Pure Data Centre – Permit Variation

784-B047734

Best Available Techniques & Operating Techniques

Environmental Permit Variation Application

PDCG (GROUP SERVICES LIMITED)

November 2024

Document prepared on behalf of Tetra Tech Limited. Registered in England number: 01959704

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1.0 INTRODUCTION

1.1 REPORT CONTEXT

1.1.1 This Environmental Permit Variation Application has been prepared by Tetra Tech on behalf of the Operator, PDCG (Group Services Limited) (PDCG) in accordance with the requirements of the Environmental Permitting (England and Wales) Regulations 2016 as amended.

1.1.2 PDCG currently operate a site known as Pure Data Centre, JVC Business Park, Staples Corner, London, NW2 7BA. The site is centred at approximate National Grid Reference (NGR) TQ 22296 87216. The site currently operates under permit EPR/QP3706LH granted on 05/09/2022.

1.1.3 The data centre comprises permanent buildings that contain data storage and associated IT infrastructure. The facility will, under normal operating conditions, be powered by grid supplied electricity. A contingency standby power solution, comprising multiple liquid-fuelled engines provides onsite electrical generating capacity to be used in the event of power outages to the site.

1.1.4 The data centre is required to be permanently online and will be powered by the national electricity supply grid. In consultation with relevant stakeholders and following a review of historic electricity outages and forecast ongoing grid resilience it is considered that the electricity supply grid will remain sufficiently stable to enable the data centre to operate on grid supplied electricity only. However, the provision of standby power generating plant is essential in accordance with best practice and contractual obligations.

1.1.5 The existing permit (EPR/QP3706LH) authorises the operation of 16 standby electric generating plant in the event of a National Grid failure and for testing purposes.

1.1.6 PDCG are now seeking to expand the site and subsequently the quantity of generators on site, by constructing a further 40 gas engines each rated at 3.3MW.

1.1.7 Each engine is specified as 3.3MW. A copy of the data sheet for the proposed engine specification is provided as Appendix B. The EA calculation for the total thermal input of each engine has been calculated on a worst-case scenario as detailed in the relevant guidance using a power factor of 08 and conversion efficiency of 0.35

3.3MWe = (3.3*0.8)/0.35 = 7.54MWth

1.1.8 As such, the total additional thermal input of the installation will be 301MWth.

1.1.9 The new generators will be located adjacent to the western side of building LON1B1 as shown on Drawing Number PURE/B047734/GEN/01. The Generators will be over five floors and will be fully enclosed. The generators will be situated in pairs totalling eight per floor with the fuel stores located below on the ground floor.

1.1.10 This document has been prepared to detail the operating and management procedures in relation to the proposed operations.

1.1.11 This Best Available Techniques and Operating Techniques (BATOT) document is an integrated document which describes both the operating techniques that will be implemented at the site to ensure compliance with the conditions of the Environmental Permit and also demonstrate that BAT will be employed.

1.1.12 This report has been prepared to satisfy the requirements of the following:-

- Environment Agency - Develop a management system: environmental permits (August 2022);
- Environment Agency - Control and monitor emissions for your environmental permit (May 2021);

- Environment Agency - Best available techniques: environmental permits (February 2016);
- European Commission – Industrial Emissions Directive (Directive 2010/75/EU); and,
- European Commission – Medium Combustion Plant Directive (Directive 2015/2193).

2.0 OPERATING PROCEDURES

2.1 PERMITTED ACTIVITIES

2.1.1 The existing permit EPR/QP3706LH authorises the operation and directly associated activities (i.e., fuel delivery) of 16 standby electric generating plant in the event of a National Grid failure and for testing purposes. The generators specified (MTU 20V4000G94LF) are considered best in class based on current technology and are a contingency solution, they do not function as electricity-generators within the daily operation of the wider site. In an abnormal / emergency event, the generators will, through an automated system, become operational; under these events, the plant would operate for no more than 72 hours in line with industry best practice, and (for the avoidance of customer compromises) no longer than 48 hours.

2.1.2 The primary commercial activity of the data centre is data storage. This is not an activity that in and of itself requires an Environmental Permit, as outlined in the Environmental Permitting (England and Wales) Regulations 2016 (as amended)

2.1.3 The data centre requires capability to continue to operate in the immediate event of power failure, and continued operation in the event of prolonged power outages. A contingency standby power solution, comprising multiple liquid-fuelled engines provides onsite electrical generating capacity to be used in the event of power outages to the site.

2.1.4 The proposal entails expansion of the existing site and the construction of a further 40 gas engines each rated at 3.3MW. The new engines will not be operated for more than 500hours/year including any testing requirements.

2.1.5 The activity will continue to be regulated under the Schedule 1 reference Section 1.1 Part A (1) (a) of the Environmental Permitting (England and Wales) Regulations 2016 (as amended) which states *'burning any fuel in an appliance with a rated thermal input of 50 or more megawatts*.' As such, it will be regarded as an installation-regulated activity, however owing to the aggregation rules it is not considered a Large Combustion Plant and is therefore Part IV of the Industrial Emissions Directive is not applicable.

Directly Associated Activities

2.1.6 There will be no further Directly Associated Activities (DAA) as a result of this variation application. For clarity, the DAA's identified in table S1.1 are as follows: -

- Storage of raw materials, including above ground storage of gas oil or an agreed equivalent substitute; and,
- Surface water drainage.

2.1.7 As there are no proposed changes to these DAAs, they are not addressed further throughout the application.

2.2 MEDIUM COMBUSTION PLANT DIRECTIVE

2.2.1 The Medium Combustion Plant Directive (MCPD) has been developed to cover all combustion plant with rated thermal input of between 1MW and 50MW. The proposed engines and boilers will each have a thermal input of greater than 1MW but through aggregation are over the threshold of the Large Combustion Plant Directive. As such, the emission limits proposed within the MCPD are considered appropriate for the engines and boilers proposed at the site although the site will continue to be regulated as a Part A (1) Activity.

2.3 BEST AVALIABLE TECHNIQUES

2.3.1 The overriding principle under the Environmental Permitting Regulation regime is the use of Best Available Techniques (BAT) to prevent and generally reduce emission and their impact on the environment. BAT is regarded as the techniques which will deliver the highest level of overall environmental protection and are available to the relevant industrial section, being able to be practically applied at a proportionate cost.

2.3.2 BAT will be considered throughout the application and is discussed in relation to the relevant industry sector guidance in Section 9 of this document.

3.0 SITE INFORMATION

3.1 SITE ACCESS

3.1.1 Access to the site is achieved by an approach road, Priestley Way which adjoins the A5 Edgware Road.

3.2 SITE LAYOUT

3.2.1 To the eastern boundary a builder's merchant operates, whilst the western boundary comprises light industrial and Outlet retail units. The A406 North Circular forms the southern boundary. Bordering the site to the North is Neasden recreational ground and Brent Reservoir, which is a SSSI.

3.2.2 The generators will be situated in pairs totalling eight per floor with the fuel stores located below on the ground floor.

3.2.3 Each generator has a separate exhaust flue but air exhaust is into a common plenum.

3.2.4 The internal layout of the facility is detailed on drawing numbers PURE/B047734/GEN/01 and GA PROPOSED SITE PLAN (EAST AND WEST)- PHASE 02, the emissions points to air are further detailed on Drawing Number PURE/B047734/EPA/01.

3.3 FUEL STORAGE

3.3.1 Each engine has its own dedicated bulk fuel storage tank. They are positioned underneath the engines at ground level, minimising pipe-runs and pumping distances to point of use. All day tanks will be 1,200 litres (useable) and the Table below summarises the bulk tank sizes.

Table 1: Bulk Tank Capacities

Location	Tank	Tank Size	Tanks	
			Single Fuel Tank	Fuel Capacity
North	Tank 1	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	61,000
North	Tank 2	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	122,000
North	Tank 3	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	183,000
North	Tank 4	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	244,000
North	Tank 5	5,160mm Long x 3,020mm Wide x 2,550mm High	31,500	275,500
North	Tank 6	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	336,500
North	Tank 7	6,135mm Long x 3,020mm Wide x 2,550mm High	38,500	375,000
North	Tank 8	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	436,000

North	Tank 9	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	497,000
North	Tank 10	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	558,000
North	Tank 11	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	619,000
North	Tank 12	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	680,000
South	Tank 13	6,135mm Long x 3,020mm Wide x 2,550mm High	38,500	718,500
South	Tank 14	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	779,500
South	Tank 15	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	840,500
South	Tank 16	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	901,500
South	Tank 17	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	962,500
South	Tank 18	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	1,023,500
South	Tank 19	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	1,084,500
South	Tank 20	9,460mm long, x 3,020mm Wide, x 2,550mm High	61,000	1,145,500

3.3.2 Each tank is double walled, affording integrated primary and secondary containment and minimisation of leakage associated with containment failure.

3.3.3 Further to this, there are two dump tanks provided on site, one in the North Tank Room and one in the South Tank Room. These are shown on the fuel schematics (Drawing Numbers LON1B2V3A/EX/7075/GB/ ZZ/DR/X/59061, and LON1B2V3A /EX/ 7075/GB/ ZZ/DR/X/59062). Each of the day tanks in the generator rooms will be fitted with a dump valve. In the event of fire in the generator room the dump valve will open and drain the fuel to the dump tank in the basement. The fuel will then be pumped from the dump tanks back into the bulk storage tanks.

3.3.4 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.

3.4 COOLING SYSTEMS

3.4.1 Generator cooling will be via inlet and discharge louvres, the air flow required is 44.65m3/s. The engines will be cooled using a drawn-air system. Ambient air will be drawn in, pass through the container housing the engine, and exit in a vertical direction through a plenum venting above building roof-level (at a level consistent with the planning approved acoustic parapet). Given the operational design mounting pairs of engines in a vertical arrangement, the plenum has been designed to serve both engines. The Plenum also serves as the routing and structural support for single twin-flue exhaust stack per engine pairing.

3.4.2 A forced air-cooling system will be utilised to maintain optimum operating temperatures for the engine. Ambient air will be drawn in from the free areas surrounding the Installation, will pass over the engines and be drawn into the plenum. The horizontal air flow from the engines will be vertically discharged from the plenum.

4.0 INSTALLATION

4.1 PURPOSE OF ACTIVITY

4.1.1 The primary purpose of the proposed activity is to produce electricity to power the data centre should National grid supply fail.

4.1.2 The data centre comprises permanent buildings that contain data storage and associated IT infrastructure. The facility will under normal operating conditions be powered by grid supplied electricity. A contingency standby power solution, comprising multiple liquid-fuelled engines provides onsite electrical generating capacity to be used in the event of power outages to the site.

4.1.3 The data centre is required to be permanently online and will be powered by the national electricity supply grid. In consultation with relevant stakeholders and following a review of historic electricity outages and forecast ongoing grid resilience it is considered that the electricity supply grid will remain sufficiently stable to enable the data centre to operate on grid supplied electricity only. However, the provision of standby power generating plant is essential in accordance with best practice and contractual obligations.

4.1.4 The plant will operate exclusively to serve as back-up power supply and will not be used for voluntary elected power.

4.2 SUMMARY OF PROCESS

4.2.1 The Data Centre currently comprises 16 backup generators installed to provide emergency power in the event of a grid supply failure, which will be delivered in two phases. PDCG propose to expand the existing site and construction of a further 40 gas engines each rated at 3.3MW. The new engines will not be operated for more than 500hours/year including any testing requirements.

4.2.2 Each engine is specified as 3.3MW. As there are currently no stated spec sheets or faceplates the EA calculation for the total thermal input of each engine has been calculated on a worst-case scenario as detailed in the relevant guidance using a power factor of 08 and conversion efficiency of 0.35

3.3MWe = (3.3*0.8)/0.35 = 7.54MWth

4.2.3 As such, the total additional thermal input of the installation will be 301MWth.

4.2.4 Each generator set comprises a generator and alternator in a combined set. The generators are proposed to be arranged in a stacked, paired formation installed in 2 phases (allowing for phased expansion and capacity across the site as part of a forecast operating strategy).

4.2.5 A common fuel bunker (one storage tank per engine) servicing each pair of the paired generators is located at ground level.

4.2.6 Exhaust gases from each pair of engines will be discharged through a common plenum that exclusively serves each paired generator set, along with discharged air from the associated engine cooling system. Only one engine may be on at a time, for testing certainly.

4.2.7 These generators are intended to function exclusively as standby power generators for the site and will be limited to less than 500 hours per year run time, including the testing regime as detailed in Table 2 below.

Testing

4.2.8 It is essential that the standby power systems are routinely tested to ensure that they function correctly in the event of them being required to operate. The testing regime is detailed in Table 2.

Table 2 – Testing Regime

Type of Test	Duration	Scheduling	Load
Groups of up to eight engines, low load	30minutes	Groups of up to eight engines tested once per month for 10 months per year;	Up to 50% load
Individual engine, full load	4hours	Single engine tested once every 6 months (maximum 2 tests per year)	Approximately 100% load

5.0 EMISSIONS CONTROL

5.1 POINT SOURCE EMISSIONS TO AIR

5.1.1 An Air Quality Assessment (AQA) has been undertaken which discusses the potential impact of the operation for a prolonged electricity supply outage. The results of this assessment are provided in Appendix ### of this application.

5.1.2 New Medium Combustion Plants which operate less than 500 hours per year as a 3-year rolling average are exempt from meeting MCPD ELVs. Monitoring of the emissions from the units will be consistent with the currently permitted frequencies and standards within the extant Environmental Permit.

5.1.3 The additional 40 generators will be utilised to maintain power in the event of a National Grid outage and will be tested for up to 30 minutes every month for ten months at up to 50% load, and up to four hours, twice per year at up to 100% load. This assessment has modelled generator emissions under the assumption of diesel fuel, when in reality the generators will be run on hydrotreated vegetable oil (HVO 100) fuel, which has a lower emission rate for oxides of nitrogen. Each generator will have an individual flue, these will be grouped into four groups of ten flues, all of which will terminate at a height of 43.1 m.

5.1.4 It is noted here that air emission test points are to be fitted in flues for each of the generators. These can be identified on Drawing Numbers LON1B2V3A/EX/7075/GB/02/DR/X/59006, LON1B2V3A/EX/7075/GB/ZZ/DR/X/59061, and LON1B2V3A /EX/ 7075/GB/ ZZ/DR/X/59062.

5.1.5 The AQA considers the potential impacts associated with nitrogen dioxide, particulate matter, sulphur dioxide, carbon monoxide, and total organic carbon as benzene on 17 human health receptors and 15 ecological sites for both the two testing scenarios, which follows the routine testing schedule, and the outage scenario, which represent a 48-hour National Grid outage.

5.1.6 The emissions have been modelled using ADMS-5 to screen the significance of impacts against the Environment Agency (EA) screening process. The predicted environmental concentration (PEC) from the Phase 1 assessment (existing 16 generators on site) has been used at the background concentration for this assessment to represent cumulative impacts. Within the model it has been assumed that there has been no improvement since the Phase 1 assessment, which used 2019 as a background year, and the worst-case meteorological year of 2017 has been used to ensure a worst case, robust assessment.

