Permitting Decisions- Bespoke Permit

We have decided to grant the permit (05 September 2022) for Data Centre Staples Corner operated by PDCG (Group Services) Limited.

The permit number is EPR/QP3706LH.

The application is for the operation of standby electricity generating plant at a data centre located within the London Borough of Brent at national grid reference TQ 22296 87216. The data centre will under normal operating conditions be powered by grid supplied electricity.

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 considerations section to show how the main relevant factors have been taken into account
- highlights key issues in the determination
- 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.

Key Issues of the Decision

The Installation

The permit authorises the operation of 16 standby liquid fuelled generators serving a data centre, in the event of failure in the electrical grid supply. The generators can operate on either gas oil or an agreed equivalent substitute.

The contingency standby power solution comprises 16 x 7.31 MWth liquid fuelled generators with an aggregated thermal input of 117 MWth. It is integrated within

the data centre design providing on-site electrical generating capacity to be used in the event of power outages to the data centre.

The permit does not allow the export of electricity to the National Grid.

The installation is subject to the Environmental Permitting Regulations (EPR) as it carries out an activity listed in Part 1 of Schedule 1 to the EPR:

- Section 1.1 Part A(1)(a): Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more.

The activity falls under Chapter II of the Industrial Emissions Directive (IED). The liquid fuelled generators are classed as medium combustion plant (MCP) as part of a Chapter II installation. The Medium Combustion Plant Directive (MCPD) requirements are fulfilled through compliance with Chapter II of Directive 2010/75/EU.

Air Quality Assessment

The data centre is located within the London Borough of Brent, within an Air Quality Management Area (AQMA) which is managed for nitrogen dioxide (NO_2-annual mean objective) and particulate matter (PM_{10}-24-hour mean objective).

The applicant's assessment of the impact of air quality is set out in the following documents:

- Air Quality Assessment report, dated June 2021 (Ref: C73-P05-R01)
- Ecology Statement, dated July 2021
- Technical Note, dated 23 June 2022

There are 16 generators at the proposed installation which will be commissioned in two phases, with the first phase comprising eight generators. For the assessment, it is assumed that both phases will be operational.

Operation of the generators will occur during testing and maintenance and in the event of an outage of power at the facility. Operating scenarios are as follows:

Testing and Maintenance

Monthly

Every month (for ten months) each generator will be tested for thirty minutes. This test is designed to test start signals and generator run up and would be at no or very low load. Each generator would be tested separately to minimise short-term impacts on local air quality.

Therefore, the generators would operate for 80 hours/year at a reduced load during testing and maintenance (five hours/generator).

Six-monthly

Every six months each generator will be tested for four hours and will be at or near 100% load. Again, generators would be tested separately to minimise the short-term impact on local air quality. It is noted that this level of testing is a contractual requirement and cannot be altered.

Therefore, the generators would operate for 128 hours/year at full load during testing and maintenance (eight hours/generator).

Operation During an Emergency Event

The generators would also run during an interruption to the power supply. It is proposed that the facility would be connected to the Elstree 132kV substation. There have only been three very small interruptions at the Elstree substation over the last ten years totalling two minutes and four seconds. The applicant confirmed that these events would not have resulted in an interruption to the power at the site.

Therefore, it is considered very unlikely that the generators would run for extended periods during an event. However, the facility is contracted to provide support for up to 48 hours.

Screening of impacts is carried out assuming 72 hours/year. Where impacts cannot be screened out as not significant or an air quality objective is unlikely to be met, 48 hours/year and 3 hours/year event durations are also considered.

During an event, it is assumed that all 16 generators would operate at 75% load.

The applicant's summary is set out in their table below:

OPERATIONAL HOURS AND LOADS

Parameter	Monthly Testing	Six Monthly Testing	Event
Number of tests per annum	10	2	-
Number of generators operation per test/event	16 consecutively	16 consecutively	16 simultaneous
Operational load	10%	100%	75%
Operational hours for annual mean (h/a)	80 (a)	128 (b)	72, 48 or 3 (c)
Operational hours for 24-hour means (h/a)	4,380 (d)(e)	4,380 (d)(e)	8760
Operational hours for 8-hour, 1-hour and 15-minute means (h/a)	8,760	8,760	8,760

(a) 16 generators operating for 30 minutes a month for 10 months (16*10*30/60)

(b) 16 generators operating for 4 hours a month for 2 months (16*2*4)

(c) 72 hours as suggested by the Environment Agency FAQ, 48 hours as the contracted hours and 3 hours as indicated by outages at Elstree over the last 10 years

(d) Testing will only take place between 08:00 and 20:00

(e) Assumption adopted for screening purposes only, where impacts are potentially significant variable emission parameters are used

Note: Each generator will operate for 13 hours/year for testing and maintenance

Air Dispersion Modelling

Process contributions (PCs) are screened out as insignificant if:

- the **long-term** PC is less than **1%** of the relevant Environmental Standard (ES); and
- the **short-term** PC is less than **10%** of the relevant ES.

However, where an emission cannot be screened out as insignificant, it does not mean it will necessarily be significant.

For those pollutants which do not screen out as insignificant, we determine whether exceedances of the relevant ES are likely. This is done through detailed audit and review of the applicant's air dispersion modelling taking background concentrations and modelling uncertainties into account (refer to documents in Air Quality Assessment section of this document).

Emission Points to Air

Two vents will discharge into a 5m x 5m plenum shared by two generators at emission points A1a & A1b to A8a & A8b. The plenum is used to contain the generator and the cooling air exhausts.

Initial modelling of the mixed exhaust resulted in significantly lower temperatures and efflux velocities compared to the generator exhausts. This then generally resulted in lower predicted off-site concentrations compared to the generator exhaust alone. This was likely due to dilution of the pollutants with the cooling air.

Therefore, as a worst case, it is assumed that the generator stacks exhaust at the top of the plenum rather than mixing with the cooling air within the plenum before discharge.

