

xxxxxxxxxxxxx
Windsor**SL6 9AA**

Royal Borough of Windsor and Maidenhead

Town Hall

St Ives Road

Maidenhead

SL6 1RF

Planning references 20/03371/OUT & PP-09268685

Copies to;

1. RBWM Clewer East Ward Councillor Tisi cllr.tisi@rbwm.gov.uk
2. RBWM Clewer East Ward Councillor Davies cllr.davies@rbwm.gov.uk
3. RBWM Bray Ward Councillor Leo Walters cllr.walters@rbwm.gov.uk
4. RBWM Bray Ward Councillor David Coppinger cllr.coppinger@rbwm.gov.uk
5. Adam Afriyie, MP for Windsor adam.afriyie.mp@parliament.uk,
6. Holyport Residents' Association

2nd January 2021

To whom it may concern,

Lodge Farm, Holyport – Planning Application 20/03371/OUT

I welcome the opportunity to comment on this planning application and my representation is set out below.

In summary, I oppose this planning application and I urge RBWM to reject it. My opposition is based mainly on air quality considerations.

I urge RBWM to consider very carefully the air quality implications of this development for current and future residents in the Holyport/Bray locale in context with the case of Ella Kissi-Debrah where the Coroner made legal history in December 2020 by ruling that air pollution was a cause of her death.

“Ella’s family argued there was sufficient evidence to conclude there were failures by the state to take steps to protect the public from dangerous levels of air pollution, which amounted to a violation of article 2 of the Human Rights Act, concerning the right to life.”¹

RBWM has declared five Air Quality Management Areas (AQMA)². It is therefore self-evident that air quality is a significant and current local issue. It must not be exacerbated by allowing construction of a housing development close to an AQMA and close to the polluting M4 which will generate still more pollution when it becomes an operational ‘Smart’ M4. I accept that more housing is needed in the Borough, but not at Lodge Farm.

The one-month consultation period is inadequate for a development application which has significant implications for infrastructure demand and air quality. Consultation spanned the Christmas holiday during the Covid pandemic.

¹ “Air pollution a cause in girl’s death, coroner rules in landmark case”, The Guardian, 16th December 2020. [LINK](#)

² RBWM, “2016 Air Quality Annual Status Report (ASR) for The Royal Borough of Windsor and Maidenhead”, in section “Air Quality in the Royal Borough of Windsor and Maidenhead”, June 2016.

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I will argue the following;

1. Air quality in this development's locale is known to be poor now,
2. Air quality in the locale may actually be worse than we realise,
3. Air quality will deteriorate further as a consequence of the operational 'Smart' M4 motorway and other housing development sites along the A308 corridor,
4. Air quality will further deteriorate as a consequence of additional motor vehicle movements generated by the new dwellings at Lodge Farm.
5. The Applicant's Air Quality Assessment model is flawed and so undermines the validity of its conclusions.

RBWM should reject the Application, mindful of its Air Quality responsibilities to the residents it serves.

Yours faithfully,

Thomas Wigley

(sent by email and unsigned)

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Introduction

I have lived in Windsor for more than thirty years and I am familiar with the locality affected by this planning application. I strive to engage with local consultations and value highly our democratic systems which encourage dialogue between our representatives in local and national government and those whom they are elected to represent.

My representation for this planning application is focused on air quality.

Representation Summary

In the body of this Representation, I have presented substantiated arguments in support of the following points.

- 1. It is beyond dispute that that poor air quality is a major influence on public health.**
- 2. Air pollution in the Bray/Holyport locale is a known and current problem.**
 - a) RBWM has known about the air pollution problem in the Bray/Holyport locale since 2009 when it declared an AQMA.
 - b) There have been several illegal NAQO breaches, some significant; most recently in 2019.
- 3. Air pollution in the Bray/Holyport locale may currently be worse than we realise.**
 - a) There are National Air Quality Objectives for ten atmospheric pollutants but RBWM measures the concentrations only of NO₂.
 - b) Other than in this AQMA, RBWM does not measure air pollution anywhere along its M4 corridor; unlike Slough Borough Council.
 - c) Some NO₂ concentrations data is missing.
- 4. Air pollution in the Bray/Holyport locale will deteriorate further when the M4 becomes an operational 'Smart' motorway.**
 - a) The M4 is a source of air pollution recognised by Slough Borough Council who declared an AQMA along its M4 corridor.
 - b) The M4 near Bray and Holyport is being converted to a 'Smart' motorway to increase capacity.
 - c) Increasing motorway capacity drives up vehicle use and so increases air pollution from road traffic.
 - d) The M4 bisects the Bray/Holyport AQMA and is 40m from the Lodge Farm site.
 - e) Lodge Farm residents will suffer ill-health effects from increased pollution generated by M4 traffic.
 - f) The Applicant's Air Quality Assessment Report does not consider air pollution impact of the M4.
- 5. The Applicant's Air Quality Assessment Report cites computer-modelled pollutant levels which are unreliable.**
 - a) Correlation between modelled and measured values is demonstrably poor and statistically unsubstantiated.
 - b) The RBWM 'Raw Data' Annual Mean concentrations of NO₂ for 2016 were used to validate the computer model instead of 'Bias Adjusted' values.
 - c) 'Raw Data' Annual Mean values understate NO₂ concentrations.
 - d) Positive assertions that the Lodge Farm development will have negligible or near-negligible air quality impacts are unreliable.
- 6. Increased road traffic generated by new Lodge Farm residents will exacerbate the current air pollution problem around Bray and Holyport.**
 - a) The proposed development is remote from the nearest public transport hubs, schools and shops.
- 7. RBWM must refuse the Lodge Farm planning application in consideration of its Air Quality responsibilities to the residents it serves.**
 - a) The cumulative impacts on air quality impacts of this particular development and proposed developments nearby must be considered by RBWM when considering its approval decision.
 - b) Lodge Farm is in a locality where air pollution is a recognised problem.
 - c) Air pollution in the locality will deteriorate when the 'Smart' M4 motorway is operational.

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Lodge Farm and Other Developments

Analysis

The Lodge Farm application must not be considered in isolation from other housing development applications. Air quality impacts will be exacerbated by the cumulative effects of other developments in the Bray/Holyport locale.

For example, site 'AL26' located on the A308 and adjacent to the Bray/Holyport AQMA and Bray Lake, has been identified in the BLP as a suitable housing development site. Its footprint is approximately 4Ha and suitable for 100 new homes. See map in Appendix 3.

Maidenhead Golf Course 'HA6' was identified in the BLP as a site suitable for construction of 2,000 housing units.

All new housing developments will generate additional road traffic and associated air pollution.

Conclusions

1. RBWM should consider the air quality and road traffic impacts of the proposed Lodge Farm development together with other housing developments in the locality.

Air Quality General Context

RBWM must consider air quality implications, for both current and future residents, of the proposed Lodge Farm development which is located close to an AQMA and the M4 motorway.

Non-compliance with National air quality objectives is currently a persistent and significant problem. The UK Government has been subject to infraction proceedings for breaching the EU Air Quality Directive and has been taken to the Supreme Court by the campaign group 'ClientEarth' for failing to comply with the Directive.

The Supreme Court made a mandatory order requiring the Secretary of State for Environment, Food and Rural Affairs (DEFRA) to prepare new air quality plans.³

The Coroner Philp Barlow made legal history in December 2020 by ruling that failure to reduce pollution levels to legal limits was factor in death of Ella Kissi-Debrah. He said that the health effects of air pollution had been known for many years, and children and those with asthma were particularly at risk. He found that air pollution both induced and exacerbated Ella's particular form of severe asthma.⁴

Bray/Holyport AQMA Locational Context

RBWM declared this AQMA known also as "Windsor Road A308 –M4" in July 2009.

Locations of the proposed Lodge Farm site, the Bray/Holyport AQMA and the five nearest air quality monitoring sites are shown on a map in Appendix 3.

The Lodge Farm site is located approximately 200 metres West of the AQMA and 40 metres South of the M4 motorway.⁵

RBWM has measured atmospheric NO₂ concentrations at the following monitoring locations within this AQMA since 2010⁶;

- | | |
|----------|--|
| 1. WM2 | Priors Way |
| 2. WM29 | A308 |
| 3. WM29a | A308/Priors Way junction |
| 4. WM29b | Junction of Holyport Road and Earlsfield |
| 5. WM29d | Earlsfield |

Atmospheric NO₂ is the only pollutant measured at these five sites.⁷

RBWM data for NO₂ concentrations is presented in Appendices 1 and 2.

³ Judgment given on 29th April 2015. Paragraph 3.3.8 cited in "M4 Junctions 3 to 12 Smart Motorway, Examining Authority's Report of Findings and Conclusions", 3rd June 2016, document reference TR010019.

⁴ "Air pollution a cause in girl's death, coroner rules in landmark case", The Guardian, 16th December 2020. [LINK](#)

⁵ Measured using Google maps.

⁶ RBWM report "Air Quality Updating and Screening Assessment", June 2015, reference RBWM USA 2015.

⁷ RBWM Annual Air Quality Status reports published annually from 2015 to 2020 inclusive.

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National Air Quality Objectives (NAQO)

NAQO exist for the following atmospheric pollutants;⁸

1. Nitrogen Dioxide (NO₂)
2. Particulates < 2.5µm (“PM2.5”)
3. Particulates < 10.0 µm (“PM10”)
4. Sulphur Dioxide
5. Ozone
6. Polycyclic aromatic hydrocarbons
7. Benzene
8. 1,3-Butadiene
9. Carbon Monoxide
10. Lead

RBWM measures atmospheric levels of PM10 particulates at only one monitoring site; ‘MW1’ located on Frascati Way in Maidenhead.⁹

RBWM measures only atmospheric NO₂ concentrations at all other monitoring sites across the Borough.¹⁰

The National Air Quality Objective (NAQO) for the Annual Mean concentration of NO₂ is 40µg/m³ to be achieved by 31st December 2005.¹¹

NO₂ Concentrations Exceedances 2010 - 2019

Analysis

Table LFR01 shows RBWM ‘Bias Adjusted’ Annual Mean NO₂ Concentrations in the Bray/Holyport AQMA for the years 2010 to 2019. NAQO exceedances are shown in **red** type; these are illegal breaches.

