

Air Quality Review of Guildford Borough Proposed Submission Local Plan: Strategy and Sites "June 2017"

Guildford Borough Council

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Executive Summary

Guildford Borough Council (GBC) is in the process of preparing a new Local Plan, titled 'Guildford Borough Proposed Submission Local Plan: Strategy and Sites "June 2017"' (hereafter known as the Draft Local Plan), which will set out the Borough's development plans and ambitions over the next 16 years. The Draft Local Plan proposes where developments should be located, the nature of the developments and the size of the developments. GBC has commissioned this air quality review to consider the potential air quality effects of their development plans.

The air quality review presented in this report has considered the potential effect of the proposed Draft Local Plan on annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} for sensitive receptor locations within the GBC administrative area. These pollutants have been considered as these are the key pollutants associated with exhaust emissions and these are the pollutants of greatest concern generally within the UK.

The air quality review presented herein is a qualitative risk based review which has considered the risk of significant air quality effects occurring with the implementation of the Draft Local Plan based on the size and nature of anticipated developments, their location, ambient air quality around potential developments and the locations of sensitive receptors to air quality around potential developments (e.g. residential properties, schools, hospitals and nationally designated ecological sites).

In addition to the development of Local Plans to guide development, GBC also manages local air quality through the Local Air Quality Management regime. Through this regime GBC reviews air quality annually within its administrative area to identify if there are any air quality issues. Where such issues are identified Air Quality Management Areas (AQMAs) are declared and Air Quality Action Plans (AQAPs) developed to address these issues. GBC has not declared any AQMAs within their administrative area.

In summary the findings of the air quality review suggest that the effect of the Draft Local Plan on annual mean NO₂ concentrations will be negligible and not a key constraint on development in the majority of the GBC administrative area.

However, further detailed modelling would be advisable around roads where notable changes in traffic flows are predicted, at locations in close proximity to sensitive receptors, specifically:

- A3 Ripley Bypass;
- Ash and Tongham, particularly The Street and Ash Church Road; and
- Area local to A3/A31 junction, particularly Guildford and Godalming Bypass and Farnham Road.

For particulate matter (both PM₁₀ and PM_{2.5}) negligible effects are anticipated at all sensitive receptors for air quality.

It should also be noted that the findings of the air quality review undertaken to inform the Draft Local Plan should be confirmed by individual developments as part of the planning process as required by GBC. Specifically, we recommend that potential air quality issues are added as a 'key consideration' in the site policies for A24 Slyfield Area Regeneration Project, A25 Gosden Hill Farm, A26 Blackwell Farm and A29 Land to the south and east of Ash and Tongham in the Draft Local Plan. This will ensure that these issues will be considered and addressed at such time as planning applications are made for each of these sites. We note that the site policy A35 Land at former Wisley Airfield, as consulted upon in summer 2016, already includes 'Potential noise and air quality issues' as a 'key consideration'. The evidence supports this. Additionally, it is expected that air quality mitigation measures (i.e. travel plans, vehicle charging points etc.) will be considered for individual developments as part of the development of proposals through the planning application process.

1. Introduction

GBC is in the process of preparing a Draft Local Plan, which will set out the Borough's development plans and ambitions over the next 16 years. The Plan proposes where developments should be located, the nature of the development and size of developments. GBC has commissioned this air quality review to consider the air quality implications of their development plans.

This air quality review considers the effect of the proposed land uses on sensitive receptors (e.g. residential properties, schools, hospitals and nationally designated ecological sites) located within GBC's administrative area in the future, focused on the air quality effects of expected changes in traffic flows on both the strategic and local road networks due to the use of land as set out in the Draft Local Plan. The air quality review is a qualitative review and where there is a need for further detailed work to understand areas of air quality risk that may arise from the implementation of the Draft Local Plan as a whole these areas are identified and recommendations for further work are identified.

The review presented in this report does not constitute a detailed assessment of each individual development and does not consider the effects of the construction of these sites. The detailed consideration of each individual development within the Draft Local Plan is a matter for developers to consider in conjunction with GBC as part of the planning application process. Additionally, it is expected that air quality mitigation measures (e.g. travel plans, vehicle charging points, bus provision, park and ride, junction improvements etc.) will be considered for individual developments as part of the development of proposals through the planning application process.

2. Legislation and Policy Context

2.1 Legislation

2.1.1 European Legislation

The Clean Air for Europe (CAFE) program revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC (Council of European Communities, 1996), its associated Daughter Directives 1999/30/EC (Council of European Communities, 1999), 2000/69/EC (Council of European Communities, 2000), 2002/3/EC (Council of European Communities, 2002), and the Council Decision 97/101/EC (Council of European Communities, 1997) with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC (Council of European Communities, 2008).

2.1.2 National Legislation

Directive 2008/50/EC (Council of European Communities, 2008) is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010 (H.M. Government, 2010), which came into force on 11th June 2010. These limit values are binding on the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

2.1.2.1 National Air Quality Strategy

The UK National Air Quality Strategy (Defra, 2000) was initially published in 2000, under the requirements of the Environment Act 1995 (H.M. Government, 1995). The most recent revision of the strategy (Defra, 2007) sets objective values for key pollutants as a tool to help Local Authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objective values have been laid out within the Air Quality (England) Regulations 2000 (H.M. Government, 2000) and later amendments (H.M. Government, 2002).

The air quality objective values referred to above have been set down in regulation solely for the purposes of local air quality management. Under the Local Air Quality Management regime GBC has a duty to carry out regular assessments of air quality against the objective values and if it is unlikely that the objective values will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the objective values. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures to be set out in a subsequent action plan. Consequently it is not unusual for the boundary of an AQMA to include within it relevant locations where air quality is not at risk of exceeding an air quality objective. The UK's national air quality objective values for the pollutants of relevance to this assessment are displayed in Table 1.

