HEMEL HEMPSTEAD DATACENTRES: ENVIRONMENTAL PERMIT APPLICATION

Best Available Techniques and Operating Techniques

Prepared for: NTT GDC EMEA UK Limited

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1.0 Introduction

SLR Consulting Limited (SLR) has been instructed by NTT GDC EMEA UK Limited (NTT) to prepare an application for an Environmental Permit (EP) for three existing and one proposed NTT owned and operated datacentre facilities located in Hemel Hempstead, UK, specifically:

- Campus datacentre, Spring Way, Hemel Hempstead, HP2 7UP;
- Centro datacentre, 3 Boundary Way, Hemel Hempstead HP2 7SU;
- Maylands datacentre, 150 Maylands Avenue, Hemel Hempstead, HP2 7DF; and
- Hemel Hempstead 4 (HH4) datacentre, Prologis Park, Hemel Hempstead, HP2 7EQ. This datacentre is currently under construction; commencement of operations is planned for circa June 2020.

Electricity for operation of the datacentres is provided from connections to the local electricity transmission network; however, given the nature of datacentres and their requirement to have an available energy supply at all times, the sites incorporate diesel-fired generators:

- Campus datacentre: 31 generators;
- Centro datacentre: 4 generators;
- Maylands datacentre: 14 generators; and
- HH4 datacentre: 32 generators (17 generators to be installed in phase 1 and 15 generators in phase 2, all to be located in one building).

There are currently no plans to expand on the number of generators at each datacentre.

The generators provide power to the datacentre sites in the event of an emergency situation such as a brown- or black-out of the local electricity transmission network where there are fluctuations or loss of the electrical power provided by the network. On occurrence of such an event, there is the potential for a delay between fault detection and initial operation of the generators; on-site battery arrays provide a temporary uninterruptible power supply in order to cover such delays and the potential for a loss/reduction in the power supply to the on- site equipment.

Due to the close proximity of these datacentres and the potential cumulative impacts of air emissions as a result of testing and operation of the generators, the generator thermal rated input for the four datacentres has been aggregated and equates to >50MWth. In accordance with the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (the EP Regulations):

"…where two or more appliances with an aggregate rated thermal input of 50 or more megawatts are operated on the same site by the same operator, those appliances must be treated as a single appliance with a rated thermal input of 50 or more megawatts."

The total rated thermal input (under standby power operating conditions) is approximately 325MWth:

- Campus datacentre: 124.52MWth
- Centro datacentre: 9.96MWth
- Maylands datacentre: 59.76MWth
- HH4 datacentre: 131.2MWth.

Therefore, the four sites are considered to be an 'installation' as defined in Paragraph 1, Part 1, Schedule 1 of the EP Regulations as: "a stationary technical unit where one or more activities are carried on." The 'activities' that are proposed are defined in Chapter 1, Schedule 1 of the EP Regulations, under Section 1.1 (Combustion Activities).

This Best Available Techniques and Operating Techniques (BATOT) document is submitted on behalf of NTT, the operator, to support the application for a new bespoke Environmental Permit for the four datacentre sites at Hemel Hampstead (as per the requirements of Section 2(1), Part 1, Schedule 5 of the EP Regulations). This report is an integrated document which describes both the operating techniques that will be implemented at the facilities with respect to operation of the diesel generators to ensure compliance with the conditions of the Environmental Permit, and also demonstrates that BAT will be employed.

For the purpose of this BATOT, key technical standards in the following documents have been referenced:

- Develop a management system: environmental permits guidance, December 2019;
- Risk assessments for your environmental permit guidance, October 2019;
- Best Available Techniques: environmental permits, February 2016;
- Data Centre FAQ Headline Approach, Draft Version 10.0 H. Tee 01/06/18 – Release To Industry; and
- Specified generator: comply with permit conditions, July 2019.

2.0 Pre-Application Discussions

A pre-application meeting was held with Howard Tee, Regulatory Officer Combustion Sector, from the Environment Agency (EA), on 10th September 2018 to discuss the approach to the Environmental Permit application/s for the Hemel Hampstead datacentres. Following the meeting further consideration was given to the permitting approach by the EA, with a number of follow-up emails discussing approach between NTT and the EA.

On 30 November 2018, the EA issued their Key regulatory Position summary. In summary the EA confirmed the following:

- A single 3-site Environmental Permit should be made.
- If the detailed air quality assessment with the EA Air Quality Monitoring and Assessment Unit (AQMAU) in making the determination confirm that the Maylands datacentre air quality impacts do not overlap with the other two datacentres then, if required, it would be possible to have a separate >50MWth Industrial Emissions Directive (IED) permit including standby role for the Maylands datacentre. On this basis, the air quality modelling should be prepared so that information for Maylands can be easily separated.
- That the generators at each datacentre should not be operated for elective electricity generation without having been through the EA permitting process and that emissions abatement will be required as a minimum.

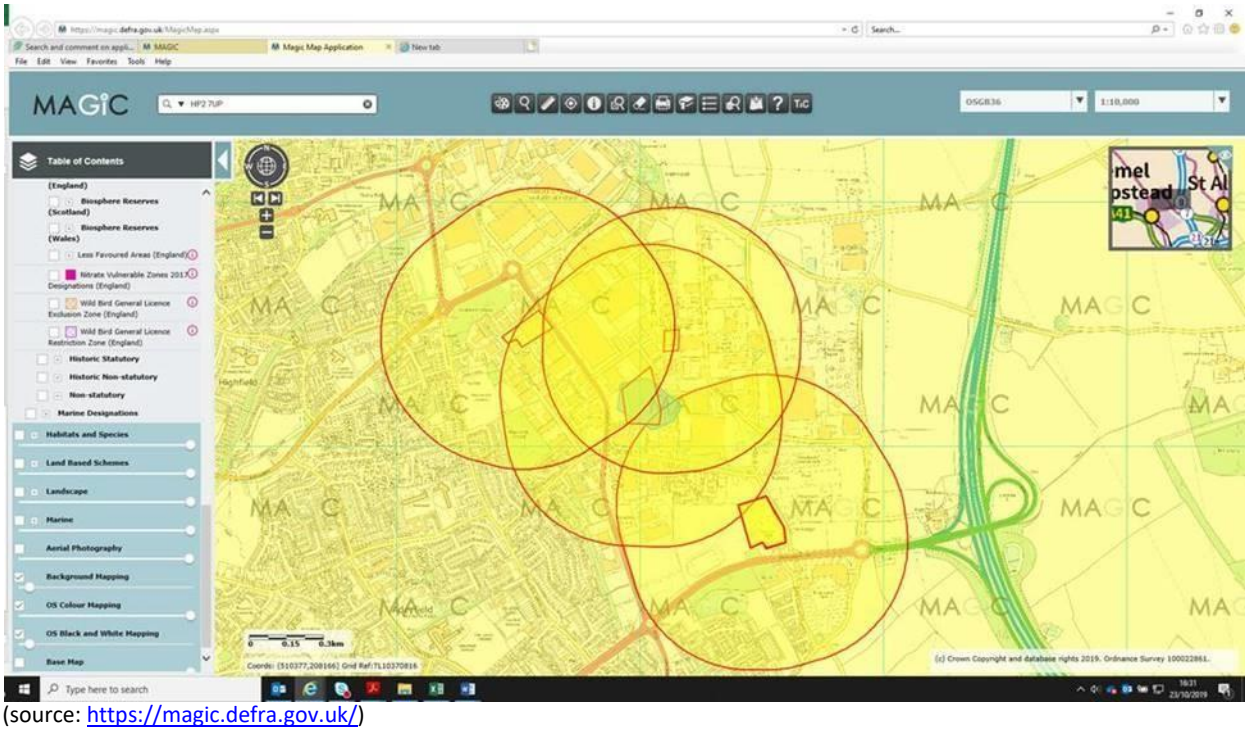
Subsequent correspondence with the EA in November 2019 with regard to the approach to the Environmental Permit which would be required for the proposed new datacentre in Hemel Hampstead (HH4), it was agreed that inclusion of HH4 in the application for the three existing Hemel datacentres was an acceptable approach. This decision was based on the proximity guidance as presented in EA guidance document 'Data Centre FAQ Headline Approach, Draft Version 10.0 H. Tee 01/06/18 – Release To Industry':

Proximity

"For combustion activities in the urban/commercial environment 'proximity' may be considered as immediately adjacent to (with or without fencing demarking individual buildings on a campus); or broadly seen as a road width (up to around 100m segment) and/or uninterrupted line of sight between buildings (plan view up to around 250m*). Outlier buildings, some distance apart, can be connected by other sites closer together on the basis of 'linking' chains of proximity (i.e. all buildings do not need to be in 'proximity' with each other). The role of permitting is ultimately to prevent or minimise pollution and harm to human health, so for air quality, consideration of proximity can take account that premises share sensitive receptors or could reasonably have adverse joint impacts or conversely are so far apart as to not have in-combination effects. A final factor may be that individual buildings/premises' short term process contributions (PC) do screen out as insignificant under our H1 guide."*

The proposed HH4 datacentre is located circa 500m south-southwest of the Campus datacentre, this being the nearest of the Hemel Hempstead datacentres; furthermore HH4 will not be directly in the line of sight of any of the three existing datacentres. Therefore, this does not satisfy the 250m rule for Proximity.

However, the datacentres do have shared receptors. Figure 2-1 presents the locations of all four datacentres; each datacentre is demarked by a red line boundary, around each of which a 500m radius has been drawn.



(source: https://magic.defra.gov.uk/)

Figure 2-1
Shared Sensitive Receptors

This figure clearly shows that HH4, Campus and Centro datacentres share common human receptors. In addition, there are also a number of shared ecological receptors including:

- European/International ecological receptors within 10km:
  - Chilterns Beechwoods (Special Area of Conservation) 8.3km northwest
- National/local ecological and cultural receptors within 2km:
  - **Ancient Woodland**
    - Maylands Wood 875m northwest of HH4
    - Widmore Wood 1,265m northwest of HH4
    - Unnamed Woodland 1,705m northwest of HH4
    - Blackwater Wood 1930m southeast of HH4.
  - **Registered Parks and Garden**
    - Gorhambury, 1,600m east of HH4.
  - Scheduled Monuments
    - Romano-Celtic temple complex at Wood Lane End, 280m SW of Woodwells Farm, 175m northwest of HH4.
    - High Street Green Roman Barrow, 1,405m northwest of HH4.
  - Listed Buildings
    - North, east, south and west, closest being 685m east 'Breakspears'.

A copy of the EA Pre-application report, the key regulatory position summary email and November 2019 correspondence with regard HH4 are provided in Appendix 01.

3.0 Regulated Activities

The four datacentres comprise in total a rated electrical generating capacity of 114.6MWe (net, under standby operation of the engines) with a corresponding thermal input of approximately 325MWth. Testing of the engines (either routinely or following maintenance) is undertaken at up to 100% of full (prime) load. There are currently no plans for the installation of further generators at any of the sites in order to respond to potential future business growth (i.e. increase in the on-site electrical load).

This application (including the associated modelling studies and risk assessments) has been prepared on the basis of a total of 81 generators. NTT has no intention of expanding any of the datacentres to include addition generators in the foreseeable future.

3.1 Schedule 1 Activities

Combustion activities that require an environmental permit are defined in Part 2, Schedule 1 of the EP Regulations:

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

The EP Regulations clarify that:

"…where two or more appliances with an aggregate rated thermal input of 50 or more megawatts are operated on the same site by the same operator, those appliances must be treated as a single appliance with a rated thermal input of 50 or more megawatts."

The aggregated total number of generators for the four datacentres is 81 diesel-fired generators. The generator provision includes for a level of redundancy to the generator system such that, even in a worst-case blackout scenario, only the required number of generators would start up to deliver the required electricity IT load for the datacentre; the number of operational generators at the time of a blackout would be dependent on the extent of blackout. However, it is noted that, without specific physical controls preventing operation of a generator, that the thermal input of all generators is required for determining the capacity of the site. Therefore, the current capacity of the datacentres in total is:

- 325MWth (81 generators).

3.2 Stationary Technical Unit (STU)

The definition of a STU is not included in the EP Regulations. However, the EA '*RGN 2 Understanding the meaning of regulated facility*' (May 2015) states:

"The essence of a "technical unit" is that it can carry out the Activity, or Activities, on its own. This means that the technical unit must include enough plant and machinery to allow the Activity to take place in a controlled manner for a sufficient period of time for the operation to reach its designed or intended output."

Each generator could be considered as an STU (for the purposes of combusting fuel) however, in accordance with A2.5 of RGN 2:

"If there are two or more STUs on the same site they will be treated as a single STU if they are technically connected and one of the following criteria is met:

a) they carry out successive steps in an integrated industrial activity;
b) one of the listed activities is a Directly Associated Activity (DAA) of the other; or
c) both units are served by the same DAA."

In the event of a worst-case blackout scenario of the local transmission system, potentially all the generators in each datacentre will be operated to deliver the required IT load. In the event of operational redundancy in case of engine failures or generators under maintenance, the remaining generators will be operated to the required load, but this can only be identified at that time. Therefore, the operation (under emergency) of individual generators is linked to the 'availability' of other engines and all generators in each datacentre are thus considered to be technically connected.

Fuel storage for the generators is considered to be a directly associated activity (DAA). Discussions of the DAA (fuel oil storage) at the site are provided in sections 7.0 and 11.0.

For the purpose of the Environmental Permit application, the Installation will comprise the four datacentre sites, with the generators and associated diesel storage arrangements on each datacentre being considered an independent STU; the associated diesel storage arrangements will be considered a Directly Associated Activity to the diesel generators for each STU, as described below.

3.3 Directly Associated Activities

Part 1 Regulation 2(1) of the EP Regulations provides that a DAA is an operation that, in relation to any other activity:

- Has a technical connection with the activity;
- Is carried out on the same site as the activity; and
- Could have an effect on pollution.

As stated in A2.19 of RGN 2, a DAA must "serve" a STU. Therefore, a DAA will normally be something that would not be in place if the STU was not present on-site. A2.22 continues that there are four types of technical connection with a STU including "*…input activities concerned with the storage and treatment of inputs into the stationary technical unit*."

A2.11 of RGN 2 states:

"Storage facilities may be technically connected. […] Stores at the same location are normally technically connected, and as their operation can give rise to pollution, either locally or at the Activity, they are likely to be DAAs."

In addition to the above, it must also be clear how a DAA may affect emissions from the installation. Incorrect storage of a raw material/fuel could cause off-site releases of these substances.

Therefore, the storage of fuel oil at each datacentre is considered to be a DAA of the 'combustion' STU for that datacentre.

3.4 Medium Combustion Plant and Specified Generators

The Medium Combustion Plant Directive (MCPD) was incorporated into UK law in early 2018 via the Environmental Permitting (England and Wales) (Amendment) Regulations 2018. In addition to MCPD requirements, in the UK regulations were also brought in for Specified Generators (i.e. any combustion plant generating electricity).

Whilst an Industrial Emissions Directive (IED) Chapter II Environmental Permit is required, specifically Chapter II of the IED states that:

"Chapter II (of the IED) MCPs are in scope either where they are the primary activity i.e. where there is more

than 50MWth total on the installation, or they are a Directly Associated Activity (DAA) to another Chapter II activity
e.g. chemical manufacture. As a minimum, these MCPs must meet the requirements of the directive and there may be occasions where site specific BAT requires more stringent conditions"

In light of this, the permit application also needs to take into consideration the MCPD and Specified Generator requirements as detailed in the Environmental Permitting Regulations (EPR) 2018.

The MCPD, as set out in Schedule 25A of the EPR 2018, defines the scope, definitions, exclusions and how the regulations apply to types of medium combustion plant (MCP), MCP being combustion plant with a rated thermal input of 1 – 50MWth regardless of the type of fuel used.

The EPR 2018 also establishes requirements for 'specified generators' in Schedule 25B. A generator is defined as any combustion plant which is used for the purpose of generating electricity, with certain exclusions. A specified generator is defined as:

a) a generator, other than an excluded generator, with a thermal rated input –

(i) more than or equal to 1 megawatt and less than 50 megawatts, or
(ii) in the case of a generator used to meet a capacity agreement or an agreement to provide balancing services, less than 50 megawatts;

b) where two or more generators falling with paragraph (a)(i) or (ii) are operated –

(i) on the same site,
(ii) by the same operator, and
(iii) for the same purpose,

Those generators together, provided that the rated thermal input of those generators together is less than 50 megawatts; or

c) where two or more generators, other than excluded generators –

(i) are operated together as set out in paragraph (b)(i) to (iii), and
(ii) together have a rated thermal input more than or equal to 1 megawatt and less than 50 megawatts, even if one or more of the generators has a rated thermal input of less than 1 megawatt.