The NAQO for the Annual Mean concentration of NO₂ is 40µg/m³.

DEFRA defines an exceedance as “... a period of time (defined for each standard) where the concentration is higher than that set out in the Standard”.¹²

SITE ID	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
WM2	28.61	28.17	28.99	28.81	30.81	25.90	27.60	27.60	26.30	25.3
WM29	56.70	55.02	60.13	56.28	60.60	50.50	53.40	49.50	48.80	43.3
WM29a	45.36	42.54	46.88	43.03	46.30	40.90	45.20	39.80	41.00	36.9
WM29b	N/A	N/A	N/A	N/A	N/A	29.50	41.20	35.30	37.30	32.0
WM29d	N/A	35.84	39.37	44.57	24.17	22.90	25.60	22.20	N/A	N/A

Table LFR01: RBWM ‘Bias Adjusted’ Annual Mean NO₂ Concentrations (µg/m³)^{13 14}

Table LFR03 shows data in Table LFR01 expressed as percentages of the NAQO for NO₂ concentrations.

SITE ID	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
WM2	72%	70%	72%	72%	77%	65%	69%	69%	66%	63%
WM29	142%	138%	150%	141%	152%	126%	134%	124%	122%	108%
WM29a	113%	106%	117%	108%	116%	102%	113%	100%	103%	92%
WM29b	N/A	N/A	N/A	N/A	N/A	74%	103%	88%	93%	80%
WM29d	N/A	90%	98%	111%	60%	57%	64%	56%	N/A	N/A

Table LFR03: Annual Mean NO₂ concentrations as percentage of 40µg limit

Table LFR04 is an analysis of exceedances presented in Table LFR03.

⁸ DEFRA “UK and EU Air Quality Limits” retrieved 02-JAN-21 <https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits>

⁹ RBWM Annual Air Quality Status reports published annually from 2015 to 2020 inclusive.

¹⁰ *ibid*

¹¹ DEFRA web site “UK and EU Air Quality Limits” retrieved 02-JAN-21 <https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits>

¹² *ibid*

¹³ RBWM example report for 2017 “2017 Air Quality Annual Status Report”, reference RBWM-ASR17, date June 2017. See RBWM Air Quality reports published in the years 2020, 2019, 2018, 2017, 2016, 2015, 2014 and 2013.

¹⁴ ‘Bias Adjusted’ Annual Mean values are shown here, published by RBWM. Values are less than the ‘Raw Data’ Annual Means calculated as the average of monthly values.

EXCEEDANCE RANGE	NUMBER OF READINGS
150% - 159%	2
140% - 149%	2
130% - 139%	2
120% - 129%	3
110% - 119%	5
100% - 109%	7
90% - 99%	4
80% - 89%	2

Table LFR04: Analysis of NO₂ NAQO Exceedances in Bray/Holyport AQMA, 2010-2019

Analysis of Table LFR01 shows the following;

- a) Three NAQO exceedances have been reported in the 2-year period; 2018-19.
- b) Eight individual data points accounting for 16% of the total have not been recorded,
 - Missing data points relate to monitoring sites WM29b and WM29d.

Analysis of Table LFR04 shows the following;

- c) Four Annual Mean concentration exceeded the NAQO by between 140% and 159%.
- d) There have been 21 illegal breaches of the NAQO for atmospheric NO₂ concentrations between 2010 and 2019.

Conclusions

1. Residents in the Bray/Holyport AQMA locale are exposed now to poor-quality air and have been since at least 2010.
2. Air quality in this AQMA may actually be worse than we realise because air quality data is incomplete.
3. The NAQO target date for NO₂ was 31st December 2005. On the A308 road between Holyport and Bray, it has not been met for fourteen consecutive years since monitoring began in 2010.
4. There have been 21 breaches of the Air Quality Objective but they have exceeded the maximum limit by large amounts.

NO₂ Concentrations: Monthly Means 2016 - 2019

Analysis

Annual Mean data masks variations evident in monthly data which is more granular. NO₂ concentration peaks will be evident in monthly data.

RBWM monthly mean concentrations of NO₂ for the five monitoring sites in the Bray/Holyport AQMA are presented in Appendix 1 for the years 2016 to 2019. Monthly mean data for other years are available but have not been considered here.

A chart illustrating monthly mean data between 2016 and 2019, using Appendix 1 data, is presented in Appendix 2. It shows the following;

- a) There are several months where data is missing (chart line dips to zero). Missing data is discussed in detail below.
- b) Monitoring site WM29 recorded 10 NO₂ concentration maxima in the range 50µg/m³ to 60µg/m³ between 2016 and 2019.
- c) Monitoring site WM29a recorded 8 NO₂ concentration maxima in the range 40µg/m³ to 50µg/m³ between 2016 and 2019.

Monitoring sites WM29 and WM29a are located within the Bray/Holyport AQMA on A308 road and close to the M4 motorway.

- WM29: Approximately 20m North of M4 ¹⁵
- WM29a: Approximately 70m North of M4

Analysis of RBWM monthly NO₂ concentrations shows the following;

¹⁵ Measured on Google maps.

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- d) 128 monthly readings equalled or exceeded the NO₂ Annual Mean NAQO between 2016 and 2019.
- e) 35 data points have not been reported.
- f) Of the five monitoring sites, WM29 and WM29a, located on the A308 road, recorded the highest NO₂ concentrations between 2016 and 2019.

Conclusions

1. An accurate view of air quality in the Bray/Holyport locale is not possible because some monthly NO₂ concentrations data is missing; air quality may be worse than we realise.
2. NO₂ concentrations are highest on the A308, close to the M4.
3. There have been monthly spikes of NO₂ concentrations recorded on the A308 road which are significantly higher than the National Air Quality Objective.

NO₂ Concentrations: Missing Monthly Data

Analysis

RBWM monthly NO₂ concentrations for the years 2016 to 2019 are shown in Appendix I.

The Bray/Holyport AQMA has 5 monitoring sites located within it (see map in Appendix 3).

We would expect 240 individual monthly values (4 years X 12 months X 5 monitoring stations).

Analysis of the monthly values shows that 36 (15%) values are missing from the 240 total values expected;

- 2016 = 6 values missing
- 2017 = 4 values missing
- 2018 = 13 values missing
- 2019 = 13 values missing

Monitoring site 'WM29d' located in Earlsfield within the AQMA appears to have ceased operation after 2017 which accounts for 24 (67%) of the missing data points. It can be seen that the greatest number of missing data is in 2018 and 2019.

Conclusions

1. In the most recent years 2018 and 2019, atmospheric concentrations of NO₂ have been measured at four locations within the Bray/Holyport AQMA rather than at five locations in previous years.
2. We therefore have an incomplete view of the true levels of atmospheric pollution in the Bray/Holyport AQMA.

NO₂ Concentrations: Additional Years

Analysis

NO₂ data for the years 2010 to 2019 measured at monitoring sites in the Bray/Holyport AQMA are presented in Table LFR01 above.

- RBWM Annual Mean NO₂ concentration data is available for 2010 and 2011. They have not been cited in the Air Quality Assessment Report.
- NO₂ data is also available for the years 2017, 2018 and 2019 however they were unavailable when the Air Quality Assessment Report was written.

The National Air Quality Objective for the Annual Mean concentration of NO₂ is **40µg/m³** to be achieved by 31st December 2005.¹⁶

Analysis of Table LFR01 data for 2010 and 2011 shows that four values reported for monitoring sites WM29 and WM29a exceeded the National Air Quality Objective for NO₂ concentrations.

Conclusions

1. Air quality in the Bray/Holyport AQMA has been poor for a longer period of time than that suggested by the Air Quality Assessment report.

¹⁶ DEFRA web site "UK and EU Air Quality Limits" retrieved 02-JAN-21 <https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits>.

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NO₂ Concentrations 2016

Analysis

RBWM publishes two Annual Mean values for NO₂ concentrations for each monitoring site as shown in the screen shot below.¹⁷

- 'Raw Data' Annual Mean,
- 'Bias Adjusted' Annual Mean.

Annual Mean values reported for monitoring site WM2 in 2016, for example, are 25.8 and 27.6 respectively.

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (1.07) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
WM1	-	16.1	19.7	13.5	20.3	12.7	9.2	8.9	15.9	21.9	21.3	30.6	17.3	18.5	
WM2	36.6	24.1	25.4	22.9	20.4	17.2	19.1	17.8	27.6	24.8	33.3	40.8	25.8	27.6	

Table LFR07 (below) shows RBWM Annual Mean NO₂ concentrations for the year 2016 for monitoring sites in the Bray/Holyport AQMA.

- Column (1) shows RBWM 'Raw Data' Annual Mean NO₂ concentrations.
- Column (2) shows RBWM 'Bias Adjusted' Annual Mean NO₂ concentrations.
- Column (3) shows variances between the 'Raw Data' and 'Bias Adjusted' Annual Mean values calculated as [Column (2) minus Column (1)].
- Column (4) shows variances in column (3) as a percentage calculated as [Column (3) / Column (1)] * 100.

MONITORING SITE ID	(1) ANNUAL MEAN 'RAW DATA' VALUES (µg/m ³)	(2) ANNUAL MEAN 'BIAS ADJUSTED' VALUES (µg/m ³)	(3) ANNUAL MEAN VARIANCE (µg/m ³) (2) minus (1)	(4) ANNUAL MEAN % VARIANCE [(3)/(1)]*100
WM2	25.8	27.60	+1.8	+6.9%
WM29	49.9	53.40	+3.5	+7.0%
WM29a	42.2	45.20	+3.0	+7.1%
WM29b	38.5	41.20	+2.7	+7.0%
WM29d	23.9	25.60	+1.7	+7.1%

Table LFR07: Comparison of 'Raw Data' and 'Bias Adjusted' Annual Mean NO₂ concentrations for 2016

Conclusions

1. 'Raw Data' Annual Mean' values for 2016 are all less than the 'Bias Adjusted' Annual Mean' values for all five monitoring sites within the Bray/Holyport AQMA (column 3).
2. The 'Raw Data Annual Mean' values understate NO₂ concentrations at all monitoring sites by 7% (column 4).