For their assessment of the impact of total organic carbon (TOC), the applicant used the ES for benzene, instead of the more precautionary ES for 1,3 butadiene. Whilst both are reasonably precautionary, we have also carried out an assessment using the lower ES. This does not result in a change to the conclusions drawn.

Air Quality Impacts (human health)

Maximum predicted impacts for the monthly testing (10/year) (human health)

Pollutant	Environmental standard		Back-ground	Process Contribution (PC) (maximum at a receptor)		Predicted Environmental Concentration (PEC)	
	µg/m^3	Rererence period	µg/m^3	µg/m^3	% of EAL	µg/m^3	% of EAL
NO_2	40	Annual Mean	-	0.024	0.06	-	-
	200	99.79th %ile of 1-hour means	55.2	26	13.0	81.2	40.6
PM_{10}	40	Annual Mean	-	0.00019	0.00	-	-
	50	90.41st %ile of 24-hour means	-	0.031	0.06	-	-
$PM_{2.5}$	20	Annual Mean	-	0.0015	0.01	-	-
SO_2	266	99.9th %ile of 15-min means	-	0.047	0.0	-	-
	350	99.73rd %ile of 1-hour means	-	0.032	0.01	-	-
	125	99.18th %ile of 24-hour means	-	0.0058	0.0	-	-
CO	10000	Maximum daily running 8-hour mean	-	17.7	0.18	-	-
	30000	1-hour average	-	26.7	0.09	-	-
TOC (as benzene)	5	Annual Mean	-	0.0027	0.05	-	-
	30	Daily average	1.5	6.8	22.67	8.30	27.67

Predicted impacts of pollutants screen out as insignificant with the exception of nitrogen dioxide (NO_2) and TOC.

For these pollutants, there is no predicted exceedance of the ESs, so no further assessment is required.

Maximum predicted impacts for the six-monthly testing (2/year) (human health)

Pollutant	Environmental standard		Back-ground	Process Contribution (PC) (maximum at a receptor)		Predicted Environmental Concentration (PEC)	
	µg/m^3	Rererence period	µg/m^3	µg/m^3	% of EAL	µg/m^3	% of EAL
NO_2	40	Annual Mean	-	0.11	0.28	-	-
	200	99.79th %ile of 1-hour means	55.2	42.3	21.2	97.5	48.8
PM_{10}	40	Annual Mean	-	0.00046	0.00	-	-
	50	90.41st %ile of 24-hour means	-	0.043	0.09	-	-
$PM_{2.5}$	20	Annual Mean	-	0.002	0.01	-	-
SO_2	266	99.9th %ile of 15-min means	-	0.094	0.0	-	-
	350	99.73rd %ile of 1-hour means	-	0.053	0.02	-	-
	125	99.18th %ile of 24-hour means	-	0.014	0.0	-	-
CO	10000	Maximum daily running 8-hour mean	-	4.9	0.05	-	-
	30000	1-hour average	-	9.1	0.03	-	-
TOC (as benzene)	5	Annual Mean	-	0.0012	0.02	-	-
	30	Daily average	-	1.5	5.00	-	-

Predicted impacts of pollutants screen out as insignificant with the exception of NO_2.

For NO_2, there is no predicted exceedance of the ES, so no further assessment is required.

Maximum predicted impacts for 72-hour emergency event (human health)

Pollutant	Environmental standard		Back-ground	Process Contribution (PC) (maximum at a receptor)		Predicted Environmental Concentration (PEC)	
	µg/m^3	Rererence period	µg/m^3	µg/m^3	% of EAL	µg/m^3	% of EAL
NO_2	40	Annual Mean	27.6	0.55	1.38	28.2	70.4
	200	99.79th %ile of 1-hour means	55.2	370.4	185.2	425.6	212.8
PM_{10}	40	Annual Mean	-	0.004	0.01	-	-
	50	90.41st %ile of 24-hour means	-	1.4	2.80	-	-
$PM_{2.5}$	20	Annual Mean	-	0.015	0.08	-	-
SO_2	266	99.9th %ile of 15-min means	-	0.78	0.3	-	-
	350	99.73rd %ile of 1-hour means	-	0.53	0.15	-	-
	125	99.18th %ile of 24-hour means	-	0.29	0.2	-	-
CO	10000	Maximum daily running 8-hour mean	-	70.7	0.71	-	-
	30000	1-hour average	-	103.9	0.35	-	-
	5	Annual Mean	-	0.0093	0.19	-	-
TOC (as benzene)	30	Daily average	1.5	17.9	59.67	19.4	64.7

Predicted impacts of pollutants screen out as insignificant with the exception of NO_2 and TOC.

For TOC there is no predicted exceedance of the ES, so no further assessment is required.

For short-term NO_2, there is a risk of exceeding the hourly mean ES for the 72-hour event, which is relevant to the maximum at a receptor (refer to Risk of Exceedance section of this document).

Risk of Exceedance

The applicant has assessed the risk of an exceedance using a hypergeometric probability distribution (HPD) method. The HPD is a statistical analysis which determines the probability that the limit value would be exceeded for emissions from facilities where emissions occur for only a limited number of hours per year but where modelling continuous operation indicates that an exceedance of the ES would occur.

For the six-monthly testing, the probability of exceeding the short-term ES for NO_2 would be highly unlikely.

For the 72, 48 and 3-hour events, the probability of exceeding the short-term ES for NO_2 at a receptor would also be highly unlikely.

Based on the location and areas of the exceedances, the overall conclusion is that the impact on local air quality of an event of 72 or 48 hours would not be significant.

In any event, there have only been three very small interruptions at the Elstree substation over the last ten years totalling two minutes and four seconds.

Environment Agency review conclusions (human health)

The applicant's human health assessment was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who agreed with the assessment's conclusions.

Operation during an emergency is not classed as normal operation. This scenario is rather an emergency operation allowed to happen only in the unlikely event of failure of electrical supply from the grid. Measures will be in place to prevent and manage/mitigate the occurrence of this emergency operation. The primary prevention measure relied upon to avoid an emergency scenario is the highly reliable design of the electrical grid and the site connections to it.