Those generators together".

The regulations go on to state that an 'excluded generator' includes back-up generators operated for the purpose of testing for no more than 50 hours per year. As the generators are operated for emergency back-up purposes only, they will be considered 'excluded generators' in accordance with EPR 2018.

Therefore, in summary, the generators:

- are not considered MCP due to the total thermal rated input being >50MWth;
- are not considered to be IED Chapter III large combustion plant (LCP) as each generator is <15MWth and is therefore not subject to Chapter III ELVs; and
- are considered to be 'excluded generators' due to being operated for emergency back-up purposes only, and for the purpose of testing are each operated for no more than 50 hours per year.

The generators are therefore 'excluded generators' in accordance with EPR 2018 and will not be required to meet the emission limit values (ELVs) for NO_X (190mg/kg).

4.0 Datacentres

All four datacentres are located to the north east of Hemel Hampstead town centre:

- Campus datacentre, Spring Way, Hemel Hempstead, HP2 7UP (National Grid Reference (NGR) TL 08008 08201);
- Centro datacentre, 3 Boundary Way, Hemel Hempstead HP2 7SU (NGR: TL 08132 08443);
- Maylands datacentre, 150 Maylands Avenue, Hemel Hempstead, HP2 7DF (NGR: TL 07541 08485); and
- Hemel Hempstead 4 (HH4) datacentre, Prologis Park, Hemel Hempstead, HP2 7EQ (NGR: TL 08525 07644).

The datacentre sites are located in a predominantly commercial setting. The site setting for each site is summarised in Table 4-1.

Table 4-1
Site
Settings

Site	North	East	South	West
Campus	Commercial/ industrial	Commercial/ industrial	Commercial/ industrial, residential	Commercial/ industrial residential, recreational, woodland
Centro	Commercial/ industrial, residential, agricultural land	Commercial/ industrial, oil terminal, agricultural land	Commercial/ industrial, residential.	Commercial/ industrial, residential, playing fields
Maylands	Commercial/ industrial, woodland	Commercial/ industrial, oil terminal	Commercial/ industrial, woodland	Commercial/ industrial, allotments, residential, woodland recreation ground
HH4	Commercial/ industrial	Cemetery and open/agricultural land	Commercial/ industrial, recreational (open) land, residential	Commercial/ industrial, residential.

There are multiple residential properties in the vicinity of the sites:

- **Campus**: There are two residential areas within a 500m radius of the site. The closest is a cluster of residential properties associated with Wood Lane End, approximately 185m south, followed by residential properties in the conurbation of Adeyfield, approximately 262m southwest.
- **Centro:** The nearest residential properties are those to the south of the site, associated with Wood Lane End at a distance of approximately 470m.
- **Maylands**: The nearest residential areas are located approximately 250m west of the site and 320m south.

HH4: The nearest residential areas are located approximately 115m northwest and 175m to the south. There are a number of ecological sites within the vicinity of the sites:

- **Campus**: There is one designated European or International site of ecological importance located within 10km of the site boundary: Chiltern's Beechwoods Special Area of Conservation (SAC), located approximately 7.7 km northwest of the site boundary. There are no Special Protection Areas (SPAs) or Ramsar sites within a 10km radius of the site. There are numerous national sites of ecological importance located within 2km of the site boundary including Local Nature Reserves (LNR), local wildlife sites (LWS) and ancient woodland.
- **Centro**: There is one designated site of European/international ecological importance within 10km of the site, the Chilterns Beechwoods SAC, located approximately 7.8km northwest of the site. There are no SPAs or Ramsar sites within a 10km radius of the site. There are numerous national sites of ecological importance located within 2km of the site boundary including LNRs, LWSs and ancient woodland.
- **Maylands**: There is one European and international site of ecological importance within 10km: Chilterns Beechwoods SAC, approximately 7.1km northwest of the site. There are no SPAs or Ramsar sites within a 10km radius of the site. There are numerous national sites of ecological importance located within 2km of the site boundary including LNRs, LWSs and ancient woodland.
- **HH4**: There is one designated European or International site of ecological importance located within 10km of the site boundary: Chiltern's Beechwoods Special Area of Conservation (SAC), located approximately 8.3km northwest of the site boundary. There are no Special Protection Areas (SPAs) or Ramsar sites within a 10km radius of the site. There are numerous national sites of ecological importance located within 2km of the site boundary including local wildlife sites (LWS) and ancient woodland.

With respect to cultural heritage, there are multiple listed buildings and scheduled monuments within 2km of the sites, the nearest being:

- **Campus**: two scheduled monuments, one located 250m southwest, the other 255m northeast and a listed building 770m southwest.
- **Centro**: two scheduled monuments located 500m south and 920m west and a listed building 1.1km west.
- **Maylands**: two scheduled monuments approximately 250m west and 835m southeast and a listed building 490m southwest.
- **HH4**: two scheduled monuments 175m and 1.4km to the northwest, one listed building 685m east and Gorhambury registered park and garden 1.6km east.

The following drawings accompany this application for the Environmental Permit for the site:

- Drawing 001 – Site Location
- Drawing 002A – Site Layout and Emissions Points – Campus Datacentre
- Drawing 002B – Site Layout and Emissions Points –Centro Datacentre
- Drawing 002C– Site Layout and Emissions Points – Maylands Datacentre
- Drawing 002D– Site Layout and Emissions Points – HH4 Datacentre
- Drawing 003A and 003B – Site Setting

4.1 Campus Datacentre

The Campus datacentre site consists of two datacentre buildings DC1 and DC2 and incorporates 31 diesel-fired generators. There are currently no plans to increase the number of generators at this site. The generating capacity of the generators are summarised in Table 4-2.

Table 4-2
Campus Datacentre Combustion Plant Rated Thermal Input

Campus Generator Reference	Campus Suite Reference	Generator Model	Electrical Rating (stand by) (MWe)	Thermal Rated Input (MWth)
Gen-HA	HA	MTU X1000	0.88	2.49
Gen-HB	HB	MTU X1000	0.88	2.49
Gen 1-1A	1	MTU X1850	1.464	4.14
Gen 1-1B	1	MTU X1850	1.464	4.14
Gen 1-1C	1	MTU X1850	1.464	4.14
Gen 3-1A	3	MTU X1850	1.464	4.14
Gen 3-1B	3	MTU X1850	1.464	4.14
Gen 3-1C	3	MTU X1850	1.464	4.14
Gen 5-1A	5	MTU X1850	1.464	4.14
Gen 5-1B	5	MTU X1850	1.464	4.14
Gen 6-1A	6	MTU X1850	1.464	4.14
Gen 6-1B	6	MTU X1850	1.464	4.14
Gen 6-1C	6	MTU X1850	1.464	4.14
Gen 8-1A	8	MTU X1850	1.464	4.14
Gen 8-1B	8	MTU X1850	1.464	4.14
Gen 8-1C	8	MTU X1850	1.464	4.14
Gen 10-1A	10	MTU X1850	1.464	4.14
Gen 10-1B	10	MTU X1850	1.464	4.14
Gen F-1-ES (Failover 1)	F	Kohler KD1800	1.44	4.1
Gen F (Failover 2)	F	Kohler KD1800	1.44	4.1
Gen-11-1	11	Kohler KD1800	1.44	4.1
Gen-11-2	11	Kohler KD1800	1.44	4.1
Gen-13-1	13	Kohler KD1800	1.44	4.1
Gen-13-2	13	Kohler KD1800	1.44	4.1
Gen-15-1	15	Kohler KD1800	1.44	4.1
Gen-16-1	16	Kohler KD1800	1.44	4.1

Campus Generator Reference	Campus Suite Reference	Generator Model	Electrical Rating (stand by) (MWe)	Thermal Rated Input (MWth)
Gen-16-2	16	Kohler KD1800	1.44	4.1
Gen-18-1	18	Kohler KD1800	1.44	4.1
Gen-18-2	18	Kohler KD1800	1.44	4.1
Gen-20-1	20	Kohler KD1800	1.44	4.1
Gen-21-1	Serves cooling infrastructure for multiple suites	Kohler KD1800	1.44	4.1
Total			**43.90**	**124.52**

4.2 Maylands Datacentre

The Maylands datacentre site consists of one datacentre building and incorporates 14 diesel-fired generators. There are currently no plans to increase the number of generators at this site. The generating capacity of the generators are summarised in Table 4-3.

Table 4-3
Maylands Datacentre Combustion Plant Rated Thermal Input

Maylands Generator Reference	Maylands Suite Reference	Generator Model	Electrical Rating (stand by) (MWe)	Thermal Rated Input (MWth)
Gen 1-1A	Suite 1	MTU 1000	0.88	2.49
Gen 1-2A	Suite 1	MTU 1000	0.88	2.49
Gen 1-1B	Suite 1	MTU 1000	0.88	2.49
Gen 1-2B	Suite 1	MTU 1000	0.88	2.49
Gen 2-1A	Suite 2	MTU 2200	1.76	4.98
Gen 2-1B	Suite 2	MTU 2200	1.76	4.98
Gen 3-1A	Suite 3	MTU 2200	1.76	4.98
Gen 3-1B	Suite 3	MTU 2200	1.76	4.98
Gen 4-1A	Suite 4	MTU 2200	1.76	4.98
Gen 4-1B	Suite 4	MTU 2200	1.76	4.98
Gen 5-1A	Suite 5	MTU 2200	1.76	4.98
Gen 5-1B	Suite 5	MTU 2200	1.76	4.98
Gen 6-1A	Suite 6	MTU 2200	1.76	4.98

Maylands Generator Reference	Maylands Suite Reference	Generator Model	Electrical Rating (stand by) (MWe)	Thermal Rated Input (MWth)
Gen 6-1B	Suite 6	MTU 2200	1.76	4.98
Total			**21.12**	**59.76**

4.3 Centro Datacentre

The Centro datacentre site consists of one datacentre building and currently incorporates 4 diesel-fired generators. There are currently no plans to increase the number of generators at this site. The generating capacity of the generators are summarised in Table 4-4.

Table 4-4
Centro Datacentre Combustion Plant Rated Thermal Input

Centro Generator Reference	Generator Model	Electrical Rating (stand by) (MWe)	Thermal Rated Input (MWth)
Gen 1	MTU X1000	0.88	2.49
Gen 2	MTU X1000	0.88	2.49
Gen 3	MTU X1000	0.88	2.49
Gen 4	MTU X1000	0.88	2.49
Total		**3.52**	**9.96**

4.4 HH4 Datacentre

The HH4 datacentre site is currently under development. The site will consist of one datacentre building with 6 suites with a total 32 generators. Each suit will be served by 5 generators (4+1 arrangement) with an additional 2 generators for house services. The datacentre will be developed in two phases:

- phase 1 will involve the installation of 17 generators; and
- phase 2: the installation of an additional 15 generators.

There are currently no plans to increase the number of generators at this site once fully developed. The generating capacity of the generators are summarised in Table 4-5.

Table 4-5
HH4 Datacentre Combustion Plant Rated Thermal Input

HH4 Generator Reference	Installation Phase	HH4 Suite	Generator Model	Electrical Rating (stand by) (MWe)	Thermal Rated Input (MWth)
Gens 1, 2,3, 4, 5	1	1	Kohler KD1800-E	1.44	4.1
Gens 6, 7, 8, 9 10	1	2	Kohler KD1800-E	1.44	4.1
Gens 11, 12, 13, 14, 15	1	3	Kohler KD1800-E	1.44	4.1
Gens 16, 17, 18, 19, 20	2	4	Kohler KD1800-E	1.44	4.1
Gens 21, 22, 23, 24, 25	2	5	Kohler KD1800-E	1.44	4.1
Gens 26, 27, 28, 29, 30	2	6	Kohler KD1800-E	1.44	4.1
H1	1	n/a	Kohler KD1800-E	1.44	4.1
H2	1	n/a	Kohler KD1800-E	1.44	4.1
Total				**46.08**	**131.2**

4.5 Staffing

Each datacentre operates 24 hours 365 days a year. The datacentres are staffed by the following number of NTT employees:

- Campus:
  - 33 staff
  - Minimum of 5 staff (comprising NTT security and facilities management personnel) on site.
- Maylands:
  - 40 staff
  - Minimum of 4 staff (comprising NTT security and facilities management personnel) on site.
- Centro:
  - 6 staff
  - Minimum of 3 staff (comprising NTT security and facilities management personnel) on site.
- HH4: it is anticipated that this datacentre will have the following employees (these figures are approximate):
  - Up to 30 staff
  - Minimum of circa 12 staff (comprising NTT security and facilities management personnel) on site.

4.6 Generator Selection and Resilience Configuration

The datacentres comprise a number of customer suits; each customer, for risk management purposes, specifies the number of generators that they require to service their suit. For the HH4 datacentre, this has been designed to ensure the maximum number of generators per datacentre suite are installed to service potential clients and to ensure resilience.

The generators were selected based on the customer demand/required electrical load for each customer suit. This incremental approach ensures that the generators are operated at their optimal design capacity, as operating diesel generator sets at low loads (i.e. underloading) for extended periods of time can potentially impact uptime and engine life.

All generators at the Campus, Maylands, Centro and HH4 datacentres comply with the TA-Luft 2g standard as detailed in Table 4-6.

Table 4-6
Comparison to TA-Luft 2g Emission Standards

Parameter	TA-Luft 2g Emission Standard (mg/m3) (at reference conditions and 5% oxygen)	NTT Generator Model (mg/m3)			
		MTU X1850	MTU X1000	MTU X2200	Kohler KD1800
NOx	2000	1700	*	**	Manufacturer specification states EPA Tier 2 compliant therefore considered to be compliant with equivalent TA-Luft2g.
CO	650	300	<300	<300	
Particulates	130	50	<20	<50	
Hydrocarbons	150	150	<150	<150	

* Generators commissioned for Maylands (Suit 1): December 2012, Campus (House): March 2016 and Centro: December 2014. Compliance with TA-Luft2g not stated on generator specification datasheet; due to manufacturer's emissions specifications and the age of the generators it is assumed that they are TA-Luft2g compliant.

** Generators commissioned for Maylands Suits 2 - 4: 2013 and Suites 5-6: 2014. Due to the age of the generators it is assumed that they are TA-Luft2g compliant.

As the number of customers has increased at each of the three existing datacentres, NTT has installed the required generator capacity to service its customers and provide the required level of resilience. In the case of HH4 datacentre, this has been designed to ensure the installation of the maximum number of generators per datacentre suite to service potential clients and to ensure resilience. This has resulted in the installation of a number of small-scale diesel generators at each datacentre rather than the installation of a smaller number of larger generators. The installation of a larger number of smaller generators offers the flexibility and reliability of electrical supply in the event of an emergency, a critical factor in the operation of the datacentres and an essential requirement to NTT's customers. The installation of a smaller number of larger generators would reduce this flexibility and reliability. Additionally, the installation of smaller generators minimises the potential for adverse impacts on air quality as a result of the planned phased maintenance and testing of the generators.

The resilience configuration of the installed generators providing for the electrical load demand of a site (i.e. the datacentre building and installed IT equipment) is referred to using 'n', where 'n' is the specified MW_e rate delivered by a generator unit. The EA Datacentre FAQ states that 2n is the exemplar (i.e. twice as many generators as required are installed).

The generator configuration for the datacentres is as follows:

- Maylands is 2n;
- Campus: 10 of the 12 data halls is N+1 with 2 data halls and the 'House systems' being 2n;
- Centro is N+1; and
- HH4 will be N+1.

The N+1 configuration (i.e. an additional generator added to support a single generator failure or required maintenance) and the 2n configuration (i.e. a fully redundant mirrored system with two independent electricity distribution systems that are not connected or dependent on one another) allows for a level of redundancy to the generator system such that, even in a worse case blackout scenario, only the required number of generators needed to meet the electrical load demand would be run. The operational capacity of the generators at the time of a blackout would be dependent on the extent of blackout. Furthermore, in the event of failure of a generator, the correct number of remaining generators will in an emergency event provide the required load. The N+1 and 2n configuration offers resilience and minimises the risk of disruption in service to NTT's clients.

The generators are all automated via each datacentre's building management system (BMS). In the event of a reduction in electrical power delivered from the National Grid, the BMS phase failure relay would automatically start-up the required number of generators necessary to service the customer suits; this configuration allows for the required number of generators to be run dependant on the failure scenario. This will result in the reduced consumption of diesel fuel and hence generation of less emissions to air from the generators.