Air Quality Assessment Report: 2012 – 2015 NO₂ Data

Analysis

RBWM 'Bias Adjusted' NO₂ Annual Mean values for the years 2010 to 2019 for the Bray/Holyport AQMA are presented in Table LFR01 (above).

Table 4.1 (below) from the Air Quality Assessment Report shows measured Annual Mean Concentrations of NO₂ for the years 2012 to 2016 for the 5 monitoring sites within Bray/Holyport AQMA.

¹⁷ LAQM Air Quality Status Report, Appendix 'B', page 39. RBWM, June 2017.

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Site ID	Location	Within AQMA?	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)				
			2012	2013	2014	2015	2016
WM2	Background	N	28.99	29	31	25.9	25.8
WM29	Roadside	Y	60.13	56	61	50.5	49.9
WM29a	Roadside	Y	46.88	43	46	40.9	42.2
WM29b	Roadside	Y	N/A	N/A	N/A	29.5	38.5
WM29d	Roadside	Y	39.37	44.57	24.17	22.9	23.9

Table 4.1: RBWM Measured Annual Mean NO₂ Concentrations ($\mu\text{g}/\text{m}^3$)¹⁸

Conclusions

- I. 'Bias Adjusted' Annual Mean values cited in Table 4.1 in the Air Quality Assessment Report align with RBWM 'Bias Adjusted' mean values for the years 2012 to 2015.

Air Quality Assessment Report: 2016 NO₂ Data

Analysis

Table 4.1 (above) shows NO₂ concentrations for the years 2012 to 2016 for the Bray/Holyport AQMA published in the Air Quality Assessment Report.

Table LFR01 (above) shows RBWM Annual Mean NO₂ concentrations for the years 2010 to 2019 for monitoring sites in the Bray/Holyport AQMA.

Table LFR02 (below) compares RBWM values published for 2016 with values in Table 4.1 from the applicant's Air Quality Assessment report.

- Column (1) shows RBWM 'Bias Adjusted' Annual Mean NO₂ values for 2016
- Column (2) shows values published for 2016 in Table 4.1 in the Air Quality Assessment Report.
- Column (3) shows variances calculated as ([Column 1] minus [Column 2]).
- Column (4) shows percentage variances calculated as (Column 3 / Column 1) * 100.

MONITORING SITE ID	(1) RBWM ($\mu\text{g}/\text{m}^3$)	(2) REPORT ($\mu\text{g}/\text{m}^3$)	(3) VARIANCE ($\mu\text{g}/\text{m}^3$)	(4) % VARIANCE
WM2	27.60	25.8	+1.8	6.5%
WM29	53.40	49.9	+3.5	6.6%
WM29a	45.20	42.2	+3.0	6.6%
WM29b	41.20	38.5	+2.7	6.6%
WM29d	25.60	23.9	+1.7	6.6%

Table LFR02: 2016 NO₂ Annual Mean Concentrations Comparison

Analysis of Table LFR02 shows;

- a) NO₂ concentration values reported by RBWM and values cited in the Air Quality Assessment Report **do not align for 2016**. (Column 3).
- b) Annual Mean values cited in Table 4.1 in the Air Quality Assessment Report **understate** NO₂ concentrations for 2016 **by 6.6%**. (Column 4).
- c) Comparison of values in column (2) in Table LFR02 with values in column (1) in Table LFR07 shows that the Air Quality Assessment Report has cited RBWM 'Raw Data' Annual Mean values for 2016 in Table 4.1.
- d) The Air Quality Assessment Report has used RBWM Annual Mean NO₂ values as follows;
 - **2012 to 2015:** 'Bias Adjusted' Annual Mean' values.
 - **2016:** 'Raw Data' Annual Mean' values.

¹⁸ Proposed Residential Development, Lodge Farm, Holyport. "Air Quality Assessment Report", Stuart Michael Associates Limited, June 2017, reference 5674/SQMA, Rev. A. Page 18.

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Conclusions

1. Table 4.1 in the Air Quality Assessment Report uniquely cites the RBWM 'Raw Data' Annual Mean values for 2016 but no rationale for the exception is provided.
2. The Air Quality Assessment Report has inconsistently cited RBWM 'Bias Adjusted' Annual Mean and 'Raw Data' Annual Mean values for the years 2012 to 2016, shown in Table 4.1.
3. Table 4.1 in the Air Quality Assessment Report cites RBWM 'Bias Adjusted' Annual Mean values for the years 2012 to 2015.

2016 Computer Modelled NO₂ Concentrations

Context

The Applicant's Air Quality Assessment has used the 'ADMS-Roads' computer model to predict future pollution levels which have then been verified by comparison with actual values.¹⁹

The method follows CERC recommendations;²⁰

"... ADMS-Roads is first used to model the emissions from a base case scenario, that is, data (emissions, meteorology, background, etc.) are used to produce results that can be verified against locally monitored data from a recent previous year or the current year. Once the base case scenario has been validated, it is possible to investigate different scenarios."

Levels of the following pollutants have been modelled;²¹

- NO_x,
- NO₂,
- PM10,
- PM2.5.

Computer modelling has also been used to predict road traffic volumes which will generate air pollution during the construction and operation phases of the proposed development.

Analysis

Concentrations of NO₂ and NO_x predicted by computer modelling for 2016 are shown in Table 4.2 below which is a screen-shot of the Air Quality Assessment report.

Table 4.2: Predicted air quality concentrations in 2016

Receptor Number and Name		NO _x	NO ₂
		Annual mean $\mu\text{g}\text{m}^{-3}$	Annual mean $\mu\text{g}\text{m}^{-3}$
WM2	Priory Road	40.3	25.2
WM29	M4 Windsor Road 1	87.9	46.3
WM29a	M4 Windsor Road 2	75.6	41.2
WM29b	M4 Windsor Road 3	84.1	44.6
WM29d	M4 Windsor Road 4	37.7	23.9
NAQO	-	-	40

Table 4.2 Computer-modelled NO₂ concentrations for Bray/Holyport AQMA in Air Quality Assessment Report

Paragraph 4.21 of the report is a summary of the 2016 modelled values (author's **emphases**);

*"If the modelled pollutant concentrations in Table 4.2 are compared to the NAQO, it can be seen that background concentrations of NO₂ are predicted to be **well below** the NAQO level of 40 $\mu\text{g}\text{m}^{-3}$. Concentrations at Earlsfield (WM29d) are also **well below** the NAQO level. However, concentrations in the AQMA adjacent to Holyport Road and the A308 Windsor Road are **above** the NAQO level."*

¹⁹ Proposed Residential Development, Lodge Farm, Holyport. "Air Quality Assessment Report", Stuart Michael Associates Limited, June 2017, reference 5674/SQMA, Rev. A. Para. 3.21, page 14. 'ADMS Roads' by Cambridge Environmental Research Consultants

²⁰ CERC web page "Why Use ADMS-Roads?", retrieved 02-JAN-21. <http://www.cerc.co.uk/environmental-software/ADMS-Roads-model.html>

²¹ Air Quality Assessment Report, para. 3.21, page 14.

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Observations

- The assertion in paragraph 4.21 “it can be seen that background concentrations of NO₂ are predicted to be **well below** the NAQO level of 40 µgm-3” is simply untrue. Three of the five values cited in Table 4.2 values **exceed** the NAQO.
- Table 4.2 shows NAQO exceedances predicted for monitoring sites WM29, WM29a and WM29b. The exceedances are +16%, +3% and +12% respectively and therefore undermine the positive assertion made in paragraph 4.21.
- Paragraph 4.21 uses comparative expressions such as “well below” and “above”. They are inappropriate for discussions of quantified data and serve only to avoid quantitative analysis on which good decisions are based.
- There is no quantitative statistical analysis of computer-modelled data to provide standard deviations, confidence limits maximum and minimum values and so on.

Conclusions

- The absence of any robust quantitative analysis of modelled NO₂ concentrations for 2016 devalues credibility of the Air Quality Assessment Report conclusions regarding predicted NO₂ concentrations.

Computer Model Verification: Correlation

Analysis

My understanding of the method employed is that NO₂ concentrations predicted by the ‘ADMS-Roads’ computer model for 2016 are compared with RBWM NO₂ concentrations reported for the Bray/Holyport AQMA; actual 2016 values are compared with predicted values to verify the computer model.

Computer model verification principles are set out in the Air Quality Assessment Report (author’s emphases);

Paragraph 4.18 (page 19)

“Model verification has been undertaken using the guidance provided in LAQM.TG(16). The process requires the comparison of the monitored roadside contribution of NO₂ with the modelled roadside contribution of NO₂.”

Paragraph 4.19 (page 19)

“To verify the model adjacent to the roads that would be affected by the proposed development traffic, predictions have been made at locations representative of the DTs for the base year 2016 using ADMS-Roads dispersion modelling.”

Paragraph 4.22 (page 20)

“ADMS-Roads has been used to calculate NO_x and NO₂, concentrations for 2016 which have been verified against the recorded NO_x and NO₂ levels at the DT monitoring locations. The results from the monitoring and the ADMS-Roads modelling are presented in Table 4.3.”

Paragraph 4.23 (page 20)

“From Table 4.3 it can be seen that there is good correlation between the modelled and monitored results, therefore no further adjustments to the model are proposed.”.

Table 4.3 (below) is a comparison of measured and predicted NO₂ concentrations for the Bray/Holyport AQMA from the Air Quality Assessment Report. It is a screen-shot from page 20.

- ‘Monitored NO₂’ values in the table are RBWM reported data.
- ‘Modelled NO₂’ values have been generated by the computer modelling software.

