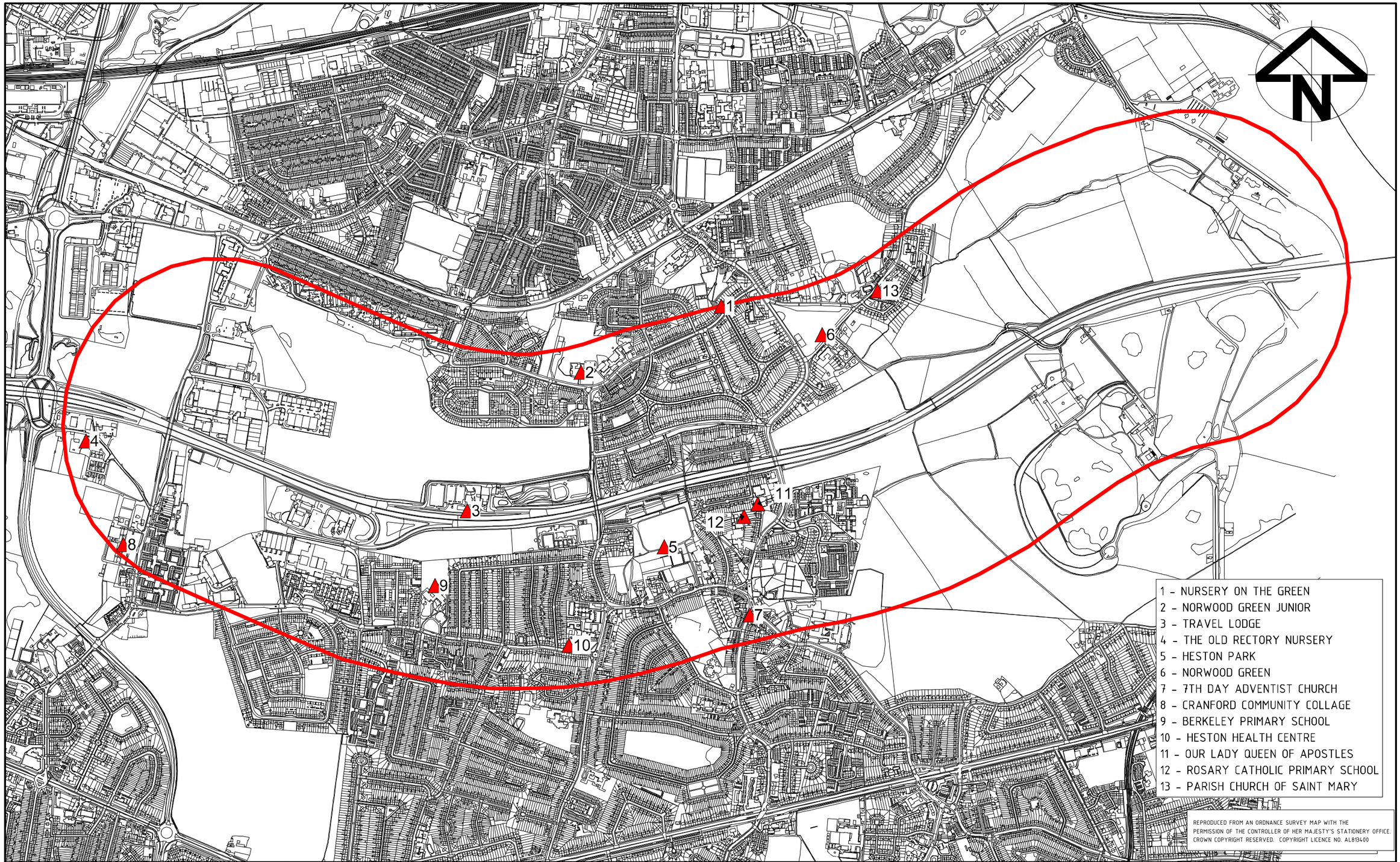
ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
3025	58.5	59.1	3092	69.4	70.1	3159	68.8	69.5	3226	56.6	57.3	3293	55.4	56.1
3026	73.9	74.6	3093	69.3	69.9	3160	57.0	57.6	3227	56.6	57.2	3294	55.5	56.2
3027	58.9	59.5	3094	68.6	69.3	3161	69.3	70.0	3228	56.3	57.0	3295	55.6	56.3
3028	62.2	62.9	3095	61.5	62.1	3162	72.9	73.6	3229	56.5	57.1	3296	55.7	56.4
3029	61.9	62.6	3096	61.1	61.8	3163	64.6	65.3	3230	73.3	74.0	3297	55.7	56.4
3030	62.9	63.6	3097	59.0	59.6	3164	64.4	65.1	3231	56.6	57.3	3298	55.7	56.3
3031	63.4	64.0	3098	60.2	60.9	3165	57.3	58.0	3232	63.4	64.1	3299	55.6	56.3
3032	63.5	64.2	3099	60.2	60.8	3166	55.2	55.9	3233	56.6	57.3	3300	55.6	56.3
3033	63.9	64.5	3100	60.5	61.2	3167	55.1	55.7	3234	55.0	55.6	3301	62.2	62.8
3034	59.4	60.0	3101	58.7	59.4	3168	55.0	55.7	3235	55.6	56.2	3302	71.6	72.2
3035	64.2	64.9	3102	58.6	59.3	3169	55.0	55.7	3236	56.3	56.9	3303	55.5	56.2
3036	73.9	74.6	3103	58.5	59.2	3170	55.0	55.6	3237	55.3	55.9	3304	55.5	56.1
3037	58.9	59.6	3104	58.7	59.3	3171	67.7	68.4	3238	55.7	56.4	3305	55.4	56.1
3038	61.7	62.4	3105	58.6	59.3	3172	64.9	65.6	3239	55.6	56.3	3306	55.4	56.0
3039	59.1	59.9	3106	58.9	59.5	3173	69.2	69.9	3240	55.8	56.5	3307	66.9	67.6
3040	63.8	64.4	3107	58.7	59.4	3174	71.8	72.5	3241	55.8	56.4	3308	55.4	56.1
3041	60.4	61.1	3108	60.4	61.1	3175	58.1	58.7	3242	55.6	56.3	3309	55.1	55.8
3042	59.5	60.2	3109	60.0	60.7	3176	59.8	60.5	3243	73.8	74.4	3310	55.0	55.6
3043	73.8	74.5	3110	60.0	60.7	3177	59.6	60.2	3244	55.8	56.5	3311	62.7	63.4
3044	62.0	62.7	3111	63.3	63.9	3178	73.4	74.1	3245	55.6	56.3	3312	71.5	72.1
3045	58.4	59.0	3112	60.1	60.8	3179	59.3	60.0	3246	55.9	56.6	3313	63.3	63.9
3046	59.1	59.7	3113	70.1	70.8	3180	55.4	56.1	3247	55.5	56.2	3314	71.1	71.7
3047	60.5	61.2	3114	59.6	60.2	3181	54.8	55.5	3248	55.9	56.6	3315	67.0	67.6
3048	63.5	64.2	3115	59.5	60.2	3182	54.7	55.4	3249	55.5	56.2	3316	71.5	72.2
3049	59.1	59.8	3116	74.1	74.8	3183	73.4	74.1	3250	55.9	56.5	3317	63.7	64.3
