

# Permitting decisions

## Bespoke permit

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We have decided to grant the permit for Woking Data Centre operated by Digital Realty (UK) Limited. The permit number is EPR/TP3530DV.

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.

### 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.

## Key issues of the decision

### Description of the installation

The site is an existing data centre which consists of a Schedule 1 Part A(1) 1.1 activity under the Environmental Permitting Regulations for the burning of any fuel in an appliance with a rated thermal input of 50 or more megawatts (MW).

The combustion plant comprises 65 diesel fuelled standby generators. 55 of the generators have a thermal input of 3.16MWth, 8 generators at 4.15MWth and 2 generators at 3.3MWth each. The aggregated total combustion capacity on site is 214MWth. No electricity will be exported from the installation.

The standby generators are powered using diesel which is stored in double skinned tanks below the generators. The tanks vary in size from 19,000 litres up to 46,000 litres. The site has a total diesel storage capacity of 1.5 million litres. The site is covered in hardstanding and surface water gullies drain into an oil interceptor prior to discharge from site. The fuel tanks are fitted with leakage alarms.

Each generator has an exhaust, approximately 6.4m above ground level.

The standby generators are designed and configured so that in the event of a mains failure all the generators will fire up then subsequently ramp down to meet the load demand at the site. All the generators are subject to a testing schedule which is as follows:

- Monthly testing – generators are started off load and run for 2-3 minutes, one at a time.

- Service A/B – the generators are tested in banks of 4. One generator is turned on and the other 3 are turned on and synchronised up to 100%. 4 generators will run for 1 hour at a time. This is done once a year. Additionally, a service test is carried out at 6 month intervals, when each generator is run for 5 minutes.
- Pull the plug scenario – originally all 65 generators were started for 15 minutes then auto-ramped down to meet the load demand of the site, with only 22 generators running for the remaining 45 minutes. To reduce emission levels, the site will manually reduce the number of generators for the required test of the system. This will result in 23 generators less, a reduction of 35% of generators running.

The site is located on a trading estate to the southwest of the London Orbital. The National Grid Reference for the site is 498500,159260. The site is approximately 3.9 hectares in size. The surrounding area is a mix of industrial, commercial and residential uses.

There is no sewer connection related to the process.

## Air Quality

The primary pollutant of concern to air quality is nitrogen dioxide (NO<sub>2</sub>) resulting from the combustion process on site. The Applicant has submitted an air dispersion modelling report which assesses the potential impact of emission of NO<sub>2</sub> from the generators on local air quality.

The data centre is not situated in an Air Quality Management Area (AQMA) and there are no AQMAs within 2km of the site.

Our Air Quality Modelling and Assessment Unit (AQMAU) audited the air dispersion modelling and report submitted with the permit application. Both the maintenance testing and emergency scenarios within the modelling were assessed.

### Maintenance testing

The applicant has modelled continuous operation for the maintenance scenario which is a worst case approach.

The PEC exceeds 100% of the short-term human health and ecological EQSs at a number of receptor locations and therefore further investigation was required to look at the actual likelihood of the process resulting in a breach of the EQSs. The Applicant completed statistical analysis to determine the likelihood of the worst predicted emissions coinciding with the worst meteorological years, and subsequently causing a breach of the short-term EQSs. The approach followed the approach set out in the following report '[Diesel generator short term NO<sub>2</sub> impact assessment](#)' dated 01/11/2016 to calculate the likelihood. The results show that there is a negligible risk of the process resulting in an exceedance of the EQSs and we agree with this conclusion.

Improvement condition IC2 is specified in the permit which requires the operator to produce a report outlining the details of the annual maintenance operating regime following the first year of operation following permitting to validate the information provided with the permit application.

### Emergency scenario

Although the site has operated for approximately 8 years without being required to operate in emergency mode, the air quality modelling does indicate that the emergency outage operating scenario could pose a risk to local air quality and identified receptors for short term NO<sub>2</sub>. As a result, improvement condition IC4 requires the Operator to submit a review of options for reducing predicted short term nitrogen dioxide emissions impacts for the grid failure emergency scenario. In the short term this concern will be addressed through the Air Quality Management Plan required by improvement condition IC1.

The EA has specified that the operator shall 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). 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.

A Schedule 5 notice was issued requesting additional information on potential improvements that could be made on site such as upgrading of generators or increased stack heights to improve dispersion of NO<sub>2</sub>. Improvement condition IC4 requires the Operator to expand of their response to this information request and

submit a review of options for reducing predicted short term nitrogen dioxide emissions impacts for the grid failure emergency scenario – see section on BAT below for further information.

We have also specified improvement condition IC3 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.

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 or associated 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).

The permit has a limit on the activity to exclude voluntary 'elective power operation' such as demand side response (i.e. on-site use) or grid short term 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' that voluntarily operate within the balancing market, and importantly a clear way to demonstrate minimisation of emissions to air as 'Emergency plant'.

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 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).

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.

### **Noise**

The primary noise sources on site are the generators, chillers, fans and transformers. An acoustic barrier has been constructed along the western elevation of the site. The generators are located within acoustic containers to reduce sound emissions. Previous noise complaints from the adjacent residents were received regarding noise from the transformers and fans.

The Applicant submitted a noise survey with the permit application to assess the effectiveness of a noise barrier installed at the site. The noise barrier was erected to mitigate fan and transformer noise from a series of HV cabins to the south west side of the main building. The key findings were as follows:

Noise levels recorded in the car parks on Willowmead Close (chosen to represent the nearest affected residential boundary) are 7-10 dB lower than those measured prior to the construction of the noise barrier in 2012. The noise barrier consisted of a 7.5m high acoustic screen constructed from a steel frame faced with acoustic panels and steel cladding. Predicted worst case exceedances of approximately 12 dB and 20dB were anticipated.