Table 4.3: Comparison of the monitored (DT) and modelled (ADMS) concentrations of NO₂

Site ID	Monitor Type	Site Type	Site Description	Background NO ₂	Monitored NO ₂	Modelled NO ₂	Difference [(monitored - modelled)/monitored] x100 (%)
WM2	DT	B	Priory Road	17.7	25.8	25.2	-2.3
WM29	DT	R	M4 Windsor Road	17.7	49.9	46.3	-7.3
WM29a	DT	R	M4 Windsor Road	17.7	42.2	41.2	-2.4
WM29b	DT	R	M4 Windsor Road	17.4	38.5	44.6	15.6
WM29d	DT	R	M4 Windsor Road	17.4	23.9	23.9	0.0

Table 4.3: 2016 Actual and modelled NO₂ concentrations

The Air Quality Assessment report states in paragraph that “there is good correlation between the modelled and monitored results” and gives the impression that the computer model is sound because it has generated good quality data for the reference year 2016. It declares satisfaction with the modelled output in saying “therefore no further adjustments to the model are proposed”.

Paragraph 7.8 in the Conclusions section of the Air Quality Assessment report states (author’s emphases);

“Therefore, taking into account the proposed development’s negligible increase in air pollution during the operational stage, and the “not significant” impact arising from dust during the construction stage, it can be concluded that air quality should not be a determining factor in refusing planning consent.”

The assertion that the development will create a “negligible increase in air pollution during the operational stage” is unsound;

- “negligible increase” is not quantifiably substantiated,
- The computer model used to predict NO₂ concentrations is unsound.

Conclusions

1. Scrutiny of “Difference %” values in Table 4.3 (above) from the Air Quality Assessment report show that there is not “good correlation between the modelled and monitored results”; the opposite is true. Analysis of the “Difference %” range in Table 4.3 is 17.9 points, from a minimum of -2.3% to a maximum of +15.6%.
2. No quantitative statistical analysis is provided in the report to substantiate the assertion that “there is good correlation”.
3. **We should conclude that the computer model used to predict future NO₂ concentration levels is unsound.**

Computer Model Verification: Variances

Analysis

That there is variance between the actual and modelled NO₂ concentration values for 2016 has been discussed above.

The extent of data variances is shown in Table LFR05 below which compares computer-modelled and actual NO₂ concentrations for monitoring sites located in the Bray/Holyport AQMA for 2016.

- Column (1) shows RBWM ‘Bias Adjusted’ Annual Mean monitored values for 2016.²²
- Column (2) shows 2016 modelled values published in Table 4.3 in the Air Quality Assessment report.²³
- Column (3) shows variances calculated as (Column 2 minus Column 1).
- Column (4) shows variances as a percentage of the RBWM ‘Bias Adjusted’ Annual Mean (column 1).

SITE ID	(1) NO ₂ RBWM (µg/m ³)	(2) NO ₂ MODELLED (µg/m ³)	(3) VARIANCE (µg/m ³)	(4) % VAR
WM2	27.60	25.2	-2.4	-8.7%
WM29	53.40	46.3	-7.1	-13.3%
WM29a	45.20	41.2	-4.0	-8.8%
WM29b	41.20	44.6	+3.4	+8.3%
WM29d	25.60	23.9	-1.7	-6.6%

Table LFR05: Comparison of 2016 Actual and Modelled NO₂ concentrations

Conclusions

1. The variance range is significant (column 4). It is 21.6 points, from a minimum of -13.3% to a maximum of +8.3%.
2. The greatest variance is for site WM29 (-13.3%) located on the A308 within the AQMA,
3. The computer model significantly underestimated NO₂ concentrations.

²² RBWM Annual Air Quality Report. June 2017. Public domain.

²³ Ibid Table 4.2, page 20.

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4. Computer-modelled data do not align with reported values and so undermine the model's credibility and its data cited in the Air Quality Assessment Report.

Computer Model Verification: 'Raw Data' and 'Bias Adjusted' NO₂ Concentrations

Analysis

It has been shown above that RBWM publishes two Annual Mean values for NO₂ concentrations;

- Raw Data Annual Mean
- Bias Adjusted Annual Mean

It has also been shown above that the RBWM 'Raw Data' Annual Mean values for 2016 have been used to verify the computer model which predicts future NO₂ concentrations. Air quality impact of the Lodge Farm development, in its operational phase, is based on computer-modelled data.

Inconsistencies between computer-modelled values for 2016 and each type of RBWM Annual Mean are quantified in Table LFR06 below.

- **Column (1)** shows RBWM 'Bias Adjusted' Annual Mean monitored values for 2016.
- **Column (2)** shows RBWM 'Raw Data' Annual Mean monitored values for 2016.
- **Column (3)** shows computer-modelled values for 2016 as used in Table 4.3 above, taken from the Air Quality Assessment report.
- **Column (4)** shows the percentage variances between RBWM 'Bias Adjusted Annual Mean' monitored values in Column (1) and Column (3) computer-modelled values;
 - Calculated as $[(\text{Monitored} - \text{Modelled}) / \text{Monitored}] * 100$.
 - Monitored values in Column (1)
 - Modelled values in Column (3)
- **Column (5)** shows the percentage variances between RBWM 'Raw Data Annual Mean' monitored values in Column (2) and computer-modelled values in Column (3);
 - Calculated as $[(\text{Monitored} - \text{Modelled}) / \text{Monitored}] * 100$.
 - Shown in Table 4.3 above taken from the Air Quality Assessment report.
 - Monitored values in Column (2)
 - Modelled values in Column (3)

SITE ID	2016	2016	2016	(4) % VARIANCE (1) ↔ (3)	(5) % VARIANCE (2) ↔ (3)
	(1) RBWM MONITORED (µg/m ³)	(2) RBWM MONITORED (µg/m ³)	(3) COMPUTER MODELLED (µg/m ³)		
WM2	27.60	25.8	25.2	-8.7%	-2.3%
WM29	53.40	49.9	46.3	-13.3%	-7.3%
WM29a	45.20	42.2	41.2	-8.8%	-2.4%
WM29b	41.20	38.5	44.6	+8.3%	+15.6%
WM29d	25.60	23.9	23.9	-6.6%	0.0%

Table LFR06: Comparison of variances between Modelled and Monitored NO₂ concentrations for 2016

Analysis of the variances shown in columns (4) and (5) in Table LFR06 show the following;

- a) The variance range for 'Bias Adjusted Annual Mean' values compared with Modelled values is **21.6** points (-13.3% to +8.3%) shown in column 4.
- b) The variance range for 'Raw Data Annual Mean' values compared with Modelled values is **22.9** points (-7.3% to +15.6%) shown in column 5.
- c) Mean of variances in Column-4 for the 'Bias Adjusted Annual Mean' comparison is +5.8%.
- d) Mean of variances in Column-5 for the 'Raw Data Annual Mean' comparison is -0.8%.

Conclusions

1. Scrutiny of variance percentages in columns (3) and (4) reinforces the conclusion made above, that the statement "good correlation between the modelled and monitored results" declared in the Air Quality Assessment Report is false; the opposite is true.

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2. No quantitative statistical analysis has been provided in the Air Quality Assessment Report therefore the assertion “*there is good correlation*” between modelled and observed data is unsubstantiated and therefore unsound.
3. Computer modelled NO_x concentrations data is poor quality. Correlation between modelled and RBWM Annual Mean values is poor when using the ‘Raw Data’ Annual Mean and the ‘Bias Adjusted’ Annual Mean.

Background Concentrations 2022

Analysis

The Air Quality Assessment Report states the following on page 26;

Background Concentrations – 2022

- 5.18 From Table 4.1, it can be seen that there has been a small reduction in measured concentrations of NO₂ in the past five years. Therefore, the DEFRA predicted background concentrations in NO_x, NO₂, PM₁₀ and PM_{2.5} for 2022 have been used for the future assessment.

Paragraph 5.18: Screenshot of Air Quality Assessment Report

Table 4.1 has been discussed above where it was established that there has been inconsistent citation of RBWM Annual Mean NO₂ data for the years 2012 to 2015 and 2016.

Paragraph 5.18 states that “*there has been a small reduction in measured concentrations of NO₂ in the past five years*” but no quantitative statistical analysis is provided to quantify “*a small reduction*”.

Table LFR03 (above) cites RBWM ‘*Bias Adjusted*’ Annual Mean values for NO₂ concentrations. It shows that three of the five monitoring sites in the Bray/Holyport AQMA exceeded the NAQO in 2016. The same data shows two exceedances in both 2014 and 2015. There has not been “*a small reduction*”, in fact NO₂ levels have deteriorated.

Table 4.1 in the Air Quality Assessment Report cites the RBWM ‘Raw Data’ Annual Mean values for NO₂ concentrations in 2016. It has been shown above that these ‘Raw Data’ Annual Mean values are all smaller than the ‘Bias Adjusted’ Annual Mean values. This observation undermines credibility of the assertion that “*there has been a small reduction in measured concentrations of NO₂ in the past five years*”.

Paragraph 5.18 states that “*DEFRA predicted background concentrations ... for 2022 have been used for future assessment.*” I do not understand this statement. I understood that a computer model would be used to predict future pollutant concentrations. No data source reference has not been provided.

Conclusions

- I. The Air Quality Assessment Report conclusions are unreliable.

NO₂ Concentrations: 2022 and 2019 Compared

Analysis

Table 5.5 (below) in the Air Quality Assessment Report shows predicted NO₂ concentrations for 2022.

Table 5.5: Predicted air quality concentrations at sensitive receptors in 2022
“do something”

Receptor Number and Name	NO _x		NO ₂		PM ₁₀		PM _{2.5}
	Annual mean $\mu\text{g}\text{m}^{-3}$	Annual mean $\mu\text{g}\text{m}^{-3}$	Annual mean $\mu\text{g}\text{m}^{-3}$	Annual mean $\mu\text{g}\text{m}^{-3}$	Days >50 $\mu\text{g}\text{m}^{-3}$	Annual mean $\mu\text{g}\text{m}^{-3}$	
1 WM2	34.88	21.94	16.76	0.62	12.10		
2 WM29	72.37	39.10	20.00	3.41	12.48		
3 WM29a	64.92	35.93	19.43	2.73	12.33		
4 WM29b	68.99	37.62	20.39	3.90	12.38		
5 WM29d	30.53	22.26	16.24	0.39	12.03		
NAQO	-	40	40	35	N/A		

Table 5.5 screen shot of Air Quality Assessment Report

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The table below compares RBWM measured NO2 concentrations for 2019 with concentrations predicted for 2022. Predicted values are from Table 5.5 in the Air Quality Assessment Report. Measured values are from Table LFR01 above.