3050	73.5	74.2	3117	70.9	71.5	3184	54.8	55.5	3251	55.5	56.1	3318	63.9	64.6
3051	58.3	59.0	3118	68.6	69.3	3185	54.9	55.6	3252	55.9	56.5	3319	75.3	75.9
3052	59.8	60.4	3119	67.1	67.7	3186	54.9	55.6	3253	55.4	56.1	3320	63.0	63.6
3053	59.2	59.9	3120	57.3	58.0	3187	54.9	55.6	3254	55.9	56.5	3321	64.8	65.4
3054	59.3	59.9	3121	57.2	57.8	3188	50.0	50.7	3255	55.4	56.1	3322	75.2	75.8
3055	73.2	73.9	3122	60.4	61.1	3189	54.9	55.6	3256	73.3	74.0	3323	67.8	68.5
3056	64.1	64.8	3123	57.6	58.2	3190	58.9	59.5	3257	55.9	56.5	3324	67.3	68.0
3057	58.6	59.4	3124	64.9	65.6	3191	57.8	58.5	3258	55.3	56.0	3325	67.3	68.0
3058	61.8	62.5	3125	64.7	65.4	3192	58.3	58.9	3259	55.8	56.5	3326	67.3	68.0
3059	59.9	60.5	3126	58.5	59.1	3193	58.6	59.2	3260	50.8	51.5	3327	65.8	66.5
3060	63.7	64.4	3127	69.9	70.6	3194	58.1	58.7	3261	55.3	56.0	3328	67.0	67.6
3061	61.8	62.5	3128	61.8	62.5	3195	58.4	59.1	3262	56.5	57.2	3329	66.0	66.7
3062	73.2	73.9	3129	62.8	63.4	3196	58.3	59.0	3263	56.6	57.3	3330	73.2	73.8
3063	58.1	58.8	3130	73.2	73.8	3197	58.3	59.0	3264	56.4	57.0	3331	66.0	66.7
3064	73.0	73.7	3131	67.4	68.0	3198	58.3	59.0	3265	64.7	65.4	3332	66.0	66.6
3065	60.4	61.0	3132	68.7	69.4	3199	58.3	58.9	3266	73.3	73.9	3333	65.9	66.6
3066	63.7	64.4	3133	68.8	69.5	3200	58.3	59.0	3267	70.0	70.7	3334	65.9	66.6
3067	62.7	63.4	3134	71.0	71.7	3201	58.2	58.9	3268	57.0	57.7	3335	59.0	59.6
3068	66.9	67.6	3135	53.1	53.8	3202	58.2	58.9	3269	56.2	56.8	3336	63.4	64.0
3069	66.7	67.3	3136	59.1	59.8	3203	58.1	58.8	3270	65.9	66.5	3337	65.4	66.0
3070	63.8	64.5	3137	65.1	65.8	3204	58.0	58.7	3271	70.4	71.1	3338	62.8	63.5
3071	62.5	63.2	3138	56.8	57.5	3205	58.0	58.7	3272	64.5	65.2	3339	65.1	65.8
3072	73.1	73.7	3139	56.3	57.0	3206	73.4	74.1	3273	56.1	56.7	3340	65.4	66.1
3073	67.5	68.2	3140	56.3	56.9	3207	66.8	67.5	3274	57.1	57.8	3341	68.5	69.2
3074	66.2	66.8	3141	61.5	62.2	3208	57.6	58.2	3275	57.6	58.3	3342	65.5	66.2
3075	61.4	62.0	3142	56.5	57.2	3209	56.8	57.4	3276	57.0	57.7	3343	65.5	66.1

