



# Environmental Permit Variation Application for Newport Data Centre (CWL11/CWL12)

Supporting Information Document

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SIGNATURE PAGE

# Environmental Permit Variation Application for Newport Data Centre (CWL11/CWL12)

Supporting Information Document  
0724643



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## ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AQMA	Air Quality Management Area
ASC	Ammonia Slip Catalyst
BAT	Best Available Techniques
BREF	Best Available Techniques Reference Documents
EA	Environment Agency
EP	Environmental Permit
ERM	Environmental Resources Management
EU	European Union
HVO	Hydrotreated Vegetable Oil
LCP	Large Combustion Plant
MCP	Medium Combustion Plant
MCPD	Medium Combustion Plant Directive
MWe	Megawatt electric
MWth	Megawatt thermal
NOx	Nitrogen oxides
NRW	Natural Resources Wales
SCR	Selective Catalytic Reduction
SID	Supporting Information Document
TGN	Technical Guidance Notes
VDC	Vantage Data Centers

## APPLICATION CHECKLIST

Requirement	Topic	Location in Report
Form A	Company Details	(in form)
Form C2 – Question 1	About the permit - Discussion before application	(in form)
Form C2 – Question 2	About your proposed changes	Section 1.4 Reason for Variation Application, Section 2 Activities
Form C2 – Question 3	Your ability as an operator	(in form)
Form C2 – Question 3d	Management Systems	Section 5 Environmental Management Systems
Form C2 – Question 4	Consultation	(in form)
Form C2 – Question 5	Supporting Information – Site Plan	Figure 1 Site Location, Figure 2 Site Layout Plan and Figure 3 Emissions Points to Air and Water
Form C2 – Question 6	Environmental risk assessment	Section 10 H1 Risk Assessment and attached spreadsheet titled 'H1 Worksheet'
Form C3 – Question 1	About your activities	Section 2.6 Listed Activities, Section 2.7 Directly Associated Activities
Form C3 – Question 2	Emissions to air, water and land	Section 3 Emissions, and Air Quality Impact Assessment Appendix A
Form C3 – Question 3a	Technical Standards	Section 4 Operating Techniques
Form C3 – Question 3b	General requirements	Section 10 H1 Risk Assessment and attached spreadsheet titled 'H1 Worksheet'
Form C3 – Question 3c	Types and amounts of raw materials	Section 7 Raw Materials
Form C3 – Question 4b	Monitoring emissions - Point source emissions to air only	Section 12.1 Emissions to Air
Form C3 – Question 5		(in form)
Form C3 – Question 6a, 6b	Resource efficiency and climate change	Section 8 Energy Efficiency
Form C3 – Question 6c	Climate change levy agreement	In form and Section 8.3 Climate Change Agreement
Form C3 – Question 6d	Justify reasons for the use of raw materials, substances and water onsite.	Section 7 Raw materials
Form C3 – Question 6e	Waste generation and minimisation	Section 6 Waste Generation
Form C3 – Question 7a	Medium Combustion Plant – Schedule 24 of EPR	Section 8.2 Energy Efficiency

Requirement	Topic	Location in Report
Form C3 – Question 7b		(in form)
Form C3 – Question 7c		(in form)
Form C3 – Appendix 8	MCP Checklist	Appendix F
Form F1	Charges and Declarations	(in form)

## NON-TECHNICAL SUMMARY

Vantage Data Centers (UK) Limited (VDC) operates the Newport Data Centre (CWL11/12) (the 'Site'), under an existing permit (EPR/BB3599CW-V003, dated 7/12/2022). The Site is located within an industrial campus in Imperial Park, Celtic Way, Marshfield, Newport, NP10 8BE with the surrounding area a mix of industrial, commercial and residential use.

The Site is permitted for 202 emergency generators, with 123 currently installed. VDC is proposing to install 71 new generators (18 at CWL11 and 53 at CWL12), taking the total number on site to 194 with a thermal input of 519.4 MWth. Due to generator design developments, VDC is applying to vary the EP to update the permitted specifications of the new generators being installed.

The proposed new generators have a thermal input capacity of 3.504 MWth for CWL11 and 3.252 MWth for CWL12, all with individual stacks of 10.39 m. These are considered Medium Combustion Plant (MCP), having a thermal input greater than 1 MWth and less than 50 MWth, and are subject to Schedule 25A of the Environmental Permitting Regulations (EPR). Each generator will operate for less than 500 hours per year and is considered Limited Operating Hours MCP and exempt from the emission limit values within Schedule 25A of EPR.

It is intended the new engines will normally run on Hydrotreated Vegetable Oil (HVO), but conventional diesel may be used as a secondary backup fuel.

As part of VDC's drive towards continual improvement, Selective Catalytic Reduction (SCR) will be installed on the 71 new generators for NO<sub>x</sub> emissions abatement.

The current permit includes a 75% load constraint for the engines added under the previous variation (CWL11 expansion and entire CWL12). This variation application seeks to remove the load constraint for most of the installed engines (except cell TF5) and the 71 new engines to be installed.

The principal emissions from permitted operations at the Site will be point source emissions to air from the emergency generators. Detailed dispersion modelling has been undertaken and an updated air quality impact assessment (AQIA) is provided as part of the application. This considers the potential impact of routine testing and emergency operation of the generators on nearby potential human and ecological receptors. The AQIA concluded that no significant impacts are anticipated from quarterly testing of individual engines. Black building tests were modelled to potentially exceed the 1-hour Air Quality Standard (AQS), but unlikely to breach the AQS per year given that this requires more than 18 exceedances in a year and the black building tests are only scheduled to total 14.5 hours per year. The Black building test was also modelled to potentially exceed the 10-minute Acute Exposure Guideline Level 1 (AEGL-1) threshold, however, it should be noted that the model conservatively uses the least favourable meteorological conditions from a five year data set and the circumstance of this test actually coinciding with such conditions in practice is highly unlikely.

In the case of an assumed emergency outage, the predicted environmental concentration (PEC) exceeded the 1-hour AQS and the AEGL-1 threshold. In practice, however, a sustained power outage is in itself highly uncommon and, again, the model is conservative in its meteorological assumptions so that actual air quality would be expected to be better than the model output. For these reasons combined, the likelihood of an actual exceedance of the AQS or AEGL-1 threshold during emergency operations is considered low. In the event of emergency operations,

VDC would initiate its air quality management plan (AQMP) to monitor actual ambient air quality and would liaise with the relevant regulators to manage the event.

Noise modelling has not been undertaken as part of this application, as a comparison between noise levels from the proposed new generators and those permitted has shown that noise levels from the proposed generators are expected to be lower than the permitted generators that they will replace, and no increase in noise impact compared to that already permitted is anticipated as a result of the variation.

This Supporting Information Document has been prepared by Environmental Resources Management Limited (ERM) on behalf of VDC. The supporting information document is based on information provided by VDC, publicly available environmental data and results of air quality dispersion modelling undertaken by ERM.

## 1. INTRODUCTION

The variation application and supporting information presented in this report for the Newport Data Centre (CWL11 and CWL12), hereafter referred to as the 'Site', has been prepared by Environmental Resources Management Limited (ERM) on behalf of Vantage Data Centers UK Limited (VDC). The supporting information document is based on the information provided by VDC, publicly available environmental data and results of air quality dispersion modelling undertaken by ERM.

### 1.1 SITE LOCATION

The Site is located at Imperial Park, Celtic Way, Marshfield, Newport, NP10 8BE (328200, 184600).

The Site location is shown in Figure 1. This also shows the location of CWL13, which is permitted separately to the Newport Data Centre.

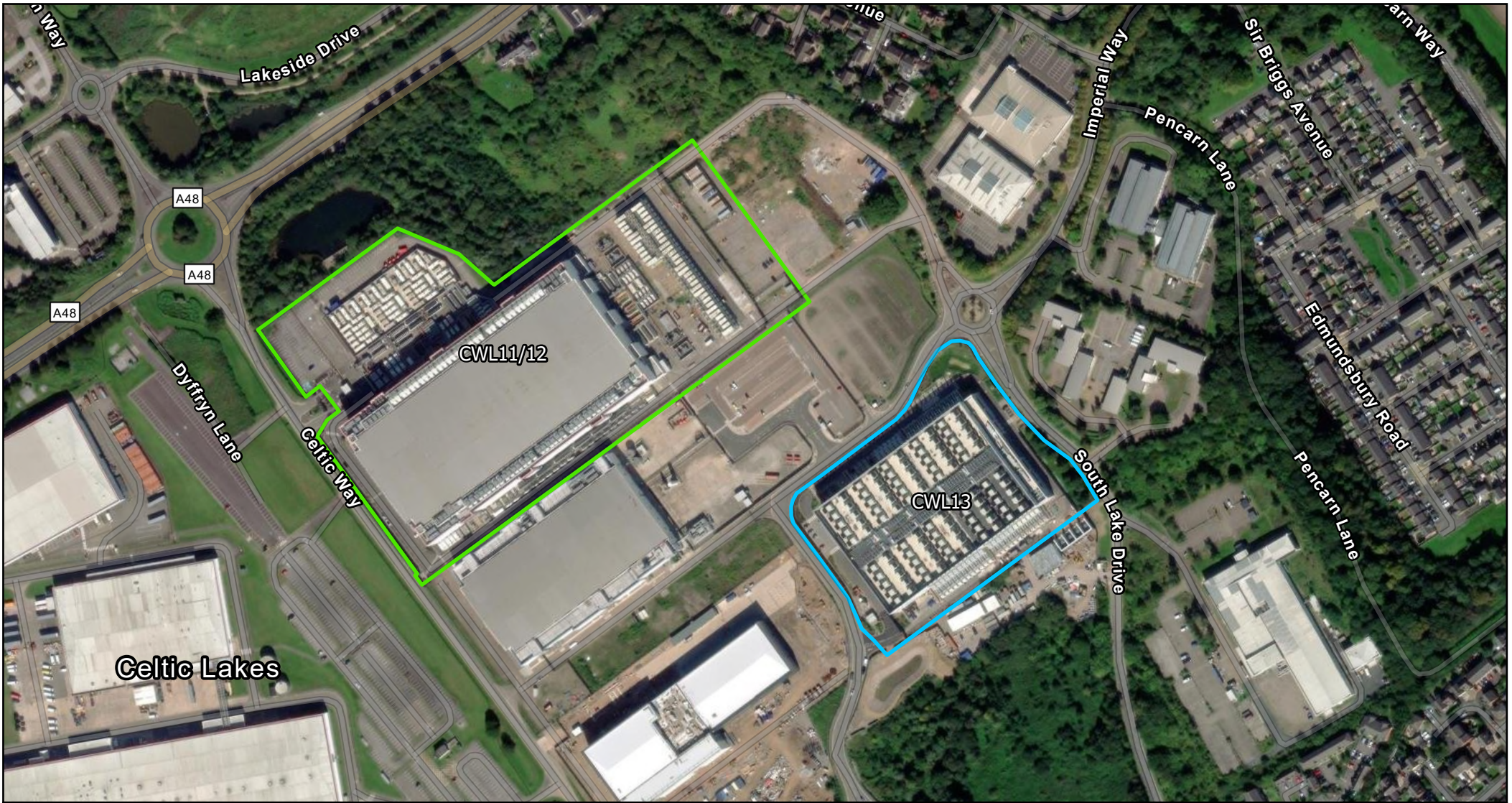
### 1.2 SITE CONTEXT

The Site is located within an industrial campus in Imperial Park, approximately three miles south west of Newport City Centre. Imperial Park houses a number of industrial, distribution and administration facilities which are located to the south and west of the Vantage facility. The Installation is bordered by IQE's Newport Semiconductor Facility to south, and warehouses, manufacturers and a newspaper distribution service to the south-west. To the immediate north of the Site there is some soft landscaping comprising a pond with trees and bushes, with some residential land-use to the north-east of the Site.

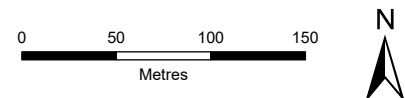
The Site itself is not subject to any known environmentally sensitive designations. It is located approximately 0.5 km north-west of the Gwent Levels-St Brides Site of Special Scientific Interest (SSSI), and approximately 2.7 km to the west in the Severn Estuary is a Special Protection Area, Special Area of Conservation, and a Ramsar site.

The Site is within Flood Zone 1 (low probability of flooding).

No changes to the Site boundary are proposed as part of this application. Refer to Figure 2 - Site layout.



- Site Boundary (CWL11/12)
- Nearby operated VDC data centre (CWL13)



**Figure 1**  
**Newport Data Centre**  
**CWL11/12 Site Location**

SCALE: See Scale Bar SIZE: A4 PROJECT: 0724643 DATE: 04/06/2024	VERSION: A01 DRAWN: RW CHECKED: VT APPROVED: KR
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PROJECTION: British National Grid

### 1.3 ENVIRONMENTAL PERMIT TO BE VARIED

The Site operates under an Environmental Permit (EP), EPR/BB3599CW-V003, issued by Natural Resources Wales (NRW). The EP was originally issued on 22<sup>nd</sup> April 2020. It was varied (V002) 1<sup>st</sup> July 2021 to change the operator name from Next Generation Data Ltd to Vantage Data Centers UK Ltd. The permit was varied again (V003) on 7<sup>th</sup> December 2022, to increase the Site capacity from 77 engines with a total thermal input of 146 MWth to 202 engines with a new aggregated total thermal input of 520 MWth.