Air Quality Impacts (Habitats)

Site of Special Scientific Interest (SSSI)

The Brent Reservoir SSSI is located within 2 Km of the installation.

The following non-statutory local wildlife and conservation sites are located within 2 Km of the installation:

Local Nature Reserve (LNR)

Brent Reservoir / Welsh Harp

Local Wildlife Sites (LWS)

Silk Stream and Burnt Oak Brook

Old St Andrew's Churchyard, Kingsbury

Harp Island

Brent Reservoir (Welsh Harp)

Kingsbury Road Bank

Meadow Way Copse

Hendon Park and Northern Line

Railway Cutting

Clarefield Park

Clitterhouse Playing Fields

Lower Dollis Brook

Quainton Street Open Space

Dudding Hill Loop between Cricklewood and Harlesden

Grange Roundabout Nature Area

Metropolitan line between Kilburn and Neasden

Gladstone Park

Dollis Hill Reservoir

Habitats Assessment

The applicant provided an Ecology Statement and a Technical Note to supplement the Air Quality Assessment report.

The purpose of the Ecology Statement was to present and discuss the key findings of the Air Quality Assessment. This Statement justifies the applicability of the higher 24-hour mean critical level for NOx of 200 µg/m^3 based on low SO_2 and ozone (O_3) concentrations.

The Technical Note was prepared in response to the conclusions of our audit of the Air Quality Assessment (see below). Evidence was provided to justify the use of the higher 24-hour mean critical level for NOx. It concluded that as SO_2 and O_3 concentrations are well below their respective critical levels, the use of the higher 24-hour mean critical level for NOx is appropriate.

We agree that the use of the higher 24-hour mean critical level is appropriate in this case. Our assessment below is therefore based on this higher critical level.

Brent reservoir SSSI monthly testing (10/year)

Pollutant	ES (critical levels and loads) (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % ES
Direct Impacts[2]						
NO_x Annual	30	-	0.094	0.31	-	-
NO_x Daily Mean	200 (3)	41.3	26.1	13.05	67.4	33.7
SO_2 Annual	10 (1)	-	0.001	0.01	-	-
Deposition Impacts[2]						
N Deposition (kg N/ha/yr)	20	-	0.014	0.07	-	-
Acidification (Keq/ha/yr)	5.071	-	0.001	0.02	-	-

Note 1: The lichen and bryophyte sensitivity standard for sulphur dioxide has been assigned as a worst-case scenario.

Note 2: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Note 3: Assessment against the appropriate higher 24-hour mean NOx critical level.

The predicted annual mean concentrations are less than 1% of the long-term critical level and screen out as insignificant.

There is no predicted exceedance of the daily mean critical level. It should be noted that this represents worst-case conditions with testing assumed to be carried out every day of the year to take account of worst-case meteorological conditions.

The predicted contribution of the installation to acidification and nitrogen deposition is less than 1% of the critical load and screen out as insignificant.

LWS (most impacted) monthly testing (10/year)

Pollutant	ES (critical levels and loads) (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % ES
Direct Impacts[2]						
NO_x Annual	30	-	0.002	0.01	-	-
NO_x Daily Mean	200 (3)	-	1.9	0.95	-	-
SO_2 Annual	10 (1)	-	0.001	0.01	-	-
Deposition Impacts[2]						
N Deposition (kg N/ha/yr)	20	-	0.0003	0.002	-	-
Acidification (Keq/ha/yr)	5.071		<0.0001	0.002	-	-

Note 1: The lichen and bryophyte sensitivity standard for sulphur dioxide has been assigned as a worst-case scenario.

Note 2: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Note 3: Assessment against the appropriate higher 24-hour mean NOx critical level.

The predicted annual mean concentrations are less than 1% of the long-term critical level and screen out as insignificant.

The predicted daily mean concentration is less than 10% of the short-term critical level and screens out as insignificant.

The predicted contribution of the installation to acidification and nitrogen deposition is less than 1% of the critical load and screen out as insignificant.

Brent reservoir SSSI six-monthly testing (2/year)

Pollutant	ES (critical levels and loads) (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % ES
Direct Impacts[2]						
NO_x Annual	30	35	0.3	1.0	35.3	117.66
NO_x Daily Mean	200 (3)	41.3	55.1	27.55	96.4	48.2
SO_2 Annual	10 (1)	-	0.001	0.01	-	-
Deposition Impacts[2]						
N Deposition (kg N/ha/yr)	20	-	0.043	0.22	-	-
Acidification (Keq/ha/yr)	5.071	-	0.0032	0.06	-	-

Note 1: The lichen and bryophyte sensitivity standard for sulphur dioxide has been assigned as a worst-case scenario.

Note 2: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Note 3: Assessment against the appropriate higher 24-hour mean NOx critical level.

The predicted annual mean SO_2 concentration is less than 1% of the long-term critical level and screens out as insignificant.

The predicted annual mean NOx concentration is 1% of the long-term critical level. It cannot be classed as insignificant (<1%), however the contribution from the facility is small compared with that from the existing background (i.e. 0.86% of the background). The background exceeds the long-term critical level.

There is no predicted exceedance of the NOx daily mean critical level.

The predicted contribution of the installation to acidification and nitrogen deposition is less than 1% of the critical load and screen out as insignificant.

LWS (most impacted) six-monthly testing (2/year)

Pollutant	ES (critical levels and loads) (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % ES
Direct Impacts[2]						
NO_x Annual	30	-	0.018	0.06	-	-
NO_x Daily Mean	200 (3)	-	3.2	1.6	-	-
SO_2 Annual	10 (1)	-	0.001	0.01	-	-
Deposition Impacts[2]						
N Deposition (kg N/ha/yr)	20	-	0.0025	0.01	-	-
Acidification (Keq/ha/yr)	5.071	-	0.0003	0.006	-	-

Note 1: The lichen and bryophyte sensitivity standard for sulphur dioxide has been assigned as a worst-case scenario.

