

# Permitting decisions

## Bespoke permit

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We have decided to grant the permit for Hayes Data Centre Emergency Back-up Generation Facility operated by Amazon Data Services UK Limited.  
The permit number is EPR/DP3442QV.

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

## 1 Purpose of this document

This decision document provides a record of the decision making process. It summarises the decision making process in the decision checklist to show how all relevant factors have been taken in to account.

This decision document provides a record of the decision making process. It:

- highlights [key issues](#) in the determination
- summarises the decision making process in the [decision checklist](#) to show how all relevant factors have been taken into account
- shows how we have considered the [consultation responses](#).

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Read the permitting decisions in conjunction with the environmental permit. The introductory note summarises what the permit covers.

## 2 Key issues of the decision

### 2.1 Description of the installation

The Hayes Data Centre Emergency Back-up Generation Facility (labelled 'EC1' on the site plan) is required to provide emergency back-up power to the Data Centre and its associated infrastructure. This is one of three Data Centres being developed on campus and, at the time of writing, the other two Data Centres are due to be under the control of a separate operator and are likely to be covered under a separate permit.

The construction of Hayes Data Centre will see 14 new 8.01 MW(th) Rolls Royce MTU DS4000 emergency back-up diesel generators installed over several floors in Energy Centre 1 ("EC1"). The total (aggregated) capacity is approximately 112 MW(th) and so is captured as a Schedule 1, Part A(1)(a) under the Environmental Permitting Regulations burning fuel of any fuel in an appliance with a rated thermal input of 50 megawatts (MW) or more comprised of New Medium Combustion Plant (MCP).

The site is in an urban location, which is relatively industrial in the immediate vicinity, with residential properties 400m to the North and South. The Parkway dual carriageway is located directly East which joins the M4 motorway further South. To the North, the site backs onto a railway line. The Grand Union Canal borders the campus to the South, while the River Crane borders the East boundary of the site.

During normal operations of the site, the generators are run for maintenance and testing only, according to the testing schedule as follows.

The generators are solely used as standby plant for emergency power provision in the event of grid failure. At the theoretical design load, only 12 of the 14 generators would need to operate to carry the site's electrical load with 2 acting as redundancy.

There is no capacity agreement in place or plans to operate the generators for generating revenue. As such, operation of the generators is likely to be limited to monthly maintenance and testing of no more than 50 hours / year / generator.

The planned operation of the generators is as follows and will be confirmed once the site is operational:

### **1. Testing and maintenance**

Each generator unit is tested separately at 25% load for half an hour every two weeks per annum. There is also a 1 hour test each quarter. This totals 14 hours per generator.

In addition to fortnightly and quarterly tests, each generator unit will be tested separately at 100% load for 1.5 hours, twice per annum. This equates to 3 hours per generator.

### **2. Grid outage**

In the unlikely event of a loss of grid power to the building, all 14 generators will start and then drop off according to requirement. The arrangement at this installation ensures that 12 generators can provide the full electrical requirement to the site, with 2 generators as back up in the event a generator fails to start.

## **2.2 Air Quality**

The primary pollutants of concern to air quality are nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), particulates and sulphur dioxide (SO<sub>2</sub>) resulting from the combustion process on site. The Applicants' air quality risk assessment is set out in the application document titled 'Air Quality Assessment', version V4, dated July 2022 and 'Air Quality Assessment Addendum for Ecological Impacts', version V1, dated March 2023. These included an air dispersion modelling study which assessed the potential impact on local air quality of emissions of NO<sub>x</sub>, particulates and SO<sub>2</sub> from the generators. Both the maintenance testing and emergency scenarios were assessed within the modelling exercise.

Refer to our web guidance [Air emissions risk assessment for your environmental permit](#) for the assessment criteria and methodology, air quality standards, and definitions of technical parameters.

The data centre is situated within the Air Quality Management Area (AQMA) declared by the London Borough of Hillingdon for NO<sub>2</sub>.

The air dispersion model carried out by the applicant used the ADMS software which we consider an appropriate air quality modelling tool for regulatory purposes. The model used 5 years meteorological data (2015-2019) from the London Heathrow airport meteorological station and included the potential effects of buildings but not terrain in the modelling domain on the dispersion of the emitted pollutants. The ADMS-5 user guidance suggests terrain effects should only be modelled where the gradient exceeds 1:10. The local area to this site is flat and as such, the impact of complex terrain has not been modelled. We agree with this approach.

The assessment carried out by the Applicant also included a sensitivity analysis of the modelling set up and a statistical interpretation of short-term exceedances of air quality standards.

Our Air Quality Modelling and Assessment Unit (AQMAU) has audited the air dispersion modelling and report submitted with the permit application, including the selection of inputs, modelling methodology and assumptions, outputs of the modelling exercise, statistical interpretation of modelling outputs and conclusions of the assessment.