5.1.7 The impacts at all human health receptors during both the two testing scenarios and the outage scenario were screened out at all receptors for all pollutants within the testing and outage scenario except for the annual mean and 1-hour mean NO2 within the outage scenario. However, the outage scenario is highly unlikely to occur over a 48-hour period, as the longest outage from Elstree Substation in the last ten years was less than 3 minutes, therefore impacts can be considered to be not significant. Subsequently, annual mean and short-term impacts at all receptors are either screened out and insignificant or assessed as not significant.

5.1.8 Impacts as a result of the six monthly and monthly testing scenarios on ecological receptors were screened to be insignificant and all but the annual mean NOx and nutrient nitrogen deposition at E1 within the six-monthly testing scenario. To ensure a conservative approach, the background concentration from 2019 being used and concentrations in the opening year likely to be lower, as well as the impact due to the background concentration already exceeding the AQO. Furthermore, NOx airborne pollutants are likely to have little impact on E1, as stated by the Air Pollution Information System (APIS). Subsequently, NOx

concentrations are not considered to be an issue for the habitat types within E1. As such, the annual mean NOx impacts and nutrient nitrogen deposition impacts are considered to be not significant.

5.1.9 During the outage scenario, impacts were screened to be insignificant for all receptors except at E1 for annual mean NOx and nutrient nitrogen deposition as well as E1, E6, E9 and E10 for 24-hour mean NOx. However, theses impacts were all determined to be not significant as it is highly unlikely that an outage will occur for a length of 48 hours, as the longest outage at Elstree substation was less than 3 minutes in the past ten years. As such the impact at ecological sites, where not able to be screened as insignificant, have been determined to be not significant in the outage scenario due to the unlikelihood of the outage scenario occurring.

Table 3: Emission Points and Monitoring

Emission Point	Source	Parameter	Limit	Reference Period	Monitoring Frequency	Monitoring Standard
A1 through A40	Engine Exhaust	Oxides of Nitrogen (NO and NO_2 expressed as NO_2)	No limit set	In line with web guide 'Monitoring stack emissions: low risk MCPs and specified generators' Published 16 February 2021 (formerly known as TGN M5)	Every 1,500 hours of operation or once every five years (whichever comes first).	In line with web guide 'Monitoring stack emissions: low risk MCPs and specified generators' Published 16 February 2021 (formerly known as TGN M5)
A1 through A40	Engine Exhaust	Carbon Monoxide	No limit set	In line with web guide 'Monitoring stack emissions: low risk MCPs and specified generators' Published 16 February 2021 (formerly known as TGN M5)	Every 1,500 hours of operation or once every five years (whichever comes first).	In line with web guide 'Monitoring stack emissions: low risk MCPs and specified generators' Published 16 February 2021 (formerly known as TGN M5)
A1 through A40	Engine Exhaust	Sulphur Dioxide	No limit set	-	-	-
A1 through A40	Engine Exhaust	Particulate	No limit set	-	-	-
Vents from fuel storage tanks	Vents from fuel storage tanks for engines: A1 through A40	No parameters set	No limit set	-	-	-

5.2 POINT SOURCE EMISSIONS TO GROUNDWATER

5.2.1 There will be no point source emissions to groundwater as a result of this application.

5.3 POINT SOURCE EMISSIONS TO SURFACE WATER AND SEWERS

5.3.1 There will be no additional point source emissions to surface water or sewer as a result of this application.

5.3.2 There will be domestic sewerage proportionate with the low numbers of staff on site. This is outside of the installation boundary of the permitted activities and will be located in the Data Centre premises.

5.4 FUGITIVE EMISSIONS

Fugitive emissions to air

5.4.1 Small quantities of alkane vapour from diesel storage tank breathers could potentially be emitted.

Fluorinated gas (F-gas) Legislation

5.4.2 No fluorinated gases will be used within the Installation's systems.

Fugitive emissions to groundwater

5.4.3 There are not expected to be fugitive emissions to land or groundwater from permitted activities within the installation boundary of the Site. There is a potential for windblown litter although this is to be mitigated by keeping waste in a secure waste storage area.

5.4.4 Surface water (principally from rainfall) will drain to sewer via the surface water runoff system.

5.4.5 Surface water from rainfall landing on vegetated areas of the wider Site will infiltrate into surface soils.

5.4.6 The fuel storage tanks are described in section 3, including details of leak prevention and detection.

Fugitive emissions to Surface water and sewers

5.4.7 There are no fugitive emissions to water from the Site. Surface water (principally from rainfall) from areas of hardstanding will drain to sewer via the surface water runoff system.

5.4.8 An oil-water separator will minimise the likelihood of any low density, insoluble substances from entering the surface water drainage system. These forecourt separators are located in the re-fuelling areas. One of which is located in the southern car park and one in the northern car park. The total capacity per interceptor is 10,000L (to contain spillage from a 7600l road tanker compartment + additional catchment collected by the separator).

5.4.9 This system is maintained in accordance with processes documented within the Site's Environmental Management System.

5.4.10 Any spills of materials that could potentially have an adverse impact on water bodies will be managed in accordance with the Site's environmental management system.

6.0 PROCESS EFFICIENCY

6.1 ENERGY EFFICIENCY

6.1.1 The scope of the Environmental Permit is limited to the combustion plant Installation, and consequently the energy efficiency of the data centre itself is beyond the scope of that boundary. Nonetheless, as a reflection of the Operator's approach the data centre is intentionally designed to be as energy efficient as practicable within the constraints of direct operational control.

6.1.2 The combustion plant specified for inclusion are market leading in terms of their reliability and performance (operational and environmental). The Electronic Control Unit will be optimised to enable the plant to operate as efficiently as possible. Given the infrequent and intermittent operation through the testing regime, and the unplanned operation during an outage, other energy efficiency measures such as heat recovery, are not considered appropriate.

6.2 ENERGY CONSUMPTION

6.2.1 The purpose of the Installation is to provide standby power generating capacity in the event of primary electricity supply failure to the Site.

6.2.2 It is intended that the Installation is installed only as a contingency solution, and one that is anticipated will not be called into operation: a reflection on the robustness and reliability of the electricity supply network.

6.2.3 The testing regime discussed elsewhere in this document is anticipated to be the only time when the plant will be operational and will operate within the 500hr limit for emergency plant outlined in the Environmental Permit FAQ for data centres.

6.2.4 Assuming no power shutdown and just for testing purposes it is forecast that the Installation will generate approximately 1088MWhr of electricity and consume approximately 336,000litres of fuel per year.

6.2.5 Should the Installation become operational in the event of an electrical supply outage to the wider site, fuel consumption will substantially increase to fulfil the energy demand requirements.

6.3 RAW MATERIALS

6.3.1 The Site uses the raw materials detailed in Table 4. Typical consumption values are given as all raw materials usage is intermittent.

Table 4 – Raw Materials Usage

Substance	Approx Annual Consumption	Typical Storage Capacity	Use	Risk
Diesel	Approximately 336,000 Litres per year under normal conditions	Overall fuel storage capacity 1,680,000 litres	Generator Fuel	Flammable liquid and vapour, Toxic to aquatic life with long lasting effects. May cause damage to organs, skin irritant and harmful if inhaled; carcinogenic

Glycol			Generator Coolant	Harmful if swallowed
Mineral Lubricant Oil			To lubricate generators	None specifically known

6.3.2 Diesel and lubricants are consumable items within the Installation and are consumed as part of the operation essential for operation.

6.3.3 Diesel fuel is stored in dedicated storage tanks, described in Section 3.

6.3.4 Lubricants and glycol coolants are present within the generator sets and stored in pipework, storage containers and sumps. Levels are monitored and maintained in accordance with the site's Environmental Management System. There is no routine storage of surplus lubricant or glycol on site; additional quantities are delivered to site by approved service and maintenance suppliers and contractors.

6.3.5 The generator units function as an integrated secondary containment solution. The result is that any failure of primary containment will be controlled within the secondary containment system, thereby preventing uncontrolled spills to ground. Routine site inspection and preventative maintenance activities seeks to identify potential leaks and implement remediation before an issue arises.

6.3.6 The use of materials will be routinely monitored in line with the site's operating processes. The quantity of diesel consumed is the primary opportunity for driving efficiency given that diesel is the primary material (by volume) consumed and has the greatest environmental impact when in normal use (combustion pollutants discharged to atmosphere).

7.0 WASTE MINIMISATION, RECOVERY AND DISPOSAL

7.1.1 The activities to be undertaken do not generate significant quantities of operational waste, relative to the scale of the activities undertaken. The anticipated waste streams, and forecast typical quantities generated, are detailed in Table 5.

Table 5 – Waste Streams

Waste stream	Source	State (Solid/Liquid/Gas)	Typical Generation	Hazardous Waste?
Testing and Maintenance				
Filters	Filtration of fuel and oil on generators	Solid	5No. Filters per generator replace every 3 years	Yes
Lubricant Oil (Mineral)	Lubrication of Generators	Liquid	Replace every 3 years. 350 litres yearly test	Yes
Glycol Solution	Generator Coolant	Liquid	Replace every 5 years. Yearly test 932 Litres per generator	Yes
Abnormal Conditions				
Oily wastes	Filtration of fuel (diesel polishing)	Liquid	Irregular, not yet known	Yes
Batteries	Generators	Solid	Irregular, not yet known	Yes
Mechanical and electrical components	Generators	Liquid	Irregular, not yet known	Yes / No – depending on part

7.1.2 The majority of the waste associated with the permitted activity is anticipated to be non-hazardous in nature. The small administrative function will generate wastes typical of an office, comprising mainly paper/cardboard and plastic/metal office consumables. Food and drink related waste streams are also expected.

7.1.3 There are anticipated to be waste streams associated with routine service and maintenance of equipment. This is expected to include oils and lubricants and their associated containers and applicators.

7.1.4 The site will operate in accordance with the waste hierarchy. In the first instance opportunities for elimination of waste will be addressed.

7.1.5 Secure, dedicated and segregated centralised waste storage areas are provided on site. These areas are positioned away from potential ignition sources (both accidental and malicious). The areas provide weather protection for wastes thereby preventing material degradation (that can reduce recyclability) and also rainwater ingress and potential contamination of surface or ground waters. Segregation at source maximises potential for the recycling of wastes.

7.1.6 Hazardous waste materials are to be securely stored separately from non-hazardous materials in containers that are appropriate to the nature of the waste stream. Appropriate primary and secondary containment (e.g., cages, bunds, etc.) will be provided.

7.1.7 All wase storage areas will be clearly labelled showing what materials are to be held in each area.

7.1.8 Management of waste, its onsite storage and offsite disposal processes will be documented within the site's Environmental Management System.

8.0 GENERAL MANAGEMENT

8.1 ENVIRONMENTAL MANAGEMENT SYSTEM

8.1.1 PDCG hold an EMS that meets the requirements of the ISO14001 standard, this was implemented prior to operation of the Installation and will be expanded to cover the changes in this variation.

8.1.2 The EMS facilitates robust operational control of the plant, and includes documented processes in relation to the plant, its operation, service and maintenance, and management of potential environmental issues highlighted elsewhere in this report. Principally the EMS addresses matters regarding: -

- Operations and maintenance;
- Management of change;
- Training and competence;
- Incidents, accidents and complaints management;
- Maintaining records; and,
- Site closure.

8.1.3 The EMS enables the identification and implementation of mitigation for potential risks of pollution and harm to human health related to operation, maintenance, accidents, incidents, and non-conformances of the installation. All critical plant and equipment will be documented and incorporate a preventative maintenance schedule.

8.1.4 The system will enable ongoing monitoring and reporting of environmental performance and support an effective continual improvement programme.

8.1.5 Training needs requirements will be addressed and allow for evidencing of Operator and employee capability and competency.

8.1.6 The system will incorporate customer and stakeholder engagement and management processes that address issues such as complaints (such as noise) and reporting requirements (e.g., potentially carbon emissions reporting).

8.1.7 EMS documentation, including a copy of the Environmental Permit, will be accessible and available to all members of staff. All members of staff will be expected to comply with the documented processes and procedures; appropriate training, including refresher training, will be provided to staff.

8.1.8 The EMS will be subject to regular review, including within a formal internal audit context, with the findings shared with the site's management. Additional reporting related to monitoring, incidents, accidents, and complaints will be provided to the site's management.

8.2 SITE RECORDS

8.2.1 A Site Diary will be kept in the site office and updated on a daily basis. This diary will be used to record any incidents on site involving accidents, spillages, vandalism, complaints etc. This will provide an ongoing record and allow for investigative and corrective action to take place in line with the requirements of the company's EMS.

8.2.2 A copy of the Environmental Permit and associated documents will be kept in a convenient location in the site office, allowing suitable access for all persons working on or visiting the site.

8.3 INSPECTION, MAINTENANCE AND MONITORING

Emissions to air

8.3.1 In line with Environment Agency Guidance regarding Environmental Permitting of standby power generators for data centres. Monitoring of NO2 and Carbon Monoxide will be undertaken every 1,500 hours of operation or once every 5 years in accordance with the conditions of the Environmental Permit.

Emissions to Water

8.3.2 There is no direct emission to water associated with the Installation and consequently no monitoring is required.

Emissions to Ground

8.3.3 Ground water monitoring has routinely been undertaken given the historic land use at the site. This monitoring will continue to be undertaken within scope of the Installation's Environmental Management System that will be implemented prior to operation of the plant.

Reporting of Waste

8.3.4 The Installation is not associated with a waste-related activity. Furthermore, the types and quantities of waste anticipated to be generated by the site are anticipated to present relatively low risk to the environment, waste contractors and staff. No specific provision is anticipated beyond good practice of waste management undertaken in accordance with the Site's Environmental Management System.

Monitoring Performance

8.3.5 The Operator proposes to monitor and report performance based on the parameter's details in Table 6.

Table 6 – Schedule of Monitoring Performance

Parameter	Reporting Frequency	Units
Diesel Consumption	Annually	m^3
Generator operating for testing / maintenance	Annually	• Total hours for the site; • Total hours for each individual generator; • Total number of runs per generator (number); and, • Total number of minutes per run.
Generator operation for emergency running	Within 24hrs of emergency operation	• Date and time of national grid failure; • Number of generators operating immediately after the failure; • Number of generators operating two hours after the failure; and, • Total duration (hours) of mains supply failure.
Generator operation for emergency running	Annually	• Total number of runs; and, • Total duration (hours) of runs.

8.3.6 If monitoring indicates that the performance of the plant does not meet any of the standards, PDCG will take the following actions: -

- Identification of the source;
- Carry out the appropriate repair and maintenance work that will be taken to improve performance to achieve the standards given, including any testing; and,
- All maintenance and repair work will be recorded as part of the sites EMS and subsequently a report would be submitted to the EA.

Maintenance

8.3.7 Only personnel who are trained and licensed to operate equipment and carry out maintenance will do so.

8.3.8 All plant and equipment will be maintained in accordance with a preventative maintenance programme which will be defined by the manufacturer's requirements. This will ensure that the integrity and operational efficiency of all plant and equipment is maintained and therefore minimise the risk of mechanical failure which may result in increased dust emissions. This particular programme forms part of the site's Environmental Management System (EMS).