Noise at the fence line has reduced by around 15-21 dBA. Noise monitoring data recorded prior to installation supports this conclusion. However, the noise generated by the transformers and fans has varied between the 2012 and 2014 surveys and therefore the comparison only provides a general indication of the effectiveness of the barriers.

The operator confirmed that no complaints in relation to the fan or transformer noise have been received following the installation of the noise barrier. One additional noise complaint was received in 2016 in relation to the waste bin collection and the collection time was rearranged in response. A quarterly audit of compliance against a number of noise indicators is carried out at the installation. An incident reporting procedure is contained within the environmental management system. 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.

## **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>. The generator specifications on the site have emissions significantly higher than this. The BAT assessment attributed this to the generators being on site when it was purchased. We do acknowledge that it would not be practicable to require the operator at this stage to upgrade all plant to BAT standards. However upgrade of some plant could be considered as part of the requirement to reduce short term nitrogen dioxide outlined in improvement condition IC4.

Retrofit abatement techniques for existing installations for engine emissions such as selective catalytic reduction (SCR) would not normally be expected for standby plant to mitigate the emissions for standby/emergency operation. The Applicant confirmed that they will carry out further investigation into reductions in short term NO<sub>x</sub> and may consider options such as changes to operational control of the plant, modifications to the flue gas dispersion or installation of reduction equipment. Options such as this will need to be considered further through the response to improvement condition IC4.

The site is powered off a 132kVa grid system, with two electrical incomers onto the site. Both incomers supply the site with electricity, but the site can also be supported by either supply in isolation.

## **Protection of Groundwater**

The site is covered in hardstanding. Diesel tanks are double skinned and part of a preventative maintenance programme. Leak detection alarms are installed within the tanks. Each set of generators are housed within bunded containers. Fuel lines to generators are enclosed.

Storm drains in the generator compound run into the petrol / oil interceptor located under the car park. The interceptor is cleaned on an annual basis.

Each set of generators are housed within bunded containers sufficient to contain complete loss of all fluids held within the generator / engine. Spill prevention kits are located in the plant areas.

Fuel is supplied to the engine by a suction pump. A float switch is present in the tank to detect the level of liquid. Fuel fill points are bunded. Oil interceptors have been installed on the drainage system surrounding the fuel tank/fill points.

## 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: Environmental Health – Woking Council Food Standards Agency Health and Safety Executive Public Health England and Director of Public Health 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.  See key issues section for additional information.  We have sent an Appendix 11 to Natural England for information only. The decision was taken in accordance with our guidance. An Appendix 4 was saved to our electronic document records management system (EDRM) for audit purposes only.
<b>Environmental risk assessment</b>	
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. 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.  See key issues section above.
<b>Operating techniques</b>	

<b>Aspect considered</b>	<b>Decision</b>
General operating techniques	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. The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.
<b>Permit conditions</b>	
Improvement programme	Based on the information on the application, we consider that we need to impose an improvement programme. We have imposed an improvement programme as outlined in the key issues section above.
Emission limits	We have decided that emission limits are not required in the permit.
Reporting	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.
<b>Operator competence</b>	
Management system	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. The decision was taken in accordance with the guidance on operator competence and how to develop a management system for environmental permits.
Relevant convictions	The Case Management System and National Enforcement Database have been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in our guidance on operator competence.
Financial competence	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions.
<b>Growth Duty</b>	
Section 108 Deregulation Act 2015 – Growth duty	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. Paragraph 1.3 of the guidance says: “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.” 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 legitimise non-compliance and its purpose is not to achieve or pursue economic growth at the expense of necessary protections. 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.

# 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 29/03/17 from</b>
Public Health England
<b>Brief summary of issues raised</b>
<ul style="list-style-type: none"><li>• Recommendation that any Environmental Permit issued for the site should contain conditions to ensure that the potential emissions from the installation do not impact upon public health.</li><li>• Recommendation that the Environment Agency should assess the modelling undertaken for the diesel generators to check whether it is robust.</li><li>• The worst case scenario modelled concentrations indicate that the emissions could pose a potential short-term adverse risk to public health, however the probability of the risk is predicted to be low as the generators are tested infrequently and the site has a dual connection to the grid.</li><li>• The applicant has provided limited detail on abatement / mitigation for the air emissions from the diesel generators. The Environment Agency may wish to assess whether measures to limit nitrogen dioxide emissions from the generators have been fully considered by the applicant to limit any potential impacts on local air quality.</li><li>• Recommendation that the Environment Agency consults the Local Authority, the Food Standards Agency and the Director of Public Health.</li></ul>
<b>Summary of actions taken or show how this has been covered</b>
<p>We carried out an assessment of the air quality modelling provided with the permit Application. Our Air Quality Assessment and Modelling team audited the assessment. As outlined in the key issues above, we agree with the Applicant's conclusions, that the maintenance scenario is unlikely to cause an exceedence of the EQSs. The site has not operated in emergency scenario in 8 years, however we have specified a number of improvement conditions which require the operator to carry out additional work in relation to the potential short term predictions resulting from the emergency scenario. These include working with the Local Authority to put together an Air Quality Management Plan and considering additional measures that could be put in place to reduce potential emissions of short term NOx which could include abatement measures.</p> <p>We consulted the Local Authority, the Food Standards Agency and the Director of Public Health. No responses to our consultation were received.</p>

We also consulted with Environmental Health – Woking Council, Food Standards Agency, the Health and Safety Executive and the Director of Public Health and received no responses.