Considering the uncertainty of the modelling predictions and statistical analysis we have imposed an improvement condition (IC2) requiring the Applicant to validate the results of their assessment with air quality monitoring at the boundaries of the site.

## Testing scenarios

The applicant modelled the testing operation of the generators according to the following:

- **Testing Scenario 1:** 'Fortnightly and Quarterly Test' scenario accounting for 14 hours of operation per year, per generator, at 25% load. Tested individually.
- **Testing Scenario 2:** 'Bi-Annual Test' scenario accounting for 3 hours of operation per year, per generator, at 100% load. Tested individually.
- **Emergency Scenario:** 72-hour grid failure event, with all generators running concurrently at 100% load.

The Applicant's assessment is summarised in the following:

- The process contributions (PC) / predicted environmental concentrations (PEC) of CO, particulates, benzene and SO<sub>2</sub> are non-significant at all receptors.
- The hourly mean percentile PC of NO<sub>2</sub> is anticipated to exceed both short-term screening criteria at four discrete receptors in the vicinity of the site, during a 72-hour grid failure event. However, the PEC is anticipated to be less than the relevant AQS at all receptors, even at the 99.79th percentile. As such, significant short-term impacts on NO<sub>2</sub> as a result of an emergency grid failure are not anticipated.
- The long-term PC/PEC of NO<sub>2</sub> are non-significant at all the human and ecological receptors.
- Both long term and short-term increases in pollution concentrations as a result of the operation of the proposed SBGs are not expected to have a significant impact on local air quality, in any normal grid failure or testing scenarios.

Although we don't agree with all the elements and predictions of the Applicants' assessment, we agree with their conclusions regarding human health. Taking into account the results of our audit, we are satisfied that the testing regime will not be likely to result in breaches of the statutory AQS and significant impacts on the human receptors in the area.

Whilst we cannot rule out exceedances of the daily NO<sub>x</sub> critical level at a number of nearby Local Wildlife Sites (LWS), we consider exceedances to be unlikely provided the grid reliability at the facility remains high.

## Emergency scenario

An assumed 3 day worst case scenario and 14 generators running concurrently at 100% load for full loss of power has been modelled which we consider a conservative scenario, given the information provided by the Applicant on the reliability of the connection of the installation to the electric grid.

For this scenario we found that there is the potential for exceedance of:

- The daily (short term) NO<sub>2</sub> environmental standards at sensitive human health receptor locations. However the PEC for ST NO<sub>2</sub> is not predicted to exceed the environmental standard.
- There is unlikely to be any exceedance of the rest of the environmental standards at sensitive human receptor locations outside the site boundary.
- Under the testing and emergency scenarios, the PCs are predicted to be insignificant when compared to the relevant critical levels and critical loads for the European habitat sites. The PCs are predicted to be less than 100% for the local nature sites. The applicant has applied the daily NO<sub>x</sub> critical level of 75 µg/m<sup>3</sup>.

Our audit of the Applicant's assessment has led us to the conclusion that the risk of exceeding the short-term statutory AQS for NO<sub>2</sub> during the emergency operations of the installation is low. The emergency scenario is unlikely to make a significant contribution to or cause an exceedance of the NO<sub>x</sub> annual critical level, NH<sub>3</sub> annual critical level or the nutrient nitrogen and acid deposition critical loads. We cannot rule out an exceedance of the daily mean NO<sub>x</sub> critical levels of 75 µg/m<sup>3</sup> and 200 µg/m<sup>3</sup> at the nearby LWSs as a result of 72 hours of emergency operation. However, we consider the likelihood of exceedances occurring as a result of a major grid failure to be low on the basis that historical data indicates that power outages have been rare.

We have specified that the operator shall have a written action Air Quality Management Plan (AQMP) to manage the risks for prolonged emergency running of the plant and limit the duration of an outage event to less than 50 hours, as far as possible. This needs to be proportionate to the level of risk at the receptors. The operator is expected to work with the Local Authority to develop this plan to ensure local factors are fully considered. This AQMP is included in the permit through improvement condition IC1.

Also, the additional measures specified under IC3 are expected to achieve a reduction of impacts during the emergency operations.

There are high uncertainties particularly due to some receptors being located in the wake and cavity of buildings. Thus we have a specified improvement condition IC2 requiring the operator to determine the actual short term NO<sub>x</sub> concentrations at the site boundary through monitoring to contribute to the validation of conclusions reached in the air quality assessment within the application and to inform the air quality management plan.

### **Permit conditions**

The permit 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. 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.

The limit on the emergency use of 500 hours is for the installation as a whole, meaning that as soon as one generator starts operating the hours count towards the 500 hours.