Note 2: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Note 3: Assessment against the appropriate higher 24-hour mean NOx critical level.

The predicted annual mean concentrations are less than 1% of the long-term critical level and screen out as insignificant.

The predicted daily mean concentration is less than 10% of the short-term critical level and screens out as insignificant.

The predicted contribution of the installation to acidification and nitrogen deposition is less than 1% of the critical load and screen out as insignificant.

Brent reservoir SSSI 72-hour emergency event

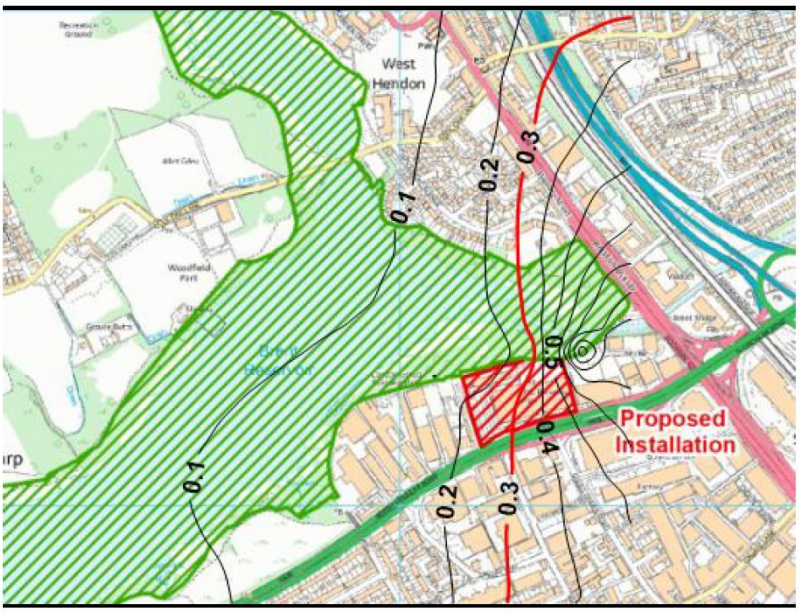
Pollutant	ES (critical levels and loads) (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % ES
Direct Impacts[2]						
NO_x Annual	30	35.00	1.1	3.67	36.1	120.33
NO_x Daily Mean	200 (3)	41.3	1038.5	519.25	1,079.8	539.9
SO_2 Annual	10 (1)	-	0.001	0.01	-	-
Deposition Impacts[2]						
N Deposition (kg N/ha/yr)	20	-	0.16	0.8	-	-
Acidification (Keq/ha/yr)	5.071	-	0.011	0.22	-	-

Note 1: The lichen and bryophyte sensitivity standard for sulphur dioxide has been assigned as a worst-case scenario.

Note 2: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Note 3: Assessment against the appropriate higher 24-hour mean NOx critical level.

The predicted annual mean NOx concentrations are more than 1% of the long-term critical level and the PEC exceeds the critical level; however as indicated on the contour plot, predicted concentrations above 1% are very localised.



The predicted daily mean NOx concentrations are more than 10% of the short-term critical level and the PEC exceeds the critical level.

It should be noted that this represents worst-case conditions with all generators assumed to run continuously for 8,760 hours/year to take account of worst-case meteorological conditions. Also refer to Risk of Exceedance section of this document.

For the three-hour event, the probability of the PEC exceeding the critical level is 1% or less for the majority of the habitat.

The impact of SO_2 emissions from an unplanned outage screens out as insignificant.

The predicted contribution of the installation to acidification and nitrogen deposition is less than 1% of the critical load and screen out as insignificant.

LWS (most impacted) 72-hour emergency event

Pollutant	ES (critical levels and loads) (µg/m³)	Back-ground (µg/m³)	Process Contribution (PC) (µg/m³)	PC as % of ES	Predicted Environmental Concentration (PEC) (µg/m³)	PEC as % ES
Direct Impacts[2]						
NO_x Annual	30	-	0.114	0.38	-	-
NO_x Daily Mean	200 (3)	41.3	102.5	51.25	143.8	71.9
SO_2 Annual	10 (1)	-	0.001	0.01	-	-
Deposition Impacts[2]						
N Deposition (kg N/ha/yr)	20	-	0.016	0.08	-	-
Acidification (Keq/ha/yr)	5.071	-	0.0013	0.03	-	-

Note 1: The lichen and bryophyte sensitivity standards for ammonia and sulphur dioxide have been assigned for this assessment as the presence of these features has been recorded in the site Management Plan for at least one of the sections of the site.

Note 2: Direct impact units are µg/m³ and deposition impact units are kg N/ha/yr or Keq/ha/yr.

Note 3: Assessment against the appropriate higher 24-hour mean NOx critical level.

The predicted annual mean concentrations are less than 1% of the long-term critical level and screen out as insignificant.

There is no predicted exceedance of the NOx daily mean critical level.

The impact of SO_2 emissions screen out as insignificant.

The predicted contribution of the installation to acidification and nitrogen deposition is less than 1% of the critical load and screens out as insignificant.

Overall Conclusions SSSI

The SSSI is designated for its assemblages of breeding birds rather than the habitat itself and any air quality effects are mediated through effects on their supporting habitats. Furthermore, despite elevated annual mean background NOx concentrations across the SSSI, it has been assessed by Natural England to be in a favourable condition (i.e. it supports more wetland breeding birds than the target). Furthermore, the habitats (reedbeds, wet woodland) are classified by Air Pollution Information System (APIS) as relatively insensitive to nutrient nitrogen deposition.

Testing and maintenance

Applying the appropriate higher 24-hour mean critical level of 200 µg/m^3, there are no exceedances during testing and maintenance as a result of emissions from the facility.

For the six-monthly testing, the predicted annual mean NOx concentration is 1% of the long-term critical level and the background exceeds the critical level. The contribution from the facility is small compared with that from the existing background (i.e. 0.86% of the background).

