Non-technical summary

Colt Hayes L4 Data Centre

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1.0 INTRODUCTION

This Non-Technical Summary (NTS) has been prepared by HDR Consulting Limited (HDR) on behalf of 'the operator' Colt Data Centre Services UK Limited (Colt) in support of the application for a new bespoke Environmental Permit for the Colt L4 Hayes Data Centre installation located at:

Beaconsfield Road,
Brook Industrial Estate,
Hayes, London
UB4 0SL (TQ 11533 80192)
(Colt L4 Hayes)

Colt, as the legal operator, is required to apply to the Environment Agency (EA) for an Environmental Permit because the total thermal input capacity of the site's combustion plant will exceed the 50MWth threshold stipulated by the legislation[1].

Colt currently holds an environmental permit for its site in Welwyn Garden City (ref KP3139DW) and is in the process of obtaining a second permit for the Colt site in Park Royal, north west London (ref: DP3107LF). Colt is fully committed to operating in accordance with the relevant permit conditions and demonstrating best practice within the data centre sector.

This document provides a non-technical summary of the installation and the application for a permit, including the supporting information submitted along with the application.

[1] The Environmental Permitting (England and Wales) Regulations 2016 (legislation.gov.uk)

2.0 SITE SUMMARY

2.1 Development plans

The Colt L4 Hayes data centre is currently being constructed with plans for the site to be commissioned and handed over in early 2025.

The data centre is being constructed on the site of an existing data centre. The campus will see the construction of x2 data hall buildings, with associated office spaces, emergency generators, fuel systems and electrical infrastructure. The location of the generators, tanks and installation boundary can be seen in Figure 2-1.

The data centre, when operational, will utilise Emergency Standby Generators (ESGs) to provide emergency power in the event of grid failure. The ESGs are all over 1MWth and are therefore classed as “Medium Combustion Plant” (MCP) with details in the table below:

The ESGs are ‘limited hours MCPs’ as they are purely standby plant operating for maintenance and testing and in emergencies. The ESGs will operate on diesel or Hydrogenated Vegetable Oil (HVO) and will be fitted with Selective Catalytic Reduction (SCR) to reduce NOx emissions.

The generator models Colt has selected are as follows:

- 17no. 2.4MWe Rolls Royce MTU DS3100 (6.4MWth each).
- 27no. 2.6MWe Rolls Royce MTU DS3600 (6.4MWth each).
- Total: x44no ESGs, approximately 283MWth

At present the generators for Building 2 are still to be confirmed. It is likely that the design will be similar to Building 1, with 2.4MWe generators on the intermediate floors and 2.6MWe on the roof. The number will depend on final IT capacity of Building 2. To be conservative, the application assumes all the Building 2 generators will be 2.6MWe.

Current plans are for the expansion works to occur in 2 Phases (See Figure 2-2):

- Building 1: Q3 2025 – Q4 2028, 22 no. ESGs installed (Trinity Data Centre and Tudor Works)
- Building 2: Q3 2028 - Q1 2030, 22 no. ESGs installed (Veetec Motor Group Area)

Building 1 will include one life safety generator below 1MWth (160kW), which has not been fitted with SCR, as it is listed as Directly Associated Activities (DAA). Building 2 is expected to house a life safety generator of a similar size.

For further details on the ESGs, please see Section 3.5, the thermal schedule and Best Available Technique (BAT) assessment that has been submitted as part of this application.

2.2 Data Centre function

Data Centres are an essential part of national infrastructure, underpinning a substantial portion of the UK’s economy. Essentially, Data Centres enable a wide range of digital activities including hosting various internet-based activities via servers in large “data halls” or warehouses.

Data Centres rely on an uninterruptible supply of electricity to power the various servers and associated IT equipment. An interruption or break in this supply even momentarily would have catastrophic consequences on equipment and on the operator’s reputation. As such, the site employs ESGs to provide power should the grid supply to the site fail.