8.3.9 In addition, all plant and equipment will be visually inspected on a daily basis by the Site Manager (or a nominated deputy) prior to use. The purpose of this inspection is to identify any signs of defects that may affect the integrity and operational efficiency of the plant.

8.3.10 Further, visual daily inspection of the interceptors will be undertaken by the Site Manager (or a nominated deputy). The purpose of this inspection is to identify any signs of defects that may affect the integrity and operational efficiency of the interceptors. The interceptors will be maintained in accordance with the guidance set out within the manufacturer's installation, operating & maintenance guidelines.

8.3.11 The oil interceptor is monitored and alarmed to the BMS system, which measures the oil levels. The chamber is inspected once every 6 months and a log is kept of the oil and silt levels and the amount removed. The alarm probes are removed and cleaned at each six-monthly inspection.

8.3.12 In the event that a defect is identified on any item of plant or equipment, the use of the plant/equipment will be suspended until the necessary remedial works have been undertaken.

9.0 BAT ASSESSMENT

9.1 The following table sets out the BAT requirements as set out in the European Commission's BAT Conclusion for Large Combustion Plants and demonstrates how PDCG will meet these requirements. In addition, consideration is given within the supplementary table to the requirements of version 10 of the Data Centre FAQ Headline Approach and the summary headlines for permitting activities for data centre permitting.

Table 7: BAT Assessment

BAT Conclusion	BAT Justification
Environmental Management System	
BAT 1 – In order to improve the overall environmental performance, BAT is to elaborate and implement an environmental management system (EMS) that incorporates all of the following features: i. commitment of the management, including senior management; ii. definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation iii. planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment iv. implementation of procedures paying particular attention to: a) structure and responsibility, b) recruitment, training, awareness and competence c) communication d) employee involvement e) documentation f) effective process control g) maintenance programmes h) emergency preparedness and response i) safeguarding compliance with environmental legislation; v. checking performance and taking corrective action, paying particular attention to: a) monitoring and measurement (see also the JRC Reference Report on Monitoring of emissions to air and water from IED installations – ROM) b) corrective and preventive action c) maintenance of records d) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained; vi. review, by senior management, of the EMS and its continuing suitability, adequacy and effectiveness	As mentioned in Section 8.1, the Pure Data Centre operations are controlled by an EMS comprising quality, environmental and health and safety requirements which meets the requirements of the ISO 14001 standard. Due to the nature of the proposed activities and the minimal associated emissions, the following are not required for the site: - • Dust Management Plan; • Noise and Vibration Management Plan; and, • Odour Management Plan.

vii. following the development of cleaner technologies; viii. consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life; ix. application of sectoral benchmarking on a regular basis; x. quality assurance/quality control programmes to ensure that the characteristics of all fuels are fully determined and controlled (see BAT 9 xi. a management plan in order to reduce emissions to air and/or to water during other than normal operating conditions, including start-up and shutdown periods (see BAT 10 and BAT 11) xii. a waste management plan to ensure that waste is avoided, prepared for reuse, recycled or otherwise recovered, including the use of techniques given in BAT 16 xiii. a systematic method to identify and deal with potential uncontrolled and/or unplanned emissions to the environment); in particular: a) Emissions to soil and groundwater from the handling and storage of fuels, additives, by-products and wastes b) emissions associated with self-heating and/or self-ignition of fuel in the storage and handling activities; xiv. dust management plan (see BAT 12); xv. noise and vibration management plan (see BAT 17) xvi. odour management Plan	
Monitoring	
BAT 2 – BAT is to determine the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the gasification, IGCC and/or combustion units by carrying out a performance test at full load(1), according to EN standards, after the commissioning of the unit and after each modification that could significantly affect the net electrical efficiency and/or the net total fuel utilisation and/or the net mechanical energy efficiency of the unit. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	The back up engines specified for installation currently represent the best performing (based on emissions and power output capacity) units available on the market. As per Environment Agency FAQ on Environmental Permitting of Data Centres no monitoring of emissions to atmosphere is required as the back up generators will not operate beyond 500 hours per year.

BAT 3. BAT is to monitor key process parameters relevant for emissions to air and water including those given in the table and below. Flue gas: • Flow • Oxygen content, temperature and pressure • Water vapour content Waste water from flue-gas treatment	As per Environment Agency FAQ on Environmental Permitting of Data Centres no monitoring of emissions to atmosphere is required. The plant will operate for no more than 500 hours per year, and testing of individual generators will be limited to not more than 50 hours per year.
BAT 4. BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	As per Environment Agency FAQ on Environmental Permitting of Data Centres no monitoring of emissions to atmosphere is required. The plant will operate for no more than 500 hours per year, and testing of individual generators will be limited to not more than 50 hours per year.
BAT 5 - BAT is to monitor emissions to water from flue-gas treatment with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.	There will be no flue gas treatment or associated emissions to water. BAT5 is not applicable
General environmental and combustion performance	
BAT 6 - In order to improve the general environmental performance of combustion plants and to reduce emissions to air of CO and unburnt substances, BAT is to ensure optimised combustion and to use an appropriate combination of the techniques	The combustion plant has been designed by technical experts in this field, and in accordance with current standards and approached. As an integrated system, the fuel tanks are designed so that fuel remains of suitable quality for use within the system. The system is considered to be one of the most efficient and best performing of its capacity

	A fully integrated control system will be deployed enabling the operator to have clear understanding and visibility of the system performance. As per the Operator's environmental management system, the Installation will be maintained in accordance with a documented preventative maintenance schedule. A range of technologies and fuels has been considered as part of the design and specification phase. At this time the latest generation of diesel-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. A regular options appraisal will be undertaken to evaluate potential system improvements.
BAT 7 - In order to reduce emissions of ammonia to air from the use of selective catalytic reduction (SCR) and/or selective non-catalytic reduction (SNCR) for the abatement of NOX emissions, BAT is to optimise the design and/or operation of SCR and/or SNCR (e.g. optimised reagent to NOX ratio, homogeneous reagent distribution and optimum size of the reagent drops)	SCR and SNCR are not proposed to be installed at this time. The engines will operate for short periods of time (anticipated to be exclusively for the test regime), and for durations of up to 30min and max 4hours. These cycles do not enable the BAT technologies to rapidly achieve optimal performance and consequently is considered that there would be no net benefit to the environment. Furthermore, the air quality modelling indicates that there would be no significant long-term impact associated with emissions without SCR/SNCR further

	undermining the potential relevance of these technologies.
BAT 8 - In order to prevent or reduce emissions to air during normal operating conditions, BAT is to ensure, by appropriate design, operation and maintenance, that the emission abatement systems are used at optimal capacity and availability	Under normal operating conditions the plant will not be combusting fuel. The temperature of the plant will be maintained using electrically heated thermal jackets to enable effective and efficient operation on immediate. start-up, in a power outage emergency.
BAT 9 - In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the following elements in the quality assurance/quality control programmes for all the fuels used, as part of the environmental management system (see BAT 1): i. Initial full characterisation of the fuel used to include at least the parameters listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality; ii. Regular testing of the fuel quality to check that it is consistent with the initial characterisation and according to the plant design specifications. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed); iii. Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system	Only fuel that meets or exceeds the quality standards specified by the engine manufacturer will be used. Fuel supplier(s) will be required to supply in-specification that meets quality requirements. Routine periodic fuel testing will be conducted in accordance with the process detailed in the Installation's Environmental Management System.
BAT 10 In order to reduce emissions to air and/or to water during other than normal operating conditions (OTNOC), BAT is to set up and implement a management plan as part of the environmental management system (see BAT 1), commensurate with the relevance of potential pollutant releases, that includes the following elements: i. appropriate design of the systems considered relevant in causing OTNOC that may have an impact on emissions to air, water and/or soil (e.g. low-load design concepts for reducing the minimum start-up and shutdown loads for stable generation in gas turbines); ii. set-up and implementation of a specific preventive maintenance plan for these relevant systems; — review and recording of emissions caused by OTNOC and associated circumstances and implementation of corrective actions if necessary; iii. periodic assessment of the overall emissions during OTNOC (e.g. frequency of events, duration, emissions	BAT10 is not considered relevant. Under normal operating conditions the Installation will not be operating (with the exception of routine testing). OTNOC events are beyond the direct control of the operator and is part of the rationale for installing the back-up power supply generators. Nonetheless, an environmental management system will be implemented that will seek to

quantification/estimation) and implementation of corrective actions if necessary	enable continual improvement, minimising the environmental impact of the Installation.
BAT 11 – BAT is to appropriately monitor emissions to air and/or to water during OTNOC.	As per Environment Agency FAQ on Environmental Permitting of Data Centres no monitoring of emissions to atmosphere is required.
Energy Efficiency	
BAT 12 - In order to increase the energy efficiency of combustion, gasification and/or IGCC units operated ≥ 1 500 h/yr, BAT is to use an appropriate combination of the techniques given below	To optimise the atmospheric emissions the engines have been specified for emission reduction and not fuel efficiency, as the hours per year are so few.
Water Usage Emissions to Water	
BAT 13 - In order to reduce water usage and the volume of contaminated waste water discharged, BAT is to use one or both of the techniques given in the table.	None reported to be used after commissioning.
BAT 14 - In order to prevent the contamination of uncontaminated waste water and to reduce emissions to water, BAT is to segregate waste water streams and to treat them separately, depending on the pollutant content	None reported to be used after commissioning.
BAT 15 - In order to reduce emissions to water from flue-gas treatment, BAT is to use an appropriate combination of the techniques given below, and to use secondary techniques as close as possible to the source in order to avoid dilution.	There will be no flue gas treatment or associated emissions to water. BAT15 is not applicable
Waste Management	
BAT 16 - In order to reduce the quantity of waste sent for disposal from the combustion and/or gasification process and abatement techniques, BAT is to organise operations so as to maximise, in order of priority and taking into account life-cycle thinking. a) waste prevention, e.g. maximise the proportion of residues which arise as by-products; b) waste preparation for reuse, e.g. according to the specific requested quality criteria; c) waste recycling; d) other waste recovery (e.g. energy recovery),	Section 7 identifies the waste streams which will be generated through the operation of the site. There are minimal waste streams which will be produced as a result of the operation of the facility however the site will follow the waste hierarchy for any reuse or disposal routes for each waste stream.
Noise	

BAT- 17. In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below: • Operational measures • Low-noise equipment • Noise attenuation • Noise-control equipment • Appropriate location of equipment and • buildings	The Noise report describes the integrated abatement design to manage noise from the engines. Operational noise during testing and any events will be managed by the designed abatement when running
BAT 18 - In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below. a) Appropriate location of equipment and buildings b) Operational measures c) Low noise equipment d) Noise and vibration control equipment e) Noise attenuation	

No	EA Summary Requirement	Applicant Response	BAT Conclusion
1	We accept that oil fired diesel generators are presently the default technology for standby generators in data centres. However, the permit application still requires a BAT discussion detailing the choice of engine, the particular configuration and plant sizing meeting the standby arrangement (e.g. 2n).	We have selected the 20V4000G94LF liquid fuelled generator set through our service partner AVK. MTU is a Rolls Royce company. These engines are widely regarded as being one of the highest quality products in the industry and have been selected for their operational efficiency, low emissions, high reliability, and long service intervals. The generators will be situated in pairs totalling eight per floor, with 5 floors and with the fuel stores located below on the ground floor. The systems are arranged in a distributed redundant N+1 firm arrangement per load group whereby N is 3	The generator sets currently represent the best available technology for deployment within the use application and are appropriate for the installation variation. The technology represents a robust platform to which upgrades can be applied over the operational life of the plant as these become more readily accessible on the market.

		and there are 4 power systems per group. There are 4 load groups under this application.	
2	Standby engine capacities are added together in MWth input at the quoted standby rating, being usually 110% of the continuous rating (if >=50MWth the site then needs an EA 1.1A Combustion Activity EPR permit)	See Line 3 below.	-
3	If precise MWth figures are unavailable and spec sheets or faceplates are unclear, the calculation for MWth derived from MVA output is based on power factor 0.8 and an assumed poor conversion efficiency of 0.35 for MWth to MWe e.g. 3MVA = (3*0.8)/0.35 = 6.86MWth.	Each engine is nominally specified at 3.23MWe. The thermal capacity of each engine has been determined to be ~7.54MWth when referring to the stated calculation methodology. This results in a total thermal input of 301MWth for the Installation.	The installation exceeds the threshold for a Part A (1) Permit under schedule 1, Part 2, Chapter 1, Section 1.1 of the Environmental Permitting (England and Wales) Regulations 2016 (as amended).
4	The sum of generator plant capacities is based only on MWth inputs of all plant regardless of the standby configuration. MWe output constraints such as realistic customer load or other practical output limiting factors do not constitute a limit to the MWth input as defined in the EA's guide RGN02.	In accordance with the stated requirement, the MWth capacities of the generators at the site have been calculated only on MWth inputs, with no constraints or limiting factors applied.	No constraints or limiting factors have been applied to the thermal capacity of the generators.
5	Proximity of data centres with a company campus, adjacent, neighbouring, or close-by buildings in urban locations (e.g. within a common trading estate but only separated by a road width or notional	The data centre is installed as a standalone facility with no direct relationship to any other premises on site or in the immediate vicinity. In accordance with the guidance received, this variation relates exclusively to the standby power generating	The site is considered to be a single, standalone facility.

	distance) may constitute a single site for determining the boundary.	plant and does not include the data centre building or any technical plant and equipment contained therein.	
6	Permits will include a maximum 500 hour 'emergency/standby operational limit' for any or all the plant producing on-site power under the limits of the combustion activity; and thereby emission limit values ELVs to air (and thus engine emissions monitoring) are not required within the permit.	Under "normal" operating conditions (i.e. testing and maintenance only) each generator is anticipated to be operational for approximately 13hours per year. The engines are installed as contingency generating capacity in the event of an electricity supply outage. Records spanning the past 10 years indicate the occurrence of just 3x outages have occurred, and none lasting more than 3 minutes in duration. The Operator is confident that there will be a negligible likelihood of the generators operating at or above 500 hours per year.	The site meets the emergency / standby operational limit and therefore no emission limit values are applicable.
7	Emergency hours' operation includes those unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated but occurring only within the data centre itself.	The site has a N+1 firm level of resilience built into the supply from the national grid, therefore the requirement to operate the generators under an emergency scenario is unlikely.	The use of generators to make emergency repairs of electrical infrastructure is unlikely given the inbuilt N-1 firm resilience of the national grid supply.
8	Each individual generator with its own discharge stack, can be maintained, tested, and used in a planned way for up to 500 hours per calendar year each without ELVs (and hence no monitoring) under IED/MCPD. Though clearly the EA expects planned testing and generator operations to be organised to minimise occasions and durations (subject to client requirements). Ideally a target should	The plant has been designed to enable independent testing of each individual generator. Following completion of detailed atmospheric dispersion modelling of the emissions, a generator testing and maintenance regime has been devised (Table 2). It is anticipated that each engine will be tested for approximately 13hours per year. The majority of testing (monthly 10 times per year) will last less than 30minutes and be run at low load.	The proposed testing regime is below the individual generator testing target detailed in the Environment Agency Data Centre FAQ of 50 hours per year per generator.