For reference, VDC also operates the neighbouring data centre CWL13 in the Imperial Park Industrial Campus, however CWL13 is operated under a separate permit and is not part of this variation application.

### 1.4 REASON FOR VARIATION APPLICATION

The Site is permitted for 202 emergency generators, with 123 currently installed. VDC wishes to install the remaining permitted capacity, however due to design developments and improvements in technology, the specific model number, thermal input and arrangement has changed for new generators. VDC is proposing to install 71 new generators (18 at CWL11 and 53 at CWL12), taking the total number on site to 194 with a combined thermal input of 519.4 MWth. VDC is applying to vary the EP to update the specifications of the new generators being installed.

The current permit allows the use of diesel as a fuel. It is intended the new engines will normally run on Hydrotreated Vegetable Oil (HVO) with conventional diesel to be used as a secondary backup fuel. The variation includes the use of HVO as a fuel.

The variation application also includes the addition of NO<sub>x</sub> abatement for the new generators (18 on CWL11 and 53 on CWL12), which will be fitted with Selective Catalytic Reduction (SCR). SCR uses AdBlue to reduce NO<sub>x</sub> emissions in the exhaust gas.

The current permit includes a 75% load constraint for the engines added under the previous variation (CWL11 expansion and entire CWL12). Re-modelling of NO<sub>2</sub> emissions from these engines (except cell TF5) and all new engines at 100% load has shown that engine testing is not expected to exceed the NO<sub>2</sub> 1 hour Air Quality Standard (200 µg/m<sup>3</sup>) at relevant receptors, therefore this variation application seeks to remove the load constraint for most of the installed engines (except cell TF5) and the 71 new engines to be installed.

This Supporting Information Document (SID) provides further information on the above changes, to support the variation application.

## 2. ACTIVITIES

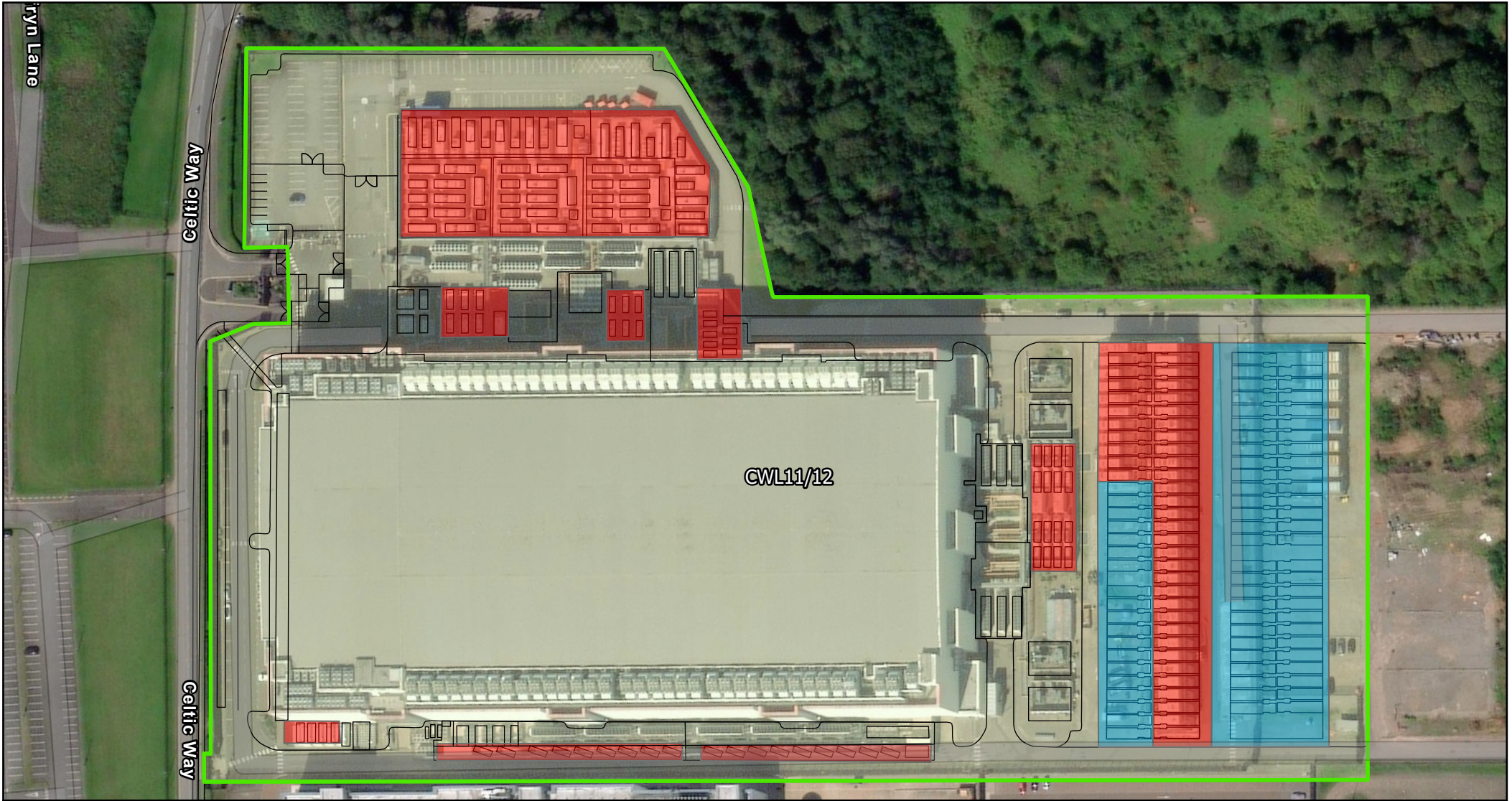
### 2.1 OVERVIEW

The overall commercial activity for the data centre remains unchanged as a data storage company.

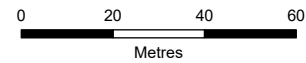
### 2.2 BACKUP GENERATORS

The Site is currently permitted for 202 backup generators, of which 123 are currently installed. VDC plans to install 71 further generators, taking the total to 194 generators onsite.

An updated site layout for the data centre, showing locations of installed and proposed generators, is shown in Figure 2.



- Site Boundary
- Location of 123 installed generators and associated fuel tanks
- Location of 71 generators planned for installation and associated fuel tanks



**Figure 2**  
**Newport Data Centre**  
**CWL11/12 Site Layout Map**

SCALE: See Scale Bar  
SIZE: A4  
PROJECT: 0724643  
DATE: 26/06/2024

VERSION: A01  
DRAWN: RW  
CHECKED: VT  
APPROVED: KR



The generators currently permitted in the EP include 125 engines of the same type (Kohler KD45V20-5DES) with a capacity of 2.987 MWth, but 79 of these have not been installed and will be replaced with a smaller number of larger engines.

On CWL11, 18 generators will be installed (Kohler KD1800-F, with Kohler KD45V20-5EFS engines), each with a capacity of 3.504 MWth. On CWL12, 53 generators will be installed (Kohler KD1605-F, with Kohler KD45V20-5DFS engines), each with a capacity of 3.252 MWth. The total thermal input of the Site will remain within the permitted capacity of 520 MWth, with a new aggregated thermal input of 519.4 MWth.

The type, number and capacity of the existing and new engine models to be installed as emergency backup generators at the data centre is shown in Table 1, with changes in bold.

**TABLE 1: DETAILS OF EMERGENCY BACKUP GENERATORS**

Area	Engine model (generator)	Number of Generators	Individual Input (MW <sub>th</sub> )	Total Input (MW <sub>th</sub> )
<b>Existing Generators</b>				
CWL11	PERKINS 4006-23TAG3A	10	1.97	19.7
CWL11	MTU 12V1600G20F-E (X715C2)	29	1.457	42.3
CWL11	VOLVO TAD 1642GE	18	1.311	23.6
CWL11	MITSUBISHI S12R-F1PTAW2 (T1650C)	5	3.226	16.1
CWL11	KOHLER KD45V20-5DEP	15	2.987	44.8
CWL11	KOHLER KD45V20-5DES	5	2.987 (restricted to 75% load, equivalent to 2.240 MWth)	14.9
CWL11	KOHLER KD45V20-5DES	41	<b>2.987 (previously limited to 2.240 due to 75% load constraint)</b>	122.5
Total		123		283.9
<b>New Generators</b>				
<b>CWL11</b>	<b>Kohler KD45V20-5EFS (KD1800-F)</b>	<b>18</b>	<b>3.504</b>	<b>63.1</b>
<b>CWL12</b>	<b>Kohler KD45V20-5DFS (KD1650-F)</b>	<b>53</b>	<b>3.252</b>	<b>172.4</b>
<b>Total</b>		<b>66</b>		<b>235.4</b>

Area	Engine model (generator)	Number of Generators	Individual Input (MW <sub>th</sub> )	Total Input (MW <sub>th</sub> )
<b>New Aggregated Total of the Site</b>				
<b>CWL11/12</b>		<b>194</b>		<b>519.4</b>

### 2.2.1 TESTING REGIME

The testing regimes for the existing engines and new engines will remain unchanged. There are two types of planned testing conducted at the installation: testing of individual engines, carried out on a quarterly basis (calendar year), and testing of 'cells' (black building tests), carried out twice per year per cell. The existing 123 engines are grouped into 21 cells, each containing between 4 and 9 engines. The proposed 71 new engines will be grouped into 7 cells, one cell of 5 engines, one cell of 6 engines and 5 cells of 12 engines.

The testing regime is presented in Table 2. Scheduling of the test runs considers the potential effect on local air quality. Further details on the assessment of air quality impacts from the testing regime can be found in Section 11.

**TABLE 2: ENGINE TESTING REGIME**

Type of test/ Frequency	Indicative duration of test	Scheduling	Load of generator at CWL11/12	Type of fuel used
Individual engines - quarterly (twice per year)	15 minutes	All generators will be run independently on CWL11/12	100%	HVO/diesel
Individual engines - quarterly (twice per year)	2 hours	All generators will be run independently on CWL11/12	100%	HVO/diesel
Cell Test (Black Building Test) (twice per year)	15 minutes	All generators in a cell being fired up with load shedding.  No overlapping testing with other cells.  No more than one black building test per day	Up to 100%	HVO/diesel

## 2.3 SELECTIVE CATALYTIC REDUCTION

To mitigate VDC's contribution to NO<sub>x</sub> emissions associated with the routine testing and emergency operation of their generators, VDC has committed to installing Selective Catalytic Reduction (SCR) systems on the 71 new generators being installed as part of this variation.

SCR is based on the on the reduction of NO<sub>x</sub> to nitrogen in a catalytic bed by reaction with ammonia. A dosing system will be used to control the rate of AdBlue (urea solution) injection into the exhaust gas stream. Once injected, the AdBlue solution is hydrolysed to ammonia which is required for NO<sub>x</sub> reduction across the SCR catalyst. An Ammonia Slip Catalyst (ASC) coating on the SCR catalyst is used to limit ammonia gas from exiting the stack should there be any excess ammonia present.

Generators utilising SCR will have associated storage tanks for AdBlue (see Section 2.5 for further details on AdBlue storage).

The SCR system uses an Electronic AdBlue Dosing and Monitoring Package with NO<sub>x</sub>, Temperature and Back Pressure Sensors, Airless Injectors, and an Electronic Control Unit for NO<sub>x</sub> Control and Measurement.

## 2.4 FUEL STORAGE

The fuel storage arrangement for the new engines will be as per the 41 new engines installed at CWL11 as part of the Site's expansion (A83-A93, A113-A142). Each engine will sit on top of an individual above-ground, 'belly tank', complete with an integral fill point and fuel polishing unit. The generator container provides secondary containment for the fuel tank, with a capacity >110% of the fuel tank capacity. Pipework will be located internally within the engine container and so there is no requirement for the pipework to be double skinned.

The tanks contain fuel sufficient for 48 hours' operation running at full load. Site operatives will monitor fuel levels daily and visual inspections will be carried out when appropriate. Each fuel tank will be fitted with level instruments (i.e. float levels and/or level probes) and the tank level will be monitored during tank filling.

The proposed reduction in number of permitted engines on site will result in less fuel storage capacity than currently permitted. The capacity permitted originally was 818.5 m<sup>3</sup>. The capacity was increased by 1,988 m<sup>3</sup> in the previous variation, giving a total capacity of 2,806 m<sup>3</sup>. A reduction in the total number of engines under this variation will reduce the fuel storage capacity to 2,705 m<sup>3</sup>, as shown in Table 3.