Under normal circumstances, electricity to the site will be provided by the National Grid. Grid supplies are very reliable, however, in the unlikely event of an outage, the generators are designed to operate until the grid supply is restored. Outages are highly rare events

and thus operation is normally limited to testing and maintenance as discussed below in Section 3.5.4.

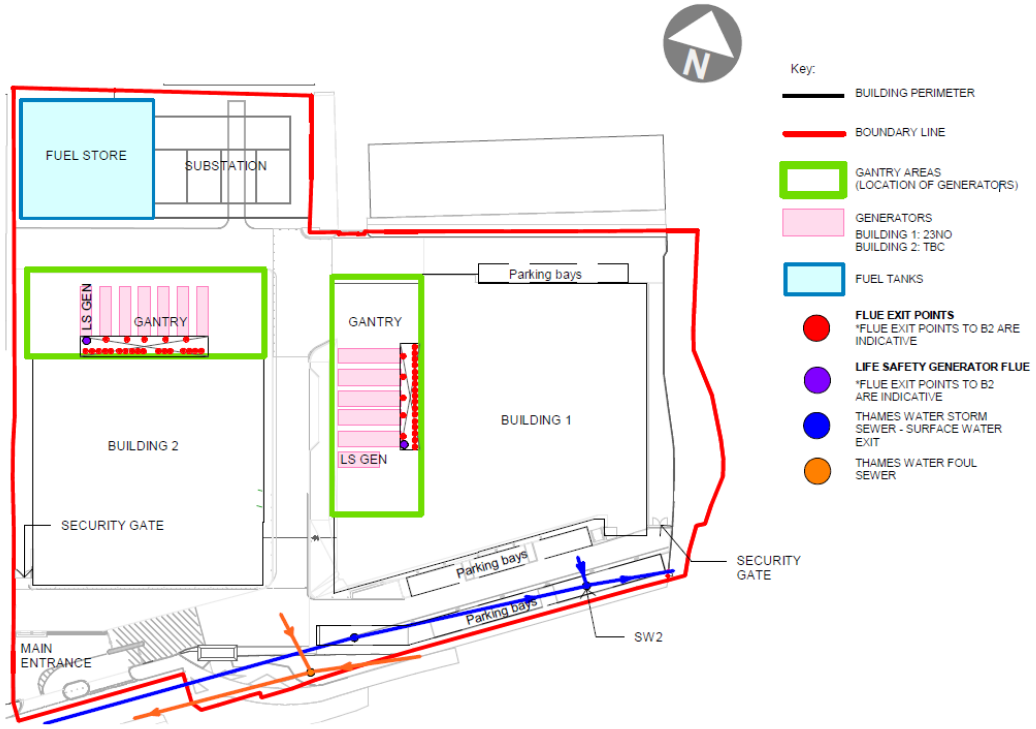

Figure 2-1 Installation boundary and emission points

Figure 2-2 Site phasing plan

2.3 Site location and context

The site is located in the Brook Industrial Estate in Hayes, in the London Borough of Hillingdon. The site boundary incorporates several plots, with mixed use of data centres and light industrial/commercial. It is situated in the Brook Industrial Estate and has previously included the Tudor Works buildings, Veetec Motor Group and Optimum Data Centres (Trinity plot). The Tudor Works buildings and data centre were demolished in 2021/2022. The surrounding area can be seen in Figure 2-3 below.

The site sits as part of Springfield Road Industrial Area, a wider commercial area bound to the north by Uxbridge Road, the west by Springfield Road, to the east by the Yeading Brook, and to the south by Beaconsfield Road. The area comprises of a mix of commercial operations, with several retail developments and a hotel located predominantly in the northern part closer to Uxbridge Road, and industrial, storage, and manufacturing operations across much of the central and southern areas.

The closest residential receptors are located approximately 180m to the east, on Cherry Avenue, and 180m to the north-east, on Bankside. There are new residential dwellings planned for development on land approximately 200m to the south-east.

Further details of the surrounding area are presented in and the Site Condition Report (SCR) and Environmental Risk Assessment (ERA) which have been submitted as part of this application.