Emergency event

There are predicted exceedances of the 24-hour and annual mean critical levels for a 72-hour event.

A 72-hour event would be an extreme event particularly since outage data from Elstree indicates that there have only been three very small interruptions totalling two minutes and four seconds over the last ten years. The applicant confirmed that these events would not have resulted in an interruption to the power at the site.

The site is contracted to provide a service for a continuous period of 48 hours, however, even this is an extreme operational scenario.

The use of NOx reduction techniques such as selected catalytic reduction (SCR) are not considered feasible since the reduction in NOx would be offset by emissions of ammonia. We agree that this is the case.

Environment Agency review conclusions (SSSI)

Emissions from the data centre generators have the potential to affect the Brent Reservoir SSSI. These relate to airborne NOx only.

The applicant's habitats assessment was reviewed by the Environment Agency's technical specialists for modelling, air quality, conservation and ecology technical services, who did not agree with the initial assessment conclusions.

Under the proposed monthly and six-monthly testing and emergency scenarios (3, 48 and 72 hours), we cannot rule out exceedances of the daily NOx critical level of 75 µg/m^3. The applicant provided additional information in their Technical Note to

demonstrate that the use of the higher 200 µg/m^3 critical level is appropriate in this case. We agree that the higher critical level is appropriate and have included this in the tables above.

Based on the above, we conclude that:

The proposed monthly and six-monthly testing scenarios are unlikely to lead to exceedances of the daily NO_x critical level of 200 µg/m^3.

The proposed emergency scenario is unlikely to lead to exceedances of the daily NO_x critical level of 200 µg/m^3 for operation of up to one hour a day.

For the emergency scenario for operation of greater than three hours, we cannot rule out exceedances of the annual NO_x critical level of 30 µg/m^3. We note the annual mean NO_x background exceeds the annual NO_x critical level alone. However, we agree with the applicant that exceedances are unlikely based on the outage data from Elstree.

We conclude that no significant impacts are predicted upon the conservation status of the Brent Reservoir SSSI. The area of the SSSI subject to a NOx exceedance is small and will not in itself be responsible for maintenance of ecosystem functioning throughout the site.

The applicant proposed mitigation in their supporting information document by limiting the six-monthly (four-hour testing) to one generator per day. They confirm that this will be adopted within the proposed testing regime. We have secured this requirement in tables S1.1 and S1.2 of the permit.

Natural England (SSSI)
Regarding the Brent Reservoir SSSI, we contacted Natural England for advice on the appropriate critical levels (CLe) for NOx and critical loads (CLo) for nutrient nitrogen and acid deposition. This is because we were unable to establish these figures which are required to inform our assessment set out in this document. We also asked them to confirm if the SSSI was sensitive to nitrogen.

Natural England responded to us 23 March 2022 to confirm that they agree with the critical level/load values used by the applicant.

Regarding the sensitivity to nitrogen, they confirmed in their response 24 March 2022 that the site may be sensitive to the added nutrients in the water through leaks etc; however, the air quality should not have a large impact. They agreed with the statement in the Ecology Statement:

'On the basis of the critical levels and critical loads suggested in this report and associated predicted nitrogen deposition and airborne concentration no significant impacts are predicted upon the conservation status of the SSSI. The area subject to short-term exceedance is small and will not in itself be responsible for maintenance of ecosystem functioning throughout the site.'

Also refer to Nature Conservation, Landscape, Heritage and Protected Species and Habitat Designations section of this document.

Overall Conclusions Other Conservation Sites

Conservation sites are protected in law by legislation. The Habitats Directive provides the highest level of protection for Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), domestic legislation provides a lower but important level of protection for SSSIs. Finally, the Environment Act provides more generalised protection for flora and fauna rather than for specifically named conservation designations. It is under the Environment Act that we assess other sites (such as LWS) which prevents us from permitting something that will result in significant pollution; and which offers levels of protection proportionate with other European and national legislation. However, it should not be assumed that because levels of protection are less stringent for these other sites, that they are not of considerable importance. Local sites link and support EU and national nature conservation sites together and hence help to maintain the UK's biodiversity resilience.

For SACs SPAs, Ramsars and SSSIs we consider the contribution PC and the background levels in making an assessment of impact. In assessing these other sites under the Environment Act we look at the impact from the installation alone in order to determine whether it would cause significant pollution. This is a proportionate approach, in line with the levels of protection offered by the conservation legislation to protect these other sites (which are generally more numerous than Natura 2000 or SSSIs) whilst ensuring that we do not restrict development.

Critical levels and loads are set to protect the most vulnerable habitat types. Thresholds change in accordance with the levels of protection afforded by the legislation. Therefore, the thresholds for SAC SPA and SSSI features are more stringent than those for other nature conservation sites.

Therefore, we would generally conclude that the installation is not causing significant pollution at these other sites if the PC is less than the relevant critical level or critical load, provided that the applicant is using Best Available Techniques (BAT) to control emissions.

The tables above show that the PCs are <1% of the ES (with the exception of the NO_2 daily mean for the 72-hour emergency event) and we can conclude that impacts are screened out as insignificant.

For the 72-hour emergency event, there is no predicted exceedance of the NOx daily mean critical level.

We are satisfied that the installation will not cause significant pollution at the sites. The applicant is required to prevent, minimise and control emissions using BAT, this is considered further in the BAT section of this document.

Permit Conditions

Permit condition 2.3.6
The permit includes a maximum 500-hour operational limit for the emergency standby generators. The 500 hours includes testing and maintenance.

Table S1.1 (Activities)
Includes some additional operational controls:

- Testing of the generators shall only take place between 08:00 and 20:00 hours.
- During monthly and six-monthly testing, each generator shall be tested separately.
- Six-monthly (four-hour testing) shall be limited to one generator per day.

The first bullet is to minimise the impact from noise, refer to the Noise and Vibration section of this document.

The second two bullets are based on the outcome of the Air Quality Assessment, refer to Air Quality Impacts section of this document.