4.7 Reliability Data

The magnitude of risk posed by operation of the generators (other than for generator testing) is strongly linked to the reliability of the provision of electricity from the local transmission network (in addition to the uninterruptable power supply (UPS) arrangements within the site).

The datacentres are designed to provide the maximum reliability of the electrical power supply to the on-site systems that are critical for operation of the site as a datacentre. Each datacentre is designed and built to Uptime Institute Tier IV standards, ensuring the required level of resilience to ensure maximum uptime for critical IT infrastructure.

The electricity supply arrangements for the sites include:

- Campus: two 33KV feeds (each rated to 30MVa) from the National Grid any of which can serve the 'customer load';
- Maylands: two 11KV feeds (each rate to 8MVa) from the National Grid, any of which can serve the
'customer load';
- Centro: one 11KV feed (3MVa) from the National Grid; and
- HH4: two 132KV (each rated to 60MVa) feeds from the National Grid (NTT HH4 only requires 33MVa).

The UPSs are arrays of batteries that can provide power, almost instantaneously, in the event of a loss of electrical input to them. Each datacentre has battery arrays which provide sufficient protection to the supply of electrical power to the 'customer load' whilst the generator(s) are started.

The site operates its electrical supplies on an automatic basis such that in the event of fluctuations in (or loss of) the electrical supply to each site, where such events could negatively impact on operation of the site's datacentre function, these are detected and the relevant response (e.g. ignition of the generators) is automatically deployed by the datacentre BMS.

The Campus datacentre has 12 customer suites; in terms of the electrical setup these suites are all independent having dedicated infrastructure to maximise reliability of each suite. The electricity supply arrangements for the Campus datacentre is illustrated in Figure 4-1.

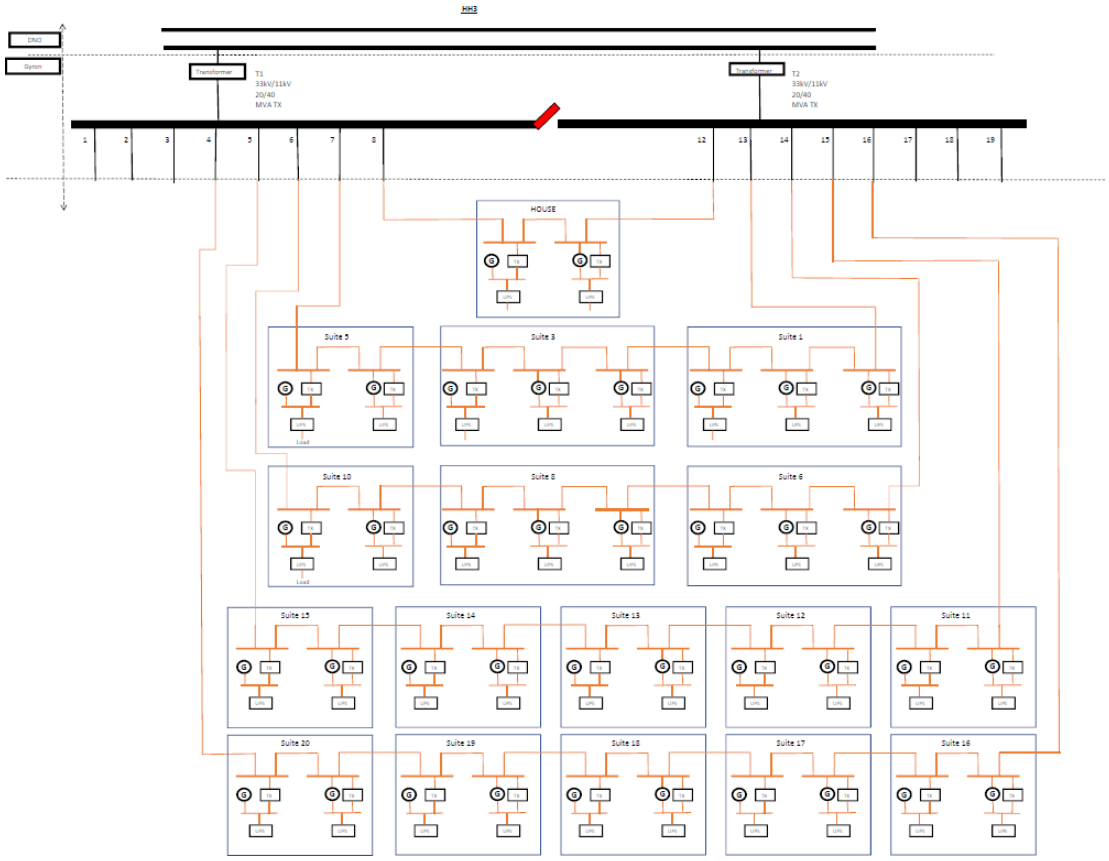


Figure 4-1
Campus Electricity Supply Arrangements

The Centro datacentre has 3 customer suites; these suites are linked in terms of electrical set-up, and are dependent on one another, allowing the 4 generators on site to serve the suits as required. The electricity supply arrangements for the Centro datacentre is illustrated in Figure 4-2.

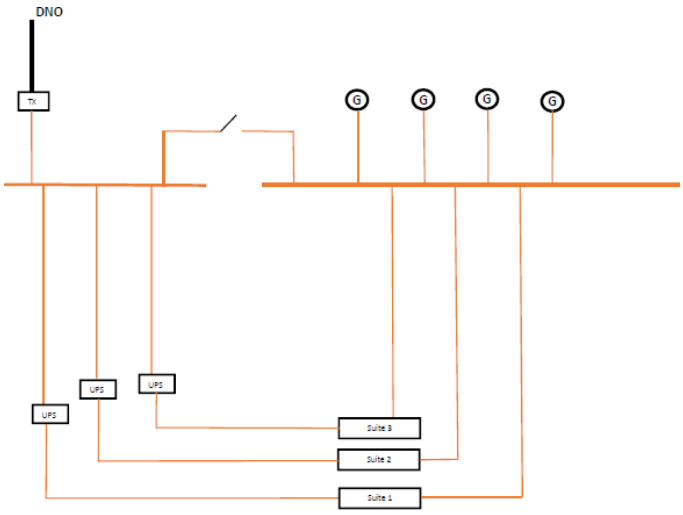


Figure 4-2
Centro Electricity Supply Arrangements

The Maylands datacentre has 6 customer suites; Suite 1 is serviced by 4 generators and suites 2 – 6 are each serviced by 2 generators. In terms of the electrical setup these suites are all independent having dedicated infrastructure to maximise reliability. The electricity supply arrangements for the Maylands datacentre is illustrated in Figure 4-3.

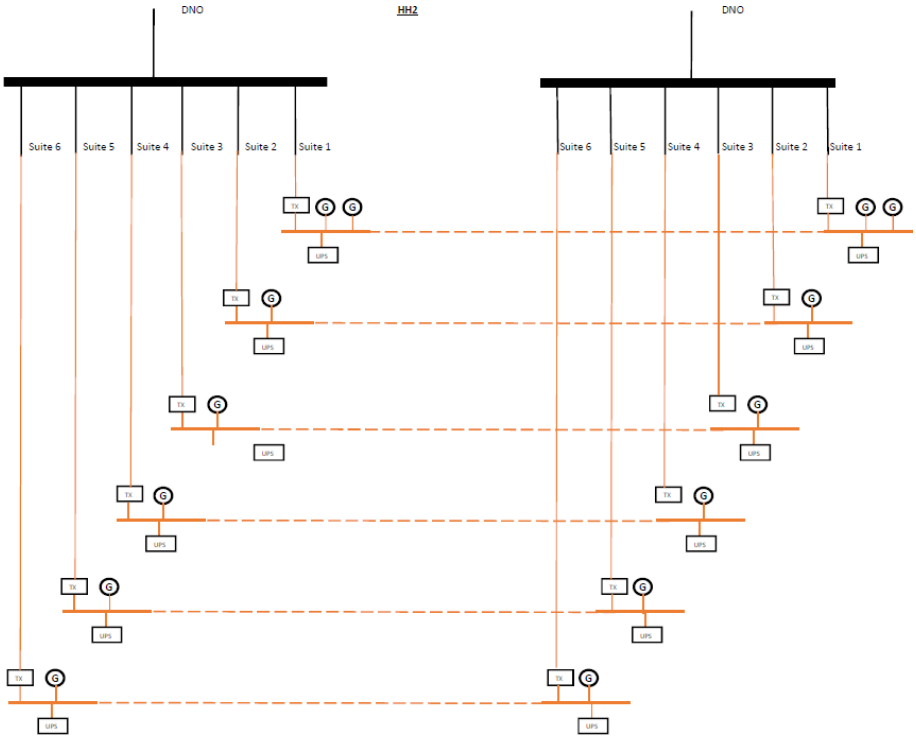


Figure 4-3
Maylands Electricity Supply Arrangements

The HH4 datacentre will have 6 customer suites each serviced by 5 generators. In terms of the electrical setup these suites are all independent having dedicated infrastructure to maximise reliability. The electricity supply arrangements for the HH4 datacentre is illustrated in Figure 4.

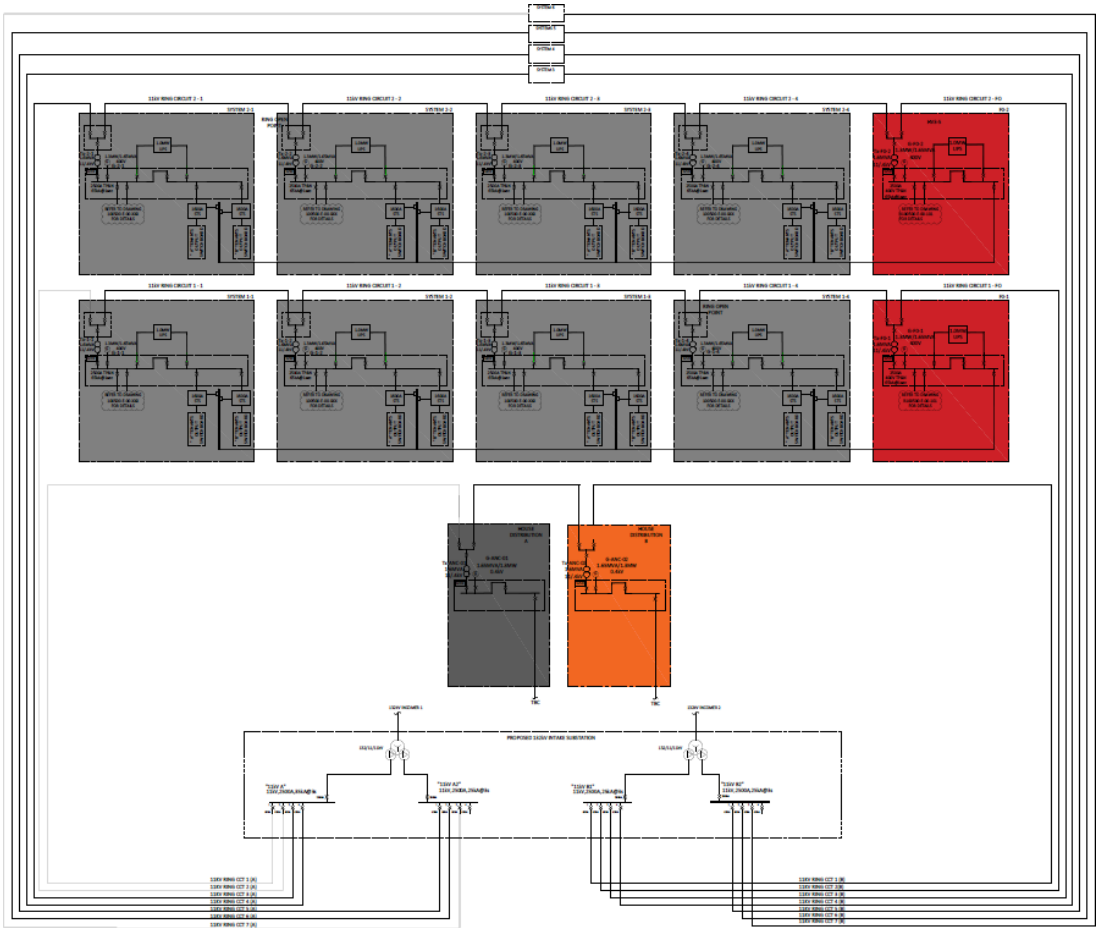


Figure 4-4
HH4 Electricity Supply Arrangements

Each datacentre has an uninterruptable power supply (UPS) consisting of battery arrays. These arrays provide almost instantaneous power in the event of a loss of electrical input to them, providing sufficient protection to the supply of electrical power to the 'customer load' whilst the generators are started.

The electrical supplies for each datacentre are operated on an automatic basis. In the event of fluctuations or the loss of the electrical supply to a datacentre, where such events could negatively impact the operation of the datacentre functions, these fluctuations are detected and the relevant response is automatically deployed by the BMS (i.e. UPS start-up followed by the start-up of generators, if required).

None of the existing datacentres have experienced a black- or brown-out scenario of the local transmission system that has required the use the generators since the sites were first developed as datacentres. The times generators have had to be started for the three datacentres currently operational in 2018, other than for planned testing and maintenance, are summarised in Table 4-7.

The approach to testing of the generators is discussed in Section 5.1.

Table 4-7
Unplanned Generator Maintenance

Datacentre	Generator	Date	Hours Generator Operated	Reason for Unplanned Maintenance
DC1				
	1A	13 March 2018	5	Generator repair
		21 May 2018	3	UPS repair
Campus DC2				
	1B	12 February 2018	12	UPS repair
		13 February 2018	16	UPS repair
		29 June 2018	10	Battery replacement/earthing
	1C	4 June 2018	7	UPS repair
		24 July 2018	9	UPS repair
	3A	12 June 2018	4	Generator sync repair
	3B	13 June 2018	5	Generator sync repair
		25 June 2018	6	Battery replacement
	3C	14 June 2018	4	Generator sync repair
	5B	2 July 2018	1	Battery replacement
	6B	26 June 2018	4	Battery replacement
	8A	10 October 2018	1	ACB Investigation
	8B	28 June 2018	4	Battery replacement
		11 October 2018	2	ACB Investigation
	8C	6 August 2018	8	BCB-UVR repair
		12 October 2018	1	ACB Investigation
	10A	9 October 2018	1	ACB Investigation
	10B	3 July 2018	2	Battery replacement
		9 October 2018	1	ACB Investigation
	House A	8 August 2018	1	Generator repair
Maylands				
	1-1A	20 April 2018	1	Loadbank & Thermal Survey repair
		30 April 2018	1	Generator repair

Datacentre	Generator	Date	Hours Generator Operated	Reason for Unplanned Maintenance
	1-2A	22nd Feb 2018	1	Generator repair

Datacentre	Generator	Date	Hours Generator Operated	Reason for Unplanned Maintenance
		26 – 28 Feb 2018	10	Generator repair
	2A	19 Apr 2018	3	Switchgear / Wiring modifications
		29 Oct 2018	3	On load test during DC coil install
	2B	20 Apr 2018	3	Switchgear / Wiring modifications
		29 Oct 2018	4	On load test during DC coil install
	3A	23 Apr 2018	3	Switchgear / Wiring modifications
	3B	24 Apr 2018	2	Switchgear / Wiring modifications
	6A	4 Apr 2018	1	Generator repair
		1 May 2018	1	Generator Wiring Modifications
	6B	1 May 2018	2	Generator Wiring Modifications
		14 Jun 2018	5	UPS repair
Centro				
	1	6 Nov 2018	6	UPS repair
		7 Nov 2018	2	UPS repair
	2	6 Nov 2018	6	UPS repair
		7 Nov 2018	2	UPS repair
	3	6 Nov 2018	7	UPS repair
		7 Nov 2018	2	UPS repair
	4	6 Nov 2018	6	UPS repair
		7 Nov 2018	2	UPS repair

4.7.1 Technical Standards

Each datacentre installation comprises an individual STU for the combustion and storage of diesel fuel oil. The sites are designed and operated in accordance with the relevant sections of the following key guidance:

- Develop a management system: environmental permits guidance, January 2019;
- Risk assessments for your environmental permit guidance, January 2019; and
- Best Available Techniques: environmental permits, February 2016.

In addition, the sites will be operated in accordance with 'Data Centre FAQ Headline Approach, Draft Version H. Tee 01/06/18 – Release To Industry)' with respect to standby operation. It is noted that this guidance, "*is not presently an official release but forms the basis for discussion of a common methodology and liaison with individual operators and their industry association*." However, for the purposes of this application, this guidance is considered to represent the current EA position of BAT for datacentre back up generation systems.