SITE ID	2019 RBWM Actual	2022 Modelled	Variance
WM2	25.3	21.94	-3.36
WM29	43.3	39.10	-4.2
WM29a	36.9	35.93	-0.97
WM29b	32.0	37.62	+5.62
WM29d	N/A	22.26	N/A

Conclusions

1. NO2 concentrations in the Bray/Holyport AQMA are predicted to be lower than they were in 2019. This is counter-intuitive as the Lodge Farm development will increase road traffic and credibility of computer-modelled data is in doubt based on discussions above.
2. The Air Quality Assessment report scope is limited to the environmental impact of the Lodge Farm development and necessarily excludes air quality impact from the M4 motorway. This is discussed below.

M4 Motorway: Lodge Farm Proximity

Analysis

At its closest point, the North-Western boundary of the Lodge Farm development site is approximately 40 metres South of the West-bound carriageway of the M4 motorway.²⁴

Between junctions 7 and 8, the M4 motorway crosses the A308 between the Upper Bray Road and Holyport Road and bisects the Bray/Holyport AQMA. (See map in Appendix 3).

The housing development is not expected to extend to the NW boundary limit based on paragraphs 2.4 and 2.5 (below) in the Applicant's Planning Statement, but we cannot yet know just how close to the M4 motorway new houses will actually be built. The business imperative to maximise profit must surely seek to maximise the housing development footprint.²⁵ (author's emphases).

*"2.4 Part of the North-Western area of the site lies within Flood Zone 2. **This area is excluded from the residential part of the scheme**, and a Flood Risk Assessment and Drainage Scheme accompanies this application."*

*"2.5 The **detail design of development layout, scale/appearance and landscape would come forward as part of subsequent reserved matters application**, however the Design and Access Statement explains the principles that will guide these further applications."*

Proximity of the Lodge Farm site to the M4 will not be problem. Paragraph 5.21 in the Air Quality Assessment Report states;

- 5.32 A prevailing south-westerly wind reduces the potential impacts arising from M4 Motorway traffic. Moreover, the proposed development site is situated at a reasonable distance from the M4 so that it will not be adversely affected by air pollutants.

Conclusions

1. The proposed Lodge Farm development is very close to the M4 motorway.
2. It is likely that the Lodge Farm site will be adversely affected by air pollution from M4 road traffic. Pollution and the M4 is discussed below.
3. If the Planning Application is approved and ground conditions allow, houses may be built as close as 40m to the M4.

²⁴ Measured using Google maps.

²⁵ Planning Statement, Lodge Farm Holyport, prepared for Beaulieu Homes Southern Limited, December 2020, reference 8256.

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M4 ‘Smart’ Motorway Capacity

Analysis

The section of the M4 which bisects the Bray/Holyport AQMA is being converted to a “Smart” motorway with declared benefits to;

*“increase capacity, improve traffic flow and reduce journey times, thereby supporting economic development.”*²⁶

The prime objective is increased capacity which will consequently improve traffic flow and reduce journey times.

As a Smart Motorway, capacity will be increased during peak times by allowing vehicles to use the hard shoulder. Thus, six lanes of traffic will increase by two lanes (33%) to eight lanes in total, assuming that the “All Lane Running” variant is implemented.

In terms of Smart Motorway capacity, the DfT has stated;²⁷

“They have raised the capacity of our busiest motorways by up to a third. A smart motorway can carry 1,600 additional vehicles an hour in each direction and studies on the M25 have shown that these roads have enabled an additional 11,000 journeys a day.”

“They are an enhancement of the existing motorway network aiming to achieve the benefits of increasing capacity ...”.

Conclusions

- I. Road traffic capacity of the M4 will increase when it has been converted to a ‘Smart’ motorway.

M4 ‘Smart’ Motorway Air Quality

Analysis

Air quality degradation is a known side-effect of Smart Motorways, recognised by central Government. In 2017, a Highways England representative stated (author’s emphases);²⁸

“Smart motorways are central to the modernisation of England’s motorways, reducing congestion and improving journey time reliability by smoothing traffic flows. One of our key challenges in delivering the £1.5bn government investment in infrastructure is tackling the issue presented by air quality and in order to meet environmental targets we are investing in wider programme of air quality research to help address this.”

“To mitigate the increased pollution caused by the smart motorway scheme, Highways England, which admits it is a “key challenge”, has been trialling a number of initiatives.”

“... the smart motorway scheme will add a further 5,000-10,000 vehicles a day by opening the hard shoulder to traffic. It stated: “Air quality assessment predicted that operating a [smart motorway] at 70mph, 24 hours a day, seven days a week, would result in significant adverse impacts on air quality.”

Considering air quality degradation resulting from the upgrade of the M4 to a ‘Smart’ motorway in the Bray/Holyport locale, the Secretary of State for Transport in 2016 accepted concerns raised by Slough Borough Council and stated (author’s emphases)²⁹;

*“24 However, the Panel also accepted the concerns expressed in representations made on behalf of Slough Borough Council about the potential for uncertainty in the applicant’s air quality baseline assessment. **The Council was concerned that, in relation to the receptors in Slough most exposed to NO₂, even slight uncertainties in the projected levels in the 2022 opening year could cause exceedances of the air quality standards not forecast by the applicant (PR 5.7.49-53).**”*

*“25. Given the importance of ambient air quality for the local authorities and residents where Air Quality Management Areas (“AQMA’s”) are located, **He accepts firstly that the inevitable element of uncertainty inherent in traffic forecasting has the potential to affect the air quality assessment**, which relies on the outcome of traffic modelling (PR 5.7.54-55). He accepts also that the continuing uncertainty about actual emission levels from Euro 6/VI diesel vehicles in real life driving conditions is another element of uncertainty in the applicant’s air quality assessment which could justify a cautionary approach (PR 5.7.56-66).”*

*“26. The Secretary of State has noted the Panel’s concerns that **the definition of significance used in the applicant’s air quality assessment may be out of date** and may not represent a sufficiently precautionary approach in the light of the uncertainties referred to 6 above; and that as a result **the proposed development may impact on***

²⁶ Secretary of State for Transport, Development Consent Order, 2nd September 2016, reference TWA8/1/19.

²⁷ DfT “Smart Motorway Safety Evidence Stocktake and Action Plan”, January 2019, retrieved 02-JAN-21 [LINK](#)

²⁸ The Guardian, 22nd January 2017, “60mph speed limit for M1 under consideration to combat air pollution”. [LINK](#)

²⁹ Secretary of State for Transport, Development Consent Order, 2nd September 2016, reference “TWA 8/1/19”.

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the ability of local authorities to comply with the air quality objectives within the AQMAs affected by the proposed development (PR 5.7.67-78). He also shares the Panel's concern about the potential risk to the health of the high residential populations in areas through which the M4 passes and which have been declared AQMAs, should the effects of the proposed development exceed the applicant's forecast levels of NO₂ (PR 5.7.79-82)."

The specialist periodical "Infrastructure Intelligence" reported the following (author's **emphases**);³⁰

"Highways England is still looking at different ways it can manage the air quality impact of its smart motorway project on the M1 near Sheffield"

"This is not the first time a smart motorway project has fallen foul of air quality limits. The M60/M62 scheme near Manchester was scaled back in 2013 when it was revealed as likely to breach legal air pollution levels. This was also in an urban area."

The Covid pandemic has changed how people commute to work, shunning public transport in favour of private vehicles to avoid close human contact. A study by the 'Centre For Cities' found that;³¹

"Air pollution in cities fell over the course of the first national lockdown, but now meets or exceeds pre-pandemic levels in 39 cities and large towns studied."

Conclusions

1. The M4 motorway is currently a source of excessive air pollution which concerns Slough Borough Council,
2. Smart motorways degrade air quality,
3. Detrimental air quality impact caused by a 'Smart' M4 motorway may be worse than predicted by traffic modelling,

M4 Motorway: Pollution & Slough Borough Council

Analysis

In 2019, British Heart Foundation research found that Slough had the highest levels of air pollution in the South East.³²

Slough Borough Council acknowledged that the M4 is a source of air pollution and declared AQMA-I which has two sections which follow the entire Northern boundary of the M4 as it passes through its Borough boundaries between junctions 5 and 7.³³

Appendix 4 shows a map of the AQMA location.

Using Google maps, I have calculated that the total length of the M4 within AQMA-I is 3.2 miles (5.1 Km).

Conclusions

1. Slough Borough Council acknowledges that the road traffic pollution from the 3.2 mile stretch of the M4 motorway is a problem.
2. Detrimental impacts on health of air pollution for Slough residents is acknowledged by the British Heart Foundation.

M4 Motorway: Pollution & RBWM

Analysis

An approximately 600m stretch of the M4, between junctions 7 and 8/9, bisects the Bray/Holyport AQMA as shown in the Appendix 3 map. RBWM declared this AQMA in 2009 and has published NO₂ data since 2010.³⁴

The total length of the M4 within the RBWM administrative boundary is approximately 7.8Km (4.9m).

It has been shown above that Slough Borough Council declared an AQMA for the entire length of the M4 which passes through its Borough boundary.

The Slough and RBWM sections of the M4 are contiguous; road traffic volumes and therefore its associated air pollution can reasonably be expected to be similar.

³⁰ Infrastructure Intelligence, Jon Masters, "Time running out for smart motorway air quality" 23rd January 2017. [LINK](#)

³¹ Centre For Cities report "How have the Covid pandemic and lockdown affected air quality in cities?", December 2020 [LINK](#)

³² Reported in Slough Express, 6th December 2019.

³³ Slough Borough Council, Air Quality Annual Status Report, June 2020, reference "ASR-2020".

³⁴ Distance measured on Google maps with reference to the AQMA boundary published by RBWM.

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RBWM measures NO₂ concentrations at five locations within the Bray/Holyport AQMA.