Table S1.1 also places a limit on the activity to exclude voluntary 'elective power generation' such as Balancing Services, Demand Side Response operations including Frequency Control Demand Management (FCDM) or Triad Avoidance. 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'.

Table S1.2 (Operating techniques)
The testing and maintenance scenarios are detailed in this document and controlled though permitted operating techniques in table S1.2 of the permit.

Table S1.3 (Improvement programme)

Whilst we are satisfied that the maintenance and testing regime is appropriate, given the local issues regarding air quality, including the designation of the AQMA, we have included an improvement condition in the permit. This requires the operator to produce an Air Quality Management Plan. Refer to Improvement Programme Section of this document.

The applicant proposed the inclusion of an improvement condition in the permit to assess the feasibility of other fuel options for the generators, for example the use of hydrogenated vegetable oil (HVO) with lower NOx emissions. Since the original submission, additional information was provided confirming that the generators will operate on both gas oil and HVO. These requirements are set out in permit tables S1.1, S1.2 and S2.1. Refer to Choice of Fuel section in this document.

Table S4.2 (Performance parameters)

Reporting of testing and maintenance run hours is required annually. Operation during an emergency scenario requires both notification within 24 hours and annual reporting.

Noise and Vibration

The application contains a noise impact assessment carried out in accordance with BS 4142:2014. The main sound sources from the generators are the horizontal inlet, vertical outlet and the exhaust, which are attenuated. The engines are contained within acoustically insulated boxes and are generally a negligible noise source compared to the three ventilation paths.

The generator units will be enclosed in weatherproof acoustic enclosures, as a combined dual generator enclosure.

If all 16 units were tested together it would be at most 5 dB above the background level during the day and 10 dB at night at the northern residences.

By staggering the testing to no more than four units at a time, noise would not be expected to be particularly noticeable at sensitive receptors.

BS4142 assesses the impact of industrial and commercial sound on residential receptors by subtracting the measured background from the rating level. BS4142 states:

“A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.”

“A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.”

Based on the above, if all 16 units were to operate together during an outage, there is the potential for adverse impacts during the day and significant adverse impacts at night.

However, the context of the operations needs to be taken into account. The generators are only likely to be operational infrequently, less than between 2.4% (based on a 3-hour event) and 3.19% (based on a 72-hour event) of the year for testing, maintenance and national grid failure.

There have only been three very small interruptions at the Elstree substation over the last ten years totalling two minutes and four seconds. The applicant confirmed that these events would not have resulted in an interruption to the power at the site. Therefore, it is considered very unlikely that the generators would run for extended periods during an event.

Therefore, although the assessment indicates the potential for significant adverse noise impact at the most sensitive receptor during the night-time, the probability of this occurring is likely to be very small.

The applicant confirms that testing will also only take place between 08:00 and 20:00. We have secured this requirement in table S1.1 of the permit.

We have also limited testing of the generators in table S1.1 as follows:

- During monthly and six-monthly testing, each generator shall be tested separately.
- Six-monthly (four-hour testing) shall be limited to one generator per day.

It is considered that the applicant has taken appropriate measures to minimise the risk of significant noise emissions.

Although no noise management plan has been provided, permit condition 3.4.2 enables the Environment Agency to request one if considered necessary in the future.

Best Available Techniques (BAT)

Technology and Fuel

The applicant considered a range of technologies and fuels as part of the design and specification phase. At this time the latest generation of gas oil-powered generators are optimally viable for operators based on availability, reliability, capital and operating costs. Alternatives, including battery storage, hydrogen fuel cells and other clean technologies and mains gas were considered but are not operationally viable yet. They commit to undertaking a regular options appraisal to evaluate potential system improvements.

We accept that gas oil powered generators are presently a commonly used technology for standby generators in data centres. We are satisfied that the applicant has provided sufficient justification to show that their proposal is BAT.

Engine Specification

Whilst the application covers a phased development, the applicant has provided details which cover all of the engines. On this basis we have not required a pre-operational condition covering the technical specification for future phases.

The engines have been chosen based on operational efficiency, low emissions, high reliability and long service intervals.

The thermal capacity of each engine is 7.31 MWth, which results in a total thermal input of 117 MWth.

The applicant is proposing Tier 2 optimised engines which meet 2.1g NOx at 5% oxygen. This is above the TA Luft 2g standard certified engines with a NOx concentration 2,000 mg/m^3 at 5% oxygen. The following information was provided on emissions versus load for the proposed engines:

75% load for a power outage: NOx 2,172 mg/Nm^3

10% load for monthly testing: NOx 2,411 mg/Nm^3

100% load for six monthly testing: NOx 2,362 mg/Nm^3

We conclude that emissions are nominally close to 2g, although there are some deviations from the emission level of 2000 mg/m^3 for NOx between +8.6% at 75% load (representative of a power outage) and +18% at 100% load (full load six-monthly testing).

The applicant confirmed that the engines operate at no more than 75% load during an outage. This has been incorporated into table S1.2 of the permit.

The applicant also confirmed that the engine manufacturer has confirmed the engines comply with tier II EPA limits, with the test cycles certified to the ISO 8178 standard.

We consider the engines are equivalent to TA Luft 2g and accept they are consistent with BAT. This is consistent with previous permitting decisions made in similar instances.

Fuel Storage

Each engine has its own dedicated bulk fuel storage tank (42,000 litres) and day tank (1,200 litres) positioned above ground and underneath the engines, minimising pipe-runs and pumping distances to point of use. The total capacity of all fuel tanks is 691,200 litres (16 x 43,200).

Each tank is double skinned, with leak detection in place within the outer skin, along with alarms that are continually monitored via the sites automated monitoring system.

Daily site walk overs will be undertaken to provide a visual inspection of multiple key locations; including visual inspection of fuel storage tanks, leaks, fill points and hardstanding and vent points.

The applicant confirmed that the fuel tanks will comply with BS 799-5 which meets the Oil Storage Regulations for businesses.