Table 1. Air Quality Objective Values for England

Pollutant	Averaging Period	Objective Value	Maximum Permitted	Target Date
Nitrogen Dioxide (NO ₂)	Annual Mean	40 µg/m ³	None	31/12/2005
	Hourly Mean	200 µg/m ³	18 times per year	31/12/2005
Particulate Matter (PM ₁₀)	Annual Mean	40 µg/m ³	None	31/12/2004
	24-hour	50 µg/m ³	35 times per year	31/12/2004
Fine Particulate Matter (PM _{2.5})	Annual Mean	25 µg/m ³	None	2020

Source: Department for Environment, Food and Rural Affairs (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1), extract from Table 2

2.2 Planning Policy Context

2.2.1 National Planning Policy

2.2.1.1 National Planning Policy Framework (2012)

The National Planning Policy Framework (NPPF) was published in March 2012 (Department of Communities and Local Government, 2012), paragraph 109 of which states:

"The planning system should contribute to and enhance the natural and local environment by:

[...]

- *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability..."*

Annex 2 of the NPPF defines 'Pollution' as:

"Anything that affects the quality of land, air, water or soils, which might lead to an adverse impact on human health, the natural environment or general amenity. Pollution can arise from a range of emissions, including smoke, fumes, gases, dust, steam, odour, noise and light".

In development of a Local Plan the NPPF states local authorities should be *"aspirational but realistic"*. In regards to allocation of land within a local authority Local Plans should (paragraph 157):

- *"plan positively for the development and infrastructure required in the area to meet the objectives, principles and policies of this Framework;*

[...]

- *allocate sites to promote development and flexible use of land, bringing forward new land where necessary, and provide detail on form, scale, access and quantum of development where appropriate;*

[...]

- *identify land where development would be inappropriate, for instance because of its environmental or historic significance."*

The National Planning Practice Guidance (NPPG) (Department of Communities and Local Government, 2014), provides a summary of the air quality issues set out in the NPPF and provides the following advice with respect to Local Plans (Paragraph 002, Reference ID 32-002-20140306, revision date 06-03-2014) :

"Local Plans can affect air quality in a number of ways, including through what development is proposed and where, and the encouragement given to sustainable transport. Therefore in plan making, it is important to take into account air quality management areas and other areas where there could be specific requirements or limitations on new development because of air quality. Air quality is a consideration in Strategic Environmental Assessment and sustainability appraisal can be used to shape an appropriate strategy, including through establishing the 'baseline', appropriate objectives for the assessment of impact and proposed monitoring. Drawing on the review of air quality carried out for the local air quality management regime, the Local Plan may need to consider:

- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments;*
- *the impact of point sources of air pollution (pollution that originates from one place); and*
- *ways in which new development would be appropriate in locations where air quality is or likely to be a concern and not give rise to unacceptable risks from pollution. This could be through, for example, identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable."*

2.2.2 Local Planning Policy

2.2.2.1 Guildford Borough Council

While GBC's Draft Local Plan is being prepared the 2003 Local Plan remains in effect with the exclusion of 7 policies removed by the Secretary of State for Communities and Local Government in 2007 (GBC, 2003; Housing and Planning Directorate, 2007). Policies excluded from the 2003 Local Plan do not address air quality or matters of pollution within the GBC administrative area. GBC state that the 2003 Local Plan should be read in conjunction with the NPPF with which all policies pertaining to preparation of future local plans and planning applications will be assessed with this document in mind (Department of Communities and Local Government, 2012).

2.2.2.2 Guildford Borough Transport Strategy 2017

GBC's Guildford Borough Transport Strategy 2017 (GBC, 2017) identifies adverse impacts on air quality as a potential consequence of traffic congestion (Paragraph 1, pp.3):

"The transport experience in the borough has a bad reputation. This is a result of a combination of issues. ...The adverse impacts of localised congestion and/or high traffic volumes on the setting of amenity of communities, including in relation to road safety, severance, noise, air quality and the demand for parking, and also the discouragement to walking and cycling."

GBC and partners have introduced initiatives such as a car club, park and ride, emissions based parking charges and walking and cycling schemes which can encourage travel by non-car modes and accordingly help to improve local air quality in relation to emissions from traffic. Further information regarding introduced initiatives is available in GBC's 2016 Annual Status Report (ASR) (GBC, 2016b).

2.3 Local Air Quality Management

Under the requirements of Part IV of the Environment Act (1995) (H.M. Government, 1995), GBC have carried out a phased review and assessment of local air quality within the area (GBC, 2016b).

GBC has not declared an AQMA within their administrative boundary. The closest declared AQMA to the GBC administrative area is Waverley AQMA No.2 – Godalming, located within the local authority of Waverley Borough Council, approximately 730m south of GBC's administrative area and designated for exceedances of the annual mean NO₂ objective.

Concentrations of nitrogen dioxide above the 40 µg/m³ objective value have been recorded at few locations within the Borough and those with the potential to affect sensitive receptors have undergone detailed assessment. The primarily residential village of Compton is one such location. In 2016 a detailed air quality assessment of emissions from traffic passing through the area along the B3000 (The Street) was carried out. The results of this assessment show that there are residential receptors at which the NO₂ concentration is above the associated objective. However, it is predicted that if little development takes place within the area and vehicles emissions are reduced by technological advances these objective exceedance should reduce to below the objective in to the future, without additional measures being required locally.

3. Review Methodology

3.1 Overview

This section explains the approach that has been adopted in the air quality review for the GBC Draft Local Plan.

Potentially affected air quality sensitive receptors have been identified and the potential for changes in air quality at sensitive receptors has been considered.

The review considers the potential for significant adverse effects on air quality due to the Draft Local Plan and provides recommendations for areas where further detailed assessment is recommended, if required.

The review of future effects on air quality as a result of the implementation of the Draft Local Plan has been considered within the GBC administrative area. This is the area where the greatest changes in traffic flows due to the Draft Local Plan would be anticipated.

One Air Quality Management Area (AQMA), Waverley AQMA No.2 – Godalming, is designated within 1 km of the administrative boundary of GBC. The impact of the implementation of the proposed Draft Local Plan on this designation has also been considered.

3.2 Road Traffic Emissions

With regard to road traffic emissions, the potential for changes in pollutant concentrations with respect to baseline concentrations at sensitive receptors was reviewed. The review considered to what extent the implementation of the Draft Local Plan presents a risk of the air quality objective values being exceeded in future years.