Operation of the generators (other than for maintenance and testing) will commence in the event that electricity is not available from the local transmission network (e.g. brown- or black-out) or on internal failure of electrical supply (e.g. transformer failure, UPS problem).

The generators on-site will be operated for maintenance and testing purposes only. Each generator will operate for less than 50 hours per annum and therefore will not be subject to the emission limit value (ELV) for NOx (190mg/kg).

The emissions from the site will be estimated using emissions factors, as discussed in Section 6.0.

Emergency Operation

Emergency operations include unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated within the data centre itself.

Given the short start-up and shutdown times for diesel engines, the generators are regarded, for the purposes of determining operating hours, as commencing operation at the first fuel ignition. This is taken to include the shorter periods of plant 'overlap' when engines provided as redundancy are started as a precautionary measure before final customer load is reached with the optimum/minimum number of generators.

The Operator will notify the EA:

- In advance of planned outage/maintenance of the local transmission system that is expected to exceed 18 continuous hours and will require the operation of one or more generators at the site; and
- Upon an incident of unplanned continuous outage that exceeds 18 hours and/or requires operation of more than 2 generators.

5.0 Operating Regime

5.1 Generator Scheduled Operating Regime

During planned maintenance and testing the generators are typically operated for less than 50 hours per year. The planned maintenance and testing regime for the generators is scheduled so that:

- testing and maintenance is completed at one datacentre at a time; and
- for each datacentre no more than 2 generators are tested each day.

This staggered regime ensures that the impact on air quality as a result of the diesel combustion emissions is minimised.

The typical operating regime for the generators (i.e. testing and maintenance) at each datacentre are presented in Tables 5-1, 5-2 and 5-3. Planned maintenance and testing for the proposed HH4 datacentre will be the same as that for Campus.

Table 5-1
Campus and HH4 Datacentre Planned Maintenance and Testing Regime

Event	Detail	Event Operational Time
Monthly on-load testing during maintenance	Each month each generator is powered-up and run at 75% load. Testing is limited to 1 suite per day. Operation of the generators for monthly on-load testing is undertaken out of hours after 17:00 hours and before 06:00 hours typically on a week day.	1 hour (per month)
Annual UPS wrap around maintenance	Once annually maintenance is undertaken on each generator set and power operation is confirmed after maintenance. The generators are off-load so the emissions are low. 1 generator is tested per day between 09:00 hours and 15:00 hours on a week day.	6 hours (once per year)
Black Building Test	Annually a full black building test is undertaken where all the generator sets are started, synchronised and run to take the building load. Black building testing yet to be undertaken, likely to be 1 suite at a time between 10:00 hours and 16:00 hours on a week day.	1 hour maximum (once annually)
Annual load test	Annually a full in-service test (IST) is undertaken on each generator set. The generators undergo a full load test where the generators are started and run to take the building load. The load is ramped up in the first hour with 3 hours at a steady 100% load level testing period 1 generator is tested each day between 09:00 hours and 17:00 hours on a weekday.	4 hours (once annually)

Table 5-2
Maylands Datacentre Planned Maintenance and Testing Regime

Event	Detail	Event Operational Time
Monthly on-load testing during maintenance	Each month each generator is powered-up and run on load. One suit of generators (A & B generators) is tested each day. The testing typically occurs between 10:00 hours and 13:00 hours on a weekday. An exception is Suite 1 where the A & B generators are tested on a Thursday morning between 01:00 hours and 06:00 hours.	1 hour (per month)
Annual UPS wrap around maintenance	Once annually maintenance is undertaken on each generator set and power operation is confirmed after maintenance. The generators are off-load so the emissions are low. No more than 2 generators are tested each day between 09:00 hours and 17:00 hours on a weekday.	12 hours (once per year)
Black Building Test	Annually a full black building test is undertaken where the generator sets are started, synchronised and run to take the building load. 3 suites are tested per day between 09:00 hours and 17:00 hours during a weekday. An exception is Suite 1 where the A & B generators are tested on a Thursday morning between 01:00 hours and 06:00 hours.	20 minutes (once annually)
Annual load test	Annually a full in-service test (IST) is undertaken on each generator set. The generators undergo a full load test (110% load) where the generators are started and run to take the building load. No more than 2 generators are tested each day between 09:00 hours and 17:00 hours during a weekday.	4 hours (once annually)

Table 5-3
Centro Datacentre Planned Maintenance and Testing Regime

Event	Detail	Event Operational Time
Monthly on-load testing during maintenance	Each month each generator is powered-up and run on load. All 4 generators are tested at the same time between 09:00 hours and 17:00 hours during a weekday.	1 hour (per month)
Annual UPS wrap around maintenance	Once annually maintenance is undertaken on each generator set and power operation is confirmed after maintenance. The generators are off-load so the emissions are low.	12 hours (once per year)

Event	Detail	Event Operational Time
	All 4 generators are tested at the same time between 09:00 hours and 15:00 hours during a weekday.	
Black Building Test	Annually a full black building test is undertaken where all the generator sets are started, synchronised and run to take the building load. Black building testing is undertaken between 09:00 hours and 17:00 hours during a weekday.	1 hour maximum (once annually)
Annual load test	Annually a full in-service test (IST) is undertaken on each generator set. The generators undergo a full load test where the generators are started and run to take the building load. All 4 generators are tested at the same time between 09:00 hours and 17:00 hours during a weekday.	4 hours (once annually)

A summary of the planned generator operating hours is presented Table 5-4.

Table 5-4
NTT Hemel Hempstead Datacentre Generator Planned Operation Hours

Operational Requirement	Annual Operational Hours per Generator			
	Campus (30 generators)	Maylands (14 generators)	Centro (4 generators)	HH4 (32 generators)
Monthly on-load Testing (1 hour per month)	12	12	12	12
Annual UPS wrap around maintenance	6	12	12	6
Black-building test	1	0.3	1	1
Annual Load Test (4 hours annually)	4	4	4	4
Operational hours for planned maintenance and testing per year per generator	**23**	**28.3**	**29**	**23**
Operational hours for planned maintenance and testing per year per datacentre (all generators)	**690**	**396.2**	**116**	**736**

The scheduled maintenance and testing regime for each generator is substantially below the 50-hour testing regime for generators which are used purely for a stand-by emergency role as stated in the EA Datacentre FAQ (v. 10 2018).

6.0 Emissions

6.1 Emissions to Air

Emissions from the generators at each datacentre dependent on the operational scenario of the generators. The Air Quality Risk Assessment (SLR Ref: 413.05391.00002 AQA_WD1) predicts:

- For operation of the site for routine planned maintenance and testing:
  - a low probability of exceedances of Air Quality Assessment Levels (AQAL) at all modelled human receptors;
  - no likely significant impacts on identified ecological receptors; and
- For an emergency 500 hour electrical grid outage:
  - the annual mean AQAL is not predicted to be exceeded at any of the modelled human receptors however, statistical analysis indicates there is potential for exceedances of the 1-hour mean at a number of identified human receptors;
  - it cannot be concluded that there will be no likely significant effects on identified ecological receptors.

  It is however recognised that such a prolonged emergency scenario is highly

unlikely. Refer to the Environmental Risk Assessment for further information

(413.05391.00001 ERA).

6.1.1 Emissions Factors

In order to estimate the total annual emissions to air from the site, emissions factors have been developed from the peak fuel consumption rate and the resultant 'worst case' emissions discussed in the Air Quality Risk Assessment (SLR Ref: 413.05391.00002 AQA_WD1).

The proposed emissions factors, calculated based on the emission rates in stated in the AERA and the planned testing and maintenance hours presented in Table 5-4, are presented in Table 6-1 – Table 6-4.

Table 6-1
Campus Emissions Factors for Annual Reporting

Pollutant	Emissions Factor (kg emission/tonne of fuel)		
	Generator Model MTU X1000 (2 generators)	Generator Model MTU X1850 (16 generators)	Generator Model Kohler KD1800 (13 generators)
Emission Rate (g/s)*	1.6	2.5	1.8
NO_x (as NO_2) per engine	132.5	207.0	149.0
NO_x (as NO_2) per total number of generators	265	3,312	1,938
* - emission rate sourced from the SLR AERA			

Table 6-2
Centro Emissions Factors for Annual Reporting

Pollutant	Emissions Factor (kg emission/tonne of fuel)
	Generator Model MTU X1000 (4 generators)
Emission Rate (g/s)*	1.6
NO_x (as NO_2) per engine	167.0
NO_x (as NO_2) per total number of generators	668
* - emission rate sourced from the SLR AERA	

Table 6-3
Maylands Emissions Factors for Annual Reporting

Pollutant	Emissions Factor (kg emission/tonne of fuel)	
	Generator Model MTU 1000 (4 generators)	Generator Model MTU 2200 (10 generators)
Emission Rate (g/s)*	1.6	3.6
NO_x (as NO_2) per engine	132.5	298.1
NO_x (as NO_2) per total number of generators	652	3,668
* - emission rate sourced from the SLR AERA		

Table 6-4
HH4 Emissions Factors for Annual Reporting

Pollutant	Emissions Factor (kg emission/tonne of fuel)
	Generator Model Kohler KD1800 (32 generators)
Emission Rate (g/s)*	1.8
NO_x (as NO_2) per engine	149.0
NO_x (as NO_2) per total number of generators	4,769
* - emission rate sourced from the SLR AERA	

6.2 Emissions to Sewer

Each datacentre has separate foul and surface water drainage systems. The drainage to foul sewer consists of sanitary foul water (sinks, toilets, cleaning water, etc.). The operation of the datacentres does not result in the generation of trade effluent.

The surface water drainage system at each of the three existing datacentres, and for the proposed HH4 datacentre, accepts surface water runoff from the areas where the generator container units and associated diesel storage are located, along with building roof area and other hard surfaced areas of the site.

The drainage arrangements for each datacentre are discussed below. The drainage plans for each datacentre are provided in Appendix 03.

- **Campus** - there are no discharges to foul sewer within the Plant Area where the generators and associated diesel storage are located. All run-off from this area drains to the on-site surface water drainage system via an oil interceptor prior to off-site discharge into the municipal sewer system.

  Surface water runoff discharges via one discharge point (Campus SW1) off site into the municipal drainage system. The location of discharge point Campus SW1 is presented on drawing 02A.

  There are six rainwater harvesting tanks (total 500m3 capacity) beneath the Plant Area where the generators are located, which collect surface water runoff from the site for use to replace evaporative losses from the on-site cooling systems for DC 1 and DC2. There is also an attenuation tank beneath the Plant Area where the generators are located. This provides 265m3 capacity to attenuate the flow of surface water to the site's surface water drainage system and off-site flow into the municipal drainage system.

  There are three interceptors on the Campus site. The surface water runoff from the Plant Area is directed via an interceptor (Klargester class 1 by-pass oil separator) located in the south of the site prior to discharge off site into the municipal surface water drainage system.

  There are no alarm systems fitted to the interceptors to indicate the presence of oil. The interceptors are emptied, cleaned and maintained at least annually by an appointed specialist contractor.

- **Maylands** - there are no discharges to foul sewer within the Plant Area where the generators and associated diesel storage are located. All run-off from this area drains to the on-site surface water drainage system via an oil interceptor prior to off-site discharge into the municipal sewer system.

  Surface water runoff discharges via one discharge point (ML-SW1) off site into the municipal drainage system. The location of discharge point ML-SW1 is presented on drawing 02C.

  There are two interceptors on the Maylands site. The surface water runoff from the area where the generators and associated bulk diesel storage are located is directed via the interceptor located in the south western area of the datacentre site, prior to discharge off site into the municipal drainage system.

  There are no alarm systems fitted to the interceptors to indicate the presence of oil. The interceptors are emptied, cleaned and maintained at least annually by an appointed specialist contractor.

- **Centro** - there are no discharges to foul sewer within the Plant Area where the generators and associated diesel storage are located. All run-off from this area drains to the on-site surface water drainage system prior to off-site discharge into the municipal sewer system.

  Surface water runoff drains directly to the surface water drainage system and discharges via discharge point (Centro SW1) off site into the municipal drainage system; there are no oil interceptors in place on the Centro datacentre site. The location of discharge point Centro SW1 is presented on drawing 002B.

- **HH4** - there are no discharges to foul sewer within the Plant Area where the generators and associated diesel storage will be located. All run-off from this area will drain to the on-site surface water drainage system via a full retention oil interceptor (with an alarm to indicate the presence of oil) and a below ground stormwater attenuation tank (700m3) prior to off-site discharge into the municipal sewer system. The interceptor will be emptied, cleaned and maintained at least annually by an appointed specialist contractor.

Surface water runoff discharges via one discharge point (HH4-SW1) off site into the municipal drainage system. The location of discharge point HH4-SW1 is presented on drawing 02D.

6.3 Emissions to Water

There are no direct discharges from the datacentres to controlled waters.

4.8 Emissions to Land

The three existing datacentres have no point source emissions to land. The proposed HH4 datacentre will also have no point source emissions to land.

6.3 Fugitive Emissions

Significant fugitive emissions, odours and noise are not anticipated in respect of operation of the existing or planned datacentre sites (either during testing and during full emergency operation).

A summary of the storage arrangements for diesel fuel is provided in section 7.0.

NTT maintains a spill procedure (*HS04-TT44 Spillage Response*) and operating personnel are provided with spill response training. Additionally, regular inspections of each of the datacentre sites are undertaken in accordance with the site's environmental management system and maintenance procedures.

The datacentres have not received complaints from nearby residents and businesses.

6.4 Noise and Vibration

A Noise Assessment has been undertaken in accordance with British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound. This report (413.05391.00002 Noise Assessment, Final, January 2020) is presented in Section 5 of this EP application.

The results of a noise survey undertaken on site and at nearby noise-sensitive receptors indicate that background noise levels in the area are dominated by local and distant road traffic, with the M1 to the east of the area. Other sources of noise included aircraft and birdsong. The assessment concluded that the predicted noise rating level is below the background sound level at all assessed locations and periods, except at two locations during the night-time period, specifically Farmhouse Lane and Hales Park.

However, as the generators are typically operated for planned maintenance and testing, the timings and duration of which are designed to minimise the periods when all generators would be operational, it is considered that the operation of the generators is unlikely to cause an adverse impact on the nearby noise-sensitive receptors.

7.0 Resource Use and Efficiency

7.1 Types and Amounts of Raw Materials

The raw materials to be used at the site are:

- Diesel fuel oil: each generator will require (when providing 'standby' power):
  - MTU X1000 (2.49 MWth): up to 207 litres per hours (at 100% load)
  - MTU X1850 (4.14 MWth): up to 365 litres per hour (at 100% load)
  - MTU 2200 (4.98MWth): up to 458 litres per hour (at 100% load)
  - Kohler KD1800-E (4.1 MWth): up to 356 litres per hour (at 100% load).
- Lubricating oil: used in the engines and other mechanical equipment. Occasional top up or replacement will be required during scheduled or forced maintenance periods only.

  The lubricating oil for the generators at all the datacentres is stored within the engine and is manually topped up during servicing by the NTT appointed service contractor. This will also be the case for the proposed HH4 datacentre.
- Transformer oil: transformer oil (free of polychlorinated biphenyls (PCBs)) will be used in oil-cooled transformers. Occasional top up or replacement will be required.

Transformers oils will not be stored on-site; the oils will be brought to site and topped up/replaced during scheduled or forced maintenance periods only.

The BAT objective with regard to raw materials is achieved by the appropriate design, operation and maintenance of the generators to ensure the lowest possible consumption rate of fuel; by the selection of least hazardous materials; and by the provision of appropriate storage methods.

The generator engines are designed for the combustion of fuel oil and there is therefore no alternative fuel for use by the site (although selection of alternative suppliers is possible).

In addition, the lubricating and transformer oils may have alternatives, however the type of oils used are limited to those recommended/specified by the engine manufacturers (again, with potential for supplier selection).

A typical composition of diesel fuel oil is shown in Table 7-1.

Table 7-1
Typical Diesel Fuel Oil Specification

Chemical	Typical % (mass basis)
Carbon	89.7
Hydrogen	10.2
Sulphur	<0.1

7.1.1 Cogeneration (Combined Heat and Power)

The provision/implementation of combined heat and power (CHP) is not applicable as the generators will each operate for less than 500 hours per annum for the provision of emergency power generation ; each engine will inherently only operate for a small fraction of the year (typically less than 30 hours for planned maintenance and testing and no more than 30 hours per year for elective electricity generation).

7.2 Fuel Storage

7.2.1 Campus

Diesel fuel is stored in bunded 'belly' tanks for each generator. A total of 881,000 litres of diesel can be stored on the Campus site as detailed below.