	seek to keep individual generator testing to below 50 hours/annum each.	Twice a year each engine will be run individually for up to 4hours at full load.	
9	The whole or part site can only operate as emergency plant up to 500 hours as an absolute limit for grid backup issues; but that individual plant (at any load) with its own stack (or a stack with multiple plant) with justification can be operated for up to 500 hours (ideally<50) each as part of its non-emergency role under maintenance and testing.	Under "normal" operating conditions (i.e. testing and maintenance only) each generator is anticipated to be operational for approximately 13hours per year. The engines are installed as contingency generating capacity in the event of an electricity supply outage. Records spanning the past 10 years indicate the occurrence of just 3x outages have occurred, and none lasting more than 3 minutes in duration. The Operator is confident that there will be a negligible likelihood of the generators operating at or above 500 hours per year.	The site meets the emergency / standby operational limit and therefore no emission limit values are applicable.
10	For the purposes of determining operating hours, data centre diesel generators are regarded as having a minimal start-up or shut down times. Operational hours start on the first fuel ignition.	Power supply into the data centre is continually monitored. Should available electricity supply reduce below operating thresholds, the UPS system will immediately provide power and automatically initiate start-up of the generators with no latency of supply.	The operational parameters of the site will meet the requirements of minimal start up and shit down times.
11	Data Centre permits (unless they apply and justify it in a permit application) will expressly have a limit on the activity to exclude voluntary 'elective power operation' such as demand side response (i.e. on-site use) or grid operating reserve (STOR) (i.e. off-site export of electricity) and Frequency Control by Demand Management (FCDM) for grid support. This is primarily to differentiate data centres	The plant will operate exclusively to serve as back-up power supply in the event of interruption to electricity supply at the site. There will be no grid paralleling provided. The generators will not be used for voluntary elective power, such as: • Demand side response (i.e. onsite use); • Grid short term operating reserve (STOR, i.e. off-site export of electricity), or, • Frequency control by demand management	The site will not operate as feed into the national grid.

	from 'diesel arrays' that voluntarily operate within the balancing market, and importantly a clear way to demonstrate minimisation of missions to air as 'Emergency plant'.		
12	The default engine specification as a minimum for new plant to minimise the impacts of emissions to air (NOx) is 2g TA-Luft (or equivalent standard). A detailed cost benefit analysis (CBA) is otherwise needed justifying worse emission such as 4g TA-Luft plant or for example a justification under FCDM.	Tier 2 optimised engines provided and NEA (ORDE) optimised also provided. The UK EA BAT for diesels under IED indicate TA Luft 2g (which is not a reference to an existing TA Luft metric but a way of reporting, e.g., 5% O2) but the real focus is to not exceed the 18 hours > 200ug/m3 and to minimise short term peak exposure and to not exceed the vegetation standard. We have looked at emissions via the Plenums in two versions, one is with the engines exhausting directly into the plenum and the other with flues for each engine to the top of the plenum. This allows a comparison for dispersion from a larger volume, lower temperature, lower velocity and lower concentration discharge compared to the reverse of lower, higher, higher and higher respectively. The discharge into the plenum gives improved compliance with the AQS.	The generators sourced do not meet, just, the 2g-TA LUFT standard and are approximately 2.1g NOx at 5% O2. The benefits associated with the specified engines are considered to outweigh the adverse implications associated with technology (SCR) that could achieve this requirement (primarily the cost associated with compliant hardware, including the provision of pollutant abatement technologies, would be prohibitive). The air quality assessment concluded that under the normal operating (testing and maintenance) regime there is expected to be a significant air quality impact, and this is being reviewed with an ecological specialist for impact potential on the SSSI adjacent. There are no deposition or annual impacts from NOx and none from other air pollutants at any metrics. Please see the detailed air modelling report.
13	CBA for improved exhaust emissions, dispersion and mitigations from the plant is expected for the maintenance/testing and the emergency standby roles. We would be looking for improvements	Detailed atmospheric dispersion modelling has been undertaken in relation to planned testing and maintenance of the plant. The impact on human health associated with these activities was concluded to be: • not significant for the 30minute test; and,	Based on the conclusions from the air quality assessment and the modelled testing regime the emissions were considered not to be significant.

	particularly if Local Air Quality (LAQ) modelling (under H1) indicates anything other than an insignificant contribution to short term local air quality for the 'planned' maintenance emissions of the plant.	• the probability of an exceedance of the relevant air quality objective `for NO2 would be highly unlikely. In relation to potential impact on habitat, the air quality assessment concluded the 24hr mean critical level for NOx may be exceeded at the Brent Reservoir during the 4-hour testing, but only where two or more tests per day were undertaken – the proposed mitigation is to limit 4-hr testing to 1x engine per day. Proposed mitigation recommendations from the Air Quality Report have been adopted within the proposed testing regime.	
14	Retrofit abatement techniques for existing installations for engine emissions such as selective non-catalytic or catalytic reduction (SNCR or SCR) would not normally be expected for standby plant to mitigate the emissions for standby/emergency operation. BAT might include improved flue gas dispersion (e.g. stack modifications, increased height) or improved low NOx engine management controls or possibly fuel choice.	The installation will be newly constructed and specified and therefore retrofitting or other mitigation is not required at this time.	Retrofitting abatement technologies or further emissions mitigation beyond that stated previously are not required.
15	Operations and management procedures should reflect the outcomes of the air quality modelling by minimising the duration of testing, phasing engines into subgroups, avoiding whole site tests and planning off-grid maintenance days and most importantly times/days to avoid	The testing regime is detailed in Section 4.2 Table 2. The testing regime is proposed based on the results of the air quality assessment. Testing will be avoided (where possible) where wind is from a south easterly to south westerly direction, which	The testing regime will not adversely impact local air quality, and specifically relevant local habitats.

	adding to “at risk” high ambient pollutant background levels.	may result in NOx being dispersed towards the Brent Reservoir SSSI.	
16	When AQ modelling the emissions from the engines, the certified technical standard provided by the manufacturer should be used (i.e. likely worst-case emissions). However, any ‘fit for purpose’ monitoring of the actual emissions from installed plant will be considered as evidence of the likely real impacts as part of the permitting decision process.	Emissions data from the certified technical standard has been provided by the generator manufacturer. The modelling is considered to be a worst-case assessment and that actual impacts will be of lesser significance than concluded within the associated technical report.	The data from the certified technical standard provided by the manufacturer of the generators has been used in the air quality modelling. The manufacturer is providing actual emissions testing for the engines at their site when tested to compare to the worse case assumptions and these data will allow further modelling. Once installed, due to the layout, it will not be possible to test the emissions; this decided based on the sector guidance on no testing for emergency supply engines.
17	The groundwater monitoring of fuel storage tanks and distribution pipework using GW boreholes is risk based for the site condition report (SCR) and IED 5-yearly monitoring. Should GW monitoring be required for underground tanks and/or the SCR, the boreholes should be positioned for whole site surveillance (for the SCR) rather than as a very local control immediately around the buried fuel oil tanks (i.e., not be just an addition to double skinned tanks already protected by leak detection and hence ignoring distribution pipework etc.).	The site condition report highlighted potential historic land use known to result in legacy ground contamination. In developing the site, a routine ground water monitoring programme has been maintained. It is proposed that this programme will continue as part of the site’s routine monitoring activity. All bulk storage of liquids (i.e., fuel) and pipelines associated with the installation variation are above ground and designed with appropriate primary and secondary containment systems. Monitoring and control systems are also to be installed and documented processes implemented, including preventative maintenance, to prevent leaks from occurring (e.g., overfilling, interconnect failing).	Based on the site condition report existing routine ground water monitoring will continue to be undertaken, results monitored, and findings reported.

18	10-yearly soil sampling under IED is normally not needed but still needs some justification.	At present the Operator does not intend to take 10-yearly soil samples. Ongoing ground water sampling is considered to be appropriate at this time. Any changes to the need to undertake intrusive soil sampling will follow a risk-based approach taking into account operations and or incidents undertaken at the site. Presently, the proposed controls (i.e., primary, secondary, tertiary containment, impermeable ground across operational areas of the installation, documented management control and provision of appropriate training) are considered to sufficiently reduce the risk of soils being adversely impacted by site activity.	Current control measures are appropriate to prevent impacts to soil at the Installation. A risk-based approach will be adopted to review the need to undertake soil sampling at a future date.
19	The permit application must assess and provide evidence of actual reliability data for the local electricity grid distribution (including data centre internal electrical design) for the EA to judge the realistic likelihood of the plant needing to operate for prolonged periods in an emergency mode (especially if emissions model so as to exceed short term air quality standards).	Below is a summary table of the performance of the UK Transmission Grid. The data evidence that it delivers extremely high standard of supply reliability. By exception in the past 10 years there has been just 4 network incidents at Elstree causing interruption to supply. This historic grid reliability provides confidence that there is unlikely to be a regular, if indeed any, requirement for the generators to provide emergency standby power.	The likelihood of the Installation needing to operate for prolonged periods in an emergency mode is considered highly unlikely.
20	Optimising grid reliability within the site as part of general BAT to minimise emergency operating hours is required – evaluation is needed within the permit application on the Tier reliability standard under ISO27001 and Uptime.	The power supply to the site is protected by an uninterruptable power supply (UPS), consisting of banks of batteries capable of meeting the full load capacity of the site for approximately 10 minutes. This allows for any fluctuations to be managed using battery backup, with the generators only being initiated after 15 seconds of failure.	Use of battery storage as back- up minimises the emergency operation of the generators.

21	Reporting of standby engine operational run hours and discussion of any electrical outages (planned or grid failures regardless of duration) required annually.	The operator will record and report on operational run hours of all generators (individually and collectively) and electrical outages on an annual basis.	The Operator will monitor and report operational run hours in accordance with the Environment Agency's requirements.
22	Assuming AQ modelling, based on operating scenarios, indicates a local air quality risk then notification to the EA of unplanned (and pre-notification of planned) continuous grid outage exceeding 18 hours LAQM (or the otherwise assessed short term interval from modelling) is likely required under a permit schedule 5 notification.	The operator does not anticipate that there will be continuous grid outages to the site that exceed 18 hours.	The Operator will implement a notification protocol, informing the Environment Agency of planned continued outages that exceed 18-hour duration
23	The notification requirement stated in the permit should also indicate the actual number of generators that need to be operating above which the local air quality is at risk e.g. 'notification of continuous emergency operation exceeding 18hours with 5 or more engines operating together is required' (i.e. model shows 4 or less engines unlikely to breach LAQ).	The impacts at all human health receptors during both the six-monthly and monthly testing scenario were screened to be insignificant at all receptors for all pollutants except for the 1-hour mean NO_2 AQO within the six monthly testing scenario. However, the 1-hour mean NO_2 PEC were below 50% of the 200 µg/m_3 AQO and therefore the impacts is considered to be not significant. For the outage scenario, the impacts from PM_{10}, SO_2, CO and Benzene were all screened to be insignificant. Only the annual mean and 1-hour mean NO_2 were found to have potentially significant impacts, however both PECs were below their respective AQOs and the 48 hour outage scenario is highly unlikely to occur as the longest outage from Elstree Substation in the last ten years was less than 3 minutes, therefore impacts can be considered to be not significant. Note that the site is contracted to provide a service for a	In a scenario where engines are required to provide standby power to the site due to a full power outage the dispersion modelling concluded that this operation would likely be undertaken without needing to limit the number of operational engines.

		continuous period of 48 hours to customers.	
24	Assuming AQ modelling, based on emergency outage operating scenarios, indicates a very significant risk to local air quality and identified receptors, the EA will ask the operator to have a written action plan to manage the issue for prolonged emergency running of the plant (including sensitive receptors list and mitigations, assessments and impacts evaluation against modelled risk conditions i.e. occurrence at periods of most concern in the year, possibly ambient air monitoring surveillance at very sensitive receptors).	The air quality modelling evaluated the potential impact of the operation of the Installation during a prolonged electricity supply outage on nearby human health receptors and habitats. The assessment concluded that only the Brent Reservoir SSSI habitat was at potential adverse risk, although this habitat is designated for reasons other than environmental sensitivity to airborne pollution. A supporting ecological assessment has been provided which discusses the impact on the ecological receptors further. A written action plan is not considered necessary given the likelihood of a prolonged outage and the sensitivity of receptors potentially adversely impacted by prolonged emergency operation	Based on the results of the air quality modelling an air quality outage action plan is not required.
25	Due to the emphasis of the permit on electrical (and cooling) systems it is noted that the EA considers the FGas regulations as falling under the remit of the EPR permit (for notifications and management) where Fgases (or potentially any polluting potential substance) are used directly under the combustion aspects of the permitted activity (e.g. switchgear). It is important to notify the EA of any significant releases. Other uses of F-gases e.g. for server room cooling are not strictly under the EA permit but are regulated by	There are no uses of F-gases at the Installation, which are directly associated with the combustion activities and therefore F-Gas notification requirements under the permit are not considered to be necessary.	This element of BAT is not applicable to the proposed variation.

	the EA generally so it may still be prudent to make the EA aware of your F-gas releases.		
26	The permit application should detail the likely quantities of waste engine oil generated annually – EWC 13 02 waste oils following servicing for example. Although unlikely to be huge, the Pollution inventory has a reporting threshold of 1 tonne for non-hazardous waste but technically no lower thresholds for hazardous waste oil.	As discussed in section 6 of this report it is anticipated that approximately 5,000 litres of waste lubricating oil will be generated at the Installation each year.	The Operator will report on all relevant substances and wastes emitted from the Installation in accordance with the pollution inventory reporting requirements.
	The permit application is for the combustion plant and associated environmental concerns and not for the Data Centre itself. The applicant should be aware that the permitting process and application is accessible to the public so should have regard to 'Commercial in Confidence' and Critical National Infrastructure. In the first instance discuss particular concerns directly with the EA and/or exclude such priority information from the application but indicate that such is 'available on request'.	The Applicant acknowledges the guidance on commercial confidentiality and in this instance has not applied for the Environment Agency to consider aspects of the application as commercially confidential. Additionally, the proposed Installation is not regarded as critical national infrastructure.	A claim for commercial confidentially has not been made.