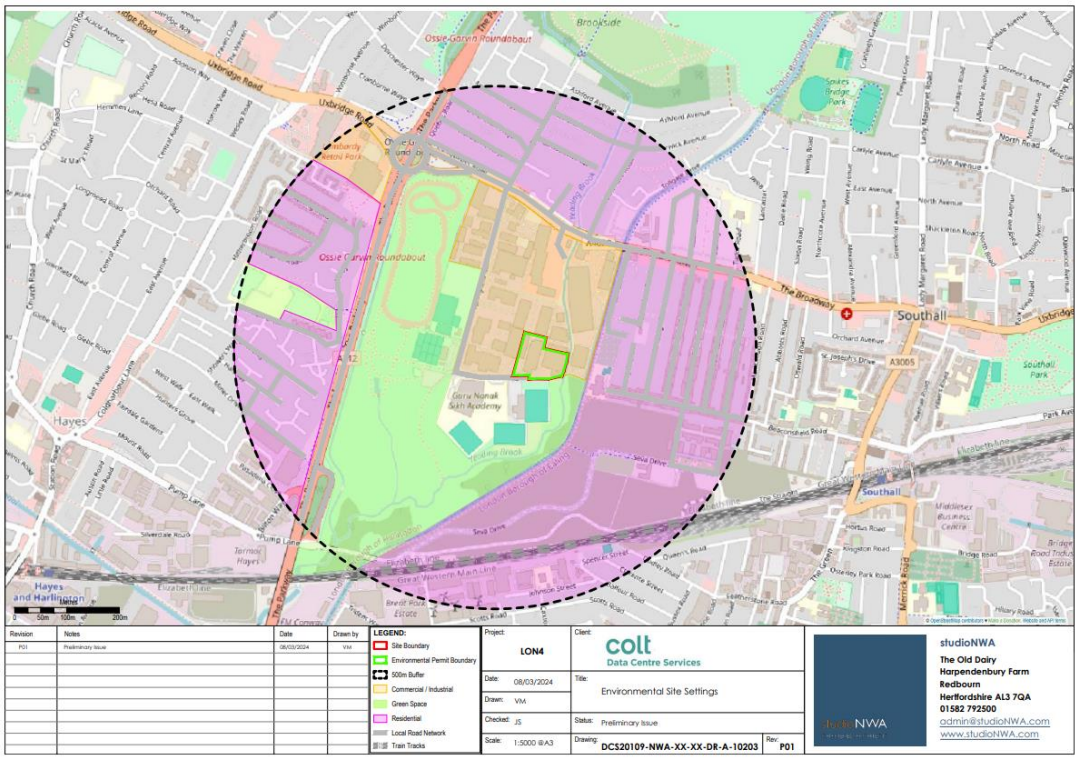

Figure 2-3 Site setting plan

2.4 Site history

The site comprised agricultural fields prior to 1945. By 1961, the east of the site had been comprised of office blocks, laboratories and a car park. Two 'works' buildings had been constructed in the west of the site, which expanded to the north in the 1970s. The buildings in the east were labelled as research depot on the 1973 map and two tanks were shown on the 1988 map. The research depot extended offsite to the north and northwest.

The east of the site underwent several phases of demolition and construction over subsequent decades. Since c.2000, the site was comprised of three parcels of land, occupied by the Trinity London data centre in the east, and Tudor Works and Veetec Motor Group in the west. The data centre has been vacant for approximately 10 years and was previously occupied by Deutsche Bank. Approval for demolition of the existing data centre and Tudor Works buildings was granted in October 2021 and this work is ongoing.

The full site history is presented in the SCR, which was submitted as part of this application.

3.0 ENVIRONMENTAL PERMIT APPLICATION

3.1 Permit type and regulated activities

The activities onsite require a bespoke installation permit under Schedule 1, Part A (1) (a) of the Environmental Permitting Regulations: "*burning of any fuel in an appliance with a rated thermal input of 50 megawatts or more*."

The regulated activity relates to the operation of 44no. new ESGs with a total site capacity of approximately 283MWth as per Section 3.5 and the Thermal Schedule submitted with the application.