Conclusions

RBWM cannot know the true extent of air pollution generated by the whole length of the M4 within its boundary because it measures air pollution in the Bray/Holyport AQMA.

Conclusions

1. Slough BC considers the M4 to be a more significant air pollution problem than does RBWM.
2. M4 traffic generates air pollution along its entire length and we can therefore reasonably assume that this will detrimentally affect residents of the Lodge Farm development.

M4 ‘Smart’ Motorway: Induced demand

Analysis

Increasing motorway capacity increases vehicle usage. This effect is called “Induced Demand” which can be defined as;

*“the increment in new vehicle traffic that would not have occurred without the improvement of the network capacity.”*³⁵

A report commissioned by the DfT stated that *“Induced demand is likely to be higher for capacity improvements in urban areas or on highly congested routes.”*³⁶

The M4 motorway section in the Bray/Holyport locale is being upgraded to a ‘Smart’ Motorway and passes through the urban areas of Slough, Maidenhead and Windsor.

Conclusions

1. The operational Smart M4, which, as we have seen above, will pass within 40 metres of the Lodge Farm site and which bisects the Bray/Holyport AQMA, will increase road traffic levels to more than they are currently.
2. Air quality in the Bray/Holyport locale will deteriorate further as a direct consequence of additional ‘induced demand’ traffic volumes on the Smart M4.
3. It is probable that residents of the Lodge Farm development will suffer the effects of air pollution in the future when the Smart M4 is operational.

Air Pollution Effects

Analysis

The detrimental effects of air pollution on human health are well-known. The recent well-known case of Ella Kissi-Debrah must be an alarm-call to local authorities. During the inquest into Ella’s death, the Coroner said **“failure to reduce pollution levels to legal limits was factor in death of Ella Kissi-Debrah”**.³⁷

The British Heart Foundation states the following with regard to air pollution impact on health (author’s **emphases**).³⁸

*“high levels of air pollution can have a detrimental effect on heart health, making existing heart conditions worse and even leading to the development of new health problems. **We know that people with existing health problems such as coronary heart disease may be more at risk from a heart attack or stroke due to air pollution, but exposure to these harmful pollutants affects everyone’s health, and is an urgent issue.**”*

Two of the most common and harmful types of air pollutants for health are nitrogen dioxide (NO₂) and particulate matter (PM). BHF research has identified that there is a particularly strong link between poor heart and circulatory health and particulate matter smaller than 2.5 micrometres. This is known as PM2.5 and comes from sources including diesel vehicle emissions, tyre and brake wear, and wood burning.

“The World Health Organization (WHO) says that there is no safe level of exposure to PM2.5.”

³⁵ Department for Transport (DfT), “Latest Evidence On Induced Travel Demand: An Evidence Review”, May 2018, document reference 70038415. [LINK](#)

³⁶ Ibid

³⁷ Reported in The Guardian 16th December 2020.

³⁸ BHF web page “Why is air pollution an issue?”, <https://www.bhf.org.uk/what-we-do/policy-and-public-affairs/creating-healthier-environments/air-pollution> retrieved 02-JAN-21.

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Atmospheric levels of PM2.5 particulates are not currently measured by RBWM in the Bray/Holyport AQMA nor at any of its more than 50 pollution monitoring stations.³⁹

Conclusions

1. Road traffic pollutes the air we breathe.
2. Road traffic pollution is bad for health.
3. Atmospheric PM2.5 particulates are bad for heart health but concentrations in the Bray/Holyport AQMA are unknown so the current impacts on residents' health are unknown.

NICE and Air Pollution

Analysis

The National Institute for Health and Care Excellence (NICE) has published Quality Standard QS181 aimed at local authorities which covers road-traffic-related air pollution and its impact on health.⁴⁰

NICE says (author's **emphases**);

NICE Quality statement 1: Strategic plans

*“Local authorities identify in the Local Plan, local transport plan and other **key strategies how they will address air pollution**, including enabling zero- and low-emission travel and **developing buildings and spaces to reduce exposure to air pollution.**”*

NICE Quality statement 2: Planning applications

*“**Local planning authorities assess proposals to minimise and mitigate road-traffic-related air pollution in planning applications for major developments.**”*

“Addressing air pollution at the planning stage for major developments may reduce the need for more expensive remedial action at a later stage.”

*“It can also help to maintain people's health and wellbeing during and after construction. **Assessing proposals to minimise and mitigate road-traffic-related air pollution will help to ensure they are robust and evidence based.**”*

Conclusions

1. RBWM has a duty to thoroughly and properly assess the Lodge Farm planning application in terms of its air pollution impacts during the construction and operational phases.
2. RBWM should publish details of its strategies to mitigate air pollution from additional road traffic generated by housing developments such as Lodge Farm. Will road capacity in the local cope? Will additional public transport be provided?

Planning Guidelines and Air Pollution

Analysis

NICE Guideline NG70 covers road-traffic-related air pollution and its links to ill health. It aims to improve air quality and so prevent a range of health conditions and deaths.⁴¹

It is aimed at;

- “Local authority staff working in planning, local air quality management and public health, including environmental health”,
- “Staff working in transport and highways authorities”.

The following paragraphs from this Guideline are relevant to this planning application (author's **emphases**);

“1.1.2 When 'plan making' consider:

- 1. **siting and designing new buildings, facilities and estates to reduce the need for motorised travel,***

³⁹ Author's analysis of RBWM Annual Air Quality Reports 2015 (includes data from 2010 to 2015), 2016, 2017, 2018, 2019 & 2020.

⁴⁰ NICE “Air pollution: outdoor air quality and health”, Quality standard [QS181], published 28th February 2019. [LINK](#)

⁴¹ NICE “Air pollution: outdoor air quality and health”, Guideline [NG70], published 30th June 2017. [LINK](#)

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2. **minimising the exposure of vulnerable groups to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high,**
3. *siting living accommodation away from roadsides,*
4. *avoiding the creation of street and building configurations (such as deep street canyons) that encourage pollution to build up where people spend time,*
5. *including landscape features such as trees and vegetation in open spaces or as 'green' walls or roofs where this does not restrict ventilation,*
6. *including information in the plan about how structures such as buildings and other physical barriers will affect the distribution of air pollutants."*

"1.3.4 Consider support for zero- and low-emission travel. This could include:

1. *Encouraging walking and cycling (see NICE's guideline on physical activity: walking and cycling).*
2. *Encouraging uptake of zero- and low-emission vehicles, for instance:*
3. *Providing electric charging points.*
4. *Encouraging public and private sector organisations to use zero- or low-emission vehicles for deliveries to retail, office, residential or other sites in the zone, particularly for the last mile of deliveries in city centres.*
5. **Developing integrated public transport networks (including park and ride schemes) based on low-emission vehicles."**

The Lodge Farm development proposes construction of 150 new homes. Residents will create additional demand on the local road infrastructure to, for example;

- Buy provisions
- Travel to work
- Get children to schools

These normal, day-to-day activities will inevitably generate additional car journeys. Significant shop facilities are available in Maidenhead, Slough and Windsor where the nearest public transport commuter hubs are also located. There are no secondary schools in Holyport. The most direct route to these towns is along the A308 corridor which is already congested.

Conclusions

1. RBWM has a responsibility to site new housing away from polluted areas and to actively seek to reduce the need for car journeys.
2. Residents of Lodge Farm will inevitably generate additional car journeys which will augment congestion on the A308 and thereby pollute the air further.

Air Quality and Design

Analysis

The specialist web site 'Infrastructure Intelligence' states the following (authors **emphases**);⁴²

"A national guide to air quality design ... for new planning developments, is vital if the UK is to reduce urban air pollution and meet housing targets"

*"... the National Planning Policy Framework states that **opportunities to improve air quality or mitigate air quality impacts should be identified at the plan-making stage.**"*

It points out that *"... **there has been an increase in the refusal of planning applications based on air quality grounds.**"*

With regard to new developments, the article states that they increase traffic and, if approved, may result in breaches of air quality standards by the authorising local authority.

*"In general terms, **developments by their nature can increase traffic by attracting new users**, and the servicing of new uses. ... developments can release emissions through new energy and heating combustion plants.*

*"In areas already exceeding air quality standards, even a small increase in air quality could result in **planning refusal** as the development could be seen as being non-compliant or **delaying compliance with air quality standards.**"*

Case laws have now set the precedent for this refusal.

"Case law of Wealden Council vs SoS + Knight Developments whereby the developer for a residential development was unable to define a scheme of mitigation for nitrogen deposition to protect the sensitive ecological habitat of the Ashdown Forest and therefore the application was refused."

⁴² 'Infrastructure Intelligence' web site article "Why the UK needs a national guide to air quality design", Guido Pellizzaro, 22nd April 2019, retrieved 2nd January 2021. [LINK](#).

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“... *Gladman Developments vs SoS, Swale Borough Council & CPRE saw the refusal of planning permission for a residential development due to a lack of evidence regarding mitigation in an air quality management area.*”

Conclusions

1. There is precedent for firm action by local authorities in dealing with housing developments in areas of poor air quality. RBWM established the Bray/Holyport AQMA in 2009 because poor air quality was detected in the locale.
2. RBWM should refuse the Lodge Farm planning application on air quality grounds.
3. Analysis above has shown that there were 21 breaches of the NAQO for NO₂ in the period 2010 to 2019, some by a considerable margin. Air quality in the Bray/Holyport AQMA is not recognised as NAQO compliant. A new housing development in the locale will “*delay compliance with air quality standards*”.

RBWM Responsibilities

Analysis

RBWM must know that it has air quality responsibilities spelled-out by DEFRA (author’s **emphases**).⁴³

“*Local authorities in the UK have a responsibility under Local Air Quality Management (LAQM) legislation to review air quality. Where concentrations exceed national objectives, measures should be put in place to reduce emissions, and be reported in the local Air Quality Action Plan (AQAP). Most such Action Plans are designed to address difficulties in complying with national objectives for either NO₂ or PM₁₀.*”

“*The Public Health Outcomes Framework indicator, which focuses on PM_{2.5}, encourages the co-operation of multiple local authority departments which can all contribute to the delivery of air quality improvements.*”

DEFRA and Public Health England in recognition of the fact that “*Air pollution ... is the largest environmental risk to the public’s health, contributing to cardiovascular disease, lung cancer and respiratory diseases*” published an Air Quality briefing document. It stated (author’s **emphases**);⁴⁴

“**Local authorities have a central role in achieving improvements in air quality**; their local knowledge and interaction with the communities that they serve mean that they know the issues on the ground in detail.”