National Electricity Transmission System Performance Report

Year of Report	GB Network	NGET System	
	Reliability of Supply	Reliability of Supply	Elstree Outages
2013 - 2014	99.99991%	99.99995%	0
2014 - 2015	99.99987%	99.99996%	0
2015 - 2016	99.999993%	99.999998%	0
2016 -2017	99.999962%	99.999964%	0
2017 - 2018	99.999975%	99.999984%	1
2018 - 2019	99.999967%	99.999984%	0
2019 - 2020	99.99.999967%	99.999974%	0
2020 - 2021	99.999948%	99.999966%	0
2021 - 2022	99.999612%	99.999936%	3
2022 - 2023	99.999981%	99.999997%	0
2023 - 2024	99.999382%	99.999998%	0

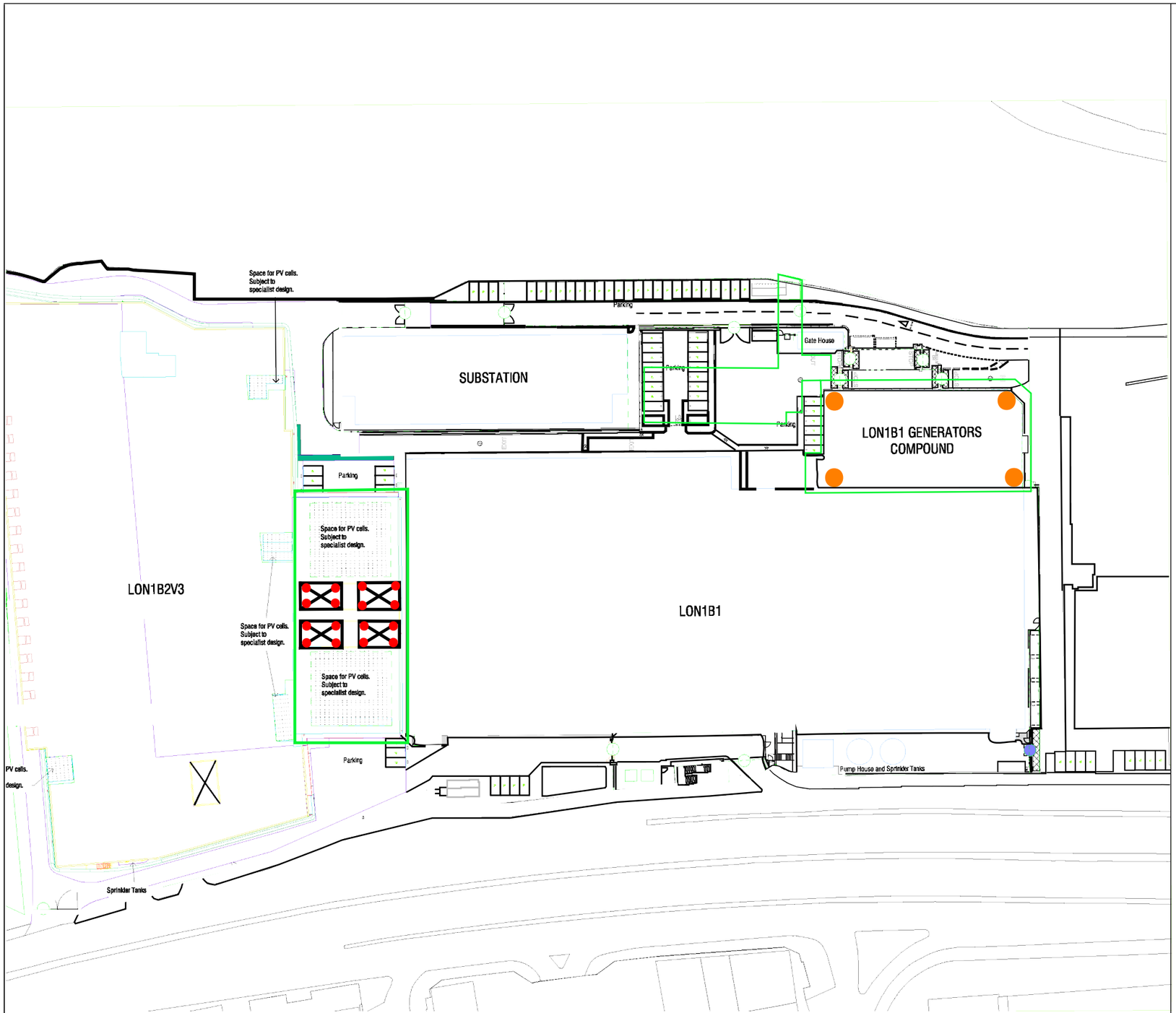
Details of Elstree Outages

Incident Date, Time & Location	MW Lost	Mins	MWh Unsupplied
27 June 2017 12:35 at Elstree 400kV substation An arching observed on disconnector X103A which resulted in Elstree – Sundon 400kV No. 1 circuit and Elstree SGT5B (Network Rail feeder) being switched out of service. In total the supply was lost for 1 minute and 54 seconds.	**Unknown**	**1.90**	**0.10†**

Incident Date, Time and Location	MW Lost	Mins	MWh Unsupplied
13 February 2022 18:02 at Elstree 275/132kV Substation Protection operated on SGT3A at Elstree 275kV substation and tripped the transformer feeder circuit to Stanmore. Due to reconfiguration works ongoing at Elstree 132kV substation, this was the only circuit supplying Stanmore demand at the time. All demand was restored via UKPN lower voltage networks. A portion of demand was restored within 3 minutes and therefore 0.5MWh relating to this incident is not incentivised.	49.7	300*	25.7
13 February 2022 18:02 at Elstree 275/132kV Substation Protection operated on SGT3A at Elstree 275kV substation and tripped the transformer feeder circuit to Stanmore. Due to reconfiguration works ongoing at Elstree 132kV substation, this was the only circuit supplying Stanmore demand at the time. All demand was restored via UKPN lower voltage networks. This figure relates to the MWh restored during the first 3 minutes of the incident which is not incentivised.	-	-	0.50
24 March 2022 18:41 at Elstree 275/132kV Substation The failure of circuit breaker W20 at Elstree 275kV substation caused two 275kV busbars and all associated circuits to trip. All demand should have been picked up from other Grid Supply points via interconnections, but the two 132kV UKPN owned interconnecting circuits to Rye House also tripped unexpectedly. 76.9MW was lost and UKPN restored demand in stages via the 33kV network prior to Elstree SGT3B being made available for reconnection.	76.9	104*	89.90

DRAWINGS

Environmental Permit Boundary - PURE/B047734/GEN/01
Site Layout Plan - GA PROPOSED SITE PLAN (EAST AND WEST)- PHASE 02
Emission Points to Air - PURE/B047734/EPA/01
Environmental Receptor Plan - PURE/B047734/REC/01
Typical Generator Room Layout - LON1B2V3A/EX/7075/GB/02/DR/X/59006
Fuel Schematic South - LON1B2V3A /EX/7075/GB/ ZZ/DR/X/59061
Fuel Schematic North - LON1B2V3A /EX/ 7075/GB/ ZZ/DR/X/59062



Key:

- Environmental Permit Boundary
- New Emisions Points to Air*

*Please See Drawing Number
PURE/B047734/EPA/01 for further details

- New Generators
- Existing Emisions Points to Air

Client: PDCG (GROUP SERVICES LIMITED)	Created: GA	2nd Floor, 11 York Street, Manchester, M2 2AW +44 161 874 4659 TETRA TECH	N W E S
	Checked: AB		
Project: Pure Data Centre	Date: 04/11/2024		
Title: Permit Boundary Plan and Emission Points to Air	Version: 1		
Drawing No: PURE/B047734/GEN/01			

Space for PV cells. Subject to specialist design.

Parking

SUBSTATION

Gate House

Parking

Parking

LON1B1 GENERATORS COMPOUND

Space for PV cells. Subject to specialist design.

Parking

Space for PV cells. Subject to specialist design.

LON1B2V3

LON1B1

Space for PV cells. Subject to specialist design.

Space for PV cells. Subject to specialist design.

VANGUARD

Space for PV cells. Subject to specialist design.

Parking

Pump House and Sprinkler Tanks

Sprinkler Tanks

FENCING STRATEGY KEY

- Application Site Boundary
- Ownership Boundary
- Proposed Site Security Fence: 3m High CLD Securus S1 Steel Meld-welsh Fence with Barbed Top
- Proposed Wildlife Friendly Fence
- Substation Compound Fence
- Existing Fence Retained
- Existing LON01 Security Fence
- Existing Louvred Screen Retained
- Existing LON01 Vehicle Gate
- Substation Compound Gate
- Emergency Access Gate
- Soft Landscaping

WIP

Revision	Description	Date	Drawn	Checked

SCOTT BROWNRIGG + HOARE LEA

PINNACLE CONSULTING ENGINEERS

Client's Name
PDCG (Group Services) Limited

PURE DC

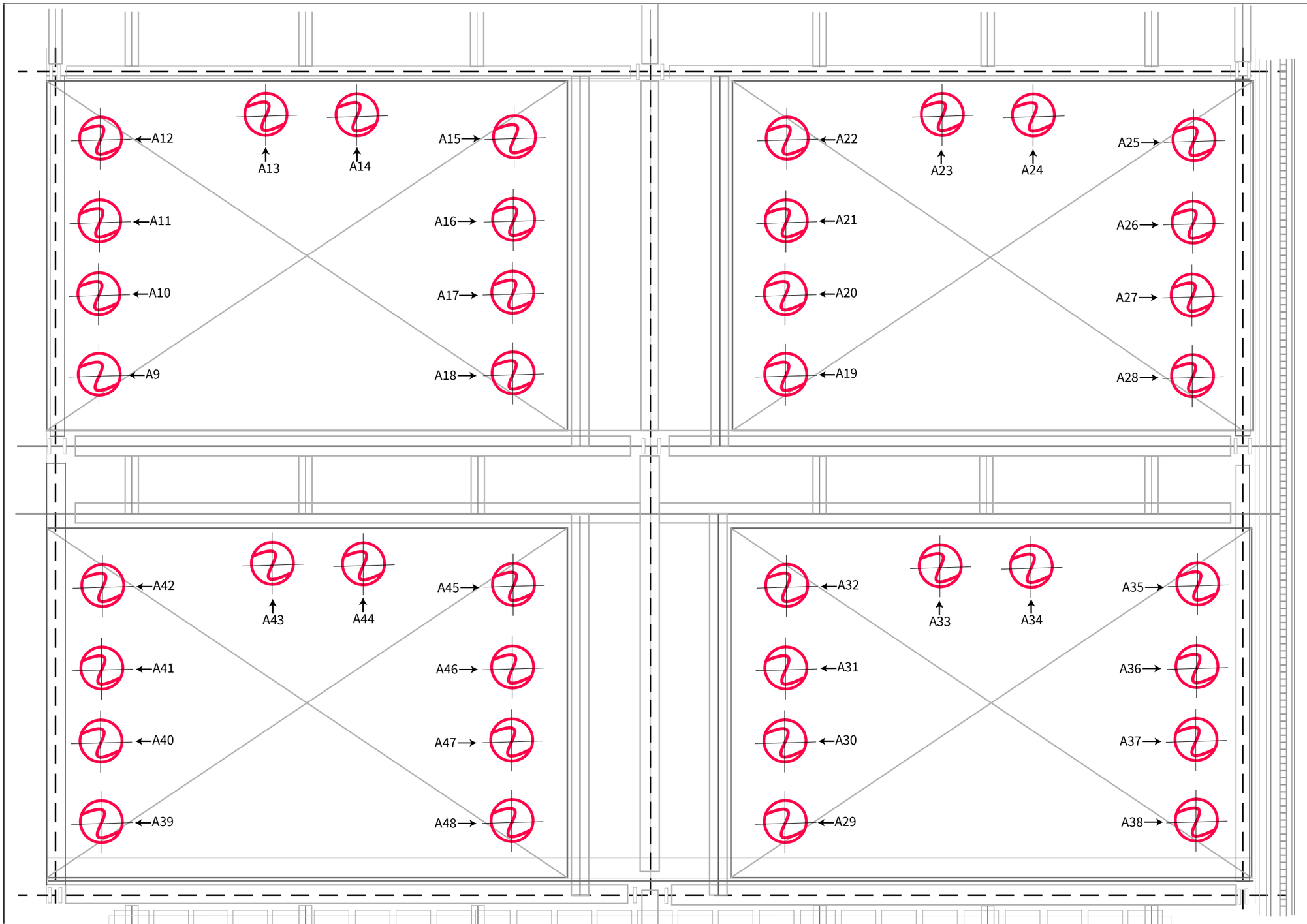
Job Title
Priestley Way, Brent (Phase 2A)

Drawing Title
GA PROPOSED SITE PLAN (EAST AND WEST)- PHASE 02

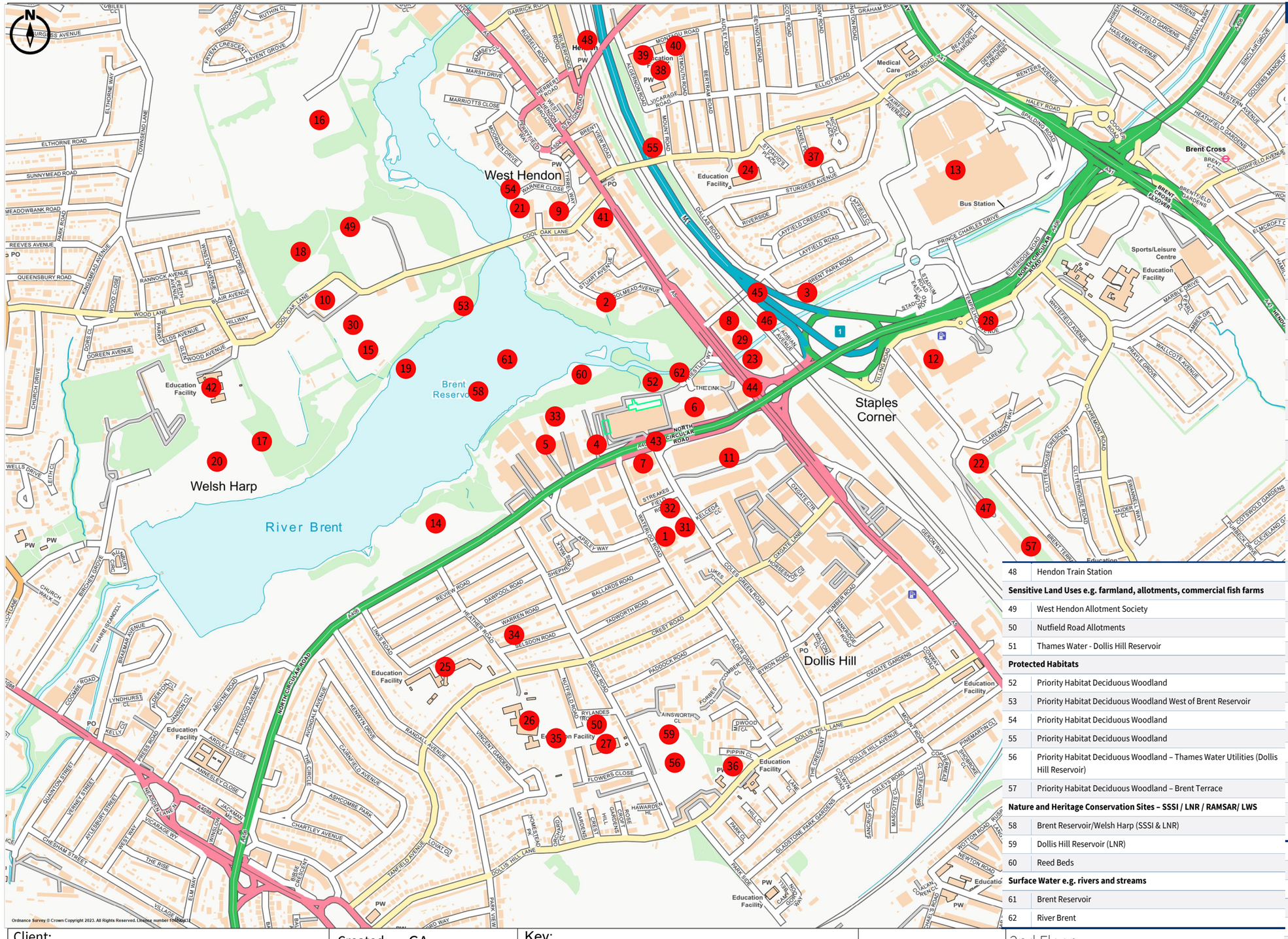
Scale	SBR Project No.
As indicated @A1	

Client Project No.	Phase	Originator	Volume	Level	Type	Role	Number
LON1B2V3A-		SBR-	DC2-	00-	DR-	A-	00202