All the new ESGs are over 1MWth and are classed as new MCPs[2] or 'limited hours MCPs' as they are purely standby plant operating for maintenance and testing and in emergencies. Therefore, they are exempt from meeting MCP Emission Limit Values (ELVs).

The Directly Associated Activities (DAA) include the 160kW life safety generator, fuel storage tanks, Urea storage tanks, associated pipework, and the drainage network. Building 2 is expected to house another life safety generator of a similar size.

3.2 Application contents

This application has been prepared in accordance with the EA's informal BAT guidance document: '*Data Centre FAQ Headline Approach v21'* (November 2022).

The following documents have been submitted to the EA as part of the application for a permit. We have provided a high level non-technical summary of these in the following sections. Please refer to these documents for further information.

- Non-technical Summary (this document)
- Application forms – A, B2, B3 & F1
- Site Condition Report
- Environmental Risk Assessment
    - Air Quality Assessment (AQA)
    - Noise Impact Assessment
- BAT Assessment
- Thermal Schedule
- Supporting information including site plans, drawings, generator datasheets, etc.

3.3 Site condition report

A Site Condition Report (or 'Site Baseline Report') has been submitted along with the application for a permit. This report is intended to provide the EA with a description of the baseline conditions at permit issue. The report has been prepared in accordance with the EA's H5 Guidance Note[3] with details on the following:

- Site background
- Condition of the land at permit issue
- Geology
- Hydrogeology
- Hydrology
- Previous land use
- Pollution history
- Evidence of historical contamination
- Permitted activities

[2] as identified in Annex I of Medium Combustion Plant Directive (EU/2015/2193)
[3] Environmental permitting: H5 Site condition report - GOV.UK (www.gov.uk)

Extensive baseline soil and groundwater sampling and site investigations were completed as part of planning requirements for the development of the site. A risk assessment and remediation strategy were undertaken to support the first phase of redevelopment at Trinity Data Centre in the east and Tudor Works in the centre of the site.

A second, later development phase (including investigation and assessment) will be undertaken in the Veetec Motor Group area in the west of the site, which will remain as a vehicle repair and servicing facility until 2024.

No significant risks to human health or controlled water receptors have been identified that require a specific advance phase of remediation based on the results of the current ground investigation. Given the historical light industrial site use, there is the potential for localised contamination, principally further asbestos, and hydrocarbons which are more likely around tanks and operation areas.

A remediation strategy has been presented which describes a range of mitigation measures that should be implemented during the construction process to ensure that any contamination encountered is appropriately controlled and managed.

3.4 Environmental risk assessment

An Environmental Risk Assessment (ERA) has been provided in support of this application using the EA's "Risk assessment for your environmental permit" guidance[4].

The purpose of the ERA is to identify the potentially significant risks to human health and the environment from permitted activities, as well as the controls in place to help mitigate these risks to an acceptable level.

The potential risks identified as part of the ERA are outlined below:

- Controlled releases to air
- Accidents
- Odour
- Noise and Vibration
- Fugitive emissions (from uncontrolled sources)
- Visible emissions
- Global warming potential
- Waste
- Water discharges

Detailed standalone risk assessments have been completed to assess the risk of air quality and noise impacts from the operation of the ESGs. These are summarised below.

3.4.1 Air Quality Assessment

An Air Quality Assessment (AQA) was completed in support of the permit application to predict the impacts of operating the generators on short- and long-term air quality. A summary of the findings is below, with further information in the AQA itself.

The Data Centre is located within the London Borough of Hillingdon's (LBH's) borough-wide Air Quality Management Area (AQMA) for NO_2.

The AQA reviewed the long and short-term impacts on local air quality from the operation of the generators under the following scenarios:

- **Scenario 1: 'Testing and Maintenance'**

[4] Risk assessments for your environmental permit - GOV.UK (www.gov.uk)

Routine 'Testing and Maintenance' of the SBGs. In this scenario, all generators are expected to run independently for 8 hours per year, and cumulatively for 12 hours per year, at 100% load.