TABLE 3: FUEL STORAGE CAPACITY

Generator Set	Tank Type	Capacity (m <sup>3</sup> ) per tank	Number of Tanks	Total Capacity (m <sup>3</sup> )
77 existing engines at CWL11 (original permit)	Bulk Storage Tank	32.5	24	780
	Day Tank	0.5	77	38.5
5 existing engines in cell TF5 at CWL11 (V003 of the permit)	Bulk Storage Tank	32.5	2	65
	Day Tank	0.5	5	2.5

Generator Set	Tank Type	Capacity (m <sup>3</sup> ) per tank	Number of Tanks	Total Capacity (m <sup>3</sup> )
41 existing engines at CWL11 as part of the expansion (V003 of the permit)	Belly Tanks	16	41	656
18 new engines at CWL11 (new engine models)	Belly Tank	17.5	18	315
53 new engines at CWL12 (new engine models)	Belly Tank	16	53	848
Site Total				2,705

## 2.5 ADBLUE STORAGE

The 71 new generators will be fitted with SCR system, each with an AdBlue storage tank. Each tank will have a capacity of 2,000 litres. These tanks are sized for approximately 100 hours' operation at 100% load. The AdBlue tank for each engine will sit underneath the outlet attenuator at ground level and is located within the generator container, which provides secondary containment in case of loss of containment from the AdBlue tank.

Site operatives will monitor AdBlue levels daily and visual inspections will be carried out when appropriate. Each tank will be furnished with a level gauge and a high/low level alarm.

## 2.6 UPDATES TO LISTED ACTIVITIES

Under this EP variation, the main commercial activity of the Newport Data Centre does not change and remains primarily data storage.

The primary activity permitted under the current EP is the combustion of diesel in an appliance(s) with an aggregated thermal input of more than 50 megawatts (MWth).

The listed primary activity in Table S1.1 of the EP will remain unchanged by this variation, however, the activity description will need to be amended to refer to the updated thermal inputs of the proposed engines, the use of HVO as a fuel and the addition of SCR. Details are given in Table 4.

**Bold** text within the table below indicates proposed updates to Table S1.1 of the EP, as a result of this variation.

TABLE 4: LISTED ACTIVITIES

Listed Activities	Description of Specified Activity	Limits of Specified Activity
<p>Schedule 1 Part 2 Section 1.1 Part A(1)(a): Burning any fuel in an appliance with a rated thermal input of 50 or more megawatts.</p> <p>Consisting of individual Schedule 25A: Medium Combustion Plant (MCP)</p> <p>Combustion of <b>hydrotreated vegetable oil (HVO) and/or diesel in 194</b> compression ignition engines for the purpose of electricity generation with a total thermal input of <b>519.4 MW</b></p> <p>Operation consisting only of:</p> <ul style="list-style-type: none"> <li>Planned operation of the engines for testing purposes (single engine / single cell)</li> <li>Unscheduled testing following unplanned repair (single engine / single cell)</li> <li>Unplanned emergency operation for backup power provision in the event of failure of supply from the National Grid (initially all engines, followed by load shedding).</li> </ul>	<p><b>CWL11:</b> 62 engines (existing MCP) (A1-A62):</p> <ul style="list-style-type: none"> <li>10 x 1.97 MWth</li> <li>29 x 1.457 MWth</li> <li>18 x 1.311 MWth</li> <li>5 x 3.226 MWth</li> </ul> <p><b>79 engines</b> (new MCP) A63-A111, A113-A142,):</p> <ul style="list-style-type: none"> <li>61 x 2.987 MWth</li> <li>18 x 3.504 MWth</li> </ul> <p><b>CWL12:</b> <b>53 engines</b> (new MCP) (A143-A195):</p> <ul style="list-style-type: none"> <li>53 x 3.252 MWth</li> </ul> <p><b>A94-A111, A143-A195 each with Selective Catalytic Reduction (SCR) for NOx control</b></p>	<p><i>Refer to EP Schedule 1 – Table S1.1 for limits of specified activities.</i></p> <p><i>Updates made to raw materials and stack arrangements/IDs below:</i></p> <p>From receipt of raw materials (<b>HVO, diesel and AdBlue</b>) to combustion of fuel and release of exhaust gases to atmosphere. Distribution of emergency standby electrical power to the data centre.</p> <p>Engines A1-A82 stack heights ranging from 3.18 m – 3.94 m as specified in the permit applications. <b>Engines A83-A93, A113-A142 stack height of 9.3 m.</b> <b>Engines A94-A111 stack height of 10.39 m.</b> <b>Engines A143-A195 stack height of 10.39 m.</b> All stack heights are from ground level.</p>

Note: The terms “Existing MCP” and “New MCP” in Table 4 have the meanings given in paragraph 2(1) of Schedule 25A of the Environmental Permitting (England and Wales) Regulations 2016 (as amended).

## 2.7 UPDATES TO DIRECTLY ASSOCIATED ACTIVITIES

The Directly Associated Activities listed in Table S1.1 of the EP will need to be amended to reflect the use of HVO as a fuel and the use of AdBlue for NO<sub>x</sub> abatement. Details are given in Table 5.

**Bold** text within the table below indicates proposed updates to Table S1.1 of the EP, as a result of this variation.

**TABLE 5: CHANGES TO DIRECTLY ASSOCIATED ACTIVITIES**

Listed Activities	Description of Specified Activity	Limits of Specified Activity
Directly associated activity	Fuel storage – Fuel tanks provide generators with fuel <b>(HVO or diesel)</b> for the above Schedule 1 activity.	From receipt of <b>fuel</b> to use in emergency standby generators.
<b>Directly associated activity</b>	<b>Chemical storage – storage tanks provide generators with AdBlue for the above Schedule 1 activity.</b>	<b>From receipt of AdBlue, to use within the facility.</b>
Directly associated activity	Surface water drainage system servicing area in which schedule 1 activity takes place	Input to site drainage system until discharged into wider business park drainage system.

### 3. EMISSIONS

#### 3.1 INTRODUCTION

This section of the report considers expected changes in emissions resulting from the proposed variation, i.e. relating to the changes in the number and model of the new generators, the use of HVO as a fuel, addition of SCR for new generators, and removal of load constraint.

#### 3.2 EMISSIONS TO AIR

##### 3.2.1 POINT SOURCE EMISSIONS TO AIR

Point source emissions to air arise from testing and emergency operation of emergency back-up generators. Emergency operation of the generators is expected to be very infrequent.

The Site is currently permitted for 202 emergency generators, each served by an individual stack. The total number of emergency generators (and emission points) is reduced by this variation to 194. The point source emissions to air are identified in Table 6. The locations of each emission point are shown in Figure 3. Approximate grid references for each stack are provided in the Air Quality Impact Assessment in Appendix A.

**TABLE 6: POINT SOURCE EMISSIONS TO AIR**

Area	Emission Point ID	Emission Source	Use	Parameter	Limits
CWL11	A1-A62 (existing)	Perkins 4006-23TAG3A MTU 12V1600G20F Volvo TWD1642GE Mitsubishi S12R-F1PTAW2	Emergency back-up generation	NO <sub>x</sub> , SO <sub>2</sub> , CO, Particulates	No limits set, backup generation only
CWL11	A63-A93, (existing)	Kohler KD45V20-5DEP	Emergency back-up generation	NO <sub>x</sub> , SO <sub>2</sub> , CO, Particulates	No limits set, backup generation only
CWL11	A94-A111 (new)	Kohler KD45V20-5EFS + SCR	Emergency back-up generation	NO <sub>x</sub> , SO <sub>2</sub> , CO, Particulates, NH <sub>3</sub>	No limits set, backup generation only
CWL11	A112 (removed)				
CWL11	A113-A142 (existing)	Kohler KD45V20-5DES	Emergency back-up generation	NO <sub>x</sub> , SO <sub>2</sub> , CO, Particulates	No limits set, backup generation only
CWL12	A143-A195 (new)	Kohler KD45V20-5DFS + SCR	Emergency back-up generation	NO <sub>x</sub> , SO <sub>2</sub> , CO, Particulates, NH <sub>3</sub>	No limits set, backup generation only
CWL12	A196-A202 (removed)				

Anticipated NO<sub>x</sub> emission levels are provided in Table 7. Note that SCR will be fitted to the new engines (A94-A11, A143-A195).

**TABLE 7: EXPECTED NO<sub>x</sub> EMISSIONS**

Area	Emission point ID	Source	Unabated NO <sub>x</sub> concentration <sup>(1)(2)</sup> (mg/Nm <sup>3</sup> )	Abated NO <sub>x</sub> concentration <sup>(1)(2)</sup> (mg/Nm <sup>3</sup> )
CWL11	A1-A82 (existing)	Combustion of fuel for emergency generation	(1,507-2,000)	N/A
CWL11	A83-A93 (existing engines @ 100% load)	Combustion of fuel for emergency generation	<b>1,456 (3,883)</b>	N/A
<b>CWL11</b>	<b>A94-A111 (new)</b>	<b>Combustion of fuel for emergency generation</b>	<b>2,096 (5,589)</b>	<b>190 (500)</b>
CWL11	A112 (removed)	-	-	-
CWL11	A113-A142 (existing engines @ 100% load)	Combustion of fuel for emergency generation	<b>1,456 (3,883)</b>	N/A
<b>CWL12</b>	<b>A143-A195 (new)</b>	<b>Combustion of fuel for emergency generation</b>	<b>1,456 (3,883)</b>	<b>190 (500)</b>
CWL12	A196-A202 (removed)	-	-	-

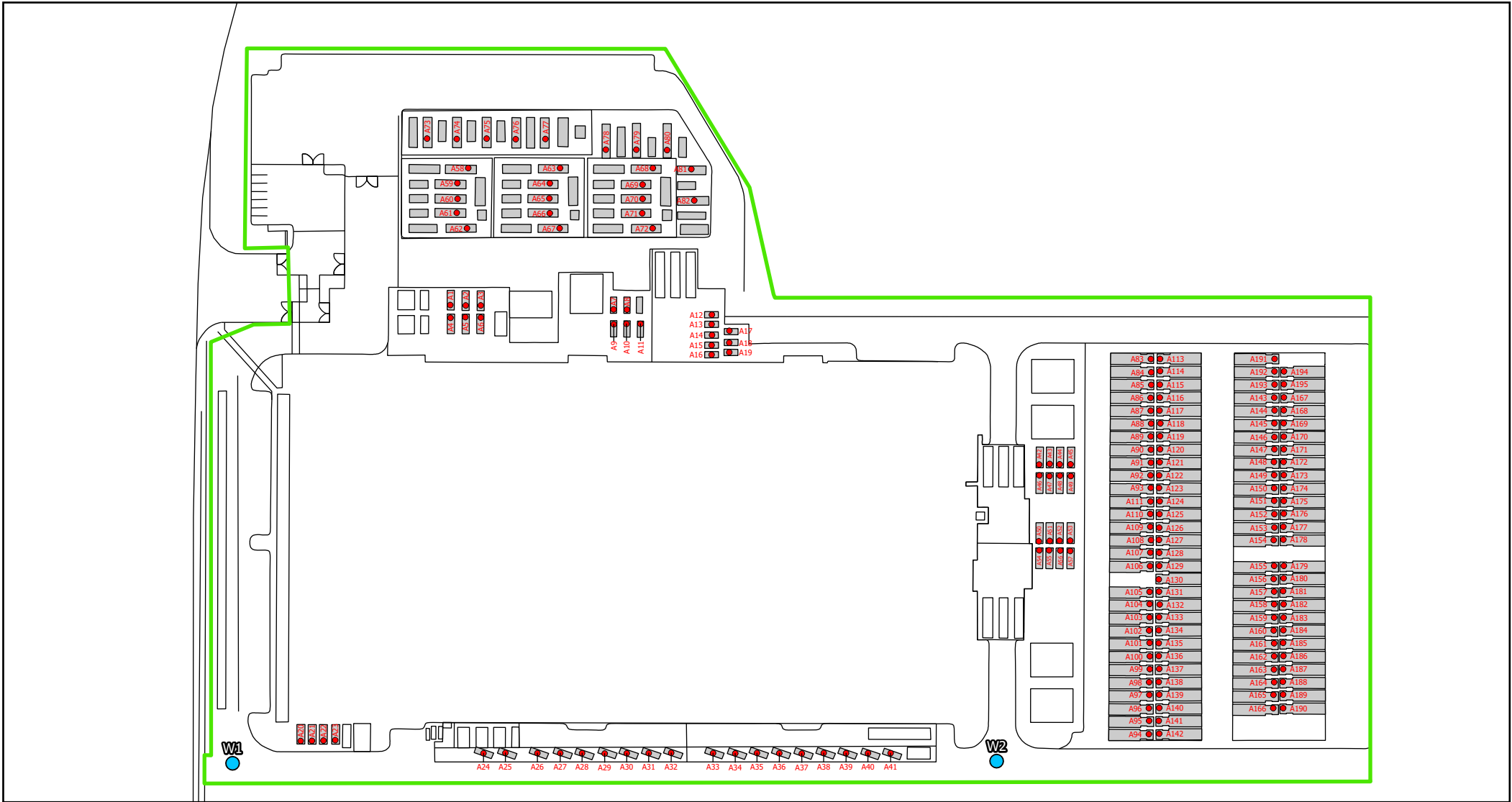
Notes:

(1) NO<sub>x</sub> concentration at reference conditions 273.15K, 101.3 kPa, 15% O<sub>2</sub>, dry basis.