The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and sulphur dioxide (SO₂), carbon monoxide (CO), PM₁₀ and PM_{2.5} in exhaust emissions. In addition, at the high temperatures and pressures found within vehicle engines, some of the nitrogen in the air and the fuel is oxidised to form NO_x, mainly in the form of nitric oxide (NO), which is then converted to NO₂ in the atmosphere. NO₂ is associated with adverse effects on human health. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

Although SO₂, CO, benzene and 1,3-butadiene are also present in motor vehicle exhaust emissions, consideration of the associated impacts on local air quality is not considered relevant in the context of this review. This is because road traffic emissions of these substances have been reviewed by GBC and nowhere within the administrative area is at risk of exceeding these objectives. The Draft Local Plan is not considered to be capable of compromising the achievement of the relevant air quality objectives for the protection of human health for these pollutants. Emissions of SO₂, CO, benzene and 1,3-butadiene from road traffic are therefore not considered further within this review.

Exhaust emissions from road vehicles affect the concentrations NO₂, PM₁₀ and PM_{2.5} at sensitive receptors in the vicinity of the developments included within the Draft Local Plan. Therefore, these pollutants are the focus of the risk review.

The review considers the potential impact of road traffic emissions at sensitive receptors adjacent to major roads in the Borough and in areas where the largest changes in traffic flows resulting from the implementation of the Draft Local Plan are anticipated.

3.3 Traffic Data

The traffic data used within this review have been provided by GBC. The potential for changes in traffic flows and the associated effect on air quality has been considered on the roads around the largest draft local plan site allocations.

The potential for significant adverse effects on air quality takes into account the traffic change criteria set out in the Design Manual for Roads and Bridges (DMRB) (Highways Agency, 2007) for changes in traffic flows that may lead to a significant change in air quality. These criteria are:

- road alignment will change by 5m or more; or
- annual average daily traffic ("AADT") flows will change by 1,000; or

- heavy duty vehicles ("HDV") (vehicles more than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
- daily average speeds will change by 10 km/h or more; or
- peak hour speed will change by 20 km/h or more.

The consideration of effects on air quality due to changes in traffic flows is focused on links in close proximity to the largest site allocations, where the largest changes in traffic flows would be anticipated. These links include A3, A31, A320, A323 and the B2215.

3.4 Sensitive Receptors

The concentration of road traffic emitted pollutants at the roadside or at sensitive receptors is influenced by a number of factors. These include background pollution levels and the volume of emissions from traffic sources, which is dictated by traffic flow rates, composition and speed.

Sensitive receptors in this review are used to represent worst case exposure adjacent to road links predicted to experience a significant change in traffic flows. The sensitive receptors identified in this review are predominantly residential properties, with four schools and one hospital.

The air quality objective values for pollutants associated with road traffic have been set by the Expert Panel of Air Quality Standards at a level below the lowest concentration at which the more sensitive members of society have been observed to be adversely affected by exposure to each pollutant. Therefore all receptors that represent exposure of the public are of equal sensitivity as any member of the public could be present at those locations.

Air quality has the potential to affect the health and status of designated ecological sites within 200 m of road links predicted to experience a significant change in traffic flows, thus ecological designations are classified as sensitive receptors. The Borough of Guildford contains designated ecological sites including Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

3.5 Potential for Significant Effects

The potential for significance of expected effects is considered in overall terms. The potential for the additional traffic to contribute to or interfere with the successful implementation of policies and strategies for the management of local air quality are considered if relevant, but the principle focus is any change to the likelihood of future achievement of the air quality objective values set for the following pollutants:

- Annual mean nitrogen dioxide (NO₂) concentration of 40 µg/m³;
- Annual mean particulate matter (PM₁₀) concentration of 40 µg/m³
- Annual mean fine particulate matter (PM_{2.5}) concentrations of 25 µg/m³;
- 24-hour mean PM₁₀ concentration of 50 µg/m³ not to be exceeded on more than 35 days per year; and
- 1-hour mean NO₂ concentration of 200 µg/m³ not to be exceeded on more than 18 times per year.

The achievement of local authority goals for local air quality management are directly linked to the achievement of the air quality objective values described above and as such this review focuses on the likelihood of future achievement of the air quality objective values.

3.6 Recommendations for Further Work

Where areas with potential to experience significant adverse effects on air quality due to the implementation of the Draft Local Plan are identified, if any, recommendations for further detailed assessment work have been made. This additional work would take the form of localised detailed modelling of the areas of concern.

4. Existing Conditions

4.1 Review and Assessment of Local Air Quality

The review and assessment process in the GBC administrative area has identified that no AQMAs are required within their areas. However, Waverley Borough Council has designated an area approximately 740 m to the south of the GBC administrative boundary as an AQMA due to exceedances in the annual mean NO₂ concentration objective.

At one monitoring location in the village of Compton passive NO₂ monitoring data shows an exceedance of the annual mean NO₂ objective (GBC, 2016b). GBC therefore carried out further air quality reviews of this area. The further assessment work found that one sensitive receptor experienced annual mean NO₂ concentrations in exceedance of the associated annual mean NO₂ objective and that additional nearby sensitive receptors were approaching the objective. The assessment identified a risk of exceedance if traffic flows, primarily on the B3000, increased. The area was not declared as an AQMA as the assessment noted that emissions from traffic were expected to decrease into the future which should lead to a decrease in NO₂ concentrations measured in the area.

4.2 Local Monitoring Data

Monitoring data is collected by GBC at a number of locations of potential air quality concern throughout the borough using passive diffusion tubes. The location of these and the concentrations of nitrogen dioxide measured are set out in Table 2, with the locations also shown on Figure 1.

GBC undertook passive sampling of atmospheric NO₂ concentrations using diffusion tubes at 17 locations within the Borough during 2015 (GBC, 2016b). Measurement data demonstrates that the majority of GBC administrative area was not in or approaching exceedance of the annual mean NO₂ objective during 2015. However, three monitoring locations were found to exceed the national air quality standard objective of an annual mean NO₂ concentration of 40 µg/m³, with one further location approaching the objective but not exceeding (i.e. with a concentration of more than 36 µg/m³).

