

APPENDIX 10.2

AIR QUALITY NEUTRAL ASSESSMENT

Appendix 10.2: Air Quality Neutral Calculations

Introduction

- 10.2.1 This Appendix presents the calculations undertaken by Waterman Infrastructure and Environment (WIE) to demonstrate how the Development performs against relevant 'air quality neutral' benchmarks.

Description of the Development

- 10.2.2 The Development is located within the Outer London Activity Zone and would provide a mixed-use scheme (see **Table 1**).
- 10.2.3 The total amount of floorspace proposed by the Development, relevant to the Air Quality Neutral Assessment criteria is set out below in **Table 1**.

Table 1: 'Air Quality Neutral' Emissions Benchmarks for Buildings

Land Use (Use Class)	Proposed Floorspace Areas (GIA) (m ²)
Residential (Use Class C3, excluding assisted living)	75,119
Office (Use Class B1)	2,424
Cinema (Use Class D2)	2,120
Gym (Use Class D2)	740
Flexible Uses - Restaurant / bar / retail / community / leisure (Use Classes A1 / A2 / A3 / A4 / B1 / D1 / Boathouse)	4,664
Hotel (Use Class C1)	1,668
Assisted Living (Use Class C2)	14,738
Nursing and Care Home (Use Class C2)	9,472
School (Use Class D1)	9,070
Management (Use Class B1)	33
Total	120,081

Note: Table 1 is not the Total Floor Space provided within the Development and excludes non-habitable uses such as plant and storage areas, play space, private amenity space, car park space, which are not used within the Air Quality Neutral Assessment calculations.

The AQNA assessment requires the comparison of Development against relevant benchmarks for each use class and therefore it is necessary for them to be included in Table 1.

- 10.2.4 It is noted the proposed land uses of Assisted Living are submitted as flexible use and have the potential to become residential. For the purposes of the Air Quality Neutral Assessment Assisted Living have been calculated separately as either Use Class C2 or Use Class C3.

Planning Policy

Draft New London Plan, 2017

- 10.2.5 Policy SI1 'Improving air quality' of the Draft London Plan¹ states that:

"...the development of large-scale redevelopment areas, such as Opportunity Areas and those subject to an Environmental Impact Assessment should propose methods of achieving an Air Quality Positive approach through the new development. All other developments should be at least Air Quality Neutral..."

The London Plan - The Spatial Development Strategy for Greater London; consolidated with alterations since 2011, March 2015

- 10.2.6 Policy 7.14 'Improving air quality' of the London Plan² states that development proposals should:
"...be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs);..."

The Mayor's Air Quality Strategy 'Clearing the Air' 2010

- 10.2.7 The Mayor's Air Quality Strategy states that:
"New developments in London shall as a minimum be 'air quality neutral' through the adoption of best practice in the management and mitigation of emissions".

Sustainable Design and Construction - Supplementary Planning Guidance, 2014

- 10.2.8 To enable the implementation of the London Plan the GLA have produced a Sustainable Design and Construction Supplementary Planning Guidance (SPG). Section 4.3 focusses on air pollution and the effects from the operation of new developments to ensure that they are 'air quality neutral'.
- 10.2.9 Paragraph 4.3.17 and Appendix 5 of the SPG note that Building Emission Benchmarks (BEBs) have been defined for a series of land-use classes for both NO_x and PM₁₀. **Table 2** outlines the relevant emissions benchmarks for the Development. It is considered that where a Development does not exceed these benchmarks then they are considered to be 'air quality neutral' and would not increase NO_x and PM₁₀ emissions across London as a whole.

Table 2: 'Air Quality Neutral' Emissions Benchmarks for Buildings

Land Use Class	NO _x (g/m ²)	PM ₁₀ (g/m ²)
Class A1	22.6	1.29
Class A3 - A5	75.2	4.32
Class A2 and Class B1	30.8	1.77
Class B2 – B7	36.6	2.95
Class B8	23.6	1.90
Class C1	70.9	4.07
Class C2	68.5	5.97
Class C3	26.2	2.28
Class D1(a)	43.0	2.47
Class D1(b)	75.0	4.30
Class D1(c-h)	31.0	1.78
Class D2(a-d)	90.3	5.18
Class D2(e)	284	16.3

- 10.2.10 As well as defining a series of benchmarks for a buildings' operation, Appendix 6 of the SPG also defines benchmarks for the transport emissions related to the Development. **Table 3** details the emissions benchmarks for transport relevant to the Development. Section 4.3.18 of the SPG

notes that the design of a development should encourage and facilitate walking, cycling and the use of public transport, thereby minimising the generation of air pollutants.

Table 3: 'Air Quality Neutral' Emissions Benchmarks for Transport

Land Use	London Central Activity Zone	Inner	Outer
NO_x (g/m²/annum)			
Retail (A1)	169	219	249
Office (B1)	1.27	11.4	68.5
NO_x (g/dwelling/annum)			
Residential (C3)	234	558	1553
PM₁₀ (g/m²/annum)			
Retail (A1)	29.3	39.3	42.9
Office (B1)	0.22	2.05	11.8
PM₁₀ (g/dwelling/annum)			
Residential (C3, C4)	40.7	100	267

10.2.11 For both the Building and Transport Emissions Benchmarks, where a development does not exceed these benchmarks then the development is considered to be 'air quality neutral' and would not increase NO_x and PM₁₀ emissions across London as a whole.