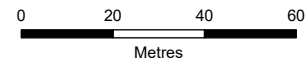
(2) Concentrations in brackets are at 273.15K, 101.3 kPa, 5% O<sub>2</sub>, dry basis.

Detailed dispersion modelling of expected NO<sub>x</sub> emissions to air has been undertaken. The modelling considers the potential impact of the 71 new generators in combination with the existing 123 generators on CWL11 and 60 generators on the Vantage CWL13 site (CWL13 permitted separately, EPR/CB3895HY-A001). More details can be found in Section 11 and the Air Quality Impact Assessment in Appendix A.

The AQIA also includes an assessment of SO<sub>2</sub>, CO and particulate emissions from the Site.



- Surface Water Drainage Point
- Stack Exhaust



**Figure 3**  
Newport Data Centre  
CWL11/12 Emission points to Air and Water

SCALE: See Scale Bar  
SIZE: A4  
PROJECT: 0724643  
DATE: 26/06/2024

VERSION: A01  
DRAWN: RW  
CHECKED: VT  
APPROVED: KR



### 3.2.2 FUGITIVE EMISSIONS TO AIR

There are no expected changes to fugitive emissions to air as a result of the proposed variation. Fugitive emissions to air may arise from the storage of fuel (HVO/diesel).

## 3.3 EMISSIONS TO WATER

### 3.3.1 POINT SOURCE EMISSIONS TO WATER

There are no changes to point source emissions to water as a result of the proposed variation.

### 3.3.2 FUGITIVE EMISSIONS TO WATER

Fugitive emissions to water may arise from a leak or spillage from the above ground fuel tanks, AdBlue tanks or chemical storage area.

VDC has a spill management procedure (CWL11-EOP-Spillage Response), emergency procedure (ENHS-PRO-GLO-1190 - EHS Emergency Management Procedure) and Liquid Pollution Risk Assessment to be used in the event of a release of fuel or chemicals.

During deliveries of fuel and AdBlue, the supplier will be escorted at all times by a Site operative, who will be trained in VDC's Tanker Transfer of Diesel Procedure (PM18-04) (to be updated to include HVO and AdBlue) and Spillage Procedure (PM03-02). Tanks are fitted with level gauges that are monitored during filling to ensure they are not filled above the safe working capacity to prevent overfilling, with oil interceptors fitted within tanker delivery bays to capture spills in the loading area. The Site is equipped with spill kits in delivery areas and other locations around the site.

All fuel and AdBlue storage tanks will be located within generator containers that can contain 110% of their maximum capacity with bunded fill point cabinets and leak detection systems. Additionally, when topping up engine oil and antifreeze/coolant (within the engines, not stored onsite) drip trays will be used and any spills or leaks would be contained within the generator container, essentially acting as a bund. The Site consists of hardstanding, which is maintained in good condition.

## 3.4 EMISSIONS TO SEWER

There will be no discharges to sewer as a result of the proposed variation.

## 3.5 EMISSIONS TO LAND AND GROUNDWATER

There will be no emissions to land or groundwater as a result of the proposed variation.

## 4. OPERATING TECHNIQUES

### 4.1 APPLICABLE TECHNICAL STANDARDS

The proposed variation has been assessed against the following technical standards and guidance:

- 'How to comply with your environmental Permit', Natural Resources Wales, October 2014<sup>1</sup>
- 'Data Centre FAQ Headline Approach', DRAFT version 21.0, Environment Agency, 15/11/2022
- Medium Combustion Plant guidance, UK Government<sup>2</sup>
- Best Available Techniques (BAT) Reference Document (BREF) for Large Combustion (LCP) plants, 2017<sup>3</sup>

#### 4.1.1 HOW TO COMPLY GUIDANCE

This application has been prepared with reference to the 'How to Comply' guidance.

#### 4.1.2 DATA CENTRE FAQ TECHNICAL APPROACH

The EA's Data Centre FAQ, dated November 2022, is currently in draft form, but forms the basis for discussion of a common methodology and liaison with individual operators and their industry association. For this application and the selected abatement, this guidance is considered to represent the current NRW position of BAT for data centre back-up generation systems (an EA document now adopted by NRW).

Assessment of the variation against this guidance is presented in Table 8.

#### 4.1.3 MCP GUIDANCE

The generators meet the definition of Medium Combustion Plant (MCP) under the meaning in the Medium Combustion Plant Directive (MCPD) (2015/2193/EU)<sup>4</sup>, having a thermal input greater than 1 MWth and less than 50 MWth. MCPD states:

*(19) In order to take account of certain specific circumstances where the application of emission limit values would lead to disproportionately high costs compared to the environmental benefits, Member States should be able to exempt medium combustion plants used in cases of emergency and operated during limited time periods from compliance with the emission limit values set out in this Directive.*

The generators are operated as emergency backup generators operated less than 500 hours per year and therefore exempt from meeting ELVs.

The following MCP guidance is relevant to the Site:

- Medium combustion plant and specified generators: environmental permits - GOV.UK (www.gov.uk)
- Medium combustion plant (MCP): comply with emission limit values - GOV.UK (www.gov.uk)

1 <https://naturalresources.wales/media/680335/how-to-comply-with-your-environmental-permit.pdf>

2 Medium combustion plant and specified generator regulations - GOV.UK (www.gov.uk)

3 [https://eippcb.jrc.ec.europa.eu/sites/default/files/2019-11/JRC\\_107769\\_LCPBref\\_2017.pdf](https://eippcb.jrc.ec.europa.eu/sites/default/files/2019-11/JRC_107769_LCPBref_2017.pdf)

4 Directive (EU) 2015/ 2193 of the European Parliament and of the Council of 25 November 2015 on the Limitation of Emissions of Certain Pollutants into the air from Medium Combustion Plants (europa.eu)

- [Medium combustion plant and specified generator permits: how to comply - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/medium-combustion-plant-and-specified-generator-permits-how-to-comply)
- [Specified generator: when you need a permit - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/specified-generator-when-you-need-a-permit)

Assessment of the variation against the MCP guidance is presented in Table 9.

Note that the generators are not classed as *specified generators* under Schedule 25B of the Environmental Permitting (England and Wales) Regulations 2016 (as amended), as they are emergency generators that are only used to provide power at a site during an emergency are excluded.

#### 4.1.4 LCP BREF

The Site does not include Large Combustion Plant (LCP) under the meaning in Chapter III of the Industrial Emissions Directive (2010/75/EU)<sup>5</sup>. This was confirmed in NRW's decision notice for the previous permit variation, dated 7 December 2022, which said:

*'Although the total thermal capacity of the installation is 520 MW<sub>th</sub>, neither Chapter III of IED (for large combustion plants) nor the large combustion plant BATc are directly applicable as the individual combustion plant (engines) are each less than 15 MW<sub>th</sub> and are discharged through separate stacks which could not reasonably be combined, and thus aggregation is not applicable.'*

The LCP BREF has therefore been reviewed for general measures only, see Table 10.

## 4.2 REVIEW OF OPERATING TECHNIQUES

Each of the documents considered above are presented in tabular form on the following pages. Best Available Techniques that are not considered applicable are greyed out.

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<sup>5</sup> Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control)

TABLE 8: DATA CENTRE FAQ HEADLINE APPROACH, 2022

	Summary Requirement	VDC Response
1	We accept that oil fired diesel generators are presently the default technology for standby generators in data centres. However, the permit application still requires a BAT discussion detailing the choice of engine, the particular configuration and plant sizing meeting the standby arrangement (e.g. 2n). But TBC there are now site-specific issues where abatement (SCR) is now the default for new plant – see the details in the text.	<p>The proposed engines in each cell 'block' are in 'n+1' configuration, where n is the actual load requirement of the cell block and the +1 provides additional resilience.</p> <p>The 71 new engines at CWL11/12 will have emissions above the TA Luft 2g standard. However, all 71 new engines will have SCR installed for NO<sub>x</sub> abatement, reducing expected NO<sub>x</sub> emission levels in the exhaust gas to 190 mg/Nm<sup>3</sup>, thereby making them compliant against the standard.</p>
2	Standby engine capacities are added together in MWth input at the quoted standby rating, being usually 110% of the continuous rating (if >=50MWth the site then needs an EA 1.1A Combustion Activity EPR permit).	<p>The combined capacity of the generators will be in excess of 50 MWth.</p> <p>The Site is currently permitted under Schedule 1 Part A(1)(a) Combustion Activity for 202 generators with an aggregated input of 520 MWth. This variation will result in the Site having a new total of 194 generators with an aggregated input of 519.4 MWth.</p>
3	If precise MWth figures are unavailable and spec sheets or face-plates are unclear, the calculation for MWth derived from MVA output is based on: power factor 0.8 and an assumed poor conversion efficiency of 0.35 for MWth to MWe e.g. 3MVA = $(3*0.8)/0.35 = 6.86\text{MWth}$ .	MWth figures for the new generators have been provided by the suppliers, see Table 1. Calculation of MWth from MVA output is not required.
4	The sum of generator plant capacities is based only on MWth <u>inputs</u> of all plant regardless of the standby configuration. MWe output constraints such as realistic customer load or other practical output limiting factors do not constitute a limit to the MWth input as defined in the EA's guide RGN02.	Generator plant capacities are based on MWth inputs.
5	Proximity of data centres with a company campus, adjacent, neighbouring or close-by buildings in urban locations (e.g. within a common trading estate but only separated by a road width or notional distance) may constitute a single site for determining the boundary of the installation as 'same site – same operator' as per RGN02 – see the details in the text	This variation relates to CWL11/CWL12, which is considered as a single Site. VDC also operates the CWL13 Data Centre, 120m southeast of Newport Data Centre, which is operated as a separate Site with a separate permit.

	Summary Requirement	VDC Response
6	Permits will include a maximum 500 hour 'emergency/standby operational limit' for any or all the plant producing on-site power under the limits of the combustion activity; and thereby emission limit values ELVs to air (and thus engine emissions monitoring) are not required within the permit.	The existing permit includes a maximum 500 hour limit per MCP per year. This will also apply to the generators covered by the proposed variation. There are no ELVs set in the permit.
7	Emergency hours' operation includes those unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated but occurring only within the data centre itself.	Emergency operation is unlikely to occur. Running hours for testing and emergency operation are recorded and reported to NRW.
8	Each individual generator with its own discharge stack, can be maintained, tested and used in a planned way for up to 500 hours per calendar year each without ELVs (and hence no monitoring) under IED/MCPD. Though clearly the EA expects planned testing and generator operations to be organised to minimise occasions and durations (subject to client requirements). Ideally a target should seek to keep individual generator testing to below 50 hours/annum each. Accepting <50hours/gen/annum as a default upper limit for bespoke large data centres, the EA regards a BAT aspiration to aim for a more routine 1hour/month per generator.	The existing permit includes a limit of 50 hours per MCP per year for testing and 500 hours per MCP per year for operation. The duration of engines tests will be minimised. Duration of engine tests will be approximately 5 hours per engine per year (see Section 2.2.1).
9	In summary 7, & 8 means the whole or part site can only operate as emergency plant up to 500 hours as an absolute limit for grid backup issues; but that individual plant (at any load) with its own stack (or a stack with multiple plant) <u>with justification</u> can be operated for up to 500 hours (ideally <50) each as part of its non-emergency role under maintenance and testing.	See point 8.
10	For the purposes of determining operating hours, data centre diesel generators are regarded as	Noted.

	Summary Requirement	VDC Response
	having a minimal start-up or shut-down times. Operational hours start on the first fuel ignition.	
11	Data Centre permits (unless they apply and justify it in a permit application) will expressly have a limit on the activity to exclude voluntary 'elective power operation' such as demand side response (i.e. on-site use) or grid operating reserve (STOR) (i.e. off-site export of electricity) and Frequency Control by Demand Management (FCDM) for grid support. This is primarily to differentiate data centres from 'diesel arrays or MCPD specified generators' that voluntarily operate within the balancing market, and importantly a clear way to demonstrate minimisation of emissions to air as 'Emergency plant'.	No voluntary elective power operation is proposed.
12	The default engine specification as a minimum for new plant to minimise the impacts of emissions to air (NOx) is 2g TA-Luft or EPA Tier 2 or equivalent standard. A detailed cost benefit analysis (CBA) is otherwise needed existing, old plant justifying worse emission such as 4g TA-Luft plant or for example a justification under FCDM. TBC There are now site specific issues where abatement (SCR) is the default for new plant – see details in the text.	Refer to point 1 above.  Unabated NOx emissions from the new engines (A94-A111 & A143-A195) exceed 2g TA Luft standard, however SCR will be installed on these engines to reduce expected NO <sub>x</sub> emissions below TA Luft levels. (See Section 2.3)  The impact of emissions has been considered in the Air Quality Assessment – see Section 11 and Appendix A.
13	CBA for improved exhaust emissions, dispersion and mitigations from the plant is expected for the maintenance/testing and the emergency standby roles. We would be looking for improvements particularly if Local Air Quality (LAQ) modelling (under H1) indicates anything other than an insignificant contribution to <u>short term local air quality for the 'planned' maintenance</u> emissions of the plant.	An H1 risk assessment has been completed, see Section 10. A detailed dispersion model has also been prepared to assess the impact of maintenance testing and emergency operation of the engines. The modelled emissions reflect changes to engine types (model/outputs), number of engines, SCR installation on 71 engines, and removal of 75% load constraint removed from 41 existing generators installed at CWL11 (Section 11). The detailed report is presented in Appendix A.