Generator Belly Tanks

The belly tanks are integral to the generator container units and are located beneath the base of each generator unit. The belly tank capacities are summarised in Table 7-2.

Table 7-2
Campus Datacentre Diesel Fuel Storage

Campus Generator Reference	Generator Model	Campus Suite	Diesel Belly Tank Capacity (litres)
Gen-HA	MTU X1000	Campus House	1,000
Gen-HB	MTU X1000		1,000
Gen 1-1A	MTU X1850C	Suite 1	33,000
Gen 1-1B	MTU X1850C		33,000
Gen 1-1C	MTU X1850C		33,000
Gen 3-1A	MTU X1850C	Suite 3	33,000
Gen 3-1B	MTU X1850C		33,000
Gen 3-1C	MTU X1850C		33,000
Gen 5-1A	MTU X1850C	Suite 5	33,000
Gen 5-1B	MTU X1850C		33,000
Gen 6-1A	MTU X1850C	Suite 6	33,000
Gen 6-1B	MTU X1850C		33,000
Gen 6-1C	MTU X1850C		33,000
Gen 8-1A	MTU X1850C	Suite 8	33,000
Gen 8-1B	MTU X1850C		33,000
Gen 8-1C	MTU X1850C		33,000
Gen 10-1A	MTU X1850C	Suite 10	33,000

Campus Generator Reference	Generator Model	Campus Suite	Diesel Belly Tank Capacity (litres)
Gen 10-1B	MTU X1850C		33,000
Gen F-1-ES	Kohler KD1800	Failover	27,000
Gen F	Kohler KD1800	Failover	27,000
Gen-11-1	Kohler KD1800	Suite 11	27,000
Gen-11-2	Kohler KD1800		27,000
Gen-13-1	Kohler KD1800	Suite 13	27,000
Gen-13-2	Kohler KD1800		27,000
Gen-15-1	Kohler KD1800	Suite 15	27,000
Gen-16-1	Kohler KD1800	Suite 16	27,000
Gen-16-2	Kohler KD1800		27,000
Gen-18-1	Kohler KD1800	Suite 18	27,000
Gen-18-2	Kohler KD1800		27,000
Gen-20-1	Kohler KD1800	Suite 20	27,000
Gen-21-1	Kohler KD1800	Serves cooling infrastructure for multiple suites	27,000
Total	-	-	**881,000.00**

Bulk Storage Tanks

There is no bulk storage of diesel at the Campus datacentre.

7.2.2 Maylands

Diesel fuel is stored in bunded 'belly' tanks and in two above ground bulk storage tanks (these bulk tanks serve
Maylands Suite 1 only).

A total of 283,360 litres of diesel can be stored on the Maylands site as detailed below.

Generator Belly Tanks

Diesel fuel is stored in bunded 'belly' tanks. These tanks are integral to the generator container units and are located beneath the base of each generator unit. The diesel tank capacities are summarised in Table 7-3.

Table 7-3
Maylands Datacentre Diesel Fuel Storage – Generator Belly Tanks

Maylands Generator Reference	Generator Model	Maylands Suite	Diesel Belly Tank Capacity (litres)
Gen 1-1A	MTU 1100	Suite 1	840.0
Gen 1-2A	MTU 1100		840.0
Gen 1-1B	MTU 1100		840.0
Gen 1-2B	MTU 1100		840.0
Gen 2-1A	MTU 2200	Suite 2	19,000
Gen 2-1B	MTU 2200		19,000
Gen 3-1A	MTU 2200	Suite 3	19,000
Gen 3-1B	MTU 2200		19,000
Gen 4-1A	MTU 2200	Suite 4	19,000
Gen 4-1B	MTU 2200		19,000
Gen 5-1A	MTU 2200	Suite 5	19,000
Gen 5-1B	MTU 2200		19,000
Gen 6-1A	MTU 2200	Suite 6	19,000
Gen 6-1B	MTU 2200		19,000
Total	-	-	**193,360.00**

Bulk Storage Tanks

Two above ground bulk storage tanks serve Suite 1 at the Maylands datacentre. These serve the belly tanks for the two Suite 1 generators; this design was dictated by NTT's customer.

Table 7-4
Maylands Datacentre Diesel Fuel Storage – Bulk Tanks

Bulk Tank Reference	Bulk Diesel Tank Capacity (litres)
Suit 1 Tank 1	45,000
Suit 1 Tank 2	45,000
Total	**90,000**

7.2.3 Centro

Diesel fuel is stored in bunded 'belly' tanks and in an above ground bulk storage tank which serves the generator
belly tanks.

A total of 78,360 litres of diesel can be stored on the Centro site as detailed below.

Generator Belly Tanks

Diesel fuel is stored in bunded 'belly' tanks. These tanks are integral to the generator container units and are located beneath the base of each generator unit. The diesel belly tank capacities are summarised in Table 7-5.

Table 7-5
Centro Datacentre Diesel Fuel Storage

Centro Generator Reference	Generator Model	Diesel Belly Tank Capacity (litres)
Gen 1	MTU X1000	840
Gen 2	MTU X1000	840
Gen 3	MTU X1000	840
Gen 4	MTU X1000	840
Total		**3,366.00**

Diesel Bulk Storage Tank

Diesel fuel is stored in an above ground bulk storage tank. The tank is provided with secondary containment (110% capacity). The tank serves the belly tanks for the four generators. The capacity of the bulk diesel storage tank is 75,000 litres.

7.2.4 HH4 Datacentre

Diesel fuel will be stored in bunded 'belly' tanks for each generator. A total of 1,056,000 litres of diesel can be stored on the HH4 datacentre site as detailed below.

Generator Belly Tanks

The belly tanks will be integral to the generator container units, located beneath the base of each generator unit. The belly tank capacity for each generator is summarised in Table 7.6.

Table 7-6
HH4 Datacentre Diesel Fuel Storage

Campus Generator Reference	Generator Model	Diesel Belly Tank Capacity (litres)
Generators 1 – 30, H1 and H2	Kohler KD1800-E	27,000
Total		864,000

Bulk Storage Tanks

There will be no bulk storage of diesel at the HH4 datacentre.

Further details of the diesel storage arrangements are provided Section 11.0 Best Available Techniques.

7.3 Energy Efficiency

7.3.1 Climate Change Agreement

NTT is a participant to a Climate Change Agreement, (CAA) for the datacentre sector (agreement reference DATC/T00015). Energy management techniques have been implemented to monitor, record and track energy consumption at the datacentres. The CCA Agreement is included in Appendix 02.

To achieve the reductions required under the CCA energy reduction targets are established in the ISO14001 Environmental Management System (EMS).

The HH4 datacentre, once operational, will be included on the CCA agreement and energy reduction initiatives and targets will be managed via the organisation's ISO14001 EMS.

7.3.2 Energy Efficiency Directive (EED)

The EED exempts "those peak load and back-up electricity generating installations which are planned to operate
under 1,500 operating hours per year as a rolling average over a period of five years".

Based on the planned maintenance and testing schedule in total the generators at each datacentre will be operated for less than 1,500-hour threshold, however all 4 datacentre sites when aggregated exceed this threshold, as summarised in Table 7-7. For the purpose of this permit application it is considered that the datacentres are not exempt from the EED requirements and an assessment of energy efficiency in accordance with the Reference Document on Best Available Techniques for Energy Efficiency, February 2009 has been undertaken as presented in Table 7.8. For the purpose of the proposed HH4 datacentre, the design and operation of the generators and diesel systems will be subject to the same degree of compliance as the existing datacentres as described in Table 7-8.

Table 7-7
Annual Operational Hours

Generator Operational Hours	Campus	Centro	Maylands	HH4 Datacentre
Number of generators	31	4	14	32
Total annual hours per generator (for planned maintenance and testing)	23.0	28.3	29.0	23.0
Total hours per datacentre	**713.0**	**816.2**	**236.0**	**736.0**

Table 7-8
Compliance with Indicative BAT for Energy Efficiency

Indicative BAT requirement	Compliance level
BAT is to implement an Energy Management System	Energy is managed via the ISO14001 certified environmental management system (EMS). The EMS establishes energy objectives and targets and requires the monitoring of energy usage at the datacentres.

Indicative BAT requirement	Compliance level
• Continuously minimise the environmental impact of an installation by planning actions and investment on an integrated basis... considering the cost benefits and cross media effects	The environmental impacts of proposed changes at the datacentres are considered at the design stage of a project; changes are designed to minimise adverse environmental impacts. NTT requires that equipment suppliers provide energy efficient equipment for all new projects. The latest energy efficient technologies are specified for development of new facilities and retrofits, such as the application of EC fans, adiabatic cooling, LED lighting and lighting controls. NTT has even specified electric cars for business travel between sites.
• Identify aspects of an installation that influence energy efficiency by carrying out an audit.	The facility operates to a formal Climate Change Agreement, which establishes fixed carbon emission targets, and both Campus and Maylands datacentres are each subject to an EUETS permit (Maylands - UK-E0IN-13343 and Campus – UK-E-IN-13383), which focus on greenhouse gas emissions. The datacentres will be complying with the Simplified Energy and Carbon Reporting (SECR), which will be introduced in 2020. SECR requires organisations to include in the annual report annual energy usage and energy efficiency initiatives. In accordance with the EMS, energy usage is monitored and reviewed. Regular monitoring of energy usage allows for the investigation of any notable changes in energy usage. In accordance with the requirements of the Energy Savings Opportunities Scheme (ESOS), NTT has appointed an energy consultant to undertake energy audits and to identify energy minimisation opportunities.
• When carrying out an audit, ensure that the audit identifies the following aspects: ○ Energy use and type and its component systems and processes ○ Energy-using equipment and type and quantity of energy used in the installation ○ Possibilities to minimise energy use… ○ Possibilities to use alternative sources or use of energy that is more efficient … ○ Possibility to apply energy surplus to other processes … ○ Possibilities to upgrade heat quality	The ESOS energy audit focuses on opportunities for reducing energy use. Energy use is also considered as part of the selection process for new equipment/ processes. Energy performance in association with the facility's CCA is based on Power Utilisation Effectiveness (PUE), which measures the IT equipment power consumption within the data centre against total power consumption.

• Use tools or methodologies to assist with identifying and quantifying energy optimisation …	Various tools are used to identify and quantify energy optimisation including, estimates and calculations. External specialist consultants have also been engaged to assist in identifying opportunities for energy reduction and optimisation in accordance with the requirements of ESOS. Each datacentre control room has systems to monitor PUE on a suite by suite basis. NTT also monitors for local hot spots within each of the suites, which may indicate opportunities to optimise cooling air flow, with the implementation of immediate corrective actions if required. By monitoring electrical consumption, the load on the generators is minimised in the event that they are needed. Each datacentre monitors energy performance on a daily, weekly and monthly basis by KPIs. These KPIs are high priority and action is taken on any deviation. The CCA carbon emissions performance is measured and monitored on a monthly basis.

Indicative BAT requirement	Compliance level
• Identify opportunities to optimise energy recovery …	The recovery of energy from the generators is extremely limited given that the generators are only operated intermittently for emergency back-up electricity and planned testing. Heat exchange is performed at all datacentres between data suite exhaust air and incoming air, in order to maintain the incoming air temperature within set limits. There is no active heating of inlet air, only recovered heat is used as and when required. The external cooling circuits use adiabatic cooling wherever possible, either through external cooling circuits or with direct cooling.
• Optimise energy efficiency by taking a systems approach to energy management …	NTT will adopt a systems approach when considering the energy efficiency and energy management of any proposed changes with respect to the generators, data suite cooling and lighting.
• Establish and review energy objectives	Establishment of energy objectives is undertaken in accordance with the EMS. Progress against energy objectives are reviewed at least annually during the Management Review.
• Establish energy efficiency indicators by: ○ identifying suitable energy efficiency indicators for the installation, and where necessary individual processes, systems, units and measure change over time ○ Identifying and recording appropriate boundaries associated with the indicators ○ Identifying and recording factors that can cause variance in energy efficiency of the process, system, units.	NTT has established energy efficiency indicators for the generators. Where peaks in energy use are identified investigation will be made into the causes of this variance. NTT also monitors PUE for each data suite on a daily basis; action is taken should there be an unexpected increase. NTT monitors datacentre temperatures at multiple points: high temperatures indicate potential inefficiencies in HVAC and cooling and are investigated as priority.
• BAT is to carry out ... comparisons with sector, national or regional benchmarks, where validated data are available	NTT has internal KPIs for energy use and targets for energy reduction in accordance with the requirements of the EMS.

• Optimise energy efficiency when planning a new installation, unit or system or significant upgrade by considering: ○ Initiating EED at early design stage… ○ Development/selection of energy efficient technologies ○ EED should be carried out by an energy expert ○ Initial mapping of energy consumption should also be addressed which parties in the project organisations influence the future energy consumption and should optimise the energy efficiency design of the future plant.	In accordance with the EMS management of change process, the energy efficiency of proposed generators will be considered at the design stage.
• Seek to optimise the use of energy between more than one process or system with the installation or with a third party	The generators have been specified and optimised to meet the very specific requirements to provide back-up energy supply to NTT's datacentre customers in the event of a black or brown out scenario.

Indicative BAT requirement	Compliance level
• Maintain the impetus of the energy efficiency programme by using a variety of techniques such as: ○ Implementing specific energy efficiency measures ○ Accounting for energy usage based on real (metered) values… ○ Creation of financial profit centres for energy efficiency ○ Benchmarking ○ Fresh look at existing management systems ○ Using change management techniques	The EMS requires the management and monitoring of energy use and the identification of opportunities for energy minimisation. Energy usage and energy efficiency improvements/minimisation are discussed at least annually in the Management Review. Additionally, in accordance with ESOS, energy audits are undertaken every 4 years which focus on opportunities for reducing energy use. Targets within CCAs also provide a driver for improvement. There is a dedicated facilities team who meet at least monthly to review utility consumption at the datacentres and to review energy performance (PUE). The same team are also aware of and monitor any engineering improvements to infrastructure. The energy requirements of any proposed changes are considered at the design stage, as previously discussed.
• Maintain expertise in energy efficiency and energy using systems by using: • Skilled staff • Training staff off line periodically… • Sharing in-house resources between sites • Use of appropriately skilled consultants • Outsourcing specialist systems and/or functions.	NTT provides basic training in energy efficiency and sustainability to staff, as required. NTT also engages specialist consultants to provide support in energy management/efficiency as required.
• Ensure that the effective control of processes is implemented by …	Operating procedures are in place for the operation, management and maintenance of the generators, and associated diesel storage arrangements. Suitable training in these processes and procedures is provided to relevant staff, as required, to ensure optimal operation.
• Carry out maintenance to optimise energy efficiency by …	NTT has a Preventative Maintenance Programme in place; the maintenance of equipment is undertaken in accordance with manufacturer's requirements to ensure the efficiency, including energy efficiency, of equipment is maintained. Designated maintenance personnel undertake the required maintenance activities; where appropriate, specialist contractors will be appointed to undertake maintenance of specific equipment. Records of maintenance are retained at the facility.
• Establish and maintain documented procedures to monitor on a regular basis key characteristics of operations and activities that can have a significant impact on energy efficiency	Operating procedures are in place for the operation, management and maintenance of the generators, and associated diesel storage arrangements, ensuring that those operations which can have a significant impact on energy efficiency are subject to regular monitoring. In accordance with the EMS, energy efficiency is reviewed on a regular basis and, where relevant, opportunities for minimising energy use are investigated.
• Optimise energy efficiency of combustion …	The optimal combustion of diesel in the generators is addressed during maintenance.

Indicative BAT requirement	Compliance level
	The generators are subject to regular preventative maintenance to ensure efficient operation.
• Maintain efficiency of heat exchangers by monitoring the efficiency periodically and preventing/removing fouling.	See previous comments
• Optimise electric motors …	All electrical systems are optimised with respect to the latest motor technologies and efficient equipment. Through this optimisation and maintenance the electrical load on the generators is minimised and hence the fuel consumption is minimised.
Compressed Air Systems	
• Optimise compressed air systems by ..	Not applicable: There are no compressed air systems.
• Optimise pumping systems	The diesel pumping systems have been designed/specified to the correct sizing; oversized pumps have not been specified. Any new pumps will be correctly matched to the motor duty. The pumps and motors are subject to regular planned preventative maintenance (PPM). All diesel delivery pipework has been designed to the correct diameter for fuel delivery to the belly tanks and generators and pipeline layouts designed to minimise the need for bends and valves.
HVAC Systems	Not applicable.
Lighting	Only a very small amount of lighting is provided in the generator container units to achieve the required illumination.
Drying, Separation and Concentration Processes	Not applicable. None in operation at the site.