Table 2: Guildford Council Nitrogen Dioxide Monitoring Data

Site ID	Site Type	Monitoring Location	OSGB X	OSGB Y	2013 (µg/m ³)	2014 (µg/m ³)	2015 (µg/m ³)
GD1	Roadside	Bridge Street	499269	149522	35	31	33
GD2	Roadside	York Road	499799	149934	39	25	33*
GD3	Urban Background	Josephs Road	499659	150739	22	16	20*
GD5	Kerbside	Wisley	507947	159099	45	40	46
GD6	Rural Background	The Chantry	500385	148342	14	14	13
GD8	Roadside	Down Lane	496302	448429	23	19	25
GD9	Roadside	A331, Ash	488275	149859	27	31	30
GD10	Urban Background	The Garth	488629	150032	18	16	17
GD11	Near Road	Beckingham Road	498133	150648	29	29	28
GD13	Kerbside	YMCA	499305	149512	35	31	38
GD14	Roadside	Sandfields	499800	149913	37	30	42
C1	Kerbside	New Pond Road East	497005	146328	**	22	28
C2	Kerbside	New Pond Road West	495411	147412	**	32	28
C3	Near Road	Compton	495509	147024	**	**	21*
C4	Roadside	Compton	495437	147288	**	67*	53
C5	Roadside/ Near	Compton	495498	147097	**	**	27*

C6	Near Road	Compton	495453	147206	**	**	17*
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Source: Guildford Borough Council (2016b). 2016 ASR, extracts from Table 1 and Table 2

* Annual mean concentrations have been corrected for bias. All annual means have been 'annualised' as per Technical Guidance

LAQM.TG16 if valid data capture for the full calendar year is less than 75%.

**Monitoring not deployed in these years.

Of these sampling locations experiencing exceedances GD14, a kerbside diffusion tube located at Sandfields, only has a data capture of 33%, therefore the measured exceedance cannot be relied upon. The remaining monitoring locations found to be exceeding the annual mean NO₂ concentration objectives were: GD5, a kerbside diffusion tube located at the junction of the A3 and the M25 in Wisley which returned an annual mean NO₂ concentration of 46 µg/m³ and C4 a roadside diffusion tube located adjacent to the B3000 in the village of Compton, which returned an annual mean NO₂ concentration of 53 µg/m³. Due to the distance of diffusion tube GD5 from local sensitive receptors this monitoring location was repositioned during 2016 to be more representative of NO₂ concentrations experienced at local sensitive receptors.

GBC does not undertake automatic monitoring of atmospheric pollutants within the borough. GBC does not currently monitor for PM₁₀ or PM_{2.5} as in 2011 it was determined that it was highly unlikely that there would be exceedances of the air quality objectives for PM₁₀ or any other atmospheric pollutants of note except nitrogen dioxide (NO₂) (GBC, 2012).

Where GBC monitoring data is not available or applicable, modelled background annual mean NO₂ concentrations produced by the Department for Environment, Food and Rural Affairs (Defra) (Defra, 2016) are referred to in the air quality review.

4.3 Background Pollutant Concentrations

Annual average background pollutant concentration estimates have been sourced from Defra's 2013 based background maps for 2016 (Defra, 2016) for the administrative area of GBC for NO₂, NO_x, PM₁₀ and PM_{2.5}.

These background concentrations are an average concentration for a 1km by 1km square and as such are only a general indicator of air quality; concentrations of pollutants will be higher than these backgrounds closer to major pollutant sources, such as large roads. The ranges of background concentrations within GBC are shown in Table 3.

Table 3: Defra Modelled Atmospheric Pollutant Concentrations

Pollutant	Annual Mean Range (µg/m ³)	Average Annual Mean (µg/m ³)	Annual Mean Objective (µg/m ³)
NO ₂	8.8 – 22.7	12.2	40
PM ₁₀	12.9 – 18.3	14.3	40
PM _{2.5}	9.4 – 12.9	10.3	25

The maximum background concentration for each pollutant reviewed in this assessment is well below the associated annual mean objective. The maximum modelled annual mean NO₂ concentration for 2016 was 22.7 µg/m³ associated with the 1km by 1km grid square with central coordinates 507500, 159500 located just north of the M25, centered west of junction 10. However, this annual mean NO₂ concentration is still well below the annual mean objective.

Maximum background annual mean concentrations of PM₁₀ and PM_{2.5} for 2016 were associated with 1km x1km grid squares centered on 498500, 150500 and 499500, 150500 respectively. These concentrations, 18.3 µg/m³ and 12.9 µg/m³ respectively, are in areas located to the north of the town of Guildford. These annual mean concentrations are also well below the associated annual mean objectives.

5. Review of Potential Air Quality Impacts of Draft Local Plan

5.1 Draft Local Plan Overview

A portion of the GBC Draft Local Plan includes land use allocations for parcels of land within the Borough. These allocations are likely to be developed over the duration of the plan period in order for GBC to achieve its targets in terms of domestic and infrastructure development. AECOM have been provided with information in connection with land allocations within GBC's administrative area for developments comprising over 25 residences or mixed use developments.

The Draft Local Plan sets a spatial strategy for Guildford borough and is based on a number of strategic sites. These consist of the North Street redevelopment site in Guildford town centre, the Slyfield Area Regeneration Project (SARP) on the edge of the Guildford urban area, two new urban extensions both west and east of Guildford urban area (Blackwell Farm and Gosden Hill Farm), and a new village community on the former Wisley airfield to the east. There is a further strategic location for development around the urban area of Ash and Tongham to the west of the borough.

The consideration of effects on air quality due to changes in traffic flows is focused around links in close proximity to the largest site allocations, where the largest changes in traffic flows would be anticipated. These links include the A3, A31, A320, A323 and B2215.

The changes in traffic flows considered in this air quality review are a combination of additional flows generated due to the proposed land allocations within the Draft Local Plan and changes to the road network due to a combination of Highways England road improvement schemes and local authority work to facilitate the Plan.