- **Scenario 2**: **Emergency operation**

  72-hour 'Grid Failure'/power outage emergency, inclusive of the testing and maintenance run times above.

The conclusion of the assessment is as follows:

"Long term impacts from the proposed SBGs were predicted to be insignificant for both scenarios at all relevant modelled receptor locations when assessed against all relevant long-term UK Air Quality Standards. Short term impacts were also found to be insignificant for scenario 1 which assesses 'business as usual' maintenance and testing operations. An exceedance of the 24-hour critical level for NOX was considered possible if prolonged 72-hour grid failure events occurred consistently for several years, at the nearby Yeading Brook local wildlife site.

Prolonged 72-hour grid failure events are considered to be extremely rare events and therefore do not reflect the likely impacts from the installation. To address and mitigate the risks associated with a prolonged grid failure, it is recommended that an Air Quality Management Plan be implemented."

The conclusion of the AQA indicates that there is a low likelihood of that short- and long-term impacts from operation of the sites ESGs is likely to be insignificant.

Given the above, the sites ESGs are unlikely to have a significant impact on surrounding receptors and therefore represent best available technique.

3.4.2 Noise assessment

A noise impact assessment (NIA) was completed in support of the application for an environmental permit. This report identifies sensitive receptors and potential sources of noise from the installation. The primary noise sources are the sites generators.

The impact assessment concluded the following:

"The results indicate that during the planned testing periods, the calculated site Rating Levels at the closest noise sensitive receptors range between 6dB below and 4dB above the existing background sound level.

When considered in context, the risk of an adverse noise impact during the daytime period is low.

The criteria adopted for this assessment (based on the Local Planning Authorities noise criteria) of a rating level to be no more than 5 dB above the background sound level is met.

Therefore, no further mitigation measures, other than those already incorporated at design stage, are required."

Given the above, the site's ESGs are unlikely to have a significant impact on surrounding receptors and therefore represents BAT.

3.5 BAT assessment

A BAT assessment has been submitted with the application. There are currently no BAT reference documents or BREF notes that have been made available by the European Commission for the specific provision of backup power in the data centre industry. Instead

the BAT assessment is based on the guidance in the EAs "*Data Centre FAQ v21 – Working Draft*" (November 2022).

The assessment report seeks to provide evidence of BAT or justification where the requirements have not been met. The following sections provide a non-technical summary of the BAT assessment which concluded that the installation is considered to meet the current BAT requirements for data centres.

3.5.1 Technology selected to provide emergency power

ESGs capable of operating on diesel or HVO have been selected to provide emergency power to the installation in the event of grid failure. An assessment considering alternative technologies and why ESGs are chosen is presented in the BAT document.

The conclusion of the BAT assessment is that emissions optimised ESGs (operating on Diesel/HVO) have been selected again as BAT for this installation for the following reasons, which are in line with EA BAT guidance for Data Centres:

- Proven technology for providing reliable power supply
- Start-up time & cold start capability
- Space requirements
- Capital expenditure
- Environmental impact
- Fuel storage

3.5.2 Generator Operation

The ESGs are solely used as standby plant for emergency power provision in the event of grid failure. 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 20 hours/year/generator.

Monthly Testing and maintenance:

The maintenance schedule for the generators is based on manufacturer guidelines. These guidelines help to prolong the life of the equipment, reduce the use of raw materials (e.g., replacement parts, oil changes) and ensure the engines perform efficiently to prevent increases in pollutant levels or black smoke.

Regimes for monthly and annual testing are detailed below and these have been used in the AQA. The AQA has not identified significant impacts to short term Air Quality from the proposed test regime. The current test regime is considered to meet the BAT requirements.

Where possible and practicable, the intention will be to avoid testing during peak traffic periods when background NOx has the potential to be elevated and to avoid testing during school hours. There may be instances where operational requirements dictate the time tests are to be undertaken.