7.3.3 Energy Management

The management of energy is an integral part of the ISO14001 environmental management system (EMS). Energy use is one of the key environmental aspects, with energy use at the datacentres, including operation of the generators, and efficiency typically being an EMS objective against which reduction targets are established. The datacentres are also subject to assessment in accordance with the Energy Savings and Opportunities Scheme (ESOS). The ESOS assessments, completed on a four-yearly basis in accordance with the requirements of ESOS, identify energy saving opportunities, the financially viability of which are appraised; where such opportunities are deemed viable NTT will consider implementation.

Training aimed at minimising energy use and developing good housekeeping techniques are part of staff training.

7.3.4 Measures for the Improvement of Energy Efficiency

The generators are subject to regular maintenance and inspections that include ensuring the engines are optimised to minimise the heat rate (energy consumption) whilst maintaining the relevant emissions standards.

Energy recovery is not reasonably practicable for engines with such small anticipated operational hours,

however, as part of the EMS, assessment of each datacentre's energy usage will be undertaken with a view to identifying measures to reduce energy consumption.

7.3.5 Energy Usage

Operation of the generators is for emergency back-up only. The overall efficiencies of the generators (under the
provision of 'standby' power) at each datacentre are summarised

below: Campus:

- MTU X1850: 35.6%
- MTU X1000: 35.34%
- Kohler KD 1800: 35.12%

The overall efficiency of the datacentre DC1, under this scenario and generating 25.18MWe, will be approximately 35.36%.

The overall efficiency of the datacentre DC2, under this scenario and generating 15.84MWe, will be approximately 35.12%.

Maylands:

- MTU X1000: 35.34%
- MTU X2200: 35.34%

The overall efficiency of the site, under this scenario and generating 59.96MWe, will be approximately

35.34%. Centro:

- MTU X1100: 35.34%

The overall efficiency of the site, under this scenario and generating 3.52MWe, will be approximately

35.34%. HH4:

- MTU X1850: 35.6%.

The overall efficiency of the HH4 datacentre, under this scenario and generating 46.9MWe, will be approximately 35.36%.

7.4 Water Minimisation

There will be no consumption of water associated with the generator combustion activities and diesel use/storage at the site.

7.5 Waste Minimisation

The sites will inherently not produce significant amounts of waste. Waste oil will be generated at the sites as a result of generator maintenance. Generator maintenance is undertaken by an appointed third party specialist who is responsible for the off-site disposal of this waste; this will also be the case for HH4. No waste oil is/will be stored on the datacentre sites. NTT has ensured that this contracted company is a certified waste carrier.

Waste oil is managed off-site, the majority of which is processed into Processed Fuel Oil (PFO) (it should be noted that this is market dependent with respect to the price of crude oil) for use as a fuel in power stations in the UK or is transported overseas for various uses.

A summary of the quantities of waste oil generated at each of the three operational datacentres for 2016, 2017 and 2018 are presented in Table 7-9.

Table 7-9
Waste Oil Quantities 2016 - 2018

Datacentre	Waste Oil Quantities (litres)		
	2016	2017	2018
Campus	0*	0*	0*
Centro	560	0*	560
Maylands	2,360	0*	0*
HH4	It is anticipated that waste oils generated at this proposed site will be of a similar quantity as to the Campus datacentre.		
* No oil change undertaken			

Overall, it is estimated that waste oils (EWC 13 02) from the generators at each datacentre will be less than 5m3/4.5 tonnes per annum.

8.0 F-Gases

Fluorinated gases (F-gases) are used at each facility in the refrigeration systems for chiller units and air conditioning units; this will also be the case for the proposed HH4 datacentre.

These units are subject to regular maintenance and leak testing; these requirements are included in the site's preventative maintenance system. Maintenance and testing are undertaken by a NTT approved external specialist contractor; copies of the certificates of the engineers qualified to install, maintain and service refrigeration equipment are maintained on file by NTT.

NTT maintains an F-gas register for each datacentre. Each register details the location of each refrigerant-containing unit, the make, model and serial number, refrigerant type and charge, the global warming potential (GWP), carbon dioxide equivalent (CO_2e kg), maintenance/leak test frequency and refrigerant used per year.

Leak detection and maintenance records are maintained which include details of the quantity of refrigerant used to recharge the units, date of recharge and leak re-test for those assets where leaks are identified.

The refrigerant in use at all three datacentres is R410a, a hydrofluorocarbon (HFC) with zero ozone depleting potential (ODP) and medium-high global warming potential (GWP).

The aforementioned systems and PPM for the management of F gases will implemented at the proposed HH4 datacentre.

An extract of the F-gas register for the Campus datacentre is presented in Figure 8-1 (this register is representative of both the Maylands and Centro F-gas registers).

Control Document TC-22-01

Optimum.

GYRON - Campus DC1 - Maxted Close, Hemel Hempstead, HP2 7EG

				Type of Refrigerant 410a							REFRIGERANT USED PER ASSET PER YEAR		
							Leak Test Frequency						
Location of unit	Make	Model	Serial Number	Quantity of Refrigerant in circuit (kg)	GWP	CO2 tonnes	5-49.99 CO_2 T 12 monhtly	50-499.99 CO_2 T 6 monhtly	500 + CO_2 T 3 monhtly	Risk	Fixed Leak Detection >500 CO_2 T	2018 (KG)	2019 (KG)	2020 (KG)
BCU 1-1A - Battery Room 1A	Mitsubishi	PUHZ-ZRP50VKA	5XU05229	2.4	2088	5.0112	5.0112			5.0112	NO			
BCU 1-2A - Battery Room 1A	Mitsubishi	PUHZ-ZRP50VKA	5XU05223	2.4	2088	5.0112	5.0112			5.0112	NO			
BCU 1-1B - Battery Room 1B	Mitsubishi	PUHZ-ZRP50VKA		2.4	2088	5.0112	5.0112			5.0112	NO			
BCU 1-2B - Battery Room 1B	Mitsubishi	PUHZ-ZRP50VKA		2.4	2088	5.0112	5.0112			5.0112	NO			
BCU 1-1C - Battery Room 1C	Mitsubishi	PUHZ-ZRP50VKA	5XU05228	2.4	2088	5.0112	5.0112			5.0112	NO			

Figure 8-1
Extract from Campus Datacentre F-Gas Register

9.0 Management Systems

The data storage services at the datacentre sites are managed in accordance with the following standards:

- ISO/IEC 27001:2013 that specifies the requirements for establishing, implementing, maintaining and continually improving an information security management system;
- ISO 14001:2015 that specifies the requirements for an environmental management system to enable an organization to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organization subscribes, and information about significant environmental aspects; and
- ISO9001:2015 that specifies the requirements for establishing, implementing, monitoring, managing and improving quality throughout the organisation.

NTT has an overall ISO Integrated Management Systems Manual (QM22) under which all the aforementioned ISO certified management systems are included; specific requirements for each of the ISO management systems are contained within the relevant NTT ISO system manual.

9.1 Environmental Management System (EMS)

NTT has an ISO14001 certified EMS that includes the policies, management principles, organisational structure, responsibilities, standards/ procedures, process controls and resources which are in place to manage environmental protection across all aspects of the business. The scope of this EMS will include the HH4 datacentre.

The EMS places particular importance on:

- Reducing risks to the environment to a level that is as low as reasonably practicable using best available techniques;
- Integrating EMS responsibilities within line management;
- A commitment to personnel environmental awareness and competence;
- The ongoing monitoring and review of environmental performance; and
- A commitment to working to achieve continuous improvement in environmental performance.

9.1.1 Policy

The ISO14001 certified EMS includes an Environmental Policy. The Environmental Policy clearly defines NTT's commitment to continual improvement and to developing objectives and targets aimed at preventing pollution and improving environmental performance. The Policy is reviewed annually and agreed with the Chief Executive Officer and is communicated to all NTT employees.

9.1.2 Organisation

NTT has established and maintains documented procedures for identifying and recording environmental aspects for all its activities, products and services. Where significant, the environmental aspects have been considered in the development, implementation and maintenance of the EMS. These are also considered when introducing new or modified activities and services. NTT has also documented in the EMS the process for the setting, managing and reviewing environmental Objectives and Targets.

NTT has documented within the EMS the structure and responsibility within the organisation. Senior

management have overall responsibility for the provision and maintenance of an effective EMS Policy and improvement programme and will ensure that the requirements of the EMS are addressed in all management and business decisions.

NTT maintains an internal audit programme for periodic internal audits of environmental documents, procedures, implementation and compliance status to determine whether the EMS conforms to planned arrangements, and to determine whether it has been appropriately implemented and maintained in accordance with its Environmental Policy. The EMS is externally verified through accreditation and surveillance audits by the appointed management system certification organisation.

9.1.3 Environmental Aspects Evaluation

The environmental significance of the site activities is determined by means of environmental aspects evaluation. NTT identifies the aspects and impacts (direct and indirect) relevant to its activities, highlighting which substances, activities or incidents related to the aspects are likely to have a harmful effect on the environment. Any substance, activity or incident that has the potential to cause harm, or under the worst case scenario has a high-risk of potential to harm, the aspect will be identified as being 'Significant '.

NTT's main activities are identified and recorded in the Environmental Aspect and Impact Register (EMS04). Evaluation of these aspects and impacts and the associated implications are recorded in the Register. Environmental aspects are considered under the following conditions:

- Normal operation (i.e. standard operating procedures and conditions);
- Abnormal operation (i.e. standard operating procedures but non-standard conditions); and
- Emergency conditions.

Aspects which are identified as being 'Significant' are managed by establishing operational controls, process, procedures, training and monitoring activities such audits. The NTT Management Team is responsible for reviewing aspects and impacts defined as being significant. All staff are responsible for working in accordance with procedures relating to environmental compliance.

9.1.4 Environmental Risk Assessment

Environmental risk assessments, together with the environmental aspect evaluation, allow routine management system (MS) procedures to manage risks under normal circumstances, and emergency plans to mitigate impacts under abnormal circumstances. Such assessments cover the implications of material storage, oil transfer, drainage and site security.

Environmental risk assessments are carried out:

- Under normal operating conditions;
- Under potential abnormal/emergency conditions;
- For existing equipment;
- For existing material storage;
- Before a new substance is introduced;
- Before the installation of new plant on-site; and
- Before existing plant is modified.

All significant risks will be referenced in the Aspect and Impact Register.

NTT requires/encourages full and open reporting of all environmental incidents, including near misses. Staff

are encouraged to report environmental incidents and problems which may result from (inter alia) the following factors:

- Pollution incidents;
- Potential incidents;
- Breaches of legislation;
- Supplier non-compliances;
- Contractor non-compliances;
- Non-compliances identified during audits; and
- Management system non-compliances.

Additionally, contractor personnel are informed of the need to report incidents.

9.1.5 Adaptation to Climate Change Risk Assessment (CCRA)

In support of the EP application a CCRA was completed. The CCRA addresses potential risks that may occur in the event of predicted changes to our climate. Predicted climate changes, which can potentially be extreme, and organisations at risk of these changes need to ensure that they have measures in place to ensure business resilience and continuity.

The CCRA was completed in accordance with Environment Agency (EA) guidance Adapting to Climate Change: risk assessment for your environmental permit[1](2019). The completed risk assessment worksheet (Thames River Basin District worksheet, this being the river basin district the datacentres are located) is presented in the Environmental Risk Assessment which has been completed in support of this permit application (413.05391.00002 ERA).

Based on the 'potential changing climate variables' presented in the worksheet and the potential impact on operations at the datacentres, specifically related to the diesel-fired generators and diesel storage, the overall risks are low, with risk scores ranging from 1 – 3; these scores are below the threshold whereby mitigation measures are required to ensure operational resilience against potential climate change impacts.

This CCRA worksheet will be included in the NTT ISO14001 Environmental Management System and will be updated on a regular basis. Where there are changes in the level of risk, for example as a result of new climate change predications or changes in site infrastructure, the CCRA worksheet will be updated and if necessary, mitigation measures implemented to reduce risk.

9.1.6 Monitoring, Control and Change Management

The primary mechanism that ensures operational control is the Environmental Aspect and Impacts Register (EMS04). Processes and procedures address each significant aspect and generate the information and data necessary to monitor adequately the environmental performance of the datacentres and develop an understanding of performance so as to identify faults, opportunities for improvement and to optimise maintenance routines.

The EMS provides for the controlled implementation of changes which may have environmental implications. Requests for change are issued to and reviewed by the Compliance Manager to ensure any environmental risked posed by the proposed change will be adequately managed. Final change approval is given by the Chief Operating Officer. Any changes are communicated to staff via their Line Manager and training.

[1] https://www.gov.uk/guidance/adapting-to-climate-change-risk-assessment-for-your-environmental-permit

Change control includes consideration of the proposed change requirement, identification of the potential environmental implications, measures required to minimise the potential environmental impacts and the responsibility for resolution and a timescale. Change control includes consideration of (inter alia):

- Legal obligations;
- Results of routine monitoring activities;
- Changing commercial circumstances;
- Improvement targets;
- Review of the environmental aspects, which will include risks from climate change;
- Complaints or suggestions from the public;
- Staff suggestions; and
- Non-compliances.

9.1.7 Accident Prevention and Management

NTT has systems in place for managing accidents or incidents. Risks as a result of activities undertaken, or proposed to be undertaken, at the datacentres are considered and documented in the Environmental Aspect and Impact Register and via risk assessments (ISO1-F03 USMS). The Environmental Aspect and Impact Register will be updated on issue of the Environmental Permit to reflect any permit requirements.

NTT also has the following in place:

- A Disaster Recovery Plan to counteract potential interruptions to its business activities and to protect critical business processes from the effects of major failures of information systems or disasters. Risk assessments have been undertaken to ensure that the Disaster Recovery Plan has appropriate controls in place;
- A Business Continuity Plan (BCP) which details emergency procedures and the incident management team and responsibilities. The BCP documents the emergency response to be implemented in the event of emergency situations and accidents and includes details of the roles and responsibilities, contact details of key company personnel and emergency services;
- An Incident Management Policy, which details the incident response process, timelines and requirements; and.
- An investigation and root cause analysis process (Action Procedure QM06). QM06 is the action tracker control document where an incident's root causes, contributary causes and preventative actions are captured.

These documents are all reviewed annually to ensure they are up to date and effective. These documents are available for review on site.

9.1.8 Training

Environmental training relates to both general awareness and job-specific training.

The site is managed by a sufficient number of staff, who are competent to operate the site. In accordance with the EMS:

- All staff have clearly defined roles and responsibilities;
- Records are maintained of the knowledge and skills required for each post;

- Records are maintained of the training and relevant qualifications undertaken by staff to meet the competence requirement of each post; and
- Operations are governed by standard operating instructions.

Each individual's knowledge and skills are assessed and matched against the needs of the job position.

Additional experience and/or training requirements necessary to enable an individual to undertake their assigned role are identified, prioritised and planned.

Training records are maintained and training needs regularly reviewed.

All contractors and sub-contractors are given appropriate training prior to the commencement of any works or services.

9.1.9 Review and Audit

NTT recognises that continuous improvement requires the ongoing reappraisal of EMS and Environmental Policy in order to ensure that they remain effective, in line with developing best practice and relevant to the business as a whole. An annual management review examines the EMS to ensure that it remains appropriate and effective at controlling environmental performance and to identify any areas where opportunities exist for improvement.

The EMS and site activities are internally audited at least annually. Internal audits are carried out by site staff with suitable audit experience and / or training.

Where corrective action is identified as being required, through audit (or otherwise), which for example involves modifications to plant and equipment, the implementation of such changes will be managed via the EMS change management process.

10.0 Monitoring

The generators at each datacentre will each operate for less than 500 hours per annum and will not be subject to emissions limit values (ELV) for the substances listed in Annex V of Directive 2010/75/EU on industrial emissions (Industrial Emissions Directive, IED).

As the generators will not be used for the elective generation of electricity they will not be considered 'specified generators' in accordance with EPR 2018 and hence will not be subject to the ELV for NOx (190mg/kg (within 10 minutes of the specified generator commencing operation)).

The operator will record for each datacentre:

- the operating hours of each engine;
- the amount of fuel used on an annual basis;
- the estimated annual total emissions of NO_x based on emissions monitoring results;
- the estimated total emissions of SO_2 based on the sulphur content of the fuel used.

For the purposes of determining operating hours, the generators are regarded as having minimal start-up or shut-down times. Operational hours will be counted from the first fuel ignition. This will include the shorter periods of plant 'overlap' when redundant plant is started as a precautionary measure before final load is reached with the optimum/minimum number of generators.