	Summary Requirement	VDC Response
14	Retrofit abatement techniques for existing installations for engine emissions such as selective non-catalytic or catalytic reduction (SNCR or SCR) would not normally be expected for standby plant to mitigate the emissions for standby/emergency operation. BAT might include improved flue gas dispersion (e.g. stack modifications, increased height) or improved low NOx engine management controls or possibly fuel choice.	SCR will be fitted on the 71 new generators the Site to mitigate NOx emissions, see Section 2.3. It is intended that new engines will normally run on HVO, with diesel as a back-up fuel.
15	Operations and management procedures should reflect the outcomes of the air quality modelling by minimising the duration of testing, phasing engines into subgroups, avoiding whole site tests and planning off-grid maintenance days and most importantly times/days to avoid adding to "at risk" high ambient pollutant background levels.	The duration of engine tests will be minimised to the extent practicable. Individual engine tests and Black-building tests will be carried out for each cell as described in in Section 2.2.1.
16	When AQ modelling the emissions from the engines, the certified technical standard provided by the manufacturer should be used (i.e. likely worst case emissions). However any 'fit for purpose' monitoring of the actual emissions from installed plant will be considered as evidence of the likely real impacts as part of the permitting decision process.	Likely 'worst case' emissions have been used for modelling. See Section 11 and Appendix A.
17	The groundwater monitoring of fuel storage tanks and distribution pipework using GW boreholes is risk based for the site condition report (SCR) and IED 5-yearly monitoring. Should GW monitoring be required for underground tanks and/or the SCR, the boreholes should be positioned for whole site surveillance (for the SCR) rather than as a very local control immediately around the buried fuel oil tanks (i.e. not be just an addition to double skinned tanks already protected by leak detection and hence ignoring distribution pipework etc.).	VDC does not operate or plan to operate underground storage tanks for fuel oil and consider that their operational approach to prevention of releases to land minimises this risk to site condition.

	Summary Requirement	VDC Response
18	5-yearly GW sampling & 10-yearly soil sampling under IED is normally not needed but still needs some justification.	5-yearly groundwater sampling and 10-yearly repeat soil sampling is not considered warranted on the basis of the nature of the permitted operation and its low potential for emissions to land.
19	The permit application must assess and provide evidence of actual reliability data for the local electricity grid distribution (including data centre internal electrical design) for the EA to judge the realistic likelihood of the plant needing to operate for prolonged periods in an emergency mode (especially if emissions model so as to exceed short term air quality standards).	The VDC site is not expected to operate for a prolonged period in emergency mode. The extent of back-up power generation capacity and fuel storage reflects the VDC business model of providing customers with a high assurance of continuity, not an expectation of loss of grid supply in practice. The Site has four substation feeds so there is a good level of redundancy in power supply.
20	Optimising grid reliability within the site as part of general BAT to minimise emergency operating hours is required – evaluation is needed within the permit application on the Tier reliability standard under ISO27001 and Uptime.	VDC is a Tier 3 site with an expected uptime of 99.999%. The Site takes its power supply from a National Grid 400 kV substation, which supplies VDC only.
21	Reporting of standby engine operational run hours and discussion of any electrical outages (planned or grid failures regardless of duration) required annually.	Engine operating hours are recorded monthly and after any unplanned events. Engine operating hours are reported to NRW as part of annual reporting.
22	AQ modelling for permitting split into two parts: 1) for the routine planned testing regime , including scheduled on-load use supporting maintenance works like UPS or HV – if no other details are known the default is 50 hours/gen/year; Commissioning of significant new plant may be included or possibly assessed separately as a 'one off' under a permit 'pre-op condition 2) A prolonged reasonable maximum full load outage (so accepting not all installed engines will run) which the default is assumed 72 hours. Looking at ambient AQ	Details of AQ modelling are provided in Section 11 and Appendix A. 1) The test regime, as defined in Table 2 has been considered in the AQ modelling assessment. A planned testing regime of 5 hours per year has been modelled, comprising individual engine tests and black building tests. 2) 1- hour and 72-hour emergency outages have been modelled.

	Summary Requirement	VDC Response
	and potential areas for Acute exposure (AEGL).	
23	Assuming AQ modelling, based on operating scenarios, indicates a local air quality risk then notification to the EA of unplanned (and pre-notification of planned) continuous grid outage exceeding 18 hours LAQM (or the otherwise assessed short term interval from modelling) is likely required under a permit schedule 5 notification.	VDC will notify NRW of any planned or unplanned interruptions to the grid supplies relating to CWL11/12. VDC will continue to update and maintain their Air Quality Management Plan (AQMP), most recent update submitted to NRW 23 May 2024.
24	The notification requirement stated in the permit should also indicate the actual number of generators that need to be operating above which the local air quality is at risk e.g. 'notification of continuous emergency operation exceeding 18 hours with 5 or more engines operating together is required' (i.e. model shows 4 or less engines unlikely to breach LAQ)	The permit requires that the operator notifies NRW in the event that operation or activities gives rise to an incident or accident that significantly affects or may significantly affect the environment. The AQMP identifies outage scenarios that have potential to breach the Air Quality Standard (AQS) or AEGL-1, and requires that Vantage notifies NRW.
25	Assuming AQ modelling, based on emergency outage operating scenarios, indicates a very significant risk to local air quality and identified receptors, the EA will ask the operator to have a written action plan to manage the issue for prolonged emergency running of the plant (including sensitive receptors list and mitigations, assessments and impacts evaluation against modelled risk conditions i.e. occurrence at periods of most concern in the year, possibly ambient air monitoring surveillance at very sensitive receptors). An AQ outage action plan is also likely required for sites which might operate in conjunction with other neighbouring large sites during an outage i.e. data centre hubs. A template AQMP is available.	The Site currently has an active AQMP in place. The most recent update to the AQMP was submitted NRW on 23 May 2024. VDC will update the AQMP in line with any changes on Site to address the potential air quality impact from the operation of the generators at the Site.

	Summary Requirement	VDC Response
26	Due to the emphasis of the permit on electrical (and cooling) systems it is noted that the EA considers the F-Gas regulations as falling under the remit of the EPR permit (for notifications and management) where F-gases (or potentially any polluting potential substance) are used directly under the combustion aspects of the permitted activity (e.g. switchgear). It is important to notify the EA of any significant releases. Other uses of F-gases e.g. for server room cooling are not strictly under the EA permit but are regulated by the EA generally so it may still be prudent to make the EA aware of your F-gas releases.	F-gases are used within the high voltage switchgear and cooling system. Vantage keeps a register of F-gas usage to monitor any releases (if any). In an instance where F-gas releases are significant VDC will notify NRW.  The F-gas register is available to NRW upon request.
27	The permit application should detail the likely quantities of waste engine oil generated annually – EWC 13 02 waste oils following servicing for example. Although unlikely to be huge, the Pollution inventory has a reporting threshold of 1 tonne for non-hazardous waste but technically no lower thresholds for hazardous waste oil.	Waste oil will be removed by the same appointed subcontractors who perform servicing and maintenance of the generators at the Site. The reporting thresholds are noted and the data collected from the sub-contractor as part of the annual NRW reporting process. Given the lack of routine operation anticipated at the Site, lubricating oil degradation is not expected, therefore bulk replacement is unlikely.
28	The permit application is for the combustion plant and associated environmental concerns and not for the Data Centre itself. The applicant should be aware that the permitting process and application is accessible to the public so should have regard to 'Commercial in Confidence' and Critical National Infrastructure. In the first instance discuss particular concerns directly with the EA [NRW in this case] and/or exclude such priority information from the application but indicate that such is 'available on request'.	Noted.

TABLE 9: MEDIUM COMBUSTION PLANT AND SPECIFIED GENERATOR REGULATIONS GUIDANCE (SUMMARISED)

Key Definitions and Scope		Comments
<b>Medium combustion plant and specified generators: environmental permits</b>		
IED chapter 2 permits affected by the regulations	<p>MCP regulations do apply to a MCP on a chapter 2 IED installation. You must meet MCP requirements where it's a:</p> <ul style="list-style-type: none"> <li>primary activity – where the total rated thermal input is more than 50MWth on an installation, for example gas engines generating electricity</li> </ul> <p>As a minimum, the MCP must meet the appropriate Medium Combustion Plant Directive (MCPD) emission limit value (ELV) by the required date.</p>	The new generators are exempt from meeting ELVs – see below.
<b>Medium combustion plant (MCP): comply with emission limit values</b>		
Minimum ELVs your MCP must comply with	<p>MCPD sets the minimum ELVs your MCP must comply with (unless exempt). See the <a href="#">MCPD Annex 2 tables</a>. For:</p> <ul style="list-style-type: none"> <li>a new MCP that is not an engine or gas turbine (GT) the ELVs are listed in part 2, table 1</li> <li>a new MCP that is an engine or GT the ELVs are listed in part 2, table 2</li> <li>an existing MCP that is not an engine or GT between more than 5 and less than 50MWth the ELVs are listed in part 1, table 2 – it must meet these by 1 January 2025</li> <li>an existing MCP that is not an engine or GT between greater than or equal to 1 and less than 5MWth the ELVs are listed in part 1, table 1 – it must meet these by 1 January 2030</li> <li>an existing MCP between 1 and 50MWth which is an engine or GT the ELVS are listed in part 1, table 3 – it will depend on its capacity as to what deadline applies.</li> </ul>	New MCPs operating less than 500 hours per year as a 3-year rolling average are exempt from meeting MCPD ELVs. The new generators will not be tested for more than 50 hours per generator per year or operate for more than 500 hours per year.
Dark smoke	The MCP must not persistently emit dark smoke.	Noted. Persistent or unusual smoking would be picked up by operators during their regular site inspections of generators and investigated. Additionally, routine testing of engines will be carried out. Any unexpected emissions of smoke would be reported and maintenance/repairs carried out.

Key Definitions and Scope		Comments
Stack arrangements	<p>Vertical stacks that are not obstructed by caps and cowls allow for the greatest dispersion of air pollutants. You should use this design for:</p> <ul style="list-style-type: none"> <li>new MCP as required by the available standard rules permits</li> <li>existing MCP if their stack arrangements can be redesigned</li> </ul>	The new MCPs will have vertical stacks that are not obstructed by caps and cowls.
Monitoring requirements	For a new MCP you must start monitoring its emissions within 4 months of the permit being issued or the start of operation, whichever is the latest.	Noted
	<p>You are required to do periodic monitoring for new and existing MCP at least every:</p> <ul style="list-style-type: none"> <li>3 years for a MCP less than or equal to 20MWth</li> <li>year for a MCP greater than 20MWth</li> <li>1,500 hours of operation for limited operating hours MCP less than 20MWth with a minimum frequency of once every 5 years</li> <li>500 hours of operation for limited operating hours MCP greater than 20MWth with a minimum frequency of once every 5 years</li> </ul>	Current monitoring requirements are expected to apply to the new generators, i.e. 'After 3 times the maximum average annual operating hours have elapsed and no less frequent than every 5 years.'
<b>Medium combustion plant and specified generator permits: how to comply</b>		
General	You must be able to demonstrate your medium combustion plant (MCP) or specified generator emissions are protecting air quality.	The potential impact on air quality has been assessed. See Section 11 and Appendix A.
Monitoring requirements	Operators must test emissions from each unit (unless the permit has a different condition) to demonstrate compliance with emission limits.	The new generators are exempt from meeting ELVs – see above.
Records and reporting	<p>You must keep records and report to the regulators as set out in the permit.</p> <p>When you first get a permit for your plant you'll normally be required to send monitoring returns. These must show compliance with the emission limit values (ELVs). The</p>	Reporting requirements in current permit will be extended to cover the new generators.