Table 1 –Annual operational hours per generator

Generator Test Frequency	Description	Load Profile	Duration	Total hours, per gen
Emission measurements	Each standby generator may be operated individually to carry out emission measurements.	Site load	N/A	**Unknown**

Generator Test Frequency	Description	Load Profile	Duration	Total hours, per gen
Monthly "Black Building Test"	The simulation of a mains failure (parallel operation)"to test the functionality, performance and protection of the standby generation system. All standby generators on a common bus may be operated for a maximum of 1 hour per month (maximum 12 hours per calendar year) to test its operational readiness in the "black building test".	Site load	1 hour	**12**
Annual Function test operation 1	To test each standby generators operational readiness.	Site load	2 hours	**2**
3x per year Function test operation 2	To test each standby generators operational readiness.	Site load	2 Hours	**6**
			Total hours of operation per generator	**20**

Emergency operation:

The generators are to be used purely as standby plant to provide emergency standby power in the event of grid failure. There is no capacity agreement in place or elective operation of the plant for generating revenue (e.g., STOR, Triad avoidance, Demand Side Response, Peak Demand, etc.).

Major power outages are rare. The average down time for the entire national grid equated to 17.67 seconds per year across the entire network. The Colt connection is fully redundant and dedicated, as there are no other offtakes on the connection that could interfere. As such, operation of the generators is likely to be limited to monthly maintenance and testing only.

In the unlikely event of a loss of grid power to the building, the ESGs will operate to support the site load. The generators would provide ongoing power until a stable mains electrical supply is restored. In a major outage where the installation loses both A & B grid supplies, all generators will start. If generators start, Colt will look to sequence with the mains and come off generators once the supply to site is stable.

For more information on ESG operation during an outage please refer to the 'BAT Assessment' submitted with the application.

3.5.3 Generator emissions performance

The EA guidance for new generators is that they, as a minimum achieve the following:

> *"TA-Luft 2g' or Tier II USEPA with guaranteed emissions: this has requirements for 2000mg/m3 NOx; 650 mg/m3 for CO; particulates and dust 130 mg/m3 and 150 mg/m3 for hydrocarbons (all at reference conditions and 5% O2)."*

The 44no. new ESGs that have been selected to support the site development are emissions optimised and achieve the Tier II US EPA standard.

The installation is located within an Air Quality Management Area (AQMA) for NO_2 and as such, the operator has made significant investment in NO_x abatement technology in the form of Selective Catalytic Reduction (SCR). All generators will be fitted with SCR to achieve a NOx concentration of <250 mg/Nm^3 (5% O_2).

Once the SCR is fully operational, the NO_x emissions will be reduced to a level that surpasses what can generally be achieved by a gas generator of equivalent size and output.

Engine and emissions datasheets for the ESGs have been supplied with the application. For more information on ESG operation please refer to the 'BAT Assessment' submitted with the application.

3.5.4 Grid Reliability

The electrical supply is derived from the Iver National Grid substation. The electrical supply will be from Iver substation, which is located within the site boundary, and will be operated by Colt/Independent Distribution Network Operator (IDNO). The substation receives 132kV supplies from the National Grid Uxbridge Moor substation. Building 1 will derive power from Iver substation from day 1.

Subject to timelines of power being available from the utility, Building 2 may initially be supplied from another nearby campus substation which derives power from North Hyde at 66kV. In this case, Building 2 would later switch over to the Iver substation.

The electrical infrastructure is such that there are multiple supply routes or 'feeds'. Each feed can support the full site load, meaning that if one feed was to fail, electrical provision to the installation would not be compromised.

In 2022-23 the overall reliability of the grid is assessed at 99.999997%, with similar levels of reliability for previous years. As the service is fully buried there are no weather-related concerns and there has been no recorded failure incident at the current data centre for the last 20 years.

3.5.5 Generator flue design

The flue arrangement for the ESGs has been summarised in the table below.

