Air Quality Statement 3

LBH Response

Block 4, Union Park

July 2025

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LBH Response

In March 2025, Phlorum prepared an Environmental Statement (ES) Chapter (*Chapter 6 Air Quality*) for the development of a fourth data centre block (UP4) at the Union Park Data Centre Campus in Hayes (UB3 4QQ). The planning application (Ref: *75111/APP/2025/739*) was submitted to the London Borough of Hillingdon (LBH) on the 18th of March 2025.

The London Borough of Hillingdon (LBH) has provided an initial comment to the Air Quality Chapter and its associated Appendices[1], with the following request:

"The Air Quality Officer is unable to finalise the damage cost calculations as the testing regime time has not been provided - only the total figures have been submitted. Please can you send these over? We would also be grateful if you could provide the generator (gen set) data sheet specifications as soon as possible."

In response to this request, Phlorum confirms that all of the information requested by the Air Quality Officer has already been provided in either ES Chapter 6 or Appendix 6.

Testing Regime Information

Within ES Chapter 6, Table 6.4 details the predicted emission rates associated with each component of the testing regime, and highlights what these testing scenarios are. For ease, Table 6.4 is replicated below.

Table 6.4 Time-Weighted Pollutant Emission Rates for UP3 and UP4

Generator Scenario	Scenario Details	Pollutant	Emission Rate ($g.s^{-1}$)
Monthly Testing	Generators run simultaneously off-load for 15 minutes.	NO_X	0.209
		PM_{10}	0.005
		$PM_{2.5}$	0.005
Quarterly Testing	Generators run simultaneously at 80% load for an hour.	NO_X	1.473
		PM_{10}	0.021
		$PM_{2.5}$	0.021
Annual Testing	Generators run independently at 100% load for 2 hours.	NO_X	1.214
		PM_{10}	0.018
		$PM_{2.5}$	0.018

[1] Phlorum (March 2025). Appendix 6: Air Quality – Block 4, Union Park.

For clarity, the annual test supersedes the requirement for one of the quarterly tests. The one annual and three remaining quarterly tests supersede the requirement for four monthly tests. In total, there are eight monthly tests, three quarterly tests and one annual test per annum.

In Appendix 6.4, Table A6.4.4 provides all the numerical inputs required to determine the total annual emissions from the standby generators. For convenience, this table is replicated below. The duration of each test and the total hours of each test per annum are both provided in this table. To be clear, the engine loads differ in Table A6.4.4 to those in Table 6.4 because the specification sheet does not provide emissions data at 0% and 80% loads.

Table A6.4.4: Generator Emission Calculation Inputs

Parameter	Monthly Testing	Quarterly Testing	Annual Testing	Grid Failure
Fuel Type[a]	Diesel	Diesel	Diesel	Diesel
No. of Generators	14	14	14	12
Engine Load (%)	10%	75%	100%	100%
Unabated NOx emission rate (g/s)	0.837	4.064	6.063	6.063
NOx emission rate with SCR (g/s)	0.033	0.178	0.244	0.244
PM2.5 emission rate (g/s)[b]	0.005	0.021	0.018	0.018
Duration of each test +1.1% (hrs) [c]	0.253	1.011	2.022	2.022
Hours of operation per annum +1.1% (hrs)[c]	2.022	3.033	2.022	2.022
Total NO_x emissions (g/annum)[d]	85266.5	73545.4	36200.3	31028.8
Total NO_x emissions (tonnes/annum)	0.08527	0.07355	0.03620	0.03101
Total NO_x emissions on HVO Fuel (tonnes/annum)[e]	**0.07802**	**0.06729**	**0.03312**	**0.02839**
Total $PM_{2.5}$ emissions (g/annum)	468.497	3159.173	1872.291	1604.821
Total $PM_{2.5}$ emissions (tonnes/annum)	0.0004685	0.0031592	0.0018723	0.0016048
Total $PM_{2.5}$ emissions on HVO Fuel (tonnes/annum)[e]	**0.0004006**	**0.0027011**	**0.0016008**	**0.0013721**

Notes:

a) all generators are anticipated to run on Hydrotreated Vegetable Oil (HVO) fuel

b) assumes 100% of all PM emitted from the generators is $PM_{2.5}$, which is extremely conservative

c) planned annual maintenance was recorded by the Applicant to take on average 1.1% longer than anticipated due to problems identified during testing, so all test durations account for this additional period

d) assumes emissions will be unabated for the first 20 minutes of each test, which is 5 minutes longer than is realistically anticipated

e) For the adjacent permitted Data Centres (App Ref: 75111/APP/2022), LBH agreed that HVO fuels would reduce NO_X emissions by 8.5% and $PM_{2.5}$ emissions by 14.5%, compared with diesel.