Key Definitions and Scope		Comments
	<p>frequency after this will be specified in the permit conditions.</p> <p>You must keep records of the plant operation for at least 6 years.</p>	
<b>Specified generator: when you need a permit</b>		
Emergency backup generators	From 1 January 2019, a backup generator only used to provide power at a site during an emergency is excluded. However, it is a MCP and requires a permit by the appropriate deadline.	The generators on Site are used to provide power during an emergency, therefore they are excluded from specified generator controls.
Number of hours you can test backup generators	<p>You must not carry out more than 50 hours testing a year for each backup generator. You must get agreement in writing from your regulator if you want to increase this limit. The regulator can exclude commissioning time within the written agreement.</p> <p>For each backup generator, you must record the number of hours you test during the year. This is to demonstrate that you meet the exclusion criteria.</p> <p>If you exceed the limit of 50 hours testing a year without written agreement the regulator will take appropriate enforcement action.</p>	<p>Testing operation is limited to 50 hours per year per engine in the permit.</p> <p>The number of hours of operation is recorded and reported annually to NRW.</p>
Data centres	Data centres that use an on-site emergency backup generator when the transmission frequency is unstable are excluded. This is provided the generator is not part of a formal agreement or contract.	Emergency generators on the Site are excluded from specified generator controls.
How to test backup engines	<p>When you test backup engines you should:</p> <ul style="list-style-type: none"> <li>• stagger the tests if you have multiple backup engines</li> <li>• keep testing times and frequency to the minimum – just enough to demonstrate reliability at the appropriate load</li> </ul>	<p>Generator testing is staggered. Only one cell test shall be carried out in any one day, although individual engine testing from any cells may occur on the same day but at different times.</p> <p>The period and frequency of testing is minimised, while being sufficient to demonstrate reliability. The testing regime is described in Section 2.2.1.</p>

Key Definitions and Scope		Comments
	<ul style="list-style-type: none"><li>only test when you expect low ambient nitrogen oxides (NO<sub>x</sub>) background, such as not during peak traffic periods</li><li>use the electricity generated from the test on your site</li><li>install backup generators away from sensitive receptors (not below windows or venting onto car parks) and terminate the exhaust flues vertically, making sure there are no obstructions</li></ul>	<p>The Site does not sit within an AQMA, reducing the likelihood of elevated background NO<sub>x</sub> triggering an air quality incident (e.g. during peak traffic periods).</p> <p>Electricity generated from black building testing will be used onsite.</p> <p>Engine exhaust stacks terminate vertically without obstruction.</p>

TABLE 10: BEST AVAILABLE TECHNIQUES (BAT) REFERENCE DOCUMENT FOR LARGE COMBUSTION PLANTS, 2017

Section	Subsection	BAT #	BAT Text	Requirements	Comment
General BAT Conclusions	Environmental Management System  EMS	BAT 1	In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates the features presented in the BREF.	See BREF for detailed requirements	VDC operates with an integrated management system (IMS). This will be updated to include any changes made as a result of this proposed variation. The current ISO 14001:2015 certificate is provided in Appendix C.
	Monitoring	BAT 2	BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load (1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	(1) In the case of CHP units, if for technical reasons the performance test cannot be carried out with the unit operated at full load for the heat supply, the test can be supplemented or substituted by a calculation using full load parameters	Not required to meet this requirement for MCPs.
	Monitoring process parameters for emissions to air and water	BAT 3	BAT is to monitor key process parameters relevant for emissions to air and water including those given below	<ul style="list-style-type: none"> <li>Fuel gas</li> <li>Flow</li> <li>Oxygen content, temperature and</li> <li>Pressure</li> <li>Water vapour content</li> <li>Waste water from flue-gas treatment</li> </ul>	Not required to monitor these parameters. MCP is required to comply with MCPD requirements only.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
				<ul style="list-style-type: none"> <li>Waste water from cooling treatment and process wastewater</li> </ul>	
	Monitoring of emissions to air	BAT 4	BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	<ul style="list-style-type: none"> <li>NH3</li> <li>NO2</li> <li>N2O</li> <li>CO</li> <li>SO2</li> <li>SO3</li> <li>Gaseous chlorides</li> <li>HF</li> <li>Dust</li> <li>Metals and metalloids</li> <li>Hg</li> <li>TVOC</li> <li>Formaldehyde</li> <li>CH4</li> <li>PCDD/F</li> </ul>	Not required to monitor these parameters. MCP is required to comply with MCPD requirements only.
	Monitoring emissions to water from flue-gas treatment	BAT 5	BAT is to monitor emissions to water from flue-gas treatment with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	Parameters: <ul style="list-style-type: none"> <li>TOC</li> <li>COD</li> <li>TSS</li> <li>Fluoride</li> <li>Sulphate</li> <li>Sulphide</li> <li>Sulphite</li> <li>Metals and metalloids</li> <li>Chloride</li> <li>Total nitrogen</li> </ul>	Not applicable - there are no emissions to water from flue-gas treatment
	General environmental and combustion performance	BAT 6	In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of the techniques given below.	Techniques: <ul style="list-style-type: none"> <li>Fuel blending and mixing</li> <li>Maintenance of the combustion system</li> <li>Advanced control system</li> </ul>	VDC has an extensive preventative maintenance regime, which includes maintenance and good design of the combustion equipment to deliver the requirement of an

Section	Subsection	BAT #	BAT Text	Requirements	Comment
				<ul style="list-style-type: none"> <li>Good design of the combustion equipment</li> <li>Fuel choice</li> </ul>	<p>emergency back-up generator. This will not change as a result of this EP variation application.</p> <p>Generator equipment designs comply with current standards.</p> <p>HVO will be the primary fuel source for the backup generators.</p>
	General environmental and combustion performance	BAT 7	In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NOx emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NOx ratio, homogeneous reagent distribution and optimum size of the reagent drops).		SCR systems will be used on the 71 new generators, which will use a dosing system to control the rate of AdBlue injection and an ammonia slip catalyst (ASC) within the reactor to limit ammonia release. See Section 2.3 for further details.
		BAT 8	In order to prevent or reduce emissions to air during normal operating conditions, BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability.	(No requirements specified)	SCR system is designed to be suitable for the emergency generators and will be maintained appropriately to ensure effective operation.
		BAT 9	In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the	1. Initial full characterisation of the fuel used including at least the parameters	Primary fuel supply will be ultra-low-sulphur HVO fuel from commercial supply. Low-sulphur diesel may

Section	Subsection	BAT #	BAT Text	Requirements	Comment
			following elements in the quality assurance/quality control programmes for all the fuels used, as part of the environmental management system (see BAT 1):	<p>listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality;</p> <p>2. Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed);</p> <p>3. Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see</p>	<p>be used as a secondary backup fuel.</p> <p>The fuel will be tested quarterly by an external company and, where required, the fuel will be polished using the fuel recirculation units fitted on each fuel tank.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
				description in Section 10.8.1)).	
		BAT 10	In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements:	<ul style="list-style-type: none"> <li>• Appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines)</li> <li>• Set-up and implementation of a specific preventive maintenance plan for these relevant systems;</li> <li>• Review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary;</li> <li>• Periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions quantification/estimation) and implementation of corrective actions if necessary</li> </ul>	<p>In normal operating conditions the data centre electricity will be supplied from the grid. The generators will only be operated for planned testing (normal) and emergency operation (OTNOC). The generators are designed to operate under these conditions. A testing regime is in place for the generators – see Section 2.2.1.</p> <p>Generator running hours (for testing and emergency) are recorded and reported to NRW. Emissions monitoring – MCP is required to comply with MCPD requirements only.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
		BAT 11	BAT is to appropriately monitor emissions to air and/or to water during OTNOC	The monitoring can be carried out by direct measurement of emissions or by monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdown (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once every year, and using the results of this measurement to estimate the emissions for each and every SU/SD throughout the year.	Normal operating conditions for the data centres will be grid supply of electricity. As OTNOC conditions occur in an emergency situation, there will be no opportunity to schedule monitoring of emergency operations.  Emissions of CO, NO <sub>x</sub> , SO <sub>2</sub> and PM are calculated based on running hours as part of the Pollutant Release and Transfer Register (PRTR) annual submission.
	Energy Efficiency	BAT 12	In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated $\geq 1\,500$ h/yr, BAT is to use an appropriate combination of the techniques given below	Techniques <ul style="list-style-type: none"> <li>• Combustion optimisation</li> <li>• Optimisation of the working medium conditions</li> <li>• Optimisation of the steam cycle</li> <li>• Minimisation of energy consumption</li> <li>• Preheating of combustion air</li> <li>• Fuel preheating</li> <li>• Advanced control system</li> <li>• Feed-water preheating using recovered heat</li> <li>• Heat recovery by cogeneration (CHP)</li> <li>• CHP readiness</li> <li>• Flue-gas condenser</li> </ul>	Not applicable. The engine/generator sets will provide backup generation only and do not run for >1,500 hr/yr.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
				<ul style="list-style-type: none"> <li>Heat accumulation</li> <li>Wet stack</li> <li>Cooling tower discharge</li> <li>Fuel pre-drying</li> <li>Minimisation of heat losses</li> <li>Advanced materials</li> <li>Steam turbine upgrades</li> <li>Supercritical and ultra-supercritical steam conditions</li> </ul>	
	Water usage and emissions to water	BAT 13 - 15			Not applicable. No water usage or emissions to water from this variation.
	Waste Management	BAT 16	In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life-cycle thinking	<p>(a) waste prevention, e.g. maximise the proportion of residues which arise as by-products;</p> <p>(b) waste preparation for reuse, e.g. according to the specific requested quality criteria;</p> <p>(c) waste recycling;</p> <p>(d) other waste recovery (e.g. energy recovery)</p>	<p>Waste prevention is maximised as far as possible.</p> <p>Stored fuel is tested annually for quality. Fuel polishing is used where appropriate, and waste fuel is taken off-site by a for recovery or disposal by a licensed contractor.</p>
	Noise Emissions	BAT 17	In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below .	<p>Techniques</p> <ul style="list-style-type: none"> <li>Operational measures</li> <li>Low -noise equipment</li> <li>Noise attenuation</li> <li>Noise-control equipment</li> <li>Appropriate location of equipment and buildings</li> </ul>	<p>Generators will be housed in acoustic enclosures.</p> <p>See details in Section 9 for further noise details.</p>

Section	Subsection	BAT #	BAT Text	Requirements	Comment
BAT conclusions for the combustion of solid fuels	BAT conclusions for the combustion of coal and/or lignite	BAT 18 – 23			Not applicable
	BAT Conclusions for the combustion of solid biomass and/or peat	BAT 24 – 27			
BAT conclusions for the combustion of liquid fuels	HFO- and/or gas-oil-fired boilers	BAT 28 – 30			Not applicable
	HFO- and/or gas-oil-fired engines  Energy efficiency	BAT 31	In order to increase the energy efficiency of HFO and/or gas oil combustion in reciprocating engines,  BAT is to use an appropriate combination of the techniques given in BAT 12 and below.	<i>Techniques</i> • Combined cycle	This BATc is generally applicable for new units operated >1500 h/year. The new generators are tested for 5 h/year and operated <500 h/year.
	HFO- and/or gas-oil-fired engines  NO <sub>x</sub> , CO and volatile organic compound emissions to air	BAT 32	In order to prevent or reduce NO <sub>x</sub> emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.	<i>Techniques</i> • Low -NO <sub>x</sub> combustion concept in diesel engines • Exhaust-gas recirculation (EGR) • Water/steam addition • Selective catalytic reduction (SCR)	SCR will be installed on the 71 new engines to reduce NO <sub>x</sub> emissions. See Section 2.3 for further details.
		BAT 33	In order to prevent or reduce emissions of CO and volatile organic compounds to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or both of the techniques given below.	<i>Techniques</i> • Combustion optimisation • Oxidation catalysts	The purpose of the proposed diesel generators is for emergency supply only. Combustion is optimised for this purpose.

Section	Subsection	BAT #	BAT Text	Requirements	Comment
	HFO- and/or gas-oil-fired engines SOx, HCl and HF emissions to air	BAT 34	In order to prevent or reduce SOX, HCl and HF emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.	Techniques <ul style="list-style-type: none"> <li>Fuel choice</li> <li>Duct sorbent injection (DSI)</li> <li>Wet flue-gas desulphurisation (wet FGD)</li> </ul>	The new engines will use HVO or ultra-low sulphur diesel as fuel.
	HFO- and/or gas-oil-fired engines  Dust and particulate bound metal emissions to air	BAT 35	In order to prevent or reduce dust and particulate-bound metal emissions from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below .	Techniques <ul style="list-style-type: none"> <li>Fuel choice</li> <li>Electrostatic precipitator (ESP)</li> <li>Bag filter</li> </ul>	Ultra-low sulphur HVO is the primary fuel source.
	Gas-oil-fired gas turbines	BAT 36 – 39			Not applicable
10.4 BAT conclusions for the combustion of gaseous fuel		BAT 40 – 54			Not applicable
10.5 BAT conclusions for multi-fuel-fired plants		BAT 55 – 59			Not applicable
10.6 BAT conclusions for the co-incineration of waste		BAT 60 - 71			Not applicable
10.7 BAT conclusions for gasification		BAT 72 - 75			Not applicable

## 5. ENVIRONMENTAL MANAGEMENT SYSTEMS

### 5.1 SUMMARY OF EMS

VDC operates in accordance with an Integrated Management System (IMS) for quality, health and safety, information security and environment, which is certified to ISO 14001:2015.