The traffic scenarios considered within this assessment are:

- Do-Minimum: Includes all development sites that have received planning permission within the borough of Guildford to 2015 along with all residential planning permissions and the most likely strategic development sites identified by Waverley Borough Council (WBC) in their proposed Local Plan in the period to 2032, but no new highway schemes; and
- Do-Something: Is a continuation of the Do-Minimum with the addition of:
 - Development sites identified by GBC in their Draft Local Plan;
 - Key highway schemes providing access to large developments sites and local highway schemes in both Guildford and Waverley boroughs (as detailed below in SRN1, SRN4, SRN9, SRN10 and LRN2-LRN25); and
 - Highways England schemes (as detailed below in SRN2, SRN3 and SRN5).

The following GBC, WBC and Highways England highways schemes are identified in the GBC Transport Strategy 2017 (GBC, 2017) and are included within the Do-Something traffic data:

- SRN2 – A3 Guildford (A320 Stoke interchange to A31 Hog's Back junction) Road Investment Strategy (RIS) scheme (E31);
- SRN3 – M25 Junction 10/A3 Wisley interchange RIS scheme (E16);
- SRN4 – New A3/A3100 Burpham junction with relocated A3 southbound off-slip and new A3 southbound on-slip;
- SRN5 - M25 Junctions 10-16 RIS scheme (E15);
- SRN9 – A3 northbound on-slip at A247 Clandon Road (Burnt Common);
- SRN10 – A3 southbound off-slip at A247 Clandon Road (Burnt Common);
- LRN2 – A3/Egerton Road Tesco Roundabout improvement;
- LRN3 – New signalized junction from Blackwell Farm site to A31 Farnham Road;
- LRN4 – Access road at Blackwell Farm site with link to Egerton Road;
- LRN7 – Interventions to address potential highway performance issues resulting from development at former Wisley Airfield site;

- LRN8 – Interventions to address potential highway performance issues, including on A320 Woking Road, resulting from development at SARP site;
- LRN14 – A331 Blackwater Valley Route with A31 Hog's Back (Tongham) junction improvement scheme;
- LRN17 B300 Puttenham Hill/A31 Hog's Back junction (Puttenham) improvement scheme;
- LRN21 – New road bridge and footbridge scheme to enable level crossing closure on A323 Guildford Road adjacent to Ash railway station; and
- LRN25 – A281 Horsham Road/A248 Kings Road/A248 Broadford Road junction improvement schemes.

The consideration of effects due to changes in traffic flows therefore represents a worst case air quality review as the effect of the Draft Local Plan has been considered along with proposed highways improvement schemes.

GBC officers identify that "*The strategic highway assessment represents a robust "worst case" in terms of transport demand and supply assumptions, as it does not assess and therefore does not account for the mitigation, including the potential for modal shift, and the new and improved sustainable transport choices provided by the rail, bus and active modes schemes included in the draft Local Plan and makes no allowance for any internalisation of trips within the larger sites.*"

The largest changes in traffic flows on these road links are set out in Table 4.

Table 4: Changes to Traffic Flow on Selected Roads

Road Name	Road Description	Road Designation	Change in AADT (veh/year)	Change in HGV (veh/year)	Change in Speed (kph)
Ripley By-Pass	From A247 to B2039	A3	21,752	124	-4.5
London Road		A3	7,709	-662	-5.8
London Road	From A3 to A247	B2215	8,415	137	-1.3
Portsmouth Road	A247 to Burnt Common Lane	B2215	3,354	-129	-0.7
Portsmouth Road	Burnt Common Lane to B368	B2215	2,383	-160	-0.5
Woking Road		A320	-2,264	-53	1.7

5.2 Review of Draft Local Plan Site Allocations

5.2.1 Guildford Borough North East

In the north-easterly region of the GBC administrative area there are a handful of land allocations surrounding the village of East Horsley made in connection with the GBC Draft Local Plan. A number of smaller land allocations proposed for expansion of East Horsley will provide land for residential development in association with the Draft Local Plan. The number and size of these developments is not expected to have a significant impact on local traffic flows, the resulting change is anticipated to be less than the criteria for detailed assessment set out in DMRB guidance (Highways Agency, 2007). Therefore, significant changes in air quality would not be expected from these proposals.

GBC's Draft Local Plan outlines a further parcel of land at the extreme north of its administrative area located to the north of the village of Ockham, encompassing a significant portion of the former Wisley Airfield. It is anticipated that this allocation will comprise in the region of 2,000 residential dwellings, including plots for travellers and approximately 100 care home beds. There is also a significant area planned for industry, industrial offices, office space and retail opportunities.

Defra background maps show local annual mean background concentrations for NO₂, PM₁₀ and PM_{2.5} in this area range between 13.2-17.3, 14.7-16.1 and 10.6-11.4 µg/m³ respectively, well below the relevant air quality objective values although pollutant concentrations will be higher closer to the A3.

Due to the size of the allocated area, and the additional areas discussed below, it is likely there will be a large increase in local traffic flows, particularly on the A3 passing close to the north of the site allocation which would

provide vehicular access to the area. The change in vehicle flows on the A3 is anticipated to be over 21,000 vehicles per day (see Table 4). A change in flows of this magnitude has potential to lead to a significant adverse effect on air quality at sensitive receptors. Although there are only a small number of properties along this section of the A3, it is recommended that detailed modelling is undertaken due to the very large changes in traffic flows predicted.

In the area of Burnt Common, site policy A58 Land around Burnt Common warehouse, comprises 7,000 m² of industrial and office space. The development of this area has the potential to change traffic flows on surrounding roads, particularly on the A3 and through Ripley. Allocation A43, which concerns a larger parcel of land, is allocated to provide additional housing with approximately 400 homes proposed for this site. A further allocation, A25 Land at Gosden Hill Farm, is likely to affect future traffic flows in the local area. This allocation comprises approximately 1,700 residences, predominantly retail space with travellers plots, 20,000 m² of office and industrial office space combined and 1,100 m² of retail space. Predicted traffic flows on links local to these allocations have anticipated increases in AADT traffic flows on Ripley By-Pass (A3), London Road (A3, B2215 and A3100) and Portsmouth Road (B2215).