10.2.12 As well as providing benchmarks the SPG also recommends emission standards for combustion plant to comply with, in addition to meeting the overall 'air quality neutral' benchmark.

Air Quality Neutral Planning Support: GLA 80371, April 2014

10.2.13 In April 2014, the GLA published a report to provide support to the development of the Mayor's policy related to 'air quality neutral' developments. The report provides a method to enable a development to be assessed against the air quality neutral benchmarks set out in the Sustainable Design and Construction SPG.

10.2.14 The report provides a methodology required to apply the air quality neutral policy. It requires the transport and building emissions for the development to be identified and then compared to the benchmark emissions. The report notes that the building and transport emissions should be calculated separately and not combined.

Calculation of the Emissions Benchmarks

Building Emissions

10.2.15 The Development heating and energy strategy would provide two Energy Centres to serve the eastern and western parts of Development, split by Ship Lane. In addition, a separate heating and energy strategy would be provided for the school. The details of the Energy Centres are presented in **Table 4**.

Table 4: Calculation of the Total Building Emission

Energy Centre	Unit	Number	Release Rate (m/s)	Total NO _x Emissions (g/s)	Hours of Operation (hrs./annum)	Total NO _x (kg/annum)
Building 02	Boiler (2400kW)	5	15	0.1300	4380	2049.8
	CHP (560kW)	2	10	0.0204	8760	643.3
	CHP (610kW)	1	10	0.0111	8760	350.0
Building 17	Boiler (2500kW)	4	15	0.1027	4380	1619.4
	CHP (560kW)	2	10	0.0204	8760	643.3
	CHP (610kW)	1	10	0.0111	8760	350.0
School	Boiler (750kW)	2	15	0.0154	4380	242.8
	CHP (226kW)	1	10	0.0041	8760	129.3
Total Building NO_x Emission						6028.1

Note: For gas-fired plants PM₁₀ emission factors are not provided because gas-fired plants do not emit any significant level of particulates

10.2.16 The Building Emission Benchmarks (BEB) for each land use category are presented in **Table 5** (as Assisted Living being Use Class C2) and **Table 6** (as Assisted Living being Use Class C3). These are calculated by multiplying the floor area for each land use category with the Building Emission Benchmark presented in **Table 2**.

Table 5: Calculation of the Benchmarked NO_x Building Emissions for each Land-Use Category (Assisted Living being Use Class C2)

Land Use	GIA	Building Emissions Benchmark (gNO _x /m ² /annum)	Benchmarked Emissions (kgNO _x /annum)
C3	75,119	26.2	1968.1
B1	2,457	30.8	75.7
D2*	2,860	187.15	535.2
A1	4,664	22.6	105.4
C1	1,668	70.9	118.3
D1*	33	49.7	1.6
C2	33,280	68.5	2279.7
Total Benchmarked Building Emissions			5084.0

Note: *The average benchmark of these use-class has been taken as presented in Table A2.

Table 6: Calculation of the Benchmarked NO_x Building Emissions for each Land-Use Category (Assisted Living Use Class C3)

Land Use	GIA	Building Emissions Benchmark (gNO _x /m ² /annum)	Benchmarked Emissions (kgNO _x /annum)
C3	89,857	26.2	2354.3
B1	2,457	30.8	75.7
D2*	2,860	187.15	535.2
A1	4,663	22.6	105.4
C1	1,668	70.9	118.3
D1*	9,319	49.7	1.6
C2	18,542	68.5	1270.1
Total Benchmarked Building Emissions			4460.6

Note: *The average benchmark of these use-class has been taken as presented in Table A2.

10.2.17 As shown in **Table 4**, the Total Building NO_x Emission of 6,028.1kg/annum are above the benchmarks calculated in **Table 5** (Assisted Living Use Class C2) of 5,084.0kg/annum and **Table 6** (Assisted Living being Use Class C3) of 4,460.6kg/annum and the Development is therefore not considered to be 'Air Quality Neutral', with respect to building emissions.

10.2.18 However, **Table 4** does not represent the final parameters for each plant to be used once the Development is complete and operational. As such it is considered that a suitably wording planning condition requesting an air quality neutral assessment of the final plant would be provided by LBRuT with the granting of any planning permission.

Transport Emissions

10.2.19 Details of the trip generation per day for each land-use class have been provided by Peter Brett Associates (the Applicant's transport consultant).

Assisted Living being Use Class C2

10.2.20 The calculation of the Transport Emission for each component of the Development, assuming Assisted Living and Care Home being Use Class C2 is presented in **Table 7**.