Suitability Code Status Rev



Client: PDCG (GROUP SERVICES LIMITED)	Created: GA Checked: AB	Key: Emission Points to Air	N W E S	2nd Floor, 11 York Street, Manchester, M2 2AW +44 161 874 4659 TETRA TECH
Project: Pure Data Centre	Date: 24/08/2023			
Title: Emission Points to Air	Version: 1			
Drawing No: PURE/B047734/EPA/01				



ID	Receptor
Domestic Dwellings	
1	Properties to the south of the North Circular Road (A406)
2	Properties to the Northeast of Brent Reservoir
3	Properties to the East of the M1
Commercial and Industrial Premises	
4	Vanguard Self Storage
5	London Group Business Park
6	Harp View business Park
7	Commercial and Industrial properties South of the North Circular Road (A406)
8	Commercial and Industrial Properties East of the A5
9	Industrial Properties North of Cool Oak Lane
10	Greenmantle Landscape
11	Staples Corner Retail Park
12	Brent South Shopping Park
13	Brent Cross Shopping Centre
Recreational	
14	Neasden Recreation Ground
15	Woodfield Park
16	West Hendon Playing Fields
17	Welsh Harp Open Space
18	Princess Park Youth Football Club
19	Phoenix Canoe Club
20	Welsh Harp Green Valley
21	York Park
22	Claremount Park
Schools / Hospitals / Shops/Amenities	
23	Travelodge Brent Cross
24	Parkfield Primary School
25	Braintcroft Primary School
26	The Crest Academy
27	Menorah Girls School
28	Holiday Inn Brent Cross
29	Torah-Vodaas
30	Princess Park Youth Football Club
31	ICIS School
32	Ambulance Transfer Service
33	Harley Street Ambulance Service
34	Neasden Room
35	The Crest Boys Academy
36	Our Lady of Grace Roman Catholic School
37	Parkfield Primary School and Childrens Centre
38	West Hendon Pre-School
39	Al Naseeha Saturday School
40	Barnet Hill Academy
41	Aplomb Day and Pre-School
42	Woodfield School
Highway or Minor Roads	
43	North Circular Road A406
44	Edgware Road A5
45	M1
Railway Infrastructure	
46	Rail Line
47	Hendon Rail Transfer Station
48	Hendon Train Station
Sensitive Land Uses e.g. farmland, allotments, commercial fish farms	
49	West Hendon Allotment Society
50	Nutfield Road Allotments
51	Thames Water - Dollis Hill Reservoir
Protected Habitats	
52	Priority Habitat Deciduous Woodland
53	Priority Habitat Deciduous Woodland West of Brent Reservoir
54	Priority Habitat Deciduous Woodland
55	Priority Habitat Deciduous Woodland
56	Priority Habitat Deciduous Woodland – Thames Water Utilities (Dollis Hill Reservoir)
57	Priority Habitat Deciduous Woodland – Brent Terrace
Nature and Heritage Conservation Sites – SSSI / LNR / RAMSAR/ LWS	
58	Brent Reservoir/Welsh Harp (SSSI & LNR)
59	Dollis Hill Reservoir (LNR)
60	Reed Beds
Surface Water e.g. rivers and streams	
61	Brent Reservoir
62	River Brent

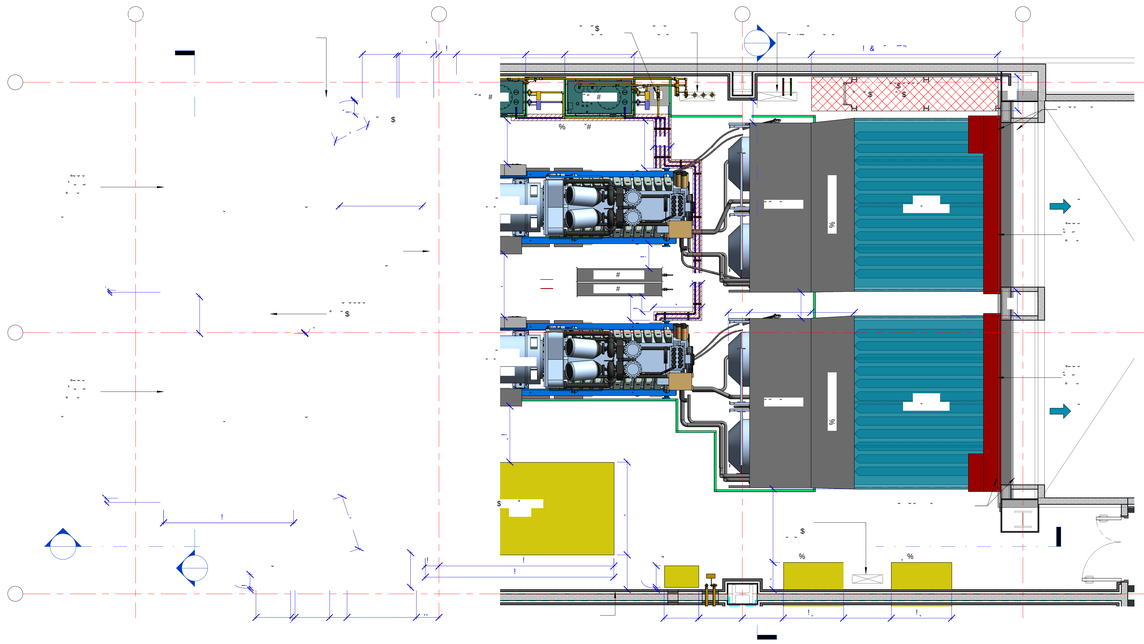
Client: PDCG (GROUP SERVICES LIMITED)	Created: GA
	Checked: AB
Project: Pure Data Centre	Date: 04/11/2024
Title: Receptor Plan	Version: 1
Drawing No: PURE/B047734/REC/01	Scale: 1:25,000

Key:

ENVIRONMENTAL PERMIT BOUNDARY

1 RECEPTOR LOCATION

2nd Floor,
11 York Street,
Manchester,
M2 2AW
+44 161 874 4659
TETRA TECH



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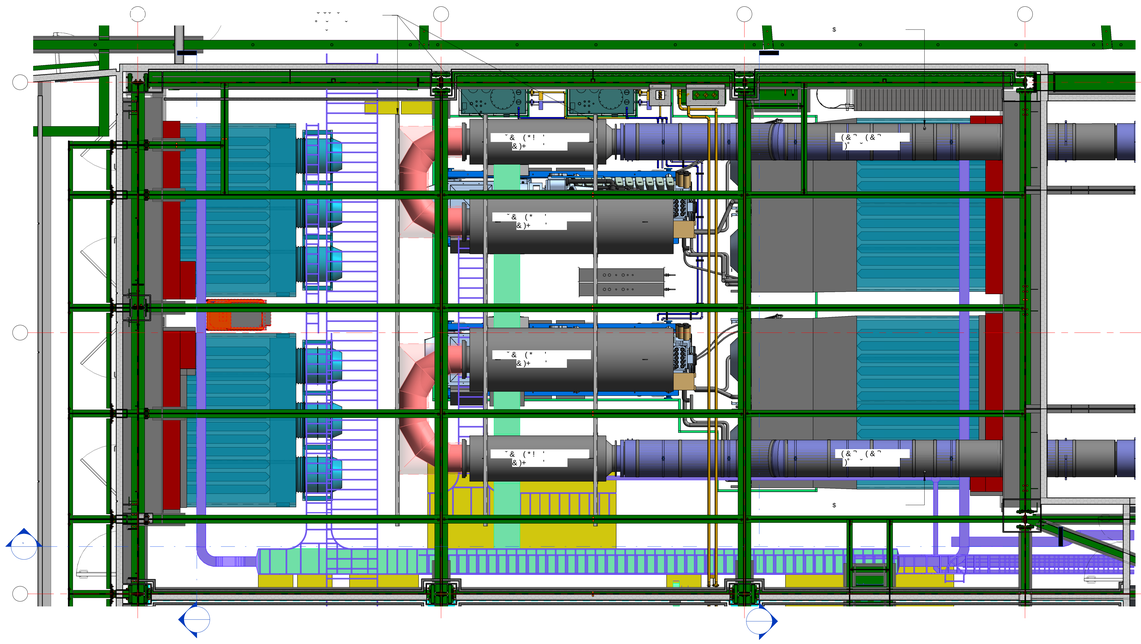

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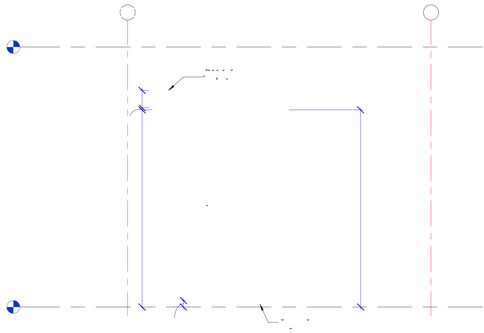

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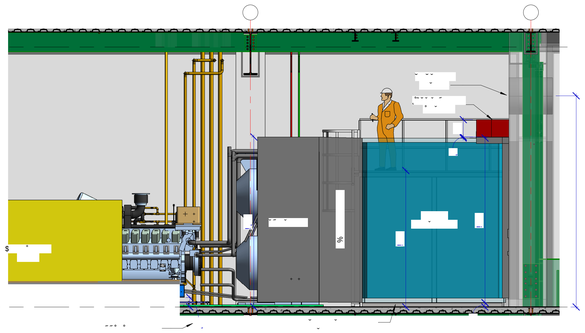

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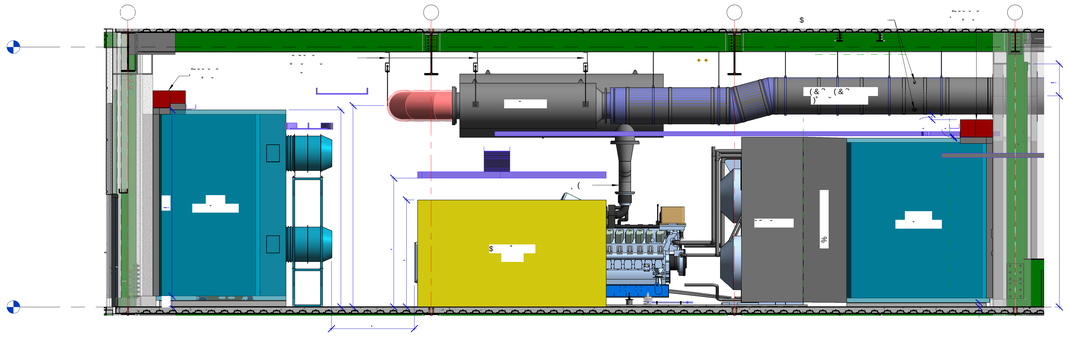

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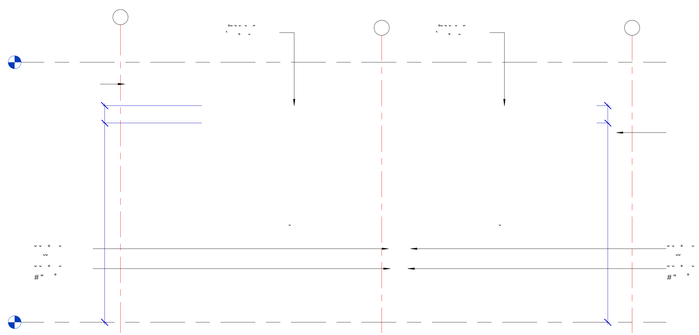

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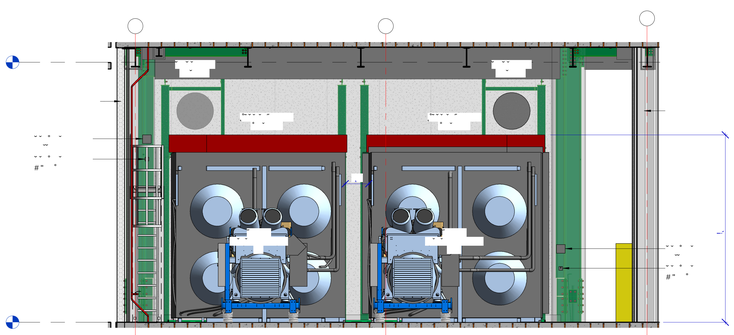

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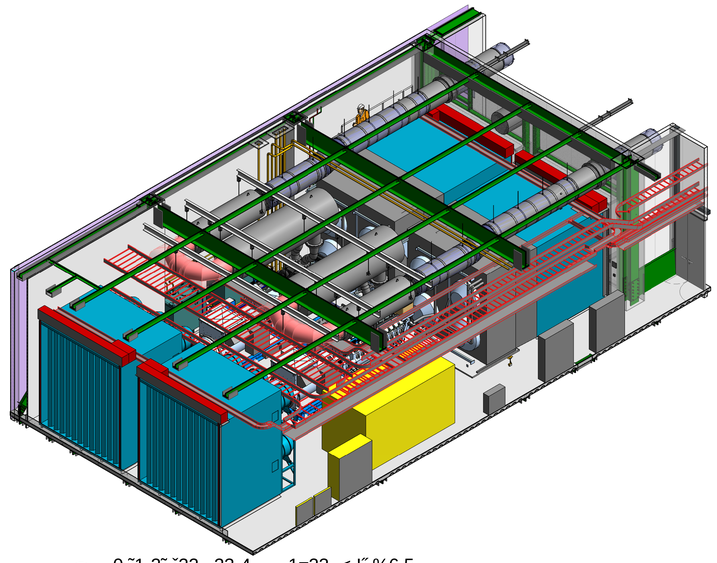

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RobertBirdGroup Member of the Surbana Jurong Group AVK THE POWER PEOPLE