Changes in traffic flows of more than 1,000 AADT have also been identified on London Road (A3, B2215 and A3100) and Portsmouth Road (B2215) from the A3 towards Ripley. On London Road, where the largest changes in flows are anticipated, there are no air quality sensitive receptors located along the road, therefore significant adverse effects on air quality are not anticipated. On Portsmouth Road, smaller changes (2,383-3,354 vehicles per day) are anticipated with the implementation of the Draft Local Plan. There are air quality sensitive receptors located along this road, however these are largely set back from the road by approximately 50m, with a small number within 20m. Small adverse effects on air quality are therefore likely at these receptors. However, as background concentrations are low and there are no existing air quality concerns in this area it is considered unlikely that there will be significant adverse effects.

5.2.2 Guildford Town Centre and Urban Area

There are 11 sites allocated in Guildford town centre within the Draft Local Plan for provision of housing and retail space, along with a further 15 sites in the wider urban area. The A31 Farnham Road is predicted to experience a reduction of approximately 1,461 AADT on the immediate approach to the gyratory. The largest increase in traffic flows local to these allocations is on the A322, undergoing an anticipated increase in AADT of 386. These increases in flows predicted by the implementation of these local sites allocated for development do not exceed the DMRB criteria set out in this report, therefore, significant adverse effects on air quality would not be expected from these proposals.

There is a large site allocation to the north of the town of Guildford, site policy A24 Slyfield Area Regeneration Project. This allocation is expected to comprise provision of approximately 1,000 dwellings with an additional 6,500 m² for industry and associated offices and significant space for traveller's plots. Changes to the local road network will be associated with this development; therefore a reduction in traffic flows is anticipated on the A320 heading north of Guildford as traffic takes alternative routes, such as the A3 already identified. A significant adverse effect on air quality is therefore not anticipated in this area.

5.2.2.1 A26 Blackwell Farm

A large parcel of land has been allocated for an urban extension and a new settlement in the area west of Guildford enclosed by a railway running east-west to the north and the A31/A3 junction to the south. This site policy, A26, includes space for approximately 1,800 dwellings of which a minimum of 1,500 are planned to be delivered during the period covered by the Draft Local Plan, approximately 30,000 m² office space, 1,160 m² retail allocations and plots for travellers and travelling showpeople.

Annual average background pollutant concentrations at the site show low annual mean nitrogen dioxide concentrations of 11.9 µg/m³ and PM₁₀ concentrations of 14.6 µg/m³ which are well below the associated objectives, although pollutant concentrations will be higher closer to the A3 and A31.

A large development such as this is likely to have an impact on local air quality as there are likely to be large changes to traffic flows on nearby roads and thus impacts on pollutant concentrations. There are a large number of sensitive receptors in Onslow Village and Dennisville within 200m of roads predicted to be significantly impacted by changes to traffic flows including the Guildford and Godalming By-Pass Road (A3) and Farnham Road (A31). Changes in traffic flows on the by-pass are anticipated to be between 12,500 and 17,000 vehicles per day, these routes therefore should be considered for further detailed air quality assessment.

There are 6 further allocated sites in the more rural area of land situated between the towns of Aldershot and Guildford. The usage, size and location of these site allocations are not expected to result in significant changes to

traffic flows in the area and local air quality.

5.2.3 Ash and Tongham

In the areas of Ash Green and Tongham there are a large number of areas of land allocated for development within the Draft Local Plan. The majority of these allocations are situated on areas which are currently primarily used for agricultural purposes. From the information provided by GBC it is understood that the purpose of these site allocations is to increase future housing provision around Aldershot. Site policy A29 Land to south and east of Ash and Tongham extends down to the piece of land adjacent to the east of the A31 junction with the A331, to the south of Tongham.

This location has background annual mean concentrations of 15.2, 15.9 and 11.2 $\mu\text{g}/\text{m}^3$ for NO_2 , PM_{10} and $\text{PM}_{2.5}$ respectively, although concentrations of pollutants will be higher closer to the local roads. There is no local monitoring data available for this area, although the urban background site to the east of the A331 measured annual mean concentrations of NO_2 of 16-17 $\mu\text{g}/\text{m}^3$ in 2014-2015 and the measurement site adjacent to the A331 northern carriageway off-slip measured annual mean concentrations of NO_2 of 30-31 $\mu\text{g}/\text{m}^3$ in the same period.

There are both increases and decreases in traffic flows anticipated due to the developments in this area and changes in traffic routing due to those developments. Large decreases in traffic flows are anticipated on Ash Street (A323) (-3,315 AADT) and a further decline in traffic flow on Manor Road (-853 AADT) located to the northwest of the allocated sites in the area.

This predicted drop in flow appears to be the result of traffic rerouting on to the surrounding road network, specifically The Street and Guildford Road (A323) which are predicted to undergo large increases of 3,056 AADT which could have an adverse effect on air quality in the area.

There are a large number of sensitive receptors immediately surrounding these significantly affected links the majority of which are residential receptors but also including two schools; Ash Manor School and Walsh Church of England Junior School. Given the large number of receptors in close proximity to these roads and the absence of measurement data within the area it is recommended that localised detailed modelling is undertaken for this area.

5.2.4 Compton

There is one large land allocation within the parish of Compton, A26 Blackwell Farm, discussed above. The additional traffic flows predicted to be generated by this development are not predicted to have a significant adverse effect on air quality in the area of the village of Compton. There are no other large allocations local to Compton Village. As a result the implementation of the GBC Draft Local Plan should have little effect on future traffic flows through the area and thus negligible impact on local air quality.

5.2.5 Nearby AQMA's

Waverley AQMA No.2 – Godalming, designated for exceedances in the annual mean NO_2 objective is located within approximately 750 m of the GBC administrative boundary. The impact of the operation of the allocated sites proposed within the Draft Local Plan on air quality within this designation is expected to be negligible due to its distance from any roads predicted to be significantly impacted by the allocations within the Draft Local Plan.