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
3076	59.3	60.0	3143	56.1	56.8	3210	64.7	65.4	3277	63.6	64.2	3344	66.0	66.6
3077	72.9	73.5	3144	55.3	56.0	3211	63.3	63.9	3278	58.7	59.4	3345	65.0	65.7
3078	57.4	58.1	3145	55.2	55.8	3212	63.4	64.0	3279	68.0	68.7	3346	65.9	66.5
3079	67.2	67.9	3146	74.1	74.8	3213	74.2	74.8	3280	56.8	57.5	3347	65.8	66.5
3080	67.0	67.7	3147	74.9	75.5	3214	56.7	57.3	3281	53.8	54.5	3348	65.7	66.4
3081	63.8	64.5	3148	71.9	72.6	3215	73.4	74.1	3282	55.8	56.4	3349	51.2	51.8
3082	60.2	60.9	3149	64.1	64.8	3216	63.1	63.7	3283	57.4	58.0	3350	66.7	67.3
3351	67.5	68.2	3418	59.0	59.6	3485	64.6	65.2	3552	61.5	62.2	3619	53.0	53.7
3352	68.1	68.8	3419	69.5	70.2	3486	66.2	66.9	3553	60.9	61.5	3620	56.9	57.6
3353	74.3	74.9	3420	69.2	69.9	3487	65.9	66.6	3554	59.7	60.3	3621	56.8	57.5
3354	67.7	68.3	3421	69.3	70.0	3488	81.5	82.1	3555	58.6	59.2	3622	55.4	56.1
3355	68.3	68.9	3422	64.4	65.0	3489	77.5	78.1	3556	57.4	58.0	3623	55.9	56.6
3356	68.6	69.2	3423	61.6	62.3	3490	60.2	60.7	3557	57.1	57.7	3624	56.8	57.4
3357	68.7	69.4	3424	57.8	58.5	3491	76.1	76.6	3558	56.8	57.4	3625	56.6	57.2
3358	68.8	69.4	3425	69.4	70.1	3492	75.0	75.6	3559	56.8	57.4	3626	56.3	57.0
3359	68.8	69.4	3426	68.5	69.2	3493	73.8	74.4	3560	56.7	57.3	3627	62.2	62.9
3360	68.1	68.7	3427	61.8	62.4	3494	72.5	73.1	3561	59.4	60.1	3628	59.9	60.6
3361	74.4	75.0	3428	69.2	69.9	3495	69.7	70.3	3562	59.2	59.9	3629	55.8	56.5
3362	68.1	68.8	3429	64.3	65.0	3496	60.9	61.6	3563	61.2	61.9	3630	55.0	55.7
3363	66.9	67.5	3430	69.2	69.9	3497	72.9	73.5	3564	61.4	62.1	3631	63.0	63.7
3364	65.0	65.7	3431	68.6	69.3	3498	60.0	60.6	3565	61.6	62.3	3632	61.4	62.1
3365	66.6	67.2	3432	62.4	63.0	3499	81.2	81.7	3566	61.7	62.4	3633	65.3	66.0
3366	67.3	67.9	3433	64.3	64.9	3500	79.6	80.1	3567	61.8	62.5	3634	65.4	66.1
3367	67.4	68.1	3434	69.0	69.7	3501	67.7	68.2	3568	61.9	62.6	3635	66.6	67.3