The following is a summary of the contents of the VDC IMS:

1. Purpose
2. Organisational Context
  - 2.1 Organisation and Its Context
  - 2.2 Needs and Expectations of Interested Parties
  - 2.3 Determining the Scope of the Management System
  - 2.4 Management System and its Processes
3. Leadership
  - 3.1 Leadership & Commitment
  - 3.2 IMS Policy
  - 3.3 Organisation Roles Responsibilities and Authorities
  - 3.4 Consultation and Participation of Workers
4. Planning
  - 4.1 Actions to address risks and opportunities
  - 4.2 IMS Objectives and Planning to Achieve Them
  - 4.3 Planning of Changes
5. Support
  - 5.1 Resources
  - 5.2 Competence
  - 5.3 Awareness
  - 5.4 Communication
  - 5.5 Documented Information
6. Operation
  - 6.1 Operational Planning and Control
  - 6.2 Requirements for Products and Services
  - 6.3 Design and Development of Products and Services
  - 6.4 Control of Externally Provided Processes, Products and Services
  - 6.5 Production and Service Provision
  - 6.6 Release of Products and Services

## 6.7 Control of Nonconforming Process Outputs, Products and Services

## 6.8 Control of Emergency situations/Emergency Preparedness and response

## 7. Performance Management

### 7.1 Monitoring, Measurement, Analysis and Evaluation

### 7.2 Internal Audit

### 7.3 Management Review

### 7.4 Communication

### 7.5 Document Management

## 8. Improvement

### 8.1 General

### 8.2 Incident, Nonconformity and Corrective Action

### 8.3 Preventive actions

### 8.4 Continual Improvement

## 9. Document Control

### 9.1 Revision Control

### 9.2 Annual Review

## 10 Appendices

### 10.1 Appendix 1. Operational Process Interaction

### 10.2 Appendix 2. In Scope Sites

### 10.2 Appendix 3. Environmental Management Lifecycle

## 5.2 PROPOSED UPDATES TO EMS

The IMS will be reviewed and updated to include any changes to CWL11/12 resulting from this variation.

The following procedures/documents will be reviewed and updated as appropriate:

- Aspects Register (ENHS-ART-EMEA-1208)
- Tanker Transfer of Diesel (PM18-04)
- CWL Liquid Pollution Risk Assessment (SM5010/LPRA/UD/160721)

## 5.3 CERTIFICATION

The IMS is certified to ISO 14001:2015. A copy of the current ISO 14001:2015 certificate is provided in Appendix C.

## 6. WASTE GENERATION

Some additional waste will be generated as a result of this variation. The SCR system will use AdBlue during operation. AdBlue has a shelf life of approximately 1 year, therefore waste will be generated from expired AdBlue, which will be disposed of via a licensed contractor.

There are no other changes to the types of wastes generated and stored at the Site as a result of the proposed variation. The facility generates minimal waste, which comprises predominantly maintenance fluids such as oils and filters. All wastes generated are stored in secure and bunded containment as required and disposed of via a licenced contractor.

## 7. RAW MATERIALS

The following raw materials are used and stored at the Site. Changes as a result of this variation are shown in bold text.

- **HVO;**
- Diesel;
- Engine oil / lubricant;
- Antifreeze / coolant; and
- **AdBlue.**

Details of raw materials usage are provided in Table 11. Typical consumption values are given, as raw materials usage will be intermittent.

**TABLE 11: RAW MATERIALS USAGE**

Description of raw material and composition	Maximum amount	Annual throughput	Description of how the raw material is used including any main hazards
HVO	2,705 m <sup>3</sup>  Refer to Table 3 for details	Approx. 122 m <sup>3</sup> /a	HVO will be used as primary fuel for the new engines.  H226 - Flammable liquid and vapour H304: May be fatal if swallowed and enters airways. EUH066 Repeated exposure may cause skin dryness or cracking.
Diesel	2,705 m <sup>3</sup>  Refer to Table 3 for details  Note that this is the total quantity of fuel on Site (HVO and diesel)	Approx. 135 m <sup>3</sup> /a	Diesel is used for existing engines on Site and will be used as secondary fuel for new engines.  H226 Flammable liquid and vapour. H304 May be fatal if swallowed and enters airways. H315 Causes skin irritation. H332 Harmful if inhaled. H350 May cause cancer. H373 May cause damage to organs. H410 Very toxic to aquatic life with long lasting effects.
Engine oil / lubricant	35 m <sup>3</sup>	Approx. 17.5 m <sup>3</sup> /a	Used to lubricate generators.  No known significant effects or critical hazards

Description of raw material and composition	Maximum amount	Annual throughput	Description of how the raw material is used including any main hazards
AdBlue (solution of 32.5% urea in water).	142 m <sup>3</sup> (See Section 2.5 for details.)	Approx. 7 m <sup>3</sup> /a	AdBlue is injected into exhaust gas stream as part of SCR system for NOx abatement.  Not classified as a hazardous substance to health or the environment. (See safety data sheet in Appendix B.
Antifreeze / coolant.	55 m <sup>3</sup> (within engines, not stored onsite).	Approx. 11 m <sup>3</sup> /a.	Coolant for engines, typically changed every 2.5 to 3 years.  H302 Harmful if swallowed H373 May cause damage to organs if swallowed

The SCR system includes an SCR catalyst and ASC catalyst. These are not considered as 'raw materials' as they are not stored on site and they should not need replacing within the lifespan of the engines. The catalyst typically requires changing after 6,000-8,000 hours of use, and the engines will only be used for approximately 5 hours per year for routine testing / maintenance.

## 8. ENERGY EFFICIENCY

### 8.1 ENERGY USAGE

The Site will be supplied by the national grid during normal operation. Emergency power will be generated by the new generators, which will consume HVO or diesel to produce electricity. Changes to overall thermal input as a result of the proposed variation are shown in Table 12.

TABLE 12: CHANGES TO THERMAL INPUT

Area	Currently Permitted capacity (MWth)	Proposed capacity (MWth)
CWL11 engines	340.6	347.0
CWL12 engines	179.2	172.4
Total	519.9	519.4

The total capacity of the generators (existing and new engines combined) is 519.4 MWth. As each engine is routinely tested for a total of 5 hours per year, the Site has a theoretical annual thermal input of approximately 2,578 MWh for testing.

### 8.2 ENERGY EFFICIENCY

Energy efficiency is assured as far as possible through regular planned maintenance. The prime requirements for standby power generation of this type are reliability, availability and resilience.

An assessment against the requirements of Schedule 24 of the EP Regulations, which implements the Energy Efficiency Directive, has not been carried out for the Site. These requirements do not apply to installations operating under 1,500 hours per year. The installation is expected to be considerably under this threshold, each engine typically operating for 5 hours per year for testing purposes. Testing is limited to 50 hours per year in the permit, and emergency operation is limited to no more than 500 hours per year.

### 8.3 CLIMATE CHANGE AGREEMENT

A Climate Change Agreement (CCA) is in place for the Site (ref. DATC/T00001 v2, 10 May 2018). A copy of the activation letter is provided in Appendix E.

## 9. NOISE

A comparison has been undertaken of the proposed generator engines and the permitted generators that they will replace. Table 13 summarises the changes to specifications and noise emission levels.

**TABLE 13: COMPARISON OF NOISE EMISSION LEVELS FOR PERMITTED AND PROPOSED GENERATORS**

Generator Engines	No. of Engines to be installed at Site	Dimensions (LxWxH) (m)	Noise Level, LP dB(A) at 1m distance	Sound Power Level LWA, dB
Permitted Engines (202no. engines, of which 123 are currently installed), including:				
Kohler / KD1650E (Acoustically Enclosed)	65 CWL11 & 60 CWL12	2.4 x 6 x 2.6	65	88
Proposed Engines (194no. engines in total):				
Kohler / KD1800-F (Acoustically Enclosed)	18 CWL11	2.4 x 6.1 x 2.9	65	86
Kohler / KD1650-F (Acoustically Enclosed)	53 CWL12	2.4 x 8.1 x 2.9	65	87

As can be seen from Table 13 above, the Sound Power Levels of the proposed engines are lower than the permitted engines that they will replace. Sound Power Level is the total acoustic energy of the unit and presents an indication of noise emission by a unit, as such, lower sound power level means lower overall noise emission levels by the engine unit.

Other factors that contribute to lower noise levels than those currently permitted are:

- **Reduced number of sources:** The number of engines will be lower than the maximum number currently permitted at both CWL11 and CWL12 areas, therefore, the number of noise-emitting sources will be fewer and as such the overall noise will be lower than previously expected.
- **Larger acoustically enclosed containers:** The Kohler KD1650-F engines are larger in size with greater height than previous models, this leads to increased sound shielding by the engine containers themselves, which should reduce noise propagation from the central sources of the Site outwards.
- **Same Positioning:** The proposed engines will be located in the same area as currently permitted and will not be moved closer to the boundary or receptor locations. As such, noise is not expected to be elevated due to closer positioning.
- **Lower emission levels:** Sound Power levels of the proposed engines are lower than the permitted engines by 1-2 dB and will be expected to produce less noise, which will lower the overall noise levels from the installation and therefore an increase in noise levels is not expected over that already permitted.

Given the points outlined above, a comparison shows that noise levels from the proposed generators are expected to be lower than the permitted generators that they will replace, therefore, no increase in effect or impact is anticipated from the proposed changes in terms of noise.

## 10. H1 RISK ASSESSMENT

The H1 screening methodology has been used for screening emissions of NO<sub>x</sub> and Particulate Matter (PM<sub>10</sub>) to air. The file is supplied with this application via OneDrive as '*Newport Data Centre\_H1 Worksheet\_Final*'. The H1 methodology shows that detailed modelling of NO<sub>x</sub> and PM<sub>10</sub> emissions to air is required and this is described in Section 11 of this document.

Sulphur Dioxide (SO<sub>2</sub>) emissions are not expected to be a material issue for the site since all fuel oil for the Site is specified as ultra-low sulphur. The diesel fuel used in the engines is regulated to no more than 0.1% sulphur by mass, and HVO has a sulphur content of <0.001%.

## 11. DETAILED AIR DISPERSION MODELLING

### 11.1 SCOPE

A detailed Air Quality Impact Assessment to support the permit variation application for the Site can be found in Appendix A. An air dispersion model has been used to evaluate the potential air quality impact of the Site's emission during the testing regime (i.e. quarterly test and black building test) and two emergency outage scenarios (i.e. 1-hour and 72-hour) in relation to human health and ecology.

### 11.2 ASSESSMENT OF NO<sub>x</sub> EMISSIONS

#### 11.2.1 TESTING REGIME

No exceedance of the human health air quality standards were modelled from the quarterly individual engine tests, therefore, significant impacts on human health are not anticipated.

The AQIA concluded that no significant impacts are anticipated from quarterly testing of individual engines. Black building tests were modelled to potentially exceed the 1-hour Air Quality Standard (AQS), but unlikely to breach the AQS per year given that this requires more than 18 exceedances in a year and the black building tests are only scheduled to total 14.5 hours per year. The Black building test was also modelled to potentially exceed the 10-minute Acute Exposure Guideline Level 1 (AEGL-1) threshold, however, it should be noted that the model conservatively uses the least favourable meteorological conditions from a five year data set and the circumstance of this test actually coinciding with such conditions in practice is highly unlikely.

Ecological impacts within 10 km of the Site are considered insignificant for ambient 24-hour NO<sub>x</sub>, ambient annual NO<sub>x</sub>, nitrogen and acid deposition from the testing regime.

#### 11.2.2 EMERGENCY POWER GENERATION

Modelling suggests potential exceedances of the 1-hour NO<sub>2</sub> AQS and AEGL-1 thresholds from the 1-hour and 72-hour emergency outage scenarios. However, the one hour outage is considered unlikely and the 72 hour outage highly unlikely in practice. In combination with the conservative use of meteorological data in the modelling, the likelihood of significant impacts due to emergency running is considered to be low. The 72-hour emergency scenario may potentially impact the ambient 24-hour and annual mean NO<sub>x</sub>, nitrogen, and acid deposition at designated ecological sites close to the Site. However, the modelled impacts on ecology are also considered unlikely due to the rare occurrence of sustained power outages. In the event of emergency running, VDC will deploy its AQMP, monitor actual ambient air quality and liaise with the relevant authorities to manage any event.

### 11.3 ASSESSMENT OF PM<sub>10</sub> EMISSIONS

The screening assessment for the potential PM<sub>10</sub> emissions concluded that no exceedance of the 24-hour PM<sub>10</sub> AQS of 50 µg/m<sup>3</sup> is modelled, therefore, significant impacts are not anticipated.

### 11.4 ASSESSMENT OF SO<sub>2</sub> EMISSIONS

Potential emissions are not expected to be a material issue as the data centre will use ultra-low-sulphur diesel or HVO.

## 12. MONITORING

### 12.1 EMISSIONS TO AIR

No changes in monitoring emissions to air are proposed as a result of this permit variation.

New MCPs operating less than 500 hours per year are exempt from meeting MCPD ELVs and can use the following monitoring standard:

- 'monitoring stack emissions; low risk MCPs and specified generators'<sup>6</sup> (formerly called TGN M5).

The current EP requires carbon monoxide monitoring in line with the above standard. It is anticipated that this requirement will also apply to the 71 new generators, as shown in Table 14.