10.1 Point Source Emissions to Atmosphere

Point source emissions to air are from the generators as a result of diesel combustion. Based on the findings of the air emissions risk assessment (413.05391.00002 AQA_WD1) the products of combustion which will be released to air will not result in an adverse impact on the environment as a result of routine planned maintenance and testing activities.

For operation of the site under an emergency (brown- or black-out) scenario (500 hours modelled), whilst the annual AQAL is not predicted to be exceeded at any of the selected human receptors, it cannot be concluded that there will be no likely significant effects on identified ecological receptors. However, as stated previously, it is recognised that such a prolonged emergency scenario is highly unlikely.

The generators on-site will each operate for less than 500 hours per annum and will not be subject to emissions limit values (ELV) for the substances listed in Annex V of Directive 2010/75/EU on industrial emissions (Industrial Emissions Directive, IED).

The operator will record:

- the operating hours of each engine;
- the amount of fuel used on an annual basis;
- the estimated total emissions of NO_x based on the emissions factors described in Section 6.0 of this document; and
- the estimated total emissions of SO_2 based on the sulphur content of the fuel used.

For the purposes of determining operating hours, the generators are regarded as having minimal start-up or shut-down times. Operational hours will be counted from the first fuel ignition. This will include the shorter periods of plant 'overlap' when redundant plant is started as a precautionary measure before final customer load is reached with the optimum/minimum number of generators.

10.2 Point Source Emissions to Sewer

The three operational datacentre sites are, and the proposed HH4 datacentre, will be connected to the municipal sewer system. Discharges to sewer are limited to sanitary effluent (sinks, toilets, cleaning water, etc.). The discharges to sewer at the datacentres are not considered to be a trade effluent discharge and monitoring of these discharges is not considered necessary.

4.9 Point Source Emissions to Water

There are no point source emissions to controlled water at the datacentres. Uncontaminated surface water runoff from the datacentres is discharged via the on-site surface water drainage system at each of the datacentre sites. This run off passes via oil interceptors prior to discharge into municipal sewer at the Campus, Maylands and HH4 datacentres, the Centro datacentre does not have any oil interceptors with surface water runoff draining directly into the municipal drainage system.

Monitoring of the surface water discharges from each datacentre is not considered necessary.

11.0 Best Available Techniques

11.1 Basis

The assessment for the implementation for Best Available Techniques (BAT) at the datacentres is based on the following:

- the latest version of the 'Data Centre FAQ Headline Approach, Draft Version 10.0 H. Tee 01/06/18 –
  Release To Industry, provided by the EA; and
- with respect to technology selection, Department of Energy & Climate Change, Developing Best Available Techniques for Combustion Plants Operating in the Balancing Market, Final Report, June 2016.

11.2 Datacentre BAT - Operating Regime

11.2.1 Planned Maintenance and Testing

During operation for planned testing/maintenance at each datacentre, the generators will each operate typically for less than 30 hours per year; this is substantially below the 50 hour per annum Datacentre BAT requirement.

In the event that electricity is not available from the local transmission network (e.g. brown- or black-out) the generators will be operated to deliver the required NTT customer load.

Whilst emergency operation (if required) would increase the total operational hours of each generator within each datacentre site, it is extremely unlikely that operation of any single generator would exceed 500 hours per annum (this being the definition of an 'emergency' unit). The operational sites have not experienced a black- or brown-out scenario of the local transmission system that has required the use of all the generators since the datacentres commenced operation. Operation of the generators in 2018 was limited in the main to testing of the engines only. A number of generators at the three existing datacentres had to be started, other than for planned testing, for the reasons as stated in Table 4-7.

The generator provision includes for a level of redundancy to the generator system such that, even in a worse case blackout scenario, whilst all generators would start up they will not operate at full capacity; the operational capacity of the generators at the time of a blackout would be dependent on extent of blackout. Should a generator fail the engine will be covered by the remaining engine/s within the suite/building (should the maximum electrical demand for that building be required).

Emergency operations are taken to include unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated only within the datacentres.

The Operator will notify the EA:

- In advance of planned outage/maintenance of the local transmission system that is expected to exceed 18 continuous hours; and
- Upon an incident of unplanned continuous outage that exceeds 18 hours.

11.2.2 Elective Electricity Generation

The generators at each datacentre will not be operated for elective electricity generation.

11.2.3 Operating Regime Time Limit

The air emissions modelling (413.05391.00002 AQA_WD1) has confirmed that operational hours of the generators for the planned maintenance and testing regime for each datacentre (refer to Table 5-4 for details)

will not result in adverse impacts on air quality. NTT will therefore not operate the generators for more than these hours per year for the purpose of planned maintenance and testing.

11.3 Datacentre BAT: Engine Selection

Diesel-fired generators have been chosen for the provision of emergency back-up energy in the event of a black- or brown out at the facility. A BAT assessment has been undertaken which compares diesel generators to other available technologies to support the chosen technology.

The following key requirements for the generators to provide emergency back-up electricity have been considered for the selected technologies:

- Start-up time;
- Reliability;
- Independence of off-system services; and
- Causing the least environmental impact.

A comparison of these technology types is presented in Table 11-1. Start up, efficiency and emissions data as stated has been obtained from a report prepared by DECC (Department of Energy & Climate Change, Developing Best Available Techniques for Combustion Plants Operating in the Balancing Market, Final Report, June 2016) unless otherwise stated. Figures are reported at oxygen reference values of 15%.

Table 11-1 Comparison of Technologies

	Combined Cycle Gas Turbines (CCGT)	Open Cycle Gas Turbines (OCGT)	Aero Derivative Gas Turbines[2]	Gas Engines	Diesel Engines
Process Description	CCGT technology uses a primary gas turbine coupled to a secondary steam turbine. Air is compressed through a rotating compressor, then mixed with fuel and combusted before being expanded through a gas turbine, converting the thermal energy into rotation of the turbine blades. Some of the mechanical energy powers the compressor, with the majority turning a generator which converts the mechanical energy to electricity.	OCGT consist of a compressor, combustion chamber and gas turbine. They differ from CCGTs in that they operate without the secondary component to recover heat. Air is fed into the compressor, pressurised and then passed to the combustion chamber where fuel is added and combusted. The hot exhaust gas turns the turbine blades and energy is converted to electricity. OCGTs can provide STOR and peaking services but not fast reserve services as during start-up thermal stresses need to be managed through a slow heating up process.	Aero Derivative Gas Turbines are similar to open cycle gas turbines, but have been derived from turbines used for aeronautical applications. As a result of the different requirements for use of gas turbines in aircraft, they are more flexible than OCGT plant, and are able to operate under wider ranges of load and start up and shut down quicker than other turbines.	A gas engine consists of a bank of fixed cylinders inside which pistons move, injecting air and fuel, compressing the mixture, igniting the mixture and then expanding the hot gas produced converting the thermal energy into rotation of a crank shaft. The engine load is adjusted by controlling the amount of gas and air injected into the cylinder, which is controlled by an automated system. A generator connected to the crank shaft of the engine converts the mechanical energy into electricity.	Diesel engines work in a similar fashion to gas engines with the key difference being that diesel fuel is injected into the cylinder after compression of the air has taken place, and automatically ignites as a result of the high temperature of the compressed air. Engines are generally rated for a continuous power output, but can exceed this by stated amounts for shorter periods of time in modes named Standby (1hr maximum) and Prime (12hr maximum). These higher power outputs come at the cost of higher emissions and greater equipment stress.

	Combined Cycle Gas Turbines (CCGT)	Open Cycle Gas Turbines (OCGT)	Aero Derivative Gas Turbines[2]	Gas Engines	Diesel Engines
	The hot turbine exhaust gases then pass through a boiler to generate steam. The steam is fed to a steam turbine which powers a second generator, producing further electricity.				
Start-Up Time[3]	1 – >3.5 hours	15 -30 minutes	As low as 1 minute	1-10 minutes	>10 minutes
Thermal Efficiency (LHV%)	58.8-60.7	38.3-39.9	35-39	35.0-45.0	35.0-37.0
Notes	The secondary steam turbine increases the start-up time of the facility, as it requires slow warming. The complexity and footprint of a combined cycle, combined with the efficiency of steam cycles only being high at relatively large capacities means that CCGT systems are only suitable for large facilities (c.100MW+)	The significant amount of heat lost in the exhaust gas makes open cycle gas turbines significantly less efficient than combined cycle systems.	As with the open-cycle gas turbine, heat loss in exhaust gases means these systems are not as efficient as other options. Certain enhancements can be added, e.g. steam injection, but these are relatively novel and difficult to apply in a non-continuous scenario.	Gas engines are proven, reliable technology and are known to perform well and emit relatively low amounts of NO_x, SO_x and particulates when compared to diesel fired engines.	Diesel engines, unabated, emit relatively high amounts of SO_2 and particulate matter as well as NO_x. The use of low sulphur fuel, catalysts and particle filters can reduce this but diesel engine emissions are considerably higher than other options.

[3] Note that this is based on typical industrial facilities.

11.3.1 Technology Selection

Gas Turbines

As per Table 11-1, CCGTs are not considered BAT for the provision of emergency/standby power. This is due to their lengthy start up times and their size limitations; the efficiency of steam cycles being relatively low at small capacity and the overall system complexity being more appropriate to larger size installations.

OCGTs have relatively high capital investment, operating and maintenance costs and lower thermal efficiencies than can be achieved by CCGTs and gas engines.

Aero derivative gas turbines can achieve suitably short start-up times of as low as one minute, however they suffer from relatively low efficiencies compared to engines and the enhancements which have recently become available to improve these are relatively novel and unproven. This is especially applicable for non-continuous operation, where steam or water injection may become a problem as a result of potential condensation within turbine sections.

Reciprocating Engines

Reciprocating engines perform well in terms of their thermal efficiencies. At the upper end of their efficiency range, gas engines have higher thermal efficiencies than diesel engines and OCGTs.

Reciprocating engines also have shorter start up times and are thus more suitable for the provision of emergency/standby power. Under standby conditions, higher emissions are produced, including NO_x, SO_2 and Particulate Matter as soot.

Gas engines benefit from lower NO_x emissions than diesel engines and can utilise gas delivered by the national gas grid, avoiding the additional transport and fuel storage issues associated with diesel systems.

Reciprocating engines fired on diesel fuel oil have a high response (i.e. low start-up duration) and good independent performance reliability due to the on-site storage of diesel fuel in sufficient quantities, which will be managed and controlled by the facility, with the option for fuel oil to be sourced from more than one supplier for delivery to the site. Diesel-fired engines do have a large number of moving parts which can be subject to failure and require regular ongoing maintenance to ensure reliability, however these moving parts can be readily obtained and replaced and are typically included as part of the service agreement with the generator vendor. Due to the number of moving parts, diesel generators when operated can be noisy and generate vibration.

When compared to gas-fired generators diesel engines produce polluting emissions to air, most notably NOx and particulate matter, which can impact local air quality if operated for prolonged periods of time.

Final Choice of Engine

From the above options, and considering all the aspects required of the plant to provide emergency/standby power for the datacentres, diesel engines have been determined as BAT on the basis that:

- These engines provide a fast response speed to the required load; as stated previously, fast start-up of standby generators for datacentres is fundamental as an almost instantaneous supply of electricity is required in the event of power loss to the site.
- The need for a reliable supply of fuel (diesel) is essential to ensure reliance, the on-site storage of sufficient quantities of diesel fuel provides the required level of independent performance reliability.
- Diesel engines have low maintenance costs and replacement parts are readily available.
-

11.4 Datacentre BAT: Emissions

The '*Data Centre FAQ Headline Approach*' specifies the BAT emissions specification for new diesel-fired reciprocating engines as 2g TA-Luft (or equivalent standard).

There are no standards specified by EA guidance for existing engines however, the existing generators at NTT do accord with the 2g TA-Luft standard and those procured for HH4 will also meet this standard.

Retrofit abatement techniques for existing installations for engine emissions such as selective non-catalytic or catalytic reduction (SNCR or SCR) are not applicable to emergency/standby plant.

NTT will report the following to the EA (annually):

- the operating hours of each engine for planned maintenance;
- the operating hours of each engine for emergency operation; and
- the amount of fuel used on an annual basis.

Given the short start-up and shutdown times for diesel engines, the generators are regarded, for the purposes of determining operating hours, as commencing operation at the first fuel ignition. This is taken to include the shorter periods of plant 'overlap' when engines provided as redundancy are started as a precautionary measure before final load is reached with the optimum/minimum number of generators.

The emissions from the site will be estimated using emissions factors, as discussed in Section 6.1.1.

11.5 Datacentre BAT: Stacks

Data Centre FAQ Headline Approach acknowledges that datacentres usually have very low profile sites and as such can have short, below roof level emission stacks and that this can impact on the efficiency of dispersion of emissions and BAT is that release stacks are vertical to aid the dispersion of emissions from the generators.

By elevating stack heights it is possible to increase the dispersion of exhaust gases as a result of mixing with the surrounding air once the plume of exhaust gases leaves the stack. Whilst this will not reduce the concentration of pollutants leaving the stack, it will result in a lower concentration at ground level – i.e. a lesser impact on the receptor. Increasing the stack height also avoids the effects of building wake and entrainment of the emissions in the locality of the emission source. The use of taller stacks does have an impact on the operation of the engine(s) as it will marginally increase the back pressure on the engine.

The reduction in ground level concentration is achieved through improved mixing with the surrounding air once the plume of exhaust gases leaves the stack. As there will be a higher mass flowrate of gases, there is a greater momentum that increases the final height of the plume after it has left the aggregated stack. This increased mixing leads to a lower concentration of pollutants at receptors.

Each generator has a dedicated stack to aid the dispersion of the engine flue gases (for further details, please see the Air Emissions Risk Assessment (413.05391.00002 AQA_WD1):

- The stack release heights for the generators at the Campus datacentre are 8.34m above ground level (agl) for 28 of the generators , 8.32magl for 2 of the generators (X1000 model) and for a more recently installed generator (Gen-21-1, KD1800E model) 19.1magl (this extends 1m above the adjacent datacentre building roofline);
- The stack release heights for the 4 generators at the Centro datacentre are 2.70magl;
- The stack release heights for the generators at the Maylands datacentre are 2.70magl for 4 generators (X1000 model) and 6.60magl for 10 generators; and
- The stack release heights for the generators at the proposed HH4 datacentre are 12.0

magl for all 32 generators.

These stacks are vertical and located on the roofs of the generator container units. For the four existing stacks at the Centro datacentre, the exit point of the stack is fitted with a hinged cover which when exhaust emissions are released lifts to allow the emissions to release to atmosphere. The vertical stacks associated with the three existing datacentres terminate below the height of the roof level and are therefore not considered to be fully BAT, one exception is the stack for the more recently installed generator Gen-21-1 which extends to 1m above the height of the adjacent datacentre building; the stacks at the HH4 datacentre will terminate just below the roof height level.

The AERA has taken into account the profiles and heights of all the stacks and building downwash impacts at the three existing datacentre sites and the proposed HH4 datacentre and has concluded that:

- For planned maintenance and testing there will not be significant impacts on air quality;
- For the 500 'electrical grid outage' operational hours NOx emissions would result in impacts on air quality and as such on local sensitive receptors (as identified in the AERA)).

Further air emissions controls are not considered necessary as, given the very low probability of emergency operation at the datacentres, the overall environmental risk is not considered to be significant[24].

11.6 Datacentre BAT: Electrical System Reliability

Sections 4.6 and 4.7 provide a description of the on-site electricity supply system for each datacentre which has been implemented to service the 'customer load' that, in addition to the generators, incorporates physical connections to the local transmission network (to allow for the failure of any single connection).

The system for each datacentre provides significant protection against the failure of (or fluctuation in) the electrical supply to the site, before it would become necessary to start the generators.

NTT, for all three existing datacentres, is certified under ISO/IEC 27001:2013 that specifies the requirements for establishing, implementing, maintaining and continually improving an information security management system. NTT will seek ISO/IEC 27001 certification for HH4 once operational.

In 2018, on the whole operation of the generators at the three existing datacentres was limited to maintenance and testing; operation was required for a number of unplanned events as summarised in *Table 4.7 Unplanned Generator Maintenance*, however NTT ensured that this operational time was minimised in order to avoid the unnecessary use of diesel and the generation of emissions to air.

11.7 Datacentre BAT: Air Quality Emergency Action Plan

NTT will develop an Air Quality Emergency Action Plan (AQEAP). The AQEAP will detail the management actions to be taken in the event of an emergency outage that could result in the prolonged usage of the generators which could potentially result in adverse impacts on local air quality.