Fuel Delivery

The applicant confirmed that they expect one tanker delivery per quarter. They have agreed procedures in place with their supplier and the process is fully monitored.

A fuel delivery operating procedure was provided 17 August 2022, which was superseded by the updated procedure provided 01 September 2022. We are satisfied that the necessary controls will be in place which include temporary kerbing, shut-off valves, localised spill kits and surface water drainage around the fuel fill point routed via a fuel interceptor.

The fuel fill point is on the western side of the generator gantry in the car parking bays. During delivery, these bays will be suspended by the site security team.

No permanent bund or surface level containment is in place around the fuel fill point, however temporary barriers/kerbing will be provided in the area.

The installation boundary includes the fuel delivery location and associated above ground and subsurface pipe-work.

Choice of Fuel

The applicant confirmed that the emergency generators will be operated on HVO instead of gas oil, subject to its commercial availability. The air impact assessment was based on gas oil as the fuel, which represents a worst case. They confirmed that HVO results in reduced carbon dioxide, carbon monoxide, oxides of nitrogen and sulphur dioxide emissions.

We have specified the fuel to burned in the engines to consist of gas oil or equivalent substitute to be agreed in writing with the Environment Agency with a sulphur concentration of 0.001% w/w. We are in the process of developing our position on the use of gas oil substitute fuels such as HVO, therefore we have required that if any of these fuels are proposed, agreement is sought by the operator from the Environment Agency’s regulatory officer.

Site Condition Report and Protection of Groundwater

A site condition report (SCR) is required for any facility regulated under the EPR, where there may be a significant risk to land or groundwater. Article 22(2) of the IED requires the applicant to provide a baseline report containing at least the information set out in paragraphs (a) and (b) of the Article before starting operation. The baseline report is an important reference document in the assessment of contamination that might arise during the operational lifetime of the installation and at cessation of activities at the installation.

At the definitive cessation of activities, the operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into account both the baseline conditions and the site's current or approved future use. To do this, the operator has to apply to us for surrender, which we will not grant unless and until we are satisfied that these requirements have been met.

The operator has provided a description of the condition of the site, which we consider is satisfactory. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under the IED.

We did however require some clarification regarding the baseline groundwater and soil data provided as follows:

Item 1

The groundwater and soil concentrations for different contaminants are provided as ranges. We asked for clarification on what the ranges represent, i.e. are these site minimum and maximum concentrations from the referenced site investigation reports.

The applicant confirmed that:

The ranges presented in Table 1 (Baseline Chemical Composition of Near-surface Made Ground), Table 2 (Baseline Ground Gas Conditions), Table 3 (Baseline Surface Water Chemical Composition) and Table 4 (Baseline Shallow Groundwater Chemical Composition) represent the minimum and maximum concentrations of soil, water and ground gas constituents previously monitored at the site over the past c.20-years.

The source of the baseline data is presented in the footnotes of each table and all referenced reports are available on request.

Item 2

How the monitoring results collected during the permit life-time will be compared to the baseline data provided, i.e. will monitoring results be compared to the

maximums of the data ranges, or will data be compared on a borehole-by-borehole basis, or by some other method.

The applicant confirmed that:

Monitoring data from each individual borehole and the surface water monitoring point collected throughout the life-time of the permit will be compared against the determined site-wide baseline ranges as presented in Tables 1 to 4 of the SCR. If monitored trend data indicates a significant increasing trend and/or an exceedance of the previously recorded maximum concentrations is observed, further investigations will be instigated.

As detailed in Section 2.5 of the SCR, the exception to the above approach relates to the presence of free-product petroleum hydrocarbons in surface and groundwaters. To date, site monitoring data has not encountered the presence of free product and, due to the proposed future storage and use of gas oil, any future occurrence in the water environment would indicate a failure of the pollution prevention measures installed and operated.

Should measurable free product be present in surface waters or groundwaters at any location, further investigations and remedial measures would then be triggered with the view of returning conditions to Table 3 and Table 4 ranges.

If pollution prevention measures are proved to be sufficient throughout the permit life-time, no 10-year or permit surrender soil sampling and assessment is deemed warranted (Section 2.5).

However, should groundwater or surface water data indicate contamination has occurred that warrants soil remedial works, the data ranges within Table 1 can be used to determine whether the site has been returned to baseline conditions on completion of the remedial works and/or on surrender of the permit.

Emission Limits

Based on the operational requirements, we have not set any emission limits.

As there are no limits, permit condition 2.3.6 ‘The activities shall not operate for more than 500 hours per year’ has been included to restrict the hours of operation. The operator will be required to record operating hours and the number of runs for each of the generators.

Monitoring Requirements

We have specified monitoring of emissions of carbon monoxide from emission points A1 a/b to A8 a/b (new MCP), with a minimum frequency of once every 1,500 hours of operation or every five years (whichever comes first). This monitoring has been included in the permit in order to comply with the requirements of the MCPD, which specifies the minimum requirements for

monitoring of carbon monoxide emissions, regardless of the reduced operating hours of the plant.

We have also specified monitoring of emissions of oxides of nitrogen (NOx) from emission points A1 a/b to A8 a/b (new MCP), with the same frequency specified for the monitoring of carbon monoxide emissions. In setting out this requirement, we have applied our regulatory discretion, as we consider that this limited monitoring, to happen in concurrence with the carbon monoxide monitoring, is proportionate to the risk associated with the emissions of NOx from the installation.

Taking into account the limited hours of operation of the generators operating at the installation, and the fact that we are not setting emission limits for carbon monoxide and NOx, we consider this monitoring can be carried out in line with web guide 'Monitoring stack emissions: low risk MCPs and specified generators' Published 16 February 2021 (formerly known as TGN M5).

The operator did not specify any monitoring requirements in their application. We have set an improvement condition requesting the operator to submit a monitoring plan. Refer to Improvement Programme section of this document.

Emissions to Sewer

There will be no emissions to sewer from the proposed installation.