**TABLE 14: EMISSION LIMITS AND MONITORING REQUIREMENTS**

Source	Parameter	Limit	Reference Period	Monitoring Frequency	Monitoring standard of method
A63-A195 Generator exhausts (new MCP)	Carbon Monoxide	No limit set	In line with web guide: Monitoring stack emissions: low risk MCPs and specified generators	After 3 times the maximum average annual operating hours have elapsed and no less frequent than every 5 years.	Representative engine monitoring in line with web guide: Monitoring stack emissions: low risk MCPs and specified generators.

Emissions of NO<sub>x</sub>, SO<sub>2</sub>, PM and CO are calculated and reported annually as part of PRTR reporting. Emissions from the 71 new generators will be included in this reporting.

<sup>6</sup> <https://www.gov.uk/government/publications/monitoring-stack-emissions-low-risk-mcps-and-specified-generators/monitoring-stack-emissions-low-risk-mcps-and-specified-generators>

## 13. ENVIRONMENTAL RISK ASSESSMENT

### 13.1 SCOPE OF RISK ASSESSMENT

An environmental risk assessment has been undertaken for the changes included under this variation, i.e. generator changes, fuel change, SCR installation, and removal of load constraint.

### 13.2 RISK MATRIX

The risk matrix shown in Table 15 has been used in the risk assessment.

TABLE 15: RISK MATRIX

Risk Matrix		Severity (Consequence)		
		High	Medium	Low
Likelihood (Probability of exposure)	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

The definitions of severity and likelihood are as follows:

Likelihood:

- Low – An incident that is highly unlikely to occur without mitigation.
- Medium – A reasonably likely incident without mitigation.
- High – An incident that is highly likely to occur without mitigation.

Severity:

- Low – An incident that would have a negligible impact on receptors.
- Medium – An incident that would have a moderate impact on receptors.
- High – An incident that would have a significant impact on human health or the environment.

### 13.3 RISK ASSESSMENT

Refer to Table 16.

TABLE 16: ENVIRONMENTAL RISK ASSESSMENT

Hazard	Operational scenario	Receptor	Pathway	Risk management techniques	Probability of exposure	Consequence	Overall risk
Emissions to air (NO <sub>x</sub> , CO, SO <sub>2</sub> , particulates, NH <sub>3</sub> )	Testing	Residential, non-residential and ecological receptors are identified in AQIA - See Section 11 and Appendix A	Dispersion through the air	Proposed testing regime scheduled for minimum practicable impact – see detailed air quality modelling in Section 11. SCR to be installed for NO <sub>x</sub> abatement on new engines. SCR to include ASC to eliminate ammonia slip.	Medium	Low	Low
	Emergency operation	Residential, non-residential and ecological receptors are identified in AQIA - See Section 11 and Appendix A	Dispersion through the air	VDC has uninterruptable power supply (UPS) designed for up to 5 minutes autonomy.  In the event of a power outage it is expected that generators will start and take load within 3 minutes of the failure occurring.  Air Quality Management Plan defines actions in event of emergency operation.	Low	High	Medium
Emission to water (HVO from fuel belly tanks)	Accidental	Surface water course approximately 20m and 120m northwest, and 400m southeast of the Site	Run-off from hard standing and/or drainage routes and then to the surface water via	HVO is less hazardous than diesel.  Fuel belly tanks will be bunded. Fuel tank containment is within generator container therefore there will be no rainwater build up within the bunds.	Low	Medium	Low

Hazard	Operational scenario	Receptor	Pathway	Risk management techniques	Probability of exposure	Consequence	Overall risk
			surface water drains	<p>Any contaminated water would be pumped and removed for offsite treatment/disposal.</p> <p>The areas in which the fuel tanks will be located will be subject to a daily site housekeeping walk around to look for issues.</p> <p>The Site ground surface consists of hard standing maintained in good condition.</p> <p>There is a drain isolation system in place on site where 'bladders' inflate within the pipework to provide tertiary containment.</p> <p>Tanks and pipework related to delivery of fuel are all above ground. The drains are manually isolated during higher risk activities such as refuelling and are also fitted with leak detection sensors in the drains to automatically isolate the drains in case of a spill.</p> <p>All fill cabinets are fitted with drip trays. And oil</p>			

Hazard	Operational scenario	Receptor	Pathway	Risk management techniques	Probability of exposure	Consequence	Overall risk
				<p>interceptors are installed within the business park drainage system.</p> <p>The onsite surface water system also has an automatic shut off system to close the site outflow pipes at W1 and W2 in the event of a fuel leak, this has an automatic function and will notify the maintenance team upon activation or fault.</p> <p>VDC has emergency response procedures in place in the event of a release of any material. Refer to Section 3.3.2 for spill/leak procedures.</p>			
Emission to water (bulk AdBlue)	Accidental	Surface water course approximately 20m and 120m northwest, and 400m southeast of the Site	Run-off from hardstanding and/or drainage routes and then to the surface water via surface water drains	<p>AdBlue tanks will be bunded. Containment is within generator container therefore there will be no rainwater build up within the bunds.</p> <p>Any contaminated water would be pumped and removed for offsite treatment/disposal.</p> <p>The areas in which the AdBlue tanks will be located will be subject to a daily site housekeeping</p>	Low	Medium	Low

Hazard	Operational scenario	Receptor	Pathway	Risk management techniques	Probability of exposure	Consequence	Overall risk
				<p>walk around to look for issues.</p> <p>The Site ground surface consists of hard standing maintained in good condition.</p> <p>There is a drain isolation system in place on site where 'bladders' inflate within the pipework to provide tertiary containment.</p> <p>Tanks and pipework related to delivery of AdBlue are all above ground. The drains are manually isolated during higher risk activities such as refuelling and are also fitted with leak detection sensors in the drains to automatically isolate the drains in case of a spill.</p> <p>All fill cabinets are fitted with drip trays.</p> <p>VDC has emergency response procedures in place in the event of a release of any material. Refer to Section 3.3.2 for spill/leak procedures.</p>			
Odour (bulk AdBlue)	Accidental	Local businesses / residential receptors	Direct spill through	AdBlue has low odour potential.	Low	Low	Low

Hazard	Operational scenario	Receptor	Pathway	Risk management techniques	Probability of exposure	Consequence	Overall risk
			failure of tank/ pipework resulting in airborne NH <sub>3</sub> emissions.	Risk management techniques are primarily by prevention of loss of containment (see emission to water above).			
Odour (NH <sub>3</sub> emissions from exhaust gas)	Testing and emergency operations	Local businesses / residential receptors	Airborne	SCR to include ASC to eliminate ammonia slip.	Low	Low	Low
Noise and vibration	Generator testing	Local businesses / residential receptors	Airborne	<p>The proposed testing regime is scheduled for daytime hours.</p> <p>Generators are housed in enclosed acoustic containers.</p> <p>Noise levels from the proposed generators are expected to be lower than the permitted generators that they will replace, refer to Section 9 for more details.</p>	Low	Low – nearest residences are approximately 150 m to the northeast. The nearest businesses are directly adjacent south.	Low
Noise and vibration	Emergency operation	Local businesses / residential receptors	Airborne	<p>Emergency running likelihood is expected to be very unlikely. Generators are housed in enclosed acoustic containers.</p> <p>Additionally, noise levels from the proposed generators are expected to be lower than the permitted generators that</p>	Low	Medium – nearest residences are approximately 150 m to the northeast. The nearest businesses are directly adjacent south.	Low

Hazard	Operational scenario	Receptor	Pathway	Risk management techniques	Probability of exposure	Consequence	Overall risk
				they will replace, refer to Section 9 for more details.			
Visible emissions (Black smoke on start-up)	Generators testing / emergency operation	Local businesses / residential receptors	Airborne/ visual	Minimisation of planned testing. Low likelihood of emergency running (see emissions to air)	Low	Low – short duration visible emission	Low



## APPENDIX A      AIR QUALITY IMPACT ASSESSMENT



## APPENDIX B      ADBLUE SAFETY DATASHEET



## APPENDIX C      ISO 14001 CERTIFICATION



## APPENDIX D      NEW ENGINE SPECIFICATIONS



## APPENDIX E

## CLIMATE CHANGE AGREEMENT DOCUMENTS

## APPENDIX F MCP CHECKLIST

This appendix contains the MCP checklist included in Appendix 8 of Part C3 of the application.

**TABLE F1: MCP CHECKLIST FOR CWL11 NEW ENGINES**

Questions	Answers		
1 What is the MCPD identifier (As shown on site plan)?	A94-A111		
2 What is the rated thermal input (MWth) of the medium combustion plant. Where there is more than one medium combustion plant, please provide the individual and aggregated total thermal input for all plants.	3.504	MWth (only one)	
	63.1	MWth (if more than one)	
3 Please indicate the type of medium combustion plant by ticking the appropriate option.	Diesel engine		<input checked="" type="checkbox"/>
	Gas turbine		<input type="checkbox"/>
	Dual fuel engine		<input type="checkbox"/>
	Other engines		<input type="checkbox"/>
	Other medium combustion plant		<input type="checkbox"/>
4 Please state the type of fuels used	Fuel type	Tick relevant options	Share of fuels used (%)
	Solid Biomass	<input type="checkbox"/>	
	Other Solid Fuels	<input type="checkbox"/>	
	Gas Oil (Diesel)	<input checked="" type="checkbox"/>	0
	Liquid fuels other than gas oil	<input checked="" type="checkbox"/>	100
	Natural Gas	<input type="checkbox"/>	
	Gaseous fuels other than natural gas		
5 Please state the start date of the operation of the Medium Combustion Plant. Or where the exact start date is unknown, provide proof that the operation started before 20th December 2018.	New MCPs, not yet in operation.		Start date
	Or, if start date unknown; provide proof:		
			Document reference



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6 Please state the sector of activity of the Medium Combustion Plant or the facility in which it is applied (NACE code)	J63.1.1 - Data processing, hosting, and related activities.		
7 Please state the expected number of annual operating hours of the Medium Combustion Plant, and average load in use.	5 hours per generator	Hours	
	Up to 100%, dependent on load requirement (Refer to Table 2)	Average load in use	
8 Please confirm that where the option of exemption under article 6(3) or article 6(8) of the medium combustion plant directive is used, the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	Yes, I/We confirm that where the option of exemption under article 6(3) or article 6(8) of the medium combustion plant directive is used, the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs		<input checked="" type="checkbox"/>
9 Please confirm that the operator name, registered office address and in the case of stationary medium combustion plant, the address where the plant is located is as stated in Form Part A and Form Part B1.	Yes, I/We confirm that the operator name, registered office address and in the case of stationary medium combustion plants, the address where the plant is located is as stated in Form Part A and Form Part B1.		<input checked="" type="checkbox"/>

TABLE F2: MCP CHECKLIST FOR CWL12 NEW ENGINES

Questions	Answers		
1 What is the MCPD identifier (As shown on site plan)?	A143-A195		
2 What is the rated thermal input (MWth) of the medium combustion plant. Where there is more than one medium combustion plant, please provide the individual and aggregated total thermal input for all plants.	3.252	MWth (only one)	
	172.4	MWth (if more than one)	
3 Please indicate the type of medium combustion plant by ticking the appropriate option.	Diesel engine	<input checked="" type="checkbox"/>	
	Gas turbine	<input type="checkbox"/>	
	Dual fuel engine	<input type="checkbox"/>	
	Other engines	<input type="checkbox"/>	
	Other medium combustion plant	<input type="checkbox"/>	
4 Please state the type of fuels used	Fuel type	Tick relevant options	Share of fuels used (%)
	Solid Biomass	<input type="checkbox"/>	
	Other Solid Fuels	<input type="checkbox"/>	
	Gas Oil (Diesel)	<input checked="" type="checkbox"/>	0
	Liquid fuels other than gas oil	<input checked="" type="checkbox"/>	100
	Natural Gas	<input type="checkbox"/>	
	Gaseous fuels other than natural gas		
5 Please state the start date of the operation of the Medium Combustion Plant. Or where the exact start date is unknown, provide proof that the operation started before 20th December 2018.	New MCPs, not yet in operation.	Start date	
	Or, if start date unknown; provide proof:		
		Document reference	
6 Please state the sector of activity of the Medium Combustion Plant or the facility in which it is applied (NACE code)	J63.1.1 - Data processing, hosting, and related activities.		



7 Please state the expected number of annual operating hours of the Medium Combustion Plant, and average load in use.	5 hours per generator	Hours
	Up to 100%, dependent on load requirement (Refer to Table 2)	Average load in use
8 Please confirm that where the option of exemption under article 6(3) or article 6(8) of the medium combustion plant directive is used, the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs.	Yes, I/We confirm that where the option of exemption under article 6(3) or article 6(8) of the medium combustion plant directive is used, the medium combustion plant will not be operated more than the number of hours referred to in those paragraphs	<input checked="" type="checkbox"/>
9 Please confirm that the operator name, registered office address and in the case of stationary medium combustion plant, the address where the plant is located is as stated in Form Part A and Form Part B1.	Yes, I/We confirm that the operator name, registered office address and in the case of stationary medium combustion plants, the address where the plant is located is as stated in Form Part A and Form Part B1.	<input checked="" type="checkbox"/>



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