It emphasises local authority responsibilities with regard to air quality.

“**Local authorities have a major role to play.** The transfer of additional responsibilities for public health to local government in 2013 has presented a major opportunity for Directors of Public Health and Councillors to take action to enhance this leadership on air quality.”

The UK Government states the following in response to the question “*What is the role of Local Plans with regard to air quality?*”⁴⁵.

“*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.*”

Conclusions

1. RBWM has significant responsibilities regarding air quality.
2. The real air quality in the Bray/Holyport locale cannot be fully understood; it may be worse than we think because, although there are NAQOs for atmospheric pollutants PM₁₀, PM_{2.5} and NO₂, RBWM does not measure PM_{2.5} particulates at all and measures PM₁₀ particulates at a single location.
3. RBWM should reject the Lodge Farm planning application on the grounds of air quality impacts and its proximity to the Bray/Holyport AQMA.

RBWM & Air Pollution

Analysis

RBWM knows that air quality is a problem because it has declared five AQMAs distributed across the Borough.

⁴³ Department for Environment, Food and Rural Affairs (DEFRA) web site “Public Health: Role for Local Authorities”, retrieved 02-JAN-21 [LINK](#)

⁴⁴ DEFRA, Public Health England & Local Government Association, “Air Quality, A Briefing for Directors of Public Health”, March 2017. [LINK](#).

⁴⁵ UK Government Air Quality web site, Paragraph: 001 Reference ID: 32-001-20140306, Revision date: 06 03 2014 <https://www.gov.uk/guidance/air-quality-3#what-is-the-role-of-local-plans-with-regard-to-air-quality> retrieved 27-SEP-17.

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RBWM knows that air pollution in the Royal Borough is caused mainly by road traffic when it stated (author's **emphases**)⁴⁶;

“Air pollution in the Borough relates mainly to pollutants emitted from road transport sources, together with other pollutants as specified within the UK Air Quality Strategy.”

RBWM recognises that air pollution is bad for health. In 2020 it stated;⁴⁷

“Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer.”

RBWM has also acknowledged the detrimental impact of atmospheric particulate pollution when it stated;⁴⁸

“The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion.”

RBWM states the following regarding air quality policy;⁴⁹

“Development proposals will need to demonstrate that they do not significantly affect residents within or adjacent to an Air Quality Management Area (AQMA) or to residents being introduced by the development itself.”

“Development proposals which may result in significant increases in air pollution must contain appropriate mitigation measures, thus reducing the likelihood of health problems for residents.”⁵⁰

Conclusions

1. RBWM knows that air pollution is bad for health and that road traffic is its main cause.
2. RBWM seeks, unrealistically, in its Air Quality Policy, to pass responsibility for air quality to developers. Self-evidently, building houses will increase road traffic and therefore increase air pollution.
3. RBWM must be seen to take action to improve air quality which should include rejection of the Lodge Farm planning application.

⁴⁶ “Borough Local Plan 2013-2033 Submission Version (2017)”, paragraph 13.4.1, page 125.

⁴⁷ RBWM “Air Quality Annual Status Report”, June 2020.

⁴⁸ Ibid

⁴⁹ “Borough Local Plan 2013-2033 Submission Version (2017)”, Policy EP2, paragraph 13.5, point 1, page 125.

⁵⁰ “Borough Local Plan 2013-2033 Submission Version (2017)”, Policy EP2, paragraph 13.5, point 2, page 125.

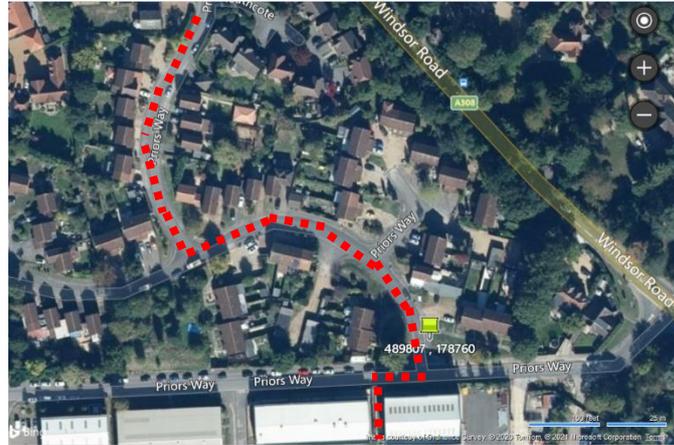
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Monitoring Site 'WM2'

RBWM states in its annual Air Quality Status reports that the location of monitoring site 'WM2' is outside the Bray/Holyport AQMA. This is replicated in the Applicant's AQ Assessment Report.

Verification of RBWM grid references for this site (489807/178760) show that it is located within the AQMA as shown by the yellow pin in the screen shot SS01 below.

Part of the Bray/Holyport AQMA boundary, as shown in RBWM AQ reports, is indicated by the dotted red line.



SS01: Map screen shot showing location of monitoring site 'WM2' & AQMA boundary (part).

Automatic Monitoring Sites

Paragraph 4.6 in the Applicant's AQ Assessment Report states "RBWM currently operates two continuous monitoring sites within their administrative boundary which are located in Maidenhead (MW1) and Windsor (MW2)."

This statement is incorrect. RBWM operates three continuous monitoring sites;

- 'MW1' Located in Frascati Way, Maidenhead.
- 'MW2' Located in Clarence Road, Windsor.
- 'MW4' Located in Aldebury Road, Maidenhead.

Inadequate Consultation Period

Analysis

The Planning Application 20/03371/OUT was received by RBWM on 11th December 2020. The consultation deadline is 11th January 2021. I believe that one calendar month is the standard consultation period for planning applications. My comments are as follows;

1. One calendar month provides insufficient elapsed time for residents and other stakeholders to properly respond to a Planning Application with such potentially significant impact as this one.
2. The consultation should be much longer.
3. The one-month consultation period unhelpfully coincided with the Christmas and New Year holiday period and the Covid-19 pandemic.
4. Further, I believe that the application date has been cynically chosen to minimise the number of residents' responses and thereby increase the likelihood for its approval.

Conclusions

1. I am concerned that, because of the inadequate consultation period, stakeholder consultation response will be muted and will therefore be interpreted by RBWM as signalling a lack of concern. RBWM may be more inclined to approve the planning application.

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Appendix I: Monthly NO₂ Concentrations in Bray/Holyport AQMA (µg/m³)

These data have been transcribed from annual Air Quality reports published by RBWM.⁵¹

 Shading denotes no published data. Values which equal or exceed the NAQO are in RED type.

2016

SITE ID	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WM2	36.6	24.1	25.4	22.9	20.4	17.2	19.1	17.8	27.6	24.8	33.3	40.8
WM29	58.0	42.8	45.6	45.6	46.3	47.5	-	46.3	61.7	48.6	56.4	-
WM29a	-	36.4	35.8	37.1	41.2	41.5	37.5	36.3	50.6	42.6	48.4	56.8
WM29b	35.6	26.1	47.9	30.6	36.9	34.5	-	-	35.9	42.0	45.5	49.8
WM29d	25.4	-	34.1	21.2	23.5	21.1	15.3	14.4	23.1	23.7	29.6	31.6

2017

SITE ID	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WM2	42.7	30.4	25.7	22.7	22.5	25.5	19.8	23.3	24.8	26.7	34.7	32.4
WM29	58.8	49.9	49.9	-	50.3	54.1	46.9	47.9	49.1	42.0	-	46.1
WM29a	45.5	41.0	40.9	38.0	-	43.0	37.2	37.7	38.4	34.5	44.2	37.5
WM29b	47.9	36.4	35.3	-	37.6	32.8	30.9	29.1	33.5	29.9	43.0	31.6
WM29d	23.9	25.4	20.5	20.3	19.3	18.0	14.2	17.2	21.5	18.2	31.0	24.1

2018

SITE ID	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WM2	28.4	28.9	34.1	26.7	23.7	21.0	26.1	25.0	26.2	30.0	34.8	28.1
WM29	49.9	54.3	57.1	50.4	50.7	44.7	57.1	50.0	45.4	50.1	58.0	48.6
WM29a	39.4	41.5	51.9	35.9	50.6	35.9	48.1	38.8	42.3	46.7	49.9	36.9
WM29b	34.9	47.2	45.5	33.1	53.6	39.1	40.8	29.4	34.3	-	40.2	34.2
WM29d	-	-	-	-	-	-	-	-	-	-	-	-