5.3 Predicted Impacts on Designated Ecological Sites

In relation to predicted future traffic flows in connection with the implementation of the GBC Draft Local Plan it is unlikely that any of the potential increases in traffic flows, and by association increases in traffic emissions, will have a significant negative impact on the health or status of European ecologically designated areas.

This is because sensitive designated ecological receptors are located greater than 200 m from road sections predicted to be most affected by the Draft Local Plan and considered within this assessment. Beyond 200 m additional pollutant contributions are likely to have reduced to a concentration equivalent to background concentrations. The potential effect of the Draft Local Plan on European designated ecological sites is considered in detail within the Habitat Regulations Assessment for the Draft Local Plan (AECOM, 2017).

5.4 Recommendations for Targeted Modelling

Targeted detailed modelling is proposed for a small number of locations to better evaluate the risk of significant adverse air quality effects from the implementation of the Draft Local Plan including the following locations, as shown on Figure 1:

- A3 Ripley Bypass;
- Ash and Tongham, particularly The Street and Ash Church Road; and
- Area local to A3/A31 junction, particularly Guildford and Godalming Bypass and Farnham Road.

At the A3 Ripley Bypass and the Guildford Bypass (local to the junction with the A31) further modelling is recommended as there are very large increases in traffic flows predicted with the Draft Local Plan and associated Highways works. This area includes proposed development with Site Policy A26 Blackwell Farm. The increase in traffic flows associated with the implementation of the Draft Local Plan are predicted to be in the region of 12,500-17,000 vehicles per day on the Guildford Bypass and 21,000 vehicles per day on the Ripley Bypass. The criteria for a potentially significant change in traffic flows within the DMRB guidance is set at 1,000 vehicles per day and the increases predicted in the area of the Ripley and Guildford Bypasses are well over that criteria. In addition there are sensitive receptors (primarily residential properties) located close to these affected roads. Given the overall good air quality in the Guildford area, it is unlikely that these increases would lead to an exceedance of the air quality objective. However, the potential effect on air quality of such large changes in traffic flows should be more fully understood to provide assurance that this is the case.

Within the areas of Ash and Tongham, to the east of the A331, there are predicted increases in traffic flows of more than 3,000 vehicles per day. This is a highly urbanised area, with many residential properties adjacent to the road, along with two schools. The closest air quality monitoring site is located adjacent to the A331 northbound off-slip measuring concentrations of 30-31 $\mu\text{g}/\text{m}^3$. Therefore it is not anticipated that changes in traffic flows would lead to an exceedance of the air quality objective. However, due to the sensitivity of the area further modelling would be precautionary.

Increases in traffic flows of 2,400-3,400 vehicles per day were predicted on the Portsmouth Road (A3100) and increases of 8,000 predicted on London Road (A3100) heading north from the A3. However there are no sensitive receptors located along that section of London Road and, whilst there are some sensitive receptors located along Portsmouth Road, these are set back from the road and are therefore unlikely to experience significant adverse effects on pollutant concentrations. As a result detailed modelling is not proposed for this area.

It should also be noted that the findings of the air quality review undertaken to inform the Draft Local Plan should be confirmed by individual developments as part of the planning application process as required by GBC. Specifically, we recommend that potential air quality issues are added as a 'key consideration' in the site policies for A24 Slyfield Area Regeneration Project, A25 Gosden Hill Farm, A26 Blackwell Farm and A29 Land to the south and east of Ash and Tongham in the Draft Local Plan. This will ensure that these issues will be considered and addressed at such time as planning applications are made for each of these sites.

6. Conclusions

The air quality review presented in this report has considered the potential effect of the Draft Local Plan on annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} for sensitive receptor locations within the GBC administrative area. These pollutants have been considered as these are the key pollutants associated with exhaust emissions and these are the pollutants of greatest concern generally within the UK.

The air quality review presented herein is a qualitative risk based review which has considered the risk of significant air quality effects occurring with the implementation of the Draft Local Plan based on the size and nature of anticipated developments, their location, ambient air quality around potential developments and the locations of sensitive receptors to air quality around potential developments (i.e. residential properties).

In summary the findings of the air quality review suggest that the effect of the Draft Local Plan on annual mean NO₂ concentrations will be negligible and not a key constraint on development in the majority of the GBC administrative area.

However, further detailed modelling would be advisable around roads where notable changes in traffic flows are predicted, at locations in close proximity to sensitive receptors, specifically:

- A3 Ripley Bypass;
- Ash and Tongham, particularly The Street and Ash Church Road; and
- Area local to A3/A31 junction, particularly Guildford and Godalming Bypass and Farnham Road.

For particulate matter (both PM₁₀ and PM_{2.5}) negligible effects are anticipated at all sensitive receptors for air quality.

7. References

AECOM (2017), Habitats Regulations Assessment for Guildford Borough Proposed Submission Local Plan: Strategy and Sites, 2017 Update

The Air Quality Standards Regulations (2010). Statutory Instrument No. 1001. The Stationary Office.

Council of European Communities (1996). Framework Directive on ambient air quality assessment and management, European Council, 96/62/EC.

Council of European Communities (1997). Council Decision 97/1010/EC on exchange of information and data from as amended by Commission Decision, 2001/752/EC.

Council of European Communities (1999). First Daughter Directive on limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air, 1999/30/EC.

Council of European Communities (2000). Second Daughter Directive on limit values for benzene and carbon monoxide in ambient air, 2000/69/EC.

Council of European Communities (2002). Third Daughter Directive on ozone in ambient air, 2002/3/EC.

Council of European Communities (2008). Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe 2008/50/EC.

Department for Communities and Local Government (2012). National Planning Policy Framework, available at <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Department for Communities and Local Government (2014). Planning Practices Guidance (PPG), Paragraph: 002 Reference ID: 32-001-20140306. Revision date: 06/03/2014. Available at <<http://planningguidance.planningportal.gov.uk/>>.

Department for Environment, Food and Rural Affairs (2000). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

Department for Environment, Food and Rural Affairs (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1).