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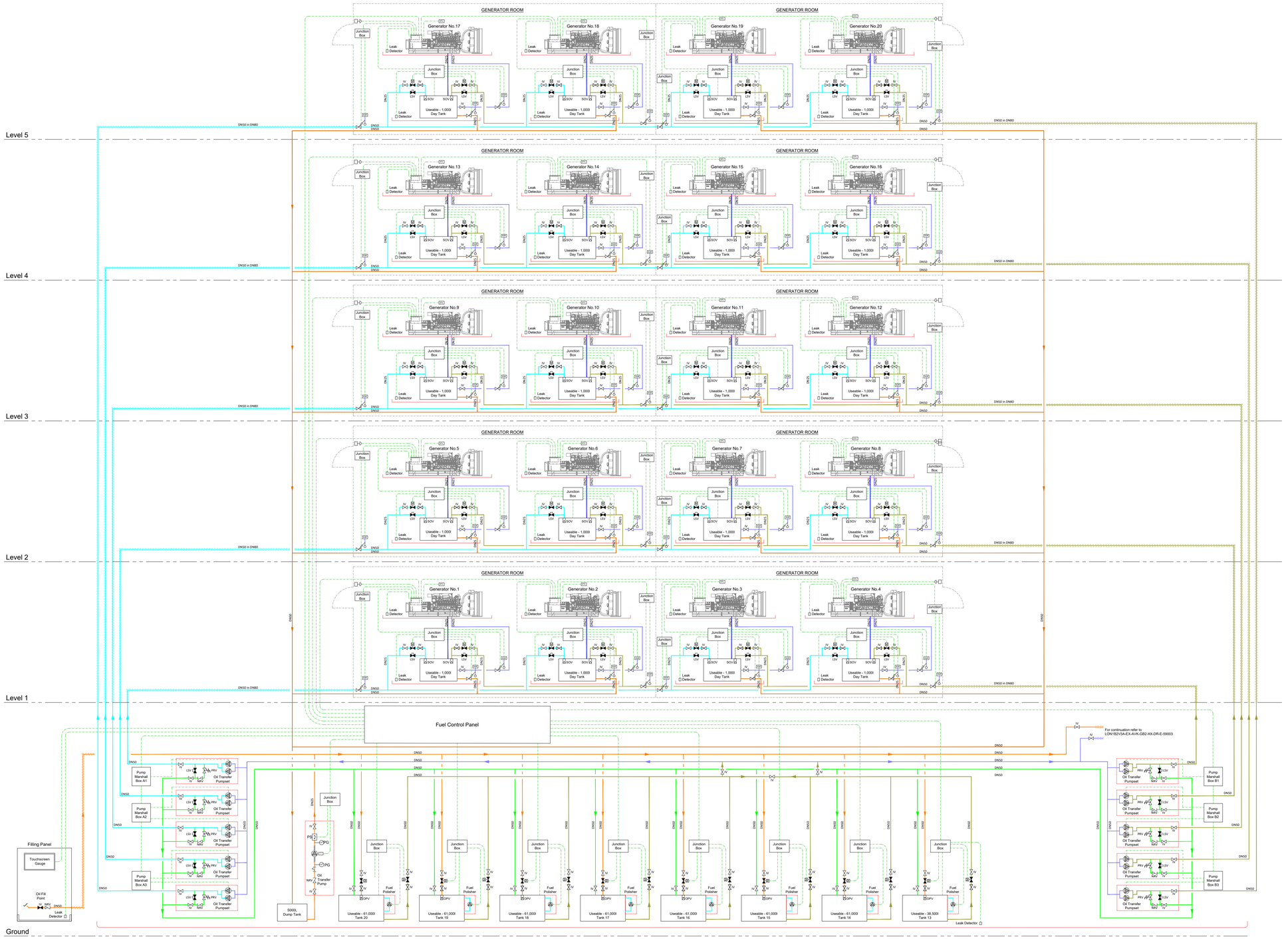
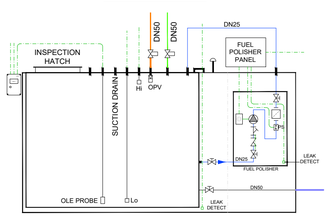


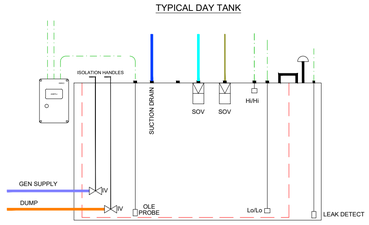
LEGEND

- ISOLATION VALVE (N/O)
- ISOLATION VALVE (N/C)
- LOCK SHIELD VALVE
- NON-RETURN VALVE
- MOTORISED VALVE MOTOR OPEN/SPRING CLOSE
- PUMP
- OVERFILL PREVENTION VALVE
- SHUT-OFF VALVE
- PIPE IN PIPE
- SIGNALS CABLING
- SUPPLY BY OTHERS
- ELECTRO THERMAL LINK
- SOLENOID QUICK RELEASE
- FREE FALL FIRE VALVE
- PULSE FLOW METER
- PRESSURE SWITCH
- PRESSURE GAUGE
- LOCAL ELECTRICAL ISOLATOR
- MUSHROOM VENT
- PRESSURE RELIEF VALVE
- EMERGENCY STOP

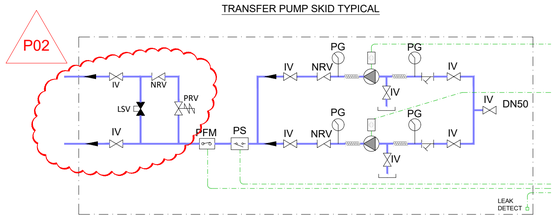
TYPICAL BULK FUEL TANK



TYPICAL DAY TANK



TRANSFER PUMP SKID TYPICAL



Revision	Description	Date	Drawn	Checked
P02	PRESSURE RELIEF ARRANGEMENT ADDED TO FUEL PUMP SKID	22/08/2024	A.D.	J.G.
P01	FIRST ISSUE	01/08/2024	A.D.	J.G.

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chapmanbdsp
RobertBirdGroup Member of the Sarfatera Jurong Group
AVK THE POWER PEOPLE

Client's Name
PDCG (Group Services) Limited

PURE DC

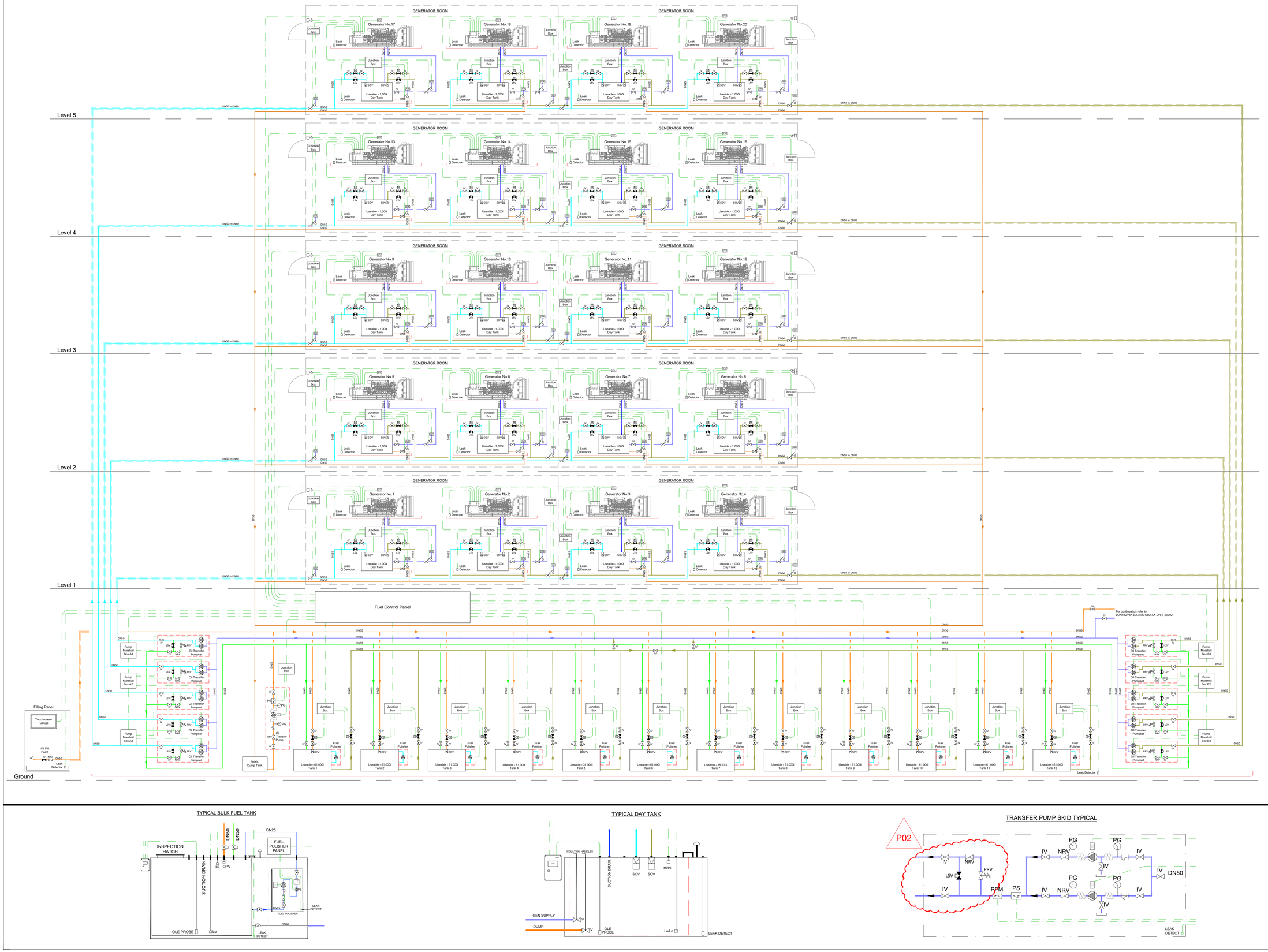
Job Title
Priestley Way, Brent (Phase 2A)
LON1B2V3A

Drawing Title
FUEL SCHEMATIC SOUTH

Scale	AVK Project No.
N/A @ A0	Jn430716A

Client Project No.	Phase	Originator	Volume	Level	Type	Role	Number
LON1B2V3A	-EX-	7075-GB-	ZZ-	DR-	X-		59061

Suitability Code	Status	Rev
S3	SUITABLE FOR REVIEW & COMMENT	P02



LEGEND

- ISOLATION VALVE (N/O)
- ISOLATION VALVE (N/C)
- LOCK SHIELD VALVE
- NON-RETURN VALVE
- MOTORISED VALVE MOTOR OPEN/SPRING CLOSE
- PUMP
- OVERFILL PREVENTION VALVE
- SHUT-OFF VALVE
- PIPE IN PIPE
- SIGNALS CABLING
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- SOLENOID QUICK RELEASE
- FREE FALL FIRE VALVE
- PULSE FLOW METER
- PRESSURE SWITCH
- PRESSURE GAUGE
- LOCAL ELECTRICAL ISOLATOR
- MUSHROOM VENT
- PRESSURE RELIEF VALVE
- EMERGENCY STOP

TYPICAL BULK FUEL TANK

TYPICAL DAY TANK

TRANSFER PUMP SKID TYPICAL

Revision	Description	Date	Drawn	Checked
P02	PRESSURE RELIEF ARRANGEMENT ADDED TO FUEL PUMP SKID	22/08/2024	A.D.	J.G.
P01	FIRST ISSUE	01/08/2024	A.D.	J.G.

SNHA A WOOLPERT COMPANY
chapmanbdsp
RobertBirdGroup Member of the Surbiana Jurong Group
AVK THE POWER PEOPLE

Client's Name
PDCG (Group Services) Limited

PURE DC

Job Title
Priestley Way, Brent (Phase 2A)
LON1B2V3A

Drawing Title
FUEL SCHEMATIC NORTH

Scale: N/A @ A0
AVK Project No.: Jn430716A

Client Project No.	Phase	Originator	Volume	Level	Type	Role	Number
LON1B2V3A	-EX-	7075-GB-	ZZ-	DR-	X-		59062

Suitability Code	Status	Rev
S3	SUITABLE FOR REVIEW & COMMENT	P02

APPENDICES

Pure Data Centre – Permit Variation

784-B047734

Environmental Management System Summary

Environmental Permit Application

PDCG (GROUP SERVICES LIMITED)

July 2024

Document prepared on behalf of Tetra Tech Limited. Registered in England numbe 01959704

TETRA TECH

Tetra Tech Limited. Registered in England number: 01959704

Tetra Tech Manchester, 2nd Floor, 11 York Street, Manchester, M2 2AW
Registered Office: 3 Sovereign Square, Sovereign Street, Leeds, United Kingdom, LS1 4ER

Document control

Document:	Environmental Management System Summary
Document name:	
Project:	Pure Data Centre – Permit Variation
Client:	PDCG (GROUP SERVICES LIMITED)
Project number:	784-B047734
File origin:	X:\784-B047734_Pure_DCG_Permit_Variation\60 Project Output\63 Published\NDM Response\Environmental Management System Summary.docx

Revision:	Final to EA	**Prepared by:**	Lauren Stanger
Date:	July 2024	**Checked by:**	Lauren Stanger
Status:	Final	**Approved by:**	Andrew Bowker
Description of revision:			

Revision:		**Prepared by:**	
Date:		**Checked by:**	
Status:		**Approved by:**	
Description of revision:			

Revision:		**Prepared by:**	
Date:		**Checked by:**	
Status:		**Approved by:**	
Description of revision:			

Table of contents

1.0 Site Operations and Infrastructure

1.1 Site Operations

1.1.1 The management system will comprise documented procedures for all site operations in relation to start up, normal operation and shut down. These procedures will also provide details of what measures will be undertaken in order to prevent or minimise the environmental risk from site operations.

1.1.2 All operational procedures will be reviewed on an annual basis as part of the management system (Section 5) and under the following circumstances: -

- After any accident, complaint, or breach of the Environmental Permit; and,
- Changes to site operations.

1.2 Site Equipment and Maintenance Plan

1.2.1 A Planned Preventative Maintenance programme (PPM) will be incorporated into the site's management system to minimise the risk to safety, health, and the environment by ensuring that all appropriate items and elements within the site are served and inspected on a regular basis or to the manufacturer's maintenance schedules.

1.2.2 Details of faults, breakdowns and repairs will be documents and records will be maintained by the operator. Faults and breakdowns will be investigated, and the service schedule will be revised if necessary.

1.3 Contingency Plans

1.3.1 All operational procedures will comprise contingency plans which details what actions will be undertaken in the event of any breakdown, enforced shutdowns and any changes to normal operations (e.g., flooding, or extreme weather). This will ensure that the necessary measures are employed to minimise the environmental risks arising from abnormal operating conditions.

2.0 Accident Prevention and Management Plan

2.0.1 The Accident Prevention and Management Plan will identify potential accidents that could arise from the site's operations, and the environmental consequences of those accidents. It will also provide details on how the operator will reduce the likelihood of accidents and indicates how the operator will respond should any such events occur.

2.0.2 The Accident Prevention and Management Plan will be reviewed on an annual basis and under the following circumstances: -

- After any accident or complaint;
- Changes to site operations that may affect the likelihood of accidents; and,
- Changes to emergency contacts.