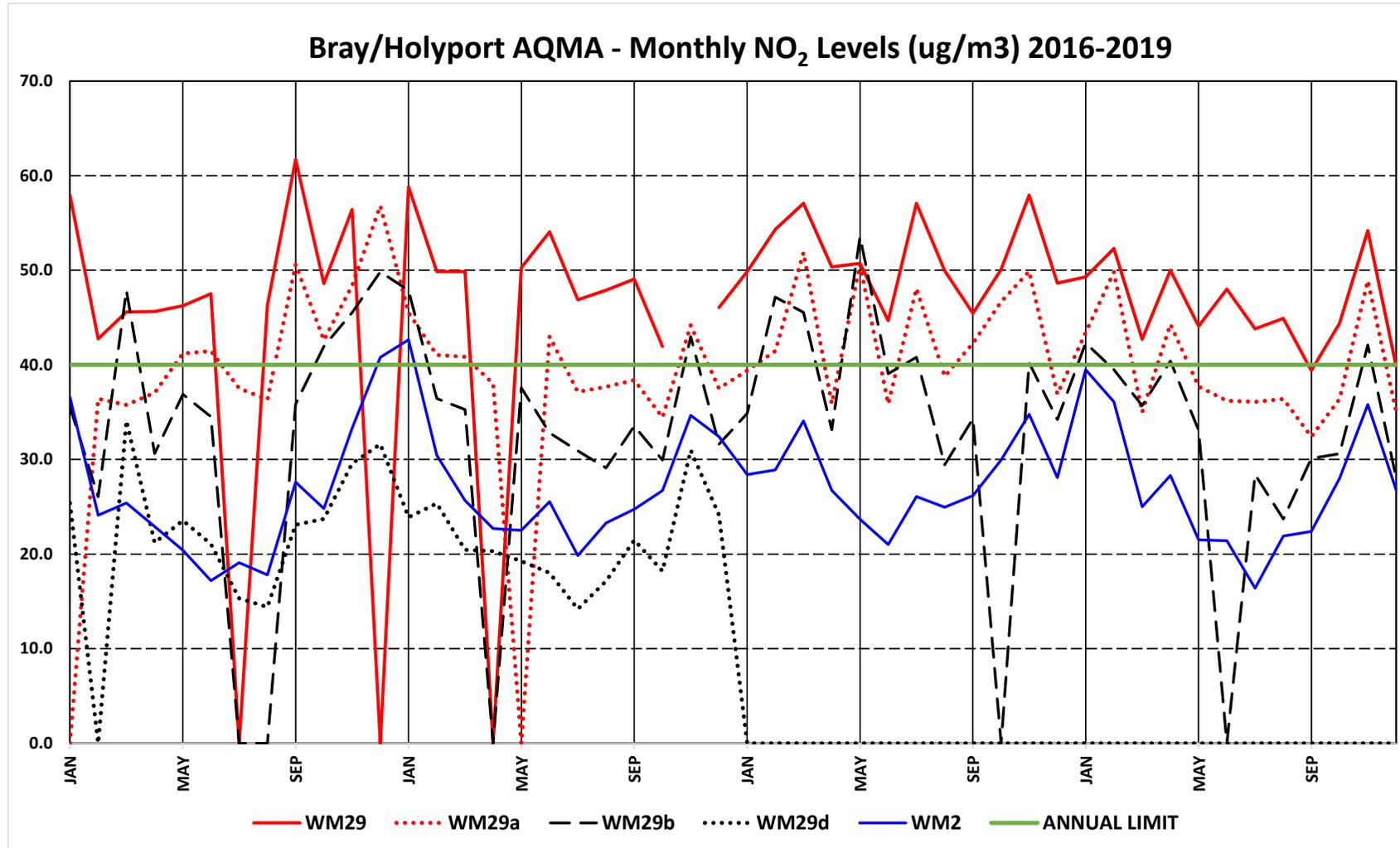
⁵¹ The 2020 Annual Report published in June, as an example, is available [HERE](#) "2020 Air Quality Annual Status Report (ASR)" reference RBWM-ASR20.

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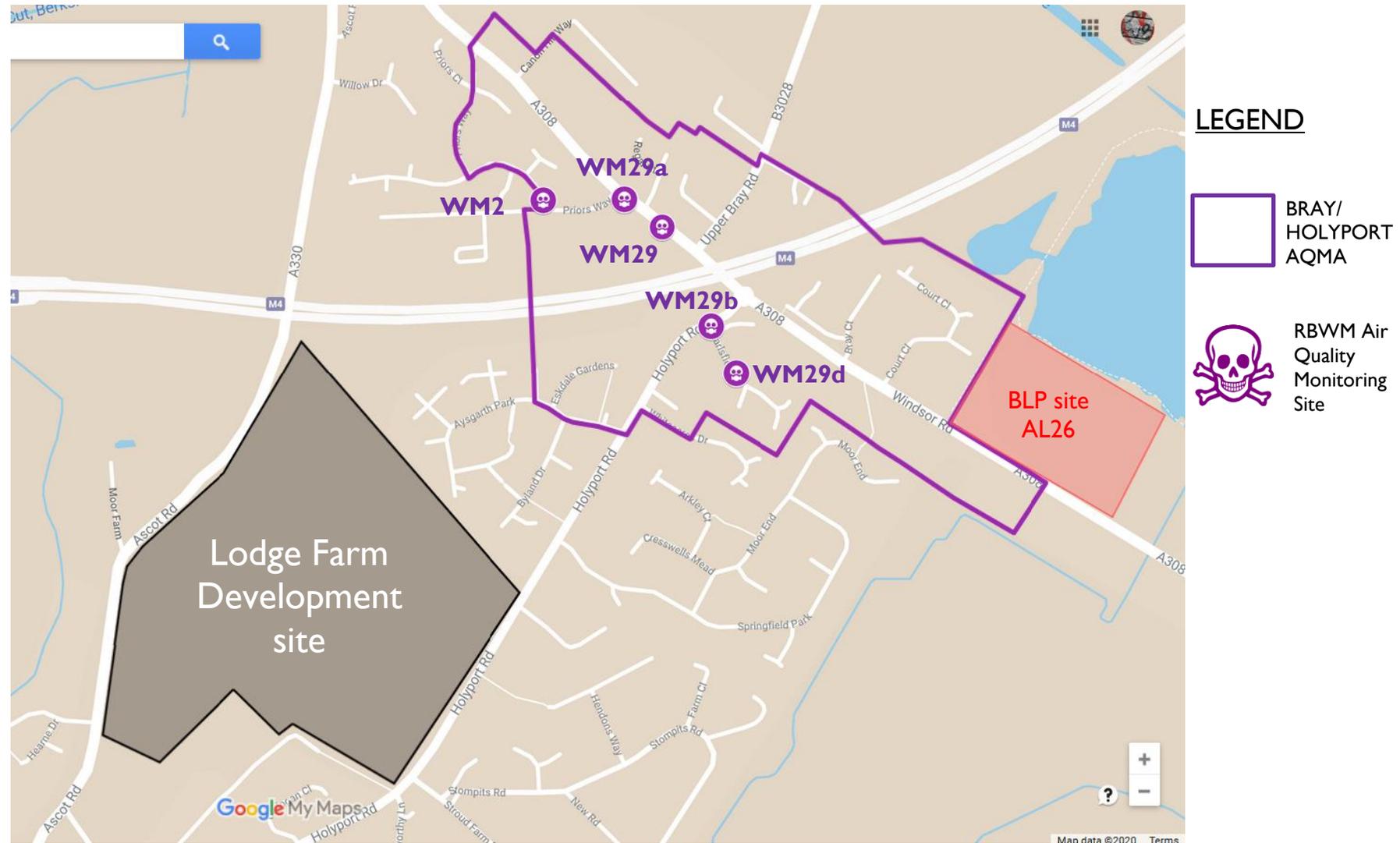
SITE ID	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WM2	39.5	36.1	25.0	28.3	21.5	21.4	16.4	21.9	22.4	28.0	35.8	26.8
WM29	49.3	52.3	42.7	50.0	44.1	48.0	43.8	44.9	39.4	44.4	54.2	39.9
WM29a	43.4	49.8	35.0	44.3	37.7	36.2	36.1	36.4	32.4	36.4	48.9	35.1
WM29b	42.3	39.5	35.7	40.4	33.1	-	28.4	23.7	30.1	30.6	42.1	28.1
WM29d	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 2: Chart of Monthly NO₂ Concentrations in Bray/Holyport AQMA

Monthly data presented in Appendix 1 for the years 2016 to 2019 is depicted in this chart. The NAQO for NO₂ Annual Mean concentration (40µg/m³) is the green horizontal line in the chart.



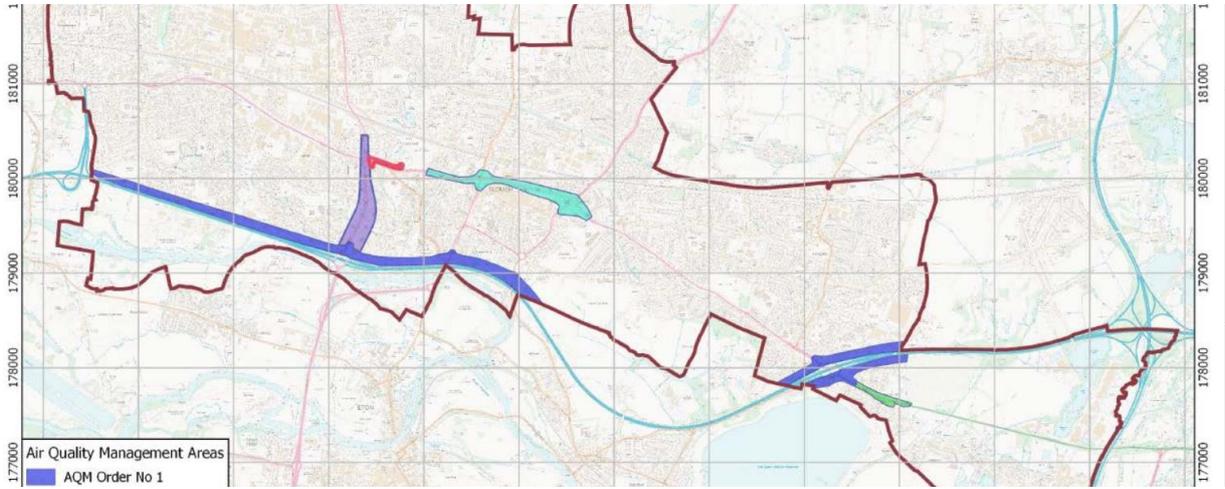
Appendix 3: Lodge Farm Site – Bray/Holyport AQMA Location Map ⁵²



⁵² Public domain map created by author using Google available [HERE](#). AQMA boundary taken from RBWM Annual Air Quality Reports. Lodge Farm site taken from Location Plan prepared for Beaulieu Homes Southern Limited, Drawing number 21415/004 Nov 20. All boundaries are approximate.

Appendix 4: Slough Borough Council – M4 AQMA

Map showing location of AQMA-I running along the M4 motorway in two sections (shown in blue).⁵³



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⁵³ Slough Borough Council, LAQM Annual Status Report 2020, Appendix 'D'.