3368	58.6	59.2	3435	69.1	69.8	3502	76.7	77.3	3569	61.7	62.4	3636	67.5	68.2
3369	58.5	59.2	3436	63.1	63.8	3503	78.0	78.6	3570	58.0	58.6	3650	48.0	48.8
3370	67.1	67.8	3437	63.6	64.3	3504	71.9	72.5	3571	59.4	60.0	3651	55.4	56.0
3371	56.8	57.5	3438	64.6	65.2	3505	59.6	60.2	3572	56.5	57.2	3652	81.1	82.0
3372	58.3	59.0	3439	65.2	65.8	3506	62.8	63.5	3573	58.8	59.4	3653	73.0	73.5
3373	58.4	59.1	3440	67.8	68.5	3507	79.6	80.2	3574	60.1	60.8	3654	62.9	63.5
3374	58.5	59.1	3441	67.5	68.2	3508	72.6	73.2	3575	59.3	60.0	3655	62.1	62.8
3375	58.8	59.5	3442	67.2	67.9	3509	60.2	60.8	3576	59.0	59.6	3656	50.7	51.3
3376	66.5	67.2	3443	66.4	67.1	3510	75.8	76.4	3577	59.0	59.6	3657	65.0	65.6
3377	58.2	58.9	3444	67.4	68.1	3511	80.5	81.0	3578	58.9	59.5	3658	69.8	70.4
3378	60.6	61.3	3445	67.5	68.2	3512	77.1	77.7	3579	59.8	60.4	3659	52.4	53.1
3379	59.6	60.3	3446	70.1	70.7	3513	61.1	61.6	3580	58.7	59.3	3660	60.8	61.4
3380	60.5	61.1	3447	63.8	64.4	3514	77.3	77.9	3581	59.5	60.1	3661	57.8	58.4
3381	60.6	61.3	3448	61.6	62.3	3515	56.5	57.1	3582	59.7	60.4	3662	56.4	57.3
3382	59.0	59.7	3449	51.9	52.5	3516	59.3	60.0	3583	58.1	58.7			
3383	59.0	59.7	3450	51.9	52.6	3517	56.5	57.2	3584	62.8	63.5			
3384	61.0	61.7	3451	61.3	61.9	3518	56.6	57.3	3585	57.8	58.4			
3385	60.3	61.0	3452	64.1	64.7	3519	59.0	59.7	3586	57.0	57.7			
3386	60.6	61.3	3453	63.4	64.0	3520	59.1	59.8	3587	56.7	57.4			
3387	69.7	70.4	3454	51.8	52.5	3521	69.7	70.3	3588	56.5	57.2			
3388	60.3	61.0	3455	55.0	55.6	3522	69.6	70.3	3589	65.3	65.9			
3389	64.4	65.1	3456	81.0	81.9	3523	58.0	58.7	3590	59.3	60.1			
3390	70.0	70.7	3457	72.5	73.2	3524	58.9	59.5	3591	58.8	59.5			
3391	58.4	59.0	3458	71.6	72.3	3525	65.3	66.0	3592	58.1	58.7			
3392	63.6	64.2	3459	56.1	56.8	3526	56.0	56.6	3593	57.6	58.2			
3393	59.8	60.4	3460	58.5	59.2	3527	56.1	56.7	3594	64.8	65.4			
3394	57.8	58.4	3461	59.9	60.6	3528	55.9	56.6	3595	65.1	65.8			

ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011	ID	dB L_{A10} 18 hour Level With Bus Lane 2010	dB L_{A10} 18 hour Level Without Bus Lane 2011
3395	59.8	60.5	3462	59.7	60.3	3529	57.2	57.9	3596	63.1	63.8			
3396	64.7	65.4	3463	62.0	62.7	3530	58.0	58.7	3597	61.7	62.5			
3397	70.0	70.7	3464	64.3	65.0	3531	58.4	59.1	3598	61.1	61.9			
3398	59.3	60.0	3465	60.7	61.4	3532	59.3	60.0	3599	61.8	62.5			
3399	60.8	61.5	3466	74.1	74.8	3533	60.1	60.7	3600	64.2	64.9			
3400	57.0	57.7	3467	71.6	72.3	3534	59.8	60.5	3601	63.4	64.1			
3401	64.2	64.8	3468	70.1	70.7	3535	57.5	58.1	3602	62.8	63.6			
3402	60.6	61.2	3469	70.1	70.7	3536	63.3	63.9	3603	62.3	63.0			
3403	65.1	65.8	3470	68.9	69.6	3537	65.2	65.8	3604	57.9	58.5			
3404	64.6	65.3	3471	70.2	70.9	3538	50.3	50.9	3605	58.0	58.6			
3405	60.8	61.5	3472	58.1	58.8	3539	50.5	51.2	3606	54.5	55.2			
3406	57.4	58.1	3473	57.8	58.4	3540	67.7	68.3	3607	56.1	56.8			
3407	63.4	64.1	3474	67.9	68.6	3541	67.8	68.5	3608	56.4	57.1			
3408	63.2	63.9	3475	67.5	68.2	3542	68.2	68.8	3609	56.0	56.7			
3409	61.6	62.3	3476	67.8	68.5	3543	68.7	69.3	3610	57.6	58.3			
3410	61.1	61.8	3477	62.1	62.7	3544	58.5	59.1	3611	57.6	58.3			
3411	64.4	65.1	3478	62.7	63.3	3545	60.1	60.7	3612	57.7	58.4			
3412	59.3	59.9	3479	63.2	63.8	3546	60.1	60.7	3613	57.7	58.3			
3413	58.7	59.4	3480	60.3	61.0	3547	60.3	61.0	3614	57.3	58.0			
3414	70.0	70.7	3481	54.1	54.8	3548	60.7	61.3	3615	57.5	58.1			
3415	58.9	59.6	3482	60.5	61.1	3549	60.9	61.6	3616	54.7	55.3			
3416	63.5	64.2	3483	61.0	61.7	3550	61.1	61.7	3617	54.5	55.2			
3417	69.5	70.2	3484	60.8	61.5	3551	61.3	62.0	3618	54.6	55.2			