Emissions to Water

There will be no emissions of process waters to surface water from the proposed installation.

There will be emissions of uncontaminated site surface water via oil interceptors at emission points W1 and W2. We have required visual checks for oil and grease via a weekly spot sample.

Emissions to Land

There will be no emissions to land from the proposed installation.

Waste

The facility will not generate significant quantities of waste. It is anticipated that approximately 5,000 litres of waste lubricating oil will be generated at the installation each year, primarily from oil replacement at the annual service.

The site management system will include procedures for the collection and disposal or recovery of any waste oils and any other wastes that are generated.

Based upon the information in the application, we are satisfied that the appropriate measures will be in place to prevent or where that is not practicable to minimise pollution from waste.

Decision Considerations

Confidential Information

A claim for commercial or industrial confidentiality has not been made.

Identifying Confidential Information

We have not identified information provided as part of the application that we consider to be confidential.

Consultation

The consultation requirements were identified in accordance with the Environmental Permitting (England and Wales) Regulations (2016) and our public participation statement.

The application was publicised on the GOV.UK website.

We consulted the following organisations:

Food Standards Agency (FSA)

Health & Safety Executive (HSE)

Brent Local Authority (planning and environmental health)

UK Health Security Agency (UKHSA) (formerly Public Health England (PHE))

National Grid (Cadent Gas)

The comments and our responses are summarised in the Consultation Responses section of this document.

Operator

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.

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 RGN2 ‘Defining the scope of the installation’ and Appendix 1 of RGN 2 ‘Interpretation of Schedule 1’.

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.

The Site

The operator has provided plans which we consider to be satisfactory.

These show the extent of the site of the facility including the discharge points.

The plan is included in the permit.

Nature Conservation, Landscape, Heritage and Protected Species and Habitat Designations

We have checked the location of the application to assess if it is within the screening distances we consider relevant for impacts on nature conservation, landscape, heritage and protected species and habitat designations. The application is within our screening distances for these designations.

We have assessed the application and its potential to affect sites of nature conservation, landscape, heritage and protected species and habitat designations identified in the nature conservation screening report as part of the permitting process. Refer to Air Quality Impacts (Habitats) section of this document.

We have not consulted Natural England, we sent an Appendix 4 Countryside and Rights of Way (CROW) Act form for information only, 31 May 2022 and 06 July 2022. The updated form sent 06 July 2022 included the higher 24-hour mean critical level for NOx. Refer to Habitats Assessment section of this document.

The decision was taken in accordance with our guidance.

Environmental Risk

We have reviewed the operator's assessment of the environmental risk from the facility.

The operator’s risk assessment is satisfactory.

Climate Change Adaptation

From 31 August 2022 there is no requirement to assess climate change risk assessments for any applications. Climate change adaptation will now be considered within the sites management system.

Based on the score provided at the time of the application, the permit did not require the inclusion of the climate change condition in the permit.

Operating Techniques

The operating techniques that the applicant must use are specified in table S1.2 in the environmental permit.

National Air Pollution Control Programme

We have considered the National Air Pollution Control Programme as required by the National Emissions Ceilings Regulations 2018. By setting controls in the permit we are minimising emissions to air. This will aid the delivery of national air quality targets. We do not consider that we need to include any additional conditions in this permit.

Raw Materials

We have specified limits on the use of liquid fuel.

Pre-operational Conditions

Based on the information in the application, we consider that we need to include a pre-operational condition requiring submission of a commissioning plan.

Improvement Programme

Based on the information in the application, we consider that we need to include an improvement programme.

We have included an improvement condition requiring a monitoring plan for the implementation of the flue gas monitoring requirements specified in the permit. This is applicable as the installation includes new MCP.

We have included an improvement condition requiring an Air Quality Management Plan required to manage any prolonged emergency running of the plant. This is a standard improvement condition required for data centres.

Emission Limits

We have decided that emission limits are not required in the permit, refer to Monitoring Requirements section of this document.

Reporting

We have specified reporting in the permit to gather information on emissions to air from A1 a/b to A8 a/b and performance parameters.

Management System

We are not aware of any reason to consider that the operator will not have the management system to enable them 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.

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 Responses

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.

Responses from organisations listed in the consultation section:

Responses received from:

UK Health Security Agency (UKHSA) (Environmental Public Health Scientist) 28 April 2022

Brief summary of issues raised:

Although the back-up generators are exempt from emission limit values (ELVs), this location is within an AQMA. Therefore, the applicant should identify appropriate checks and controls such as time periods during the day and meteorological factors to prevent adverse impacts on public health from the testing regime. Control of emissions is preferable to strategies reliant on public warning and informing.

Summary of actions taken:

The appropriate controls are implemented by permit conditions, which include limits specified in table S1.1 (activities), table S1.2 (operating techniques) and table S1.3 (air quality management plan improvement condition).

Cadentgas (Plant Protection Team) 22 April 2022

Brief summary of issues raised:

To prevent damage to their assets or interference with their rights, they asked that we include the following **Informative Note** into the **Decision Notice:**

Cadent Gas Ltd own and operate the gas infrastructure within the area of your development. There may be a legal interest (easements and other rights) in the land that restrict activity in proximity to Cadent assets in private land. The applicant must ensure that the proposed works do not infringe on legal rights of access and or restrictive covenants that exist.

If buildings or structures are proposed directly above the apparatus the development may only take place following diversion of the apparatus. The applicant should apply online to have apparatus diverted in advance of any works, by visiting cadentgas.com/diversions.

Prior to carrying out works, including the construction of access points, please register on www.linesearchbeforeudig.co.uk to submit details of the planned works for review, ensuring requirements are adhered to.

Summary of actions taken:

These do not form part of the environmental permit decision making process, so we have not included the **Informative Note** in the environmental permit. We emailed the response to the applicant 03 May 2022.

Brent Local Authority (Environmental Monitoring Officer, Regulatory Services) 09 May 2022

Brief summary of issues raised:

None.

Summary of actions taken:

Not applicable.