The planned testing operations of the generators shall be limited to the maximum testing hours described in the testing schedule outlined in the application documents and included by reference in the Operating Techniques Table S1.2 of the permit.

Reporting of standby engine maintenance run hours is required annually and any electrical outages (planned or grid failures regardless of duration) requires both immediate notification of the Environment Agency and annual reporting.

## **2.3 Noise**

The primary noise sources on site are the generators, chillers, fans and transformers. The generators are located within a building that reduces sound emissions and are provided with silencers on their exhausts.

We are not aware of any previous noise complaints relating to the site and the Applicant declared that there has not been any history of noise complaints due to the activities carried out at the site.

Although no noise management plan has been requested to date, condition 3.4 enables the Environment Agency to request one if considered necessary in the future.

## **2.4 Best Available Techniques (BAT)**

We accept that oil fired diesel generators are presently a commonly used technology for standby generators in data centres. However we requested a BAT assessment detailing the choice of engine, the particular configuration and plant sizing meeting the standby arrangement.

The default generator specification as a minimum for new plant to minimise the impacts of emissions to air (NO<sub>x</sub>) is 2g TA-Luft (or equivalent standard) or an equivalent NO<sub>x</sub> emission concentration of 2000mg/m<sup>3</sup> at reference conditions and 5% O<sub>2</sub>. The generator specifications on the site have emissions that are in line with these specifications.

## **2.5 Protection of Groundwater and Soil**

The urea tanks used to supply the source of ammonia to the Selective Catalytic Reduction (SCR) system will be stored in 7 2,500 litre tanks. These are to be integrally bunded to 110% and located within the generator rooms, with one tank serving two generators. In addition, these tanks will also have overflow alarms and leak detection devices.

The emergency back-up generators will be supplied with fuel which will be stored in 14 26,000 litre belly tanks, located beneath each generator.

The belly tanks will store enough fuel to provide 24 hours' worth of electricity when running at 100% continuous load. Each tank is double skinned and integrally bunded to 110% of the capacity of the tank. Leak detection and overfill alarms are present on each tank.

The site is to be covered in good quality hard standing and the drainage system is split into separate foul and surface water networks. The installation has no discharge to any surface water and will go through interceptor before entering the local network. Discharges will be limited to surface run-off which is unlikely to contain significant levels of contaminated liquid e.g. fuel / oils. The surface water drainage system is connected to a forecourt separator / interceptor prior to discharging to the local network. This will be fitted with an automatic sensor for detecting the presence of fuel and will close when actuated.

Spill kits (including drain covers) will be stored in close proximity of fuel storage and fill points. Drip trays will be used to capture spillages from fill points and associated pipework.

Fuel delivery, Emergency preparedness and spill response procedures to be implemented once the site operational. Suppliers are to adhere to procedures. Deliveries are to be carried out by competent individual(s) and supervised by site staff. PPM regime to include visual checks for leaks / spills. Hazardous waste to be disposed of by licenced carrier with duty of care information retained as evidence.

### 3 Decision checklist

Aspect considered	Decision
<b>Receipt of application</b>	
Confidential information	A claim for commercial or industrial confidentiality has not been made. The decision was taken in accordance with our guidance on confidentiality.
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential. The decision was taken in accordance with our guidance on confidentiality.
<b>Consultation</b>	
Consultation	The consultation requirements were identified in accordance with the Environmental Permitting Regulations and our public participation statement. The application was publicised on the GOV.UK website. We consulted the following organisations: <ul style="list-style-type: none"> <li>• Environmental Health and Planning – London Borough of Hillingdon</li> <li>• Food Standards Agency</li> <li>• Health and Safety Executive</li> <li>• Director of Public Health England and UKHSA (formerly PHE)</li> </ul> The comments and our responses are summarised in the <a href="#">consultation section</a> .
<b>Operator</b>	
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the grant of the permit. The decision was taken in accordance with our guidance on legal operator for environmental permits.
<b>The facility</b>	
The regulated facility	We considered the extent and nature of the facility at the site in accordance with RGN2 'Understanding the meaning of regulated facility', Appendix 2 of RGN 2 'Defining the scope of the installation', Appendix 1 of RGN 2 'Interpretation of Schedule 1', guidance on waste recovery plans and permits. The extent of the facility is defined in the site plan and in the permit. The activities are defined in table S1.1 of the permit.
<b>The site</b>	
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility. The plan is included in the permit.
Site condition report	The operator has provided a description of the condition of the site, which we consider is satisfactory. Based on the site condition report, we consider that appropriate pollution prevention measures are in place and that the pollution of land and water is unlikely. The decision was taken in accordance with our guidance on site condition reports.
Biodiversity, heritage, landscape and nature conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. The following statutorily protected site are within relevant screening distance from the installation: <ul style="list-style-type: none"> <li>• Richmond Park SAC (UK0030246).</li> <li>• South West London Waterbodies SPA (UK9012171).</li> <li>• South West London Waterbodies Ramsar (UK11065).</li> </ul> We consider that the application will not affect the statutorily protected conservation sites or their habitats. A number of local ecological sites are within relevant screening distance. Having taken into considerations the predictions of the air dispersion model submitted by the Applicant we have concluded that the testing scenarios are unlikely to make a significant contribution or cause an exceedance of any critical loads and levels at ecological receptors. • The emergency scenario is unlikely to make a significant contribution to or cause an