Table 2 – ESG flue arrangements

MCP type	No. of ESGs	Flue height (m)	Flue orientation	Cowls/caps?
New (building 1)	22	38.6m	Vertical (above ground)	None
New (building 2)	22	38.6m	Vertical (above ground)	None

3.5.6 Emissions monitoring plan

An Emissions monitoring plan is to be developed once the site is operational in conjunction with the EA guidance. To facilitate flue gas testing, Monitoring ports are to be pre-installed on the generator flues to facilitate NOx and CO monitoring in accordance with web guide 'Monitoring stack emissions: low risk MCPs and specified generators' Published 16 February 2021 (formerly known as TGN M5)[5].

3.5.7 Fuel storage

The ESGs require adequate fuel storage to allow them to operate during a grid failure. Fuel for the generators will be supplied from day tanks local to the generator they serve, which are in turn fed from larger bulk tanks located in a permanent fuel store.

[5] https://www.gov.uk/government/publications/monitoring-stack-emissions-low-risk-mcps-and-specified-generators/monitoring-stack-emissions-low-risk-mcps-and-specified-generators

The permanent fuel store will be constructed as either part of Phase 1 or Phase 2 works. If the permanent store is delayed until Phase 2, a temporary fuel storage arrangement will be implemented. This will be located within the footprint of Building 2. Once the permanent fuel storage building has been constructed, these temporary tanks will be removed and Building 2 constructed.

The site stores enough fuel to operate in the event of grid failure. The combination of the generator fuel storage bulk and day tanks will provide 48 hours of autonomy, whilst operating under full load (i.e., 100% load). The local day tanks have capacity to support the generator set at full load for 2 hours. This is based on a worst-case scenario where the data halls are at capacity, requiring the generators to run at 100% load. This is highly unlikely, as Halls are rarely above 50-75% of their design capacity.

For further details of the sites fuel storage arrangements please refer to the BAT assessment submitted with the application for a permit.

3.5.8 Drainage

The site's drainage system is split into separate foul and surface water drainage systems. The site is to be covered in good quality hard standing and contaminated discharges to sewer are not anticipated.

The surface water drainage system is connected to an interceptor prior to discharging to the local network. A Class 1 full retention separator with an overflow alarm has been proposed at the downstream extent of the network, as well as an additional localised interceptor at the refuelling point to the north of building 2.

Where possible, sustainable drainage systems (SuDS) have been incorporated into the site drainage design. This includes the use of green roofs and permeable paving systems, which will provide water filtration to remove suspended solids, metals & hydrocarbons from runoff.

3.5.9 Waste

Small quantities of wastes may be generated from routine generator maintenance activities or in the event of a spillage/leakage. This is likely to be low given the standby nature of the generators and procedures in place to reduce the risk of spills and leaks spillage/leaks.

Procedures for licenced and responsible collection of waste oils and other hazardous wastes are to be developed once the site is operational. This will include the retention of relevant Duty of Care information.

A licenced third-party maintenance contractor is responsible for removing waste produced as a result of generator maintenance.

Colt aims to minimise waste generation through efficient use of raw materials including diesel, filters, and lubrication oils.

3.5.10 Operational procedures

Once the site is operational, suitable procedures are to be developed and implemented. Relevant and responsible staff are to receive appropriate training and awareness on these procedures, and this will be documented through the operator's management system. This will help ensure compliance with the Environmental Permit as well as other requirements of legislation for the protection of the environment and human health. Likely procedures are as follows:

- Spill response procedure
- Refuelling procedure

- Grid failure procedure (Air Quality Management Plan or ‘AQMP’)

3.5.11 Management systems

Once the site is operational, management systems will be developed. Management systems will be the responsibility of the operator. It is our understanding that management systems will be broadly in line with the principles of the following management standards:

- ISO 14001:2015
- ISO 50001:2018
- ISO/IEC 27001:2013
- ISO 9001:2015

Current plans are for an Environmental Management System (EMS) to be implemented once the site is operational. This will be developed in line with the ISO 14001:2015 standard or a suitable equivalent. The EMS would focus on the following:

- Reducing risks to the environment
- Integrating EMS responsibilities within line management
- A commitment to personnel environmental awareness and competence
- The ongoing monitoring and review of environmental performance