Generator Data Sheet Specifications

Appendix 6.3 provides details of the pollutant dispersion modelling inputs used for the assessment of the standby generators, beyond the information already provided in the main ES Chapter 6. Within this Appendix 6.3 are screenshots showing the data sheet specifications for the standby generators (i.e. MTU 20V4000 G94LF). These are replicated below, for completeness.

Revision *Change index*					

Motordaten
engine data

	Genset	Marine	O & G	Rail	C & I
Application	x				
Engine model	20V4000G94LF				
Application group	3D				
Emission Stage/Optimisation	NEA Singapore for ORDE				
Test cycle	D2				
fuel sulphur content [ppm]	7				
mg/mN³ values base on residual oxygen value of [%]	measured				

Motor Rohemissionen*
*Engine raw emissions**

Cycle point	[-]	n1	n2	n3	n4	n5	n6	n7	n8
Power (P/PN)	[-]	1	0,75	0,50	0,25	0,10			
Power	[kW]	3307	2480	1653	827	331			
Speed (n/nN)	[-]	1	1	1	1	1			
Speed	[rpm]	1500	1499	1499	1500	1499			
Exhaust temperature after turbine	[°C]	482	427	434	403	268			
Exhaust massflow	[kg/h]	19196	15930	12083	7485	5323			
Exhaust back pressure (total)	[mbar]	52	32	14	5	0			
NOx	[g/kWh]	6,6	5,9	4,8	4,4	9,1			
	[mg/mN³]	1641	1326	930	676	776			
CO	[g/kWh]	0,3	0,4	1,0	1,4	2,8			
	[mg/mN³]	77	85	192	219	233			
HC	[g/kWh]	0,05	0,07	0,09	0,16	0,72			
	[mg/mN³]	13	14	16	25	60			
O2	[%]	9,9	11,2	11,9	13,1	15,8			
Particulate measured	[g/kWh]	0,02	0,03	0,10	0,18	0,05			
	[mg/mN³]	5	6	19	27	4			
Particulate calculated	[g/kWh]	-	-	-	-	-			
	[mg/mN³]	-	-	-	-	-			
Dust (only TA-Luft)	[mg/mN³]	-	-	-	-	-			
FSN	[-]	0,2	0,2	0,6	1,0	0,1			
NO/NO2**	[-]	-	-	-	-	-			
CO2	[g/kWh]	645,7	632,1	669,3	721,6	844,5			
	[mg/mN³]	155278	136196	126261	109200	70577			
SO2	[g/kWh]	0,003	0,003	0,003	0,003	0,004			
	[mg/mN³]	0,7	0,6	0,6	0,5	0,3			

* Emission data measurement procedures are consistent with the respective emission evaluation process. Noncertified engines are measured to sales data (TVU/TEN) standard conditions.
These boundary conditions might not be representative for detailed dimensioning of exhaust gas aftertreatment, in this case it is recommended to contact the responsible department for more information.
Measurements are subject to variation. The nominal emission data shown is subject to instrumentation, measurement, facility, and engine-to-engine variations.
All data applies to an engine in new condition. Over extended operating time deterioration may occur which might have an impact on emission.
Exhaust temperature depends on engine ambient conditions.

** No standard test. To be measured on demand.

Motordaten
engine data

	Genset	Marine	O & G	Rail	C & I
Application	X				
Engine model	20V4000G94LF				
Application group	3D				
Emission Stage/Optimisation	NEA Singapore for ORDE				
Test cycle	D2				
fuel sulphur content [ppm]	7				
mg/mN³ values base on residual oxygen value of [%]	5				