Table 7: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living Use Class C2)

Land Use	Trips per annum	Average Distance per trip*	Distance travelled km/annum	Emission Factors (g/vehicle-km)	Transport Emission (kg/annum)	
					NO _x	PM ₁₀
C3	442,782	11.4	5,047,715	NO _x : 0.353 PM ₁₀ : 0.0606	1781.8	108.0
B1	81,997	10.8	885,567.6		312.6	18.9
D2	87,928	10.8	949,622.4		335.2	20.3
A1	144,105	5.4	778,167		274.7	16.6
C1	4,885	10.8	52,758		18.6	1.1

D1	186,324	10.8	2,012,299.2	710.3	43.0
C2	61,758	10.8	666,986.4	235.4	14.3
Total Transport Emissions				3,668.8	222.3

Note: * Average distance travelled by car per trip for sites within Outer London Activity Zone

10.2.21 The Transport Benchmark for the Development, as shown in **Table 8**, can be calculated by multiplying the benchmark in **Table 3** by the number of properties within the Development.

Table 8: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living Use Class C2)

Land Use	Units	GIA	Transport Emission Benchmark		Benchmarked Emissions	
			gNO _x /m ² /annum or gNO _x /dwelling/ annum	gPM ₁₀ /m ² /annum or gPM ₁₀ /dwelling/ annum	kgNO _x / annum)	kgPM ₁₀ / annum
C3	687	-	1553	267	1066.9	183.4
B1	-	2,457	68.5	11.8	168.3	29.0
D2	-	2,860	68.5	11.8	195.9	33.7
A1	-	4,664	249	42.9	1161.3	200.1
C1	-	1,668	68.5	11.8	114.3	19.7
D1	-	33	68.5	11.8	2.3	0.4
C2	-	33,280	68.5	11.8	2279.7	392.7
Total Transport Emissions					4988.7	859.0

10.2.22 Assuming the Assisted Living is Use Class C2, the Total Transport NO_x Emission of 3,668.8kg/annum (as shown in **Table 7**) is below the benchmark of 4,988.7kg/annum (as shown in **Table 8**) and the Total Transport PM₁₀ Emission of 222.3kg/annum (as shown in **Table 7**) is below the benchmark of 859.0kg/annum (as shown in **Table 8**).

10.2.23 The Development is therefore considered to be 'Air Quality Neutral', with respect to transport emissions and no further mitigation measures are required.

Assisted Living being Use Class C3

10.2.24 The calculation of the Transport Emission for each component of the Development, assuming Assisted Living being Use Class C3 is presented in **Table 9**.

Table 9: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living being Use Class C3)

Land Use	Trips per annum	Average Distance per trip*	Distance travelled km/annum	Emission Factors (g/vehicle-km)	Transport Emission (kg/annum)	
					NO _x	PM ₁₀
C3	454,645	11.4	5,182,953		1829.6	110.9
B1	81,997	10.8	885,567.6	NO _x : 0.353	312.6	18.9
D2	87,928	10.8	949,622.4	PM ₁₀ : 0.0606	335.2	20.3
A1	144,105	5.4	778,167		274.7	16.6

C1	4,885	10.8	52,758	18.6	1.1
D1	186,324	10.8	2,012,299.2	710.3	43.0
C2	49,895	10.8	538,866	190.2	11.5
Total Transport Emissions				3671.3	222.5

Note: * Average distance travelled by car per trip for sites within Outer London Activity Zone

10.2.25 The Transport Benchmark for the Development, as shown in **Table 10**, can be calculated by multiplying the benchmark in **Table 3** by the number of properties within the Development.

Table 10: Calculation of the Benchmarked Transport Emissions for each Land-Use Category (Assisted Living Use Class C3)

Land Use	Units	GIA	Transport Emission Benchmark		Benchmarked Emissions	
			gNO _x /m ² /annum or gNO _x /dwelling/ annum	gPM ₁₀ /m ² /annum or gPM ₁₀ /dwelling/ annum	kgNO _x / annum)	kgPM ₁₀ / annum
C3	997	-	1553	267	1548.3	266.2
B1	-	2,457	68.5	11.8	168.3	29.0
D2	-	2,860	68.5	11.8	195.9	33.7
A1	-	4,663	249	42.9	1161.1	200.0
C1	-	1,668	68.5	11.8	114.3	19.7
D1	-	9,319	68.5	11.8	638.4	110.0
C2	-	18,542	68.5	11.8	1270.1	218.8
Total Transport Emissions					5096.4	877.4

10.2.26 Assuming the Assisted Living and Care Home elements are Use Class C3, the Total Transport NO_x Emission of 3,671.3kg/annum (as shown in **Table 9**) is below the benchmark of 5,096.4kg/annum (as shown in **Table 10**) and the Total Transport PM₁₀ Emission of 222.5kg/annum (as shown in **Table 9**) is below the benchmark of 877.4kg/annum (as shown in **Table 10**).

10.2.27 The Development is therefore considered to be 'Air Quality Neutral', with respect to transport emissions and no further mitigation measures are required.

References

¹ Greater London Authority (2017); 'Draft New London Plan', Draft for Public Consultation, GLA, London.

² Greater London Authority (2015); 'The London Plan -- The Spatial Development Strategy for London consolidated with alterations since 2011', GLA, London.