Aspect considered	Decision
	<p>exceedance of the NOX annual critical level, NH3 annual critical level or the nutrient nitrogen and acid deposition critical loads. We cannot rule out an exceedance of the daily mean NOX critical levels of 75 µg/m3 and 200 µg/m3 at the nearby LWSs as a result of 72 hours of emergency operation. However, we consider the likelihood of exceedances occurring as a result of a major grid failure to be low on the basis that historical data indicates that power outages have been rare.</p> <p>We sent a Habitat Risk Assessment (HRA) to Natural England for information only. The decision was taken in accordance with our guidance.</p>
<b>Environmental risk assessment</b>	
Environmental risk	<p>We have reviewed the operator's assessment of the environmental risk from the facility.</p> <p>The operator's risk assessment is satisfactory, however we have included improvement conditions to ensure additional considerations of risk relating to emissions to air are considered on an ongoing basis.</p> <p>See key issues section above.</p>
<b>Operating techniques</b>	
General operating techniques	<p>We have reviewed the techniques used by the operator and compared these with the relevant guidance notes and we consider them to represent appropriate techniques for the facility.</p> <p>The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.</p>
<b>Permit conditions</b>	
Improvement programme	<p>Based on the information on the application, we consider that we need to set an improvement programme.</p> <p>We have set an improvement programme as outlined in the key issues section above.</p>
Emission limits	<p>We have decided that emission limits are not required in the permit.</p>
Reporting	<p>We have specified reporting in the permit to ensure that the installation is being operated in line with that specified in the operating techniques and to ensure that we are notified immediately in the instance that the site ever operated in emergency scenario mode.</p>
<b>Operator competence</b>	
Management system	<p>There is no known reason to consider that the operator will not have the management system to enable it to comply with the permit conditions.</p> <p>The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.</p>
Relevant convictions	<p>The Case Management System and National Enforcement Database have been checked to ensure that all relevant convictions have been declared.</p> <p>No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.</p>
Financial competence	<p>There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.</p>
<b>Growth Duty</b>	
Section 108 Deregulation Act 2015 – Growth duty	<p>We have considered our duty to have regard to the desirability of promoting economic growth set out in section 108(1) of the Deregulation Act 2015 and the guidance issued under section 110 of that Act in deciding whether to grant this permit.</p> <p>Paragraph 1.3 of the guidance says:</p> <p>“The primary role of regulators, in delivering regulation, is to achieve the regulatory outcomes for which they are responsible. For a number of regulators, these regulatory outcomes include an explicit reference to development or growth. The growth duty establishes economic growth as a factor that all specified regulators should have regard to, alongside the delivery of the protections set out in the relevant legislation.”</p> <p>We have addressed the legislative requirements and environmental standards to be set for this operation in the body of the decision document above. The guidance is clear at paragraph 1.5 that the growth duty does not</p>

Aspect considered	Decision
	<p>legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections.</p> <p>We consider the requirements and standards we have set in this permit are reasonable and necessary to avoid a risk of an unacceptable level of pollution. This also promotes growth amongst legitimate operators because the standards applied to the operator are consistent across businesses in this sector and have been set to achieve the required legislative standards.</p>



## 4 Consultation

The following summarises the responses to consultation with other organisations, our notice on GOV.UK for the public and the way in which we have considered these in the determination process.

<b>Response received on 16/05/2023 from</b>
UKHSA
<b>Brief summary of issues raised</b>
UKHSA responded that they had no significant concerns regarding the risk to the health of the local population from the installation. The consultation response was based on the assumption that the permit holder shall take all appropriate measures to prevent or control pollution, in accordance with the relevant sector guidance and industry best practice.
<b>Summary of actions taken or show how this has been covered</b>
See key issues section above for information relating to the air quality modelling assessment. No action required.

We also consulted with:

- Environmental Health and Planning - London Borough of Hillingdon
- Food Standards Agency
- Health and Safety Executive
- Director of Public Health England and UKHSA (formerly PHE)

We did not receive comment or representations from these consultees or members of the public.