Motor Rohemissionen*
*Engine raw emissions**

Cycle point	[-]	n1	n2	n3	n4	n5	n6	n7	n8
Power (P/PN)	[-]	1	0,75	0,50	0,25	0,10			
Power	[kW]	3307	2480	1653	827	331			
Speed (n/nN)	[-]	1	1	1	1	1			
Speed	[rpm]	1500	1499	1499	1500	1499			
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Exhaust massflow	[kg/h]	19196	15930	12083	7485	5323			
Exhaust back pressure (total)	[mbar]	52	32	14	5	0			
NOx	[g/kWh]	6,6	5,9	4,8	4,4	9,1			
	[mg/mN³]	2362	2172	1639	1375	2411			
CO	[g/kWh]	0,3	0,4	1,0	1,4	2,8			
	[mg/mN³]	111	139	339	445	723			
HC	[g/kWh]	0,05	0,07	0,09	0,16	0,72			
	[mg/mN³]	19	23	29	50	187			
O2	[%]	5,0	5,0	5,0	5,0	5,0			
Particulate measured	[g/kWh]	0,02	0,03	0,10	0,18	0,05			
	[mg/mN³]	7	10	33	55	13			
Particulate calculated	[g/kWh]	-	-	-	-	-			
	[mg/mN³]	-	-	-	-	-			
Dust (only TA-Luft)	[mg/mN³]	-	-	-	-	-			
FSN	[-]	0,2	0,2	0,6	1,0	0,1			
NO/NO2**	[-]	-	-	-	-	-			
CO2	[g/kWh]	645,7	632,1	669,3	721,6	844,5			
	[mg/mN³]	223605	223061	222522	222035	219215			
SO2	[g/kWh]	0,003	0,003	0,003	0,003	0,004			
	[mg/mN³]	1,0	1,0	1,0	1,0	1,0			

* Emission data measurement procedures are consistent with the respective emission evaluation process. Noncertified engines are measured to sales data (TVU/TEN) standard conditions.
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All data applies to an engine in new condition. Over extended operating time deterioration may occur which might have an impact on emission.
Exhaust temperature depends on engine ambient conditions.

** No standard test. To be measured on demand.

	WORD	Datum/ Date	Name
Erstell. Drawn		20.09.2017 09:35:43	zwilsterp
Bearb. Change		20.09.2017 13:37:26	zwilsterp
Inhalt Content		10.04.2017	Locher
Gepr. Checked		20.09.2017	Knettel

Projekt-/Auftrags-Nr. Project/Order No.
Verwendbar f.Typ Applicable to Model
Format/Size: A3
Material-Nr./Material No.: EDS 4000 1162
Benennung/ Title: **Emissionsdatenblatt**
Emission Data Sheet
Motortyp / Engine Type: **20V4000G94LF**

Zeichnungs-Nr./Drawing No.: **ZNG00005084**
Blatt/ Sheet: 5 von/of 6

Änderungsbeschreibung/Description of Revision: Angabe Dauerstoffgehalt im Abgas bei Bezug auf 5% angepasst
Kommt von/Frequency

Buchst./Rev. Ltr.	Änderungs-Nr./Revision Notice No.	Bearbeitungsstatus/Lifecycle	Beschreibung/Description
b.1		In Arbeit	

Pos. 2	CATALYST	SCR-700/1-A-S816.45-50-A48.7,5-10-DK

general data

Engine:	MTU 20V4000G94LF	
Fuel:	Diesel	
Operation of engine:	λ > 1	
Exhaust gas mass flow:	19196	kg/h
Exhaust gas temperature:	475	°C
Maximum Exhaust gas temperature:	505	°C
Maximum Exhaust gas pressure:	0,1	barg
Pressure Los (total):	**45**	**mbar**
Urea consumption (32,5%):	appr. 52,3	L/h
Urea consumption (32,5%):	appr. 10 at 200h	m³/a
sound pressure level at SCR inlet *	**91 @ 1 m**	**dB(A)**
sound pressure level after SCR *	**70 @ 1 m**	**dB(A)**

*only achieved when honeycombs are built in the SCR.

Emissions [5% O2]

	Before Catalytic Converter	After Catalytic Converter	
CO	< 111	< 111	mg/Nm³
NOx	< 2362	< 95	mg/Nm³
CH_2O	< 19	< 19	mg/Nm³
NH_3		< 5	mg/Nm³

Equipment SCR

SCR

Number of rows SCR	5	pc.
Number of empty rows	0	pc.

Oxi

Number of rows Oxi	1	pc.
Number of empty rows	0	pc.

Material

Material injection	Stainless steel
Material flanges injection	Stainless steel
Material housing	Steel
Material flanges housing	Steel

Installation and connection

Place of installation	Inside installation; no ex zone Outdoor installation by arrangement	
Min. ambient temperature	5	°C
Max. ambient temperature	40	°C
Exhaustgas piping inlet	700/10	DN/PN
Exhaustgas piping outlet	800/10	DN/PN

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