2.1 Contract Information for The Public

2.1.1 Given that the proposed facility comprises a waste operation, a notice board will be situated at the site entrance which will include the following information: -

- The permit holder's name;
- An emergency contact name and telephone number;
- A statement that the site is permitted by the Environment Agency;
- The permit number; and,
- Environment Agency telephone number 03708 506506 and the incident hotline 0800 807060.

2.2 Complaints Procedure

2.2.1 A complaints procedure will be incorporated into the site's management system to ensure that complaints will be handled by the operator to reassure the Environment Agency and the public that any of their concerns will be acknowledged and acted upon where appropriate. The procedure will be reviewed on an annual basis as part of the management system review (Section 5) or in the event of any significant complaints.

2.2.2 As mentioned in Section 2.1, a notice board will be situated at the site entrance which details the operator's and the Environment Agency's contact details. This will ensure that any member of the public can report their complaint and be confident that it will be received by the appropriate party even if they do not wish to discuss their complaint directly with the operator.

2.2.3 Any complaint that is received by the operator will be investigated in order to identify the cause of the complaint. Once established, necessary actions will be undertaken to prevent re-occurrence.

2.2.4 The operator will maintain a record of all complaints, how the complaint was investigated and any actions that were undertaken as a result of the complaint.

3.0 Managing Staff Competence and Training Records

3.0.1 To ensure that the site is operated by personnel who are suitably trained, the operator will maintain a record which identifies each job role and the training requirements for each role. This will be monitored against a training checklist which will identify whether each member of staff has received the required training to undertake their role on site.

3.0.2 The operator will also maintain a record of all training, experience and qualifications of staff and kept will be kept up to date.

3.0.3 The training requirements and training checklist for all personnel will be reviewed on annual basis as part of the management system review (Section 5) and in the event of any significant alterations to the site operations or procedures.

4.0 Keeping Records

4.0.1 The operator will maintain a record of documents containing information regarding the operation of the site. This will include the following: -

- Environmental permits and variation notices issued to the site;
- Legal requirements;
- Risk assessment for site operations;
- Any plans that are required by the Environmental Permit;
- Operating procedures;
- Staff competence and training;
- Compliance checks, findings of investigation and actions taken;
- Complaints made, findings of investigation and actions taken;
- Audits of management system, findings and actions taken; and,
- Management reviews and changes made to the management system.

4.0.2 These documents will be kept in a convenient location on site, allowing access for any person that may be working or visiting the site.

4.1 Waste Records

4.1.1 The operator will keep a record that details all wastes that are accepted at the site. This will include the following details: -

- The quantity of waste to be imported;
- The List of Wastes (England) Regulations 2005 code;
- Original source of the waste;
- The identity of the waste producer;
- The date the waste arrives on site;
- Any non-compliant materials that were received on site and what was done to the material; and,
- Results of basic waste characterisation, compliance testing or on-site verification.

4.1.2 The information listed above will be provided to the Environment Agency at three-monthly intervals, within one months of the end of each period.

5.0 Review of Management System

5.1 Document Review Procedures

5.1.1 The management system will be reviewed on an annual basis to ensure compliance with the relevant guidance and regulations. The management system will also be reviewed under the following circumstances: -

- After any accident, complaint or breach of the Environmental Permit;
- Changes to the site or operations that will require the Environmental Permit to be varied (changed); and,
- If a new environmental problem or issue is encountered on site and a new control measure has been implemented.

5.1.2 The operator will maintain a record of any changes to the management system.

6.0 Site Closure

6.0.1 In accordance with the EA's "Develop a management system: environmental permits" Guidance, due to the nature of the site, a site closure period is not required.

6.0.2 In order to surrender the environmental permit in the future, a site condition report will be submitted in accordance with the Environment Agency's H5 SCR template and incorporate the site closure portions of the document.

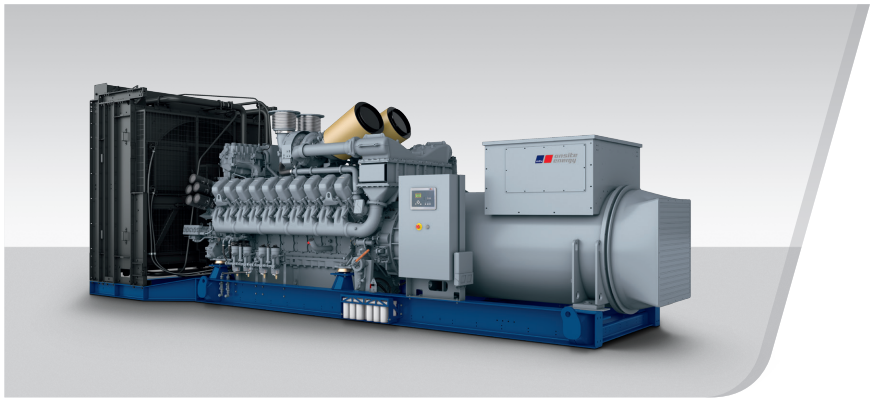
6.0.3 As such no further monitoring or post closure monitoring is deemed necessary and therefore no further closure and aftercare plan has been prepared in support of this Environmental Permit Application.

APPENDIX A – ENVIRONMENTAL MANAGEMENT SYSTEM

APPENDIX B – GENSET DATA SHEET

DIESEL GENERATOR SET
MTU 20V4000 DS4000

11 kV/50 Hz/Standby Power/NEA (ORDE) + Tier 2 Optimized
MTU 20V4000G94LF/Water Charge Air Cooling



Optional equipment and finishing shown. Standard may vary.

PRODUCT HIGHLIGHTS

// **Benefits**
- Low fuel consumption
- Optimized system integration ability
- High reliability
- High availability of power
- Long maintenance intervals

// **MTU Onsite Energy is a single-source supplier**

// **Support**
- Global product support offered

// **Standards**
- Engine-generator set is designed and manufactured in facilities certified to standards ISO 2008:9001 and ISO 2004:14001
- Generator set complies to ISO 8528
- Generator meets NEMA MG1, BS5000, ISO, DIN EN and IEC standards
- NFPA 110

// **Power Rating**
- System ratings: 3950 kVA - 4000 kVA
- Accepts rated load in one step per NFPA 110
- Generator set complies to G3 according to ISO 8528-5
- Generator set exceeds load steps according to ISO 8528-5

// **Performance Assurance Certification (PAC)**
- Engine-generator set tested to ISO 8528-5 for transient response
- 85% load factor
- Verified product design, quality and performance integrity
- All engine systems are prototype and factory tested

// **Complete range of accessories available**
- Control panel
- Power panel
- Fuel system
- Fuel connections with shut-off valve mounted to base frame
- Starting/charging system
- Exhaust system
- Electrical driven radiator
- Medium and oversized voltage alternators

// **Emissions**
- Tier 2 optimized engine
- NEA (ORDE) optimized

// **Certifications**
- CE certification option

APPLICATION DATA[1]

// Engine

Manufacturer	MTU
Model	20V4000G94LF
Type	4-cycle
Arrangement	20V
Displacement: l	95.4
Bore: mm	170
Stroke: mm	210
Compression ratio	16.4
Rated speed: rpm	1500
Engine governor	ADEC (ECU 9)
Max power: kWm	3308
Air cleaner	Dry

// Fuel System

Maximum fuel lift: m	5
Total fuel flow: l/min	27

// Fuel Consumption[2]

	l/hr	g/kwh
At 100% of power rating:	818	205
At 75% of power rating:	598	200
At 50% of power rating:	429	215

// Liquid Capacity

Total oil system capacity: l	390
Engine jacket water capacity: l	260
Intercooler coolant capacity: l	50

// Combustion Air Requirements

Combustion air volume: m^3/s	4.7
Max. air intake restriction: mbar	30

// Cooling/Radiator System

Coolant flow rate (HT circuit): m^3/h	80
Coolant flow rate (LT circuit): m^3/h	44
Heat rejection to coolant: kW	1270
Heat radiated to charge air cooling: kW	930
Heat radiated to ambient: kW	105
Fan power for electr. radiator (40°C): kW	105

// Exhaust System

Exhaust gas temp. (after turbocharger): °C	482
Exhaust gas temp. (before turbocharger): °C	693
Exhaust gas volume: m^3/s	11.9
Maximum allowable back pressure: mbar	50
Minimum allowable back pressure: mbar	–

① All data refers only to the engine and is based on ISO standard conditions (25°C and 100m above sea level).
② Values referenced are in accordance with ISO 3046-1. Conversion calculated with fuel density of 0.83 g/ml.
All fuel consumption values refer to rated engine power and are approximate values.

STANDARD AND OPTIONAL FEATURES

// System Ratings (kW/kVA)

Generator model	Voltage	NEA (ORDE) + Tier 2 optimized without radiator		
		kWel	kVA*	AMPS
Leroy Somer LSA54.2 ZL12 (Medium volt. Leroy Somer)	11 kV	3160	3950	207
Marathon 1040FDH7105 (Medium volt. Marathon)	11 kV	3200	4000	210
Leroy Somer LSA54.2 ZL14 (MV Leroy Somer oversized)	11 kV	3160	3950	207
Leroy Somer LSA54.2 ZL14 (Engine output optimized)	11 kV	3200	4000	210

* cos phi = 0,8

// Engine

- ■ 4-Cycle
- ■ Standard single stage air filter
- ■ Oil drain extension & shut-off valve
- ■ Closed crankcase ventilation
- ■ Governor-electronic isochronous
- ■ Common rail fuel injection
- ■ Tier 2 optimized engine
- ■ NEA (ORDE) optimized engine

// Generator

- ■ 4 pole three-phase synchronous generator
- ■ Brushless, self-excited, self-regulating, self-ventilated
- ■ Digital voltage regulator
- ■ Anti condensation heater
- ■ Stator winding Y-connected, accessible neutral (brought out)
- ■ Protection IP23
- ■ Insulation class H, utilization acc. to H
- ■ Radio suppression EN55011, group 1, cl. B
- ■ Short circuit capability 3xIn for 10sec
- ■ Winding and bearing RTDs (without monitoring)
- ■ Excitation by AREP + PMI
- ■ Mounting of CT´s: 3x 2 core CT´s
- ■ Winding pitch: 5/6 winding
- ■ Voltage setpoint adjustment ± 5%
- ■ Meets NEMA MG-1, BS 5000, IEC 60034-1, VDE 0530, DIN EN 12601, AS1359 and ISO 8528 requirements
- ■ Leroy Somer medium voltage generator
- ☐ Marathon medium voltage generator
- ☐ Oversized generator

// Cooling System

- ■ Jacket water pump
- ■ Thermostat(s)
- ■ Water charge air cooling
- ☐ Electrical driven front-end cooler
- ☐ Jacket water heater
- ☐ Pulley for fan drive

■ Represents standard features ☐ Represents optional features

STANDARD AND OPTIONAL FEATURES, CONTINUATION

// Control Panel

- ■ Pre-wired control cabinet for easy application of customized controller (V1+)
- ☐ Island operation (V2)
- ☐ Automatic mains failure operation with ATS (V3a)
- ☐ Automatic mains failure operation incl. control of generator and mains breaker (V3b)
- ☐ Island parallel operation of multiple gensets (V4)
- ☐ Automatic mains failure operation with short (< 10s) mains parallel overlap synchronization (V5)
- ☐ Mains parallel operation of a single genset (V6)
- ☐ Mains parallel operation of multiple gensets (V7)
- ☐ Basler controller
- ☐ Deif controller
- ■ Complete system metering
- ■ Digital metering
- ■ Engine parameters
- ■ Generator Protection Functions
- ■ Engine protection
- ■ SAE J1939 engine ECU communications
- ■ Parametrization software
- ■ Multilingual capability
- ■ Multiple programmable contact inputs
- ■ Multiple contact outputs
- ■ Event recording
- ■ IP 54 front panel rating with integrated gasket
- ☐ Remote annunciator
- ☐ Daytank control
- ☐ Generator winding temperature and temperature monitoring
- ☐ Modbus TCP-IP

// Power Panel

- ☐ Available in 600x600 mm
- ☐ Phase monitoring relay 230V/400V
- ☐ Supply for battery charger
- ☐ Supply for jacket water heater
- ☐ Supply for anti condensation heating
- ☐ Plug socket cabinet for 230V compatible Euro/USA

// Fuel System

- ■ Flexible fuel connectors mounted to base frame
- ☐ Fuel filter with water separator
- ☐ Fuel filter with water separator heavy-duty
- ☐ Switchable fuel filter with water separator
- ☐ Switchable fuel filter with water separator heavy-duty
- ☐ Separate fuel cooler
- ☐ Fuel cooler integrated into cooling equipment

// Starting/Charging System

- ■ 24V starter
- ☐ Starter batteries, cables, rack, disconnect switch
- ☐ Battery charger
- ☐ Redundant starter 2x 15kW

■ Represents standard features ☐ Represents optional features

STANDARD AND OPTIONAL FEATURES, CONTINUATION

// Mounting System

- ■ Welded base frame
- ■ Resilient engine and generator mounting
- ■ Modular base frame design

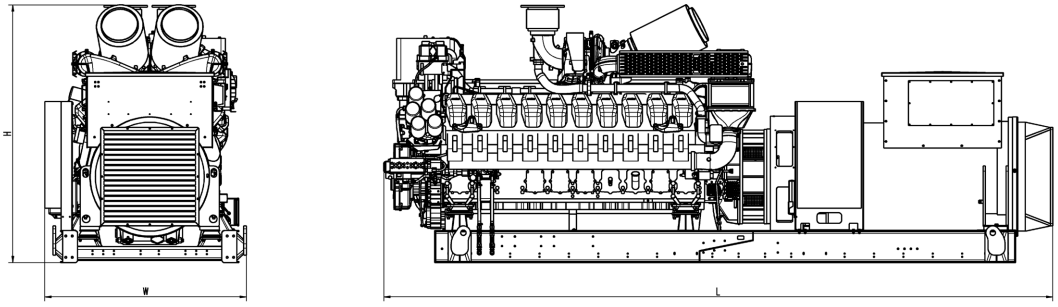
// Exhaust System

- ■ Exhaust bellows with connection flange
- ☐ Exhaust silencer with 10 dB(A) sound attenuation
- ☐ Exhaust silencer with 30 dB(A) sound attenuation
- ☐ Exhaust silencer with 40 dB(A) sound attenuation
- ☐ Y-connection-pipe

■ Represents standard features

☐ Represents optional features

WEIGHTS AND DIMENSIONS



Drawing above for illustration purposes only, based an standard open power 11 kV engine-generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight (dry/less tank)
Open Power Unit (OPU)	6339 x 1887 x 2415 mm	19350 kg

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific engine-generator set.

SOUND DATA

// Consult your local MTU Onsite Energy distributor for sound data.

EMISSIONS DATA

// Consult your local MTU Onsite Energy distributor for emissions data.

RATING DEFINITIONS AND CONDITIONS

// Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514 and AS 2789. Average Load Factor: ≤ 85%. Operating hours/year: max. 500.
// Consult your local MTU Onsite Energy Power Generation Distributor for derating information.

Subject to change. | 32310771 | Edition 01/18 | ESM 2018-11.