Department for Environment, Food and Rural Affairs (2016). 2013-based background maps for NO_x, NO₂, PM₁₀ and PM_{2.5}. Available at < <https://uk-air.defra.gov.uk/data/laqm-background-home>>

Guildford Borough Council (2003). Guildford Borough Local Plan.

Guildford Borough Council (2012). 2012 Air Quality Updating and Screening Assessment for Guildford Borough Council.

Guildford Borough Council (2016a). Guildford Borough Transport Strategy 2016. Guildford Borough Council

Guildford Borough Council (2016b). 2016 Air Quality Annual Status Report (ASR).

Highways Agency (2007) DMRB, Volume 11, Section 3, Part 1 'Air Quality' (HA 207/07).

Highways Agency (2012a). Interim Advice Note 170/12 v3, Updated air quality advice on the assessment of future NO_x and NO₂ projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality' (HA 207/07).

Highways Agency (2012b). Interim Advice Note 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality' (HA 207/07).

Highways Agency (2013). Interim Advice Note 175/13 Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for user of DMRB Volume 11, Section 3, Part 1 'Air Quality' (HA 207/07).

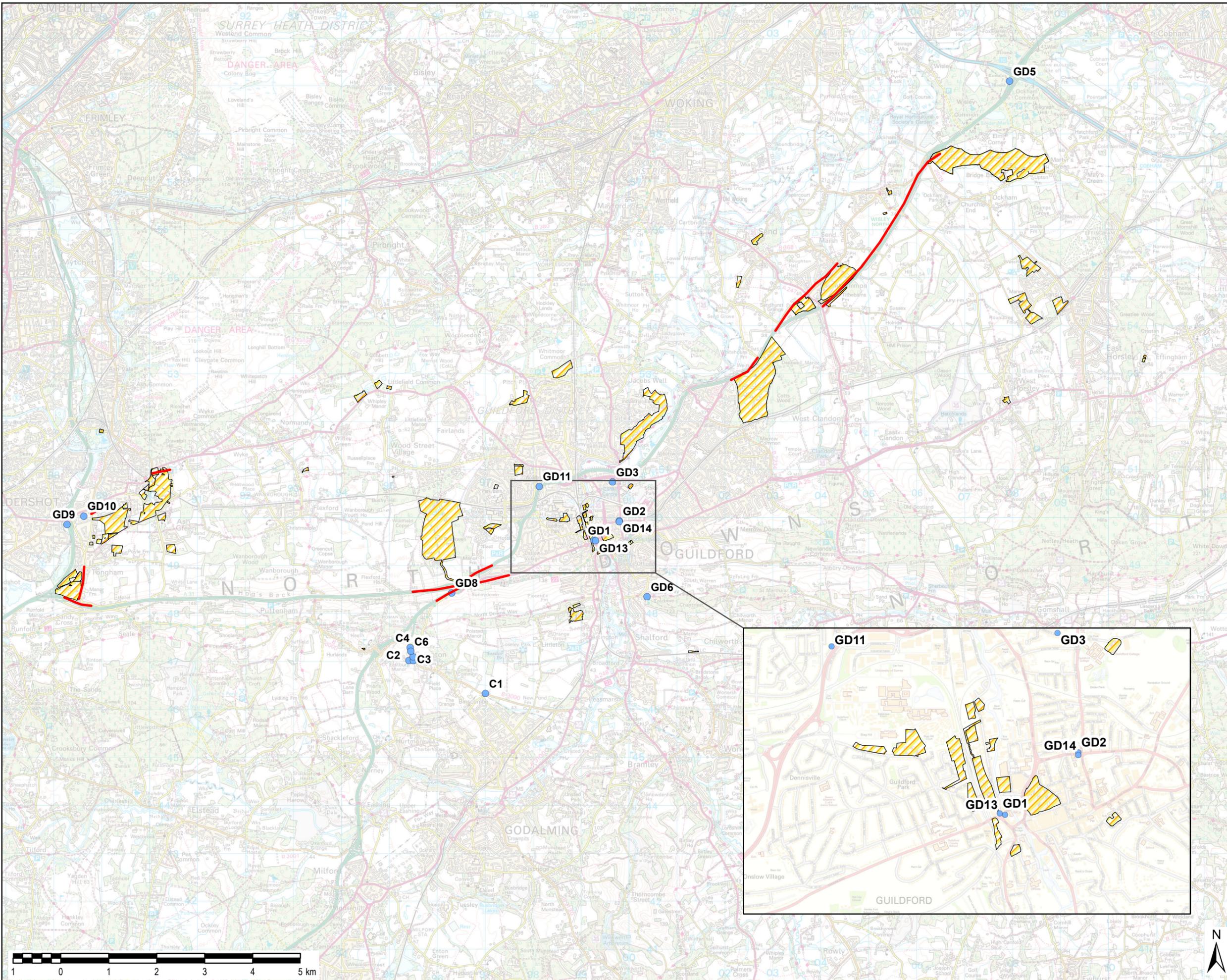
H.M. Government (1995) The Environment Act.

H.M. Government (2000). The Air Quality (England) Regulations 2000, Statutory Instrument No. 928, The Stationary Office.

H.M. Government (2002). The Air Quality (England) Regulations 2002, Statutory Instrument No. 3043, The Stationary Office.

H.M. Government (2010). The Conservation of Habitats and Species Regulations 2010, Statutory Instrument No. 490, The Stationary Office.

Housing and Planning Directorate (2007). Guildford Local Plan Direction Letter. Available at <
<http://www.guildford.gov.uk/newlocalplan/localplan>>



LEGEND

-  Site Allocation in Connection with Draft Local Plan
-  Air Quality Management Area
-  District Boundary
-  Link for further Investigation
-  Local Authority Air Quality Monitoring Location

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Purpose of Issue: **FINAL**

Client: **GUILDFORD BOROUGH COUNCIL**

Project Title: **AIR QUALITY REVIEW OF GUILDFORD BOROUGH COUNCIL DRAFT LOCAL PLAN**

Drawing Title: **AIR QUALITY OVERVIEW**

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