Appendix H

Noise Figures



Issue	Description	Date
01		MAR12

50mm on Original

Key

▲ OTHER SENSITIVE RECEPTOR

Client

HIGHWAYS AGENCY

Status

Scales	DO NOT SCALE	Current Issue Signatures	
		Author	K DOYLE
Original Size	A3	Checker	P MARKS
Datum		Approver	P MARKS
Grid		© Copyright reserved	

Filename:

Project

M4 BUS LANE REVOCATION ORDER

Title

FIGURE 4 - NOISE STUDY AREA AND OTHER SENSITIVE RECEPTOR LOCATIONS

Halcrow Hyder Joint Venture

Hyder Consulting (UK) Limited
330 Firecrest Court
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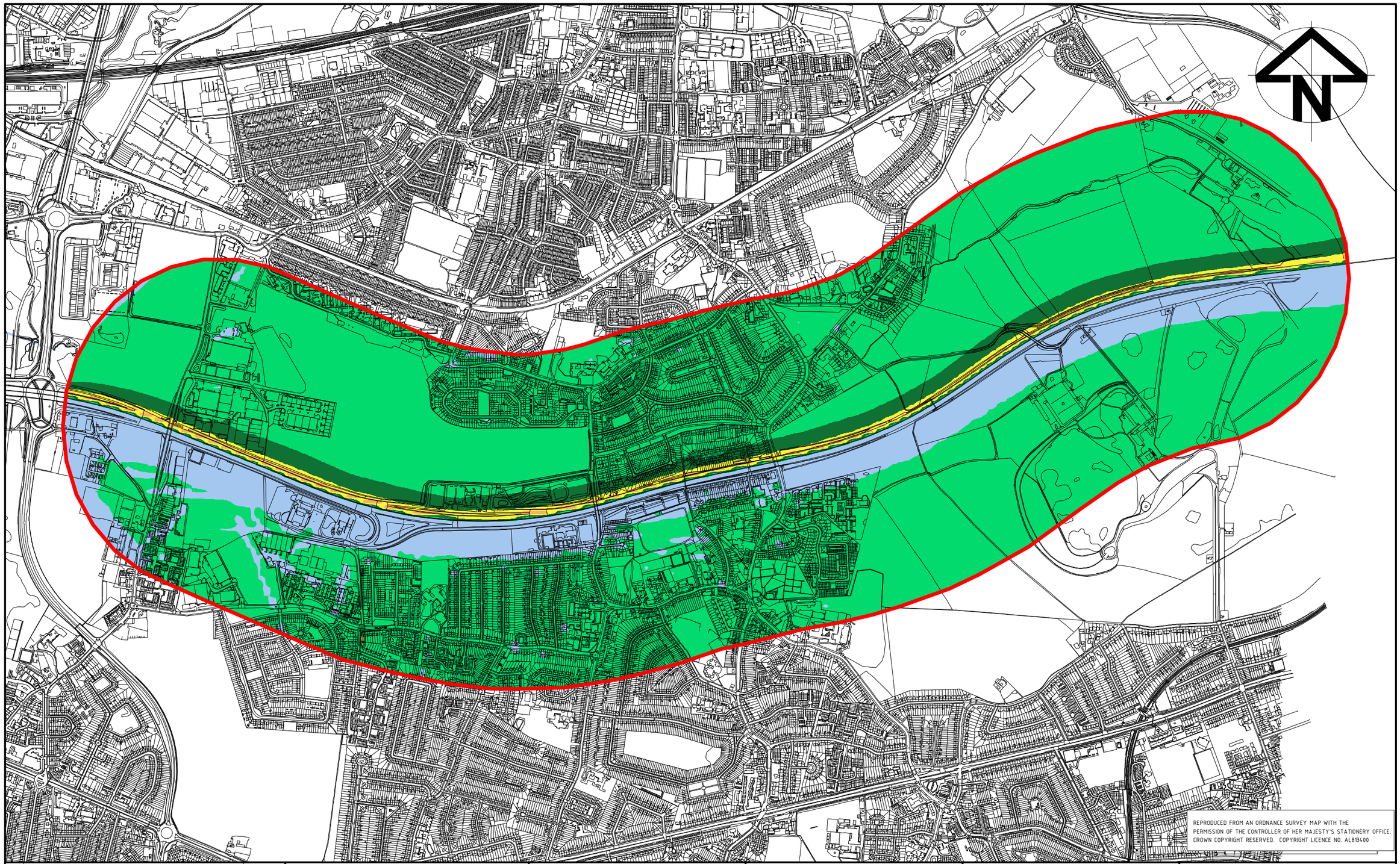
Drawing No.	Project No.	Issue
004	UA003269	01



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Key

CHANGE IN dB L_{A10} 18 Hour

- < 0.5 dB
- 0.5 to 0.6 dB
- 0.6 to 0.7 dB
- 0.7 to 0.8 dB
- 0.8 to 0.9 dB
- 0.9 to 1 dB
- > 1 dB

Issue	Description	Date
01		MAR12

50mm on Original

Client: HIGHWAYS AGENCY

Status:

Scales	DO NOT SCALE	Current Issue Signatures	
		Author	K DOYLE
Original Size	A3	Checker	P MARKS
Datum		Approver	P MARKS
Grid		© Copyright reserved	

Filename:

Project: M4 BUS LANE REVOCATION ORDER

Title: FIGURE 5 - NOISE DIFFERENCE CONTOUR

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