NTT will liaise with the Local Authority and the Environment Agency to agree actions to be taken in the event of a prolonged outage situation (>18 hours) and a finalised plan will be incorporated into the site's environmental management system.

NTT will maintain open lines of communication with the Local Authority, particularly to manage any risks that may be identified in the future as becoming significant threats to the local air quality, for example:

[2] See Air Emissions Risk Assessment (SLR Ref: 413.05391.00002 AQA_WD1) and Environmental Risk Assessment (SLR Ref: 413.05391.00002 ERA

- Identification of new emissions sources (cumulative impacts);
- Prior notification of full in-service tests; and
- Potential for future site expansion.

11.8 Datacentre BAT: Fuel Storage

Diesel is stored at the Maylands and Centro datacentres in bulk above ground tanks; there is no bulk storage of diesel fuel at the Campus datacentre. Additionally, each generator at all three datacentres has a belly tank which holds diesel for supply to individual generators.

Campus

The generator containment units at the Campus datacentre are located within a dedicated Plant Area which is hard surfaced with concrete and provided with security fencing which restricts access to authorised personnel only. The generator containment units are raised approximately 1.5m off ground level on concrete plinths which acts to protect the container units from vehicular damage. Steel access steps and walkways are provided to enable personnel to gain access to the containers.

Maylands

The generator containment units and the two bulk diesel storage tanks at the Maylands datacentre are located within secured fenced areas which restrict access to authorised personnel only; this fencing also acts to protect the container units and bulk storage tanks from vehicular damage.

Centro

The four generator containment units and the above ground diesel bulk storage tank at the Centro datacentre are located in the yard area. The generator container units are raised approximately 1.5m above ground level on a concrete plinth; steel access steps and walkways are provided to enable personnel to gain access to the containers. Vehicular access is limited in the main to the fill point cabinet at one end of the bulk tank; the eastern boundary of the site and the positioning of the generator containment units (as can be seen on Drawing 002B) act to prevent vehicular access to all other sides of the tank thus minimising the risk of vehicular damage to the bulk tank.

HH4

The fuel storage arrangements for HH4 will be the same as those for the existing Campus datacentre.

The generator containment units at the HH4 datacentre will be located within a dedicated Plant Area which will be hard surfaced with concrete and provided with security fencing which restricts access to authorised personnel only.

The generator containment units will be raised off ground level on concrete plinths or located within steel fenced areas to which vehicular access is not permitted, all of which will act to protect the container units from vehicular damage. For raised container units, steel access steps and walkways will be provided to enable personnel to gain access to the containers.

The fuel storage arrangements for diesel at each datacentre are summarised below. For HH4, the storage arrangements will be the same as those detailed for Campus.

11.8.1 Generator Belly Tanks

The generators at each datacentre are housed within propriety steel container units located in the external yard areas. Beneath the floor of the container units for each generator is a belly tank, which is integral to the generator container unit, this automatically supplies diesel to the generator.

The belly tanks are bunded (110% capacity); those belly tanks at Maylands (Suite 1 generators only) and Centro datacentres are filled directly from bulk storage diesel tanks as described below. For the Maylands datacentre (with the exception of Suite 1 generators) and Campus datacentre, the belly tanks are filled directly from refuelling vehicles (the fuel being delivered by a NTT appointed fuel supplier). Fuel is delivered directly to the belly tanks via fill points which are located on the generator container units, these are positioned in lockable cabinets which are designed with drip trays.

The diesel belly tanks have the following protection measures:

- Campus Datacentre:
  - Fill points are located in a lockable cabinet provided with a drip tray designed to capture any minor spillages of oil from the fill point during delivery, which is integral to the generator container unit. The tank fill point cabinets remain locked when not in use;
  - Tank level gauge;
  - High and low level alarms connected to the BMS and the generator container units;
  - A pressure delivery over-fill prevention valve;
  - Leak detection alarms connected to the BMS;
  - The generator sets have pressure relief valves to prevent over pressurisation of diesel supplied from the belly tanks; and.
  - To minimise the risk or corrosion all pipework is painted or is constructed of corrosion resistant material.
- Maylands Datacentre:
  - For those belly tanks that are filled directly from a refuelling vehicle, the fill points are located in a lockable cabinet provided with a drip tray designed to capture any minor spillages of oil from the fill point during delivery, which is integral to the generator container unit. The tank fill point cabinets remain locked when not in use;
  - Tank level gauge;
  - A pressure delivery over-fill prevention valve to prevent over pressurisation of diesel supplied from the bulk tanks (Suite 1 generators only, the design being dictated by NTT's customer);
  - High and low level alarms connected to the BMS;
  - The generator sets have pressure relief valves to prevent over pressurisation of diesel supplied from the belly tanks; and.
  - To minimise the risk or corrosion all pipework is painted or is constructed of corrosion resistant material.
- Centro:
  - Tank level gauge;
  - High and low level alarms connected to the BMS;
  - A pressure delivery over-fill prevention valve to prevent over pressurisation of diesel supplied from the bulk tanks;
  - The generator sets have pressure relief valves to prevent over pressurisation of

diesel supplied from the belly tanks; and.

- To minimise the risk or corrosion all pipework is painted or is constructed of corrosion resistant material.

11.8.2 Bulk Storage Tanks

Maylands

Two above ground steel bulk storage tanks serve Suite 1 at the Maylands datacentre. These serve the belly tanks for the Suite 1 generators.

The bulk tanks have the following protection measures:

- Integrated secondary containment (110% containment capacity);
- The fill points are located in a lockable cabinet provided with a drip tray designed to capture any minor spillages of oil from the fill point during delivery, which is integral to the bulk tank unit;
- Level gauges connected to the BMS;
- High and low level alarms connected to the BMS;
- The delivery pipework from the bulk tanks to the generators is above ground level with a pipe-in-pipe arrangement to minimise the risk of leaks. Leak detection is provided on the delivery pipework which is connected to the site's BMS; and
- To minimise the risk or corrosion all pipework is painted or is constructed of corrosion resistant material.

Centro

Diesel fuel is stored in an above ground steel bulk storage tank which serves the belly tanks for the four generators. The bulk tank has the following protection measures:

- Integrated secondary containment (110% containment capacity);
- The fill point is located in a lockable cabinet provided with a drip tray designed to capture any minor spillages of oil from the fill point during delivery, which is integral to the bulk tank unit;
- Level gauge connected to the BMS;
- High and low level alarms connected to the BMS;
- The delivery pipework from the bulk tank to the generators is above ground level with a pipe-in-pipe arrangement to minimise the risk of leaks. Leak detection is provided on the delivery pipework which is connected to the site's BMS; and
- To minimise the risk or corrosion all pipework is painted or is constructed of corrosion resistant material.

There is no vapour treatment or recovery on the diesel tanks. Minimal vapour is generated due to the intermittent use of diesel.

Any minor spillages of diesel will be cleaned up using proprietary spill kits, the oil contaminated materials will then be stored in suitable bunded containers in a waste storage area on the site prior to off-site disposal by a NTT approved waste contractor. Any major spillages/leaks of oil will be transferred to suitable containers/directly to road tanker for off-site treatment/disposal by a suitably licensed waste contractor. The management of spills will be undertaken in accordance with the site's spill procedures *HS12-P01 Spillage Procedure* and *HS04-TT44 Spillage*

Response.

Bulk deliveries of diesel are from NTT approved suppliers. The delivery of diesel is undertaken in accordance with procedure *HS12-P02 Diesel oil delivery procedure*. This procedure requires a NTT engineer (CFM Engineer) to escort the fuel tanker to the relevant delivery tank, to unlock and open the tank fill point, to test the tank's high-level alarm is working, only then will the fuel delivery driver be allowed to connect the tanker delivery hose and deliver the fuel. Following delivery of the fuel the tanker driver is required to ensure that the delivery hose is 'blown down' to remove any residual diesel in the hose and thus avoid fuel spillage on disconnection. The fuel supplier is required to ensure that a fuel spill kit is available on the fuel delivery vehicle.

Preventative and Predictive Maintenance

NTT has a preventative maintenance system, PPM is managed and completed by the facilities management personnel and appointed approved third party specialists, as required. The PPM system is used to inform FM personnel of plant status and any system issues. There is a central Control Room at each datacentre; Control Room personnel are responsible for the following:

- Issue of all permits for plant modification and repair (the permit issuers also control and approve Risk Analysis and Method Statements (RAMS));
- Monitoring of all fuel deliveries;
- Monitoring tank levels, flow rates, tank level alarms and leak alarms; and
- Control and monitoring of all fuel transfers between bulk diesel tanks and day tanks.

The PPM system includes the requirement for checks of storage tanks and associated infrastructure, this includes the visual inspection of the bulk tanks on day and night shifts during the plant check walk round by the Facilities Management (FM) engineer, the results of which are recorded on the 'PIPE System Check'.

The facility is manned 24 hours a day by FM personnel.

It is considered that diesel delivery and storage arrangements at the datacentres are BAT.

11.8.3 Conclusion

Based on the above discussions, it is considered that NTT operates the generators and associated diesel storage arrangements at the Hemel Hampstead datacentres in accordance with all relevant BAT.

APPENDIX 01

Key EA Correspondence

Environmental Permitting: record of pre-application discussion

Request a permit number from Permitting Support Centre

If a permit number is needed fill in this page and email to PSC central email accounts (PSC Waste , PSC Water Quality)**. If an edrm record already exists then fill in the details but do not forward to PSC.**

Name:	**Howard Tee**
Job title:	**Installation Officer**
Office:	**Alchemy - Welwyn**
Contact number:	**07876 397771**
Date:	**17/1/18**

What is the activity? **(i.e. waste, installation or water)**	Installation
Type of Application:	New (retrospective) bespoke
Existing Permit No. **(for transfers, variations or surrenders)**	No
Application Expected Date **(PAS only)**	6 months
Site Name and Address	Campus Spring Way Hemel Hempstead HP2 7TN NB see details as alternative site address to Centro or Maylands offices may be preferable for the operator. Grid: Campus 507966, 208173 Maylands 507519, 208425 Centre 508133, 208436
Permit Type	EPR 1.1A(1) a >50MWth Combustion Activity
Operator Name and Registered Office Address inc Companies House number **(if transfer we need new transferee details)**	Gyron Internet Ltd Plc 3 Centro Boundary Way, Hemel Hempstead, Herts, HP2 7SU **No. 04239332**

Record of pre-application discussion

Record operator name and address on page 1

Permit number	*If no permit number fill in page 1 to request one from P&SC*
Date/s of discussion/s:	Telcon 3/1/18 and on-site follow-up 17/1/18

Record of officer/s carrying out pre-application discussions

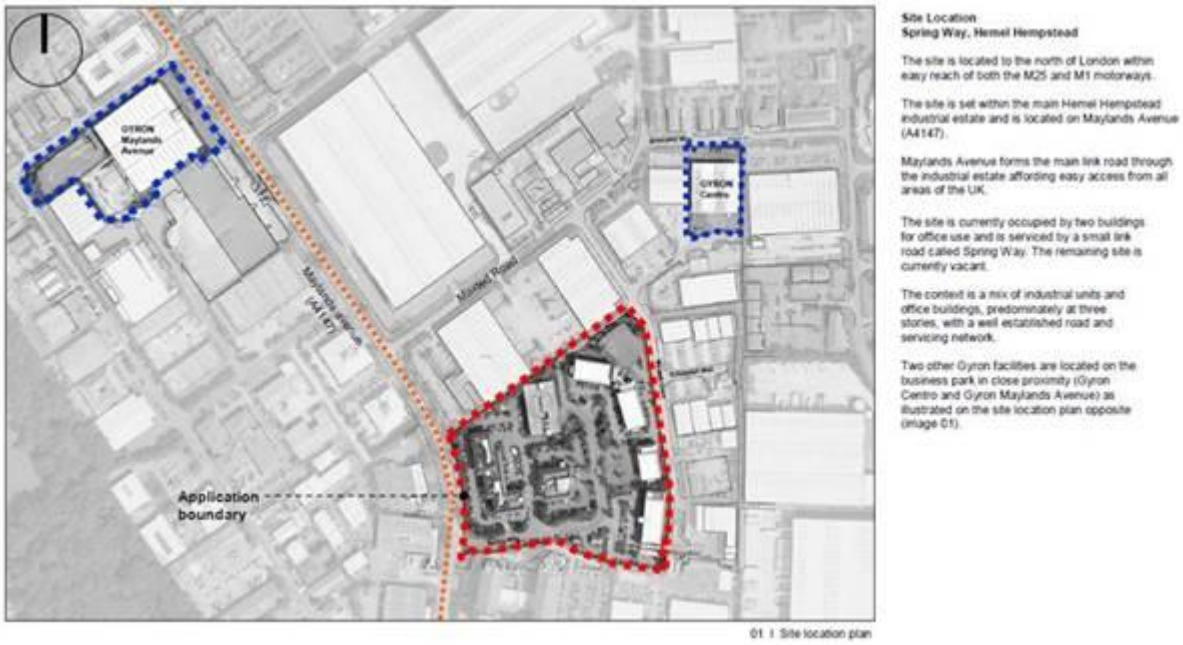
Name:
Job title:
Office:
Contact number:
Date form completed:

Name:
Job title:
Office:
Contact number:
Date form completed:

****Please ensure this document is saved to EDRM ****

Issues to discuss (See Operational instruction topic sections)

What is the boundary of the facility?



Separate boundaries for each location

Has a chargeable Standard Rule risk assessment service been requested or completed?(see page 6)

No

Is it likely to be a high public interest application:

No

Are there any confidentiality or national security issues:

Issue discussed buy unlikely

What are the key priorities for this type of facility:

See attached email for telcon prior to meeting

Confirmed (standby rating ESP – 110% of primary rating)

1. Maylands at 59MWth (top left)
2. Campus at 71MWth (expansion to about 116MWth by April 2018) (middle)
3. Centro at 10MWth (top right)

Site total 186MWth

Site does not have any additional combustion plant like boilers >1MWth.

Important:- Centro and Campus should come under one permit due to proximity but technically Maylands at 400m distance could be decided to be either on its own or as part of a set of three (based on then indicative distance in FAQ of 250m). I think a single permit is reasonable, pragmatic and the operator is happy; importantly Gyron operate the three sites as a unit in the balancing market so environmentally considering them together is best. Operator made aware of the advantage of transferring separate permits should a site be sold.

This will a Data Centre multi-site which is currently in both Triad Avoidance and Balancing Market regimes. They are investigating options to meet the MCPD Specified generators ELV of 190mg/m^3 by adding SCR but based on costs they may seek only the standby role.

It is very likely that permitting would expect the generators to meet the MCPD 190mg/m3 if export or elective generation i.e. Triad etc is retained (and justified and acceptable for impacts to AQ). With 50 generators to fit, the permitting decision process does include the 'Improvement Conditions' option; subject to justifications, determination might allow some sort of staging for the fitting of SCR (i.e. rather than expect all such to be fitted before hand).

AQ modelling by Gyron *(which looks at mass emission rates and not just emission concentrations even if <=MCPD limits with SCR are met)* may look to be assessed in three parts:
1) standby;
2) standby + Triad;
3) standby, Triad and balancing market.
The EA & DEFRA are developing 'Guidance for the dispersion modelling for oxides of nitrogen assessment from specified generators' specifically for MCPD. *It would be best to provide the EA and our AQMAU team advance sight of your modelling plan to check the approach and details are ok before doing the detailed work.*

The standby role for data centres is notionally limited to 500 'emergency' hours in IED permits see the FAQ. The added Triad or Balancing market durations may well have a separate restriction on hours, occasions or times of day (based on the modelling).

RGN02 assesses MWth input on standby rating for generators and LHV – it is possible this may be uplifted to HHV. the operator (because they do balancing market) have specified generator units on primary rating (matching physical limits on the electrical infrastructure); better engine emissions standards may thus be applicable in AQ modelling i.e. using primary emissions standard (738mg/m^3 cf standby rating of 1621mg/m^3 NOx at 15% O_2) even if only doing standby role.

Broadly speaking the generators each operate 50hours export and 25hours testing/maintenance {2 hour annual black building test and 2 hours/month, operator has their own load bank}. The operator has the ability to balance export and customer load so as to operate all the engines but only each to their full primary rating, which in the case of Campus is 23MWelec (estimated 65MWth). Each generator pairing has its own export transformer.

The site is basically a 2n arrangement with 2 or three generators per hall. All generators run to the load (customer + export) i.e. redundant n unit does not back off and stop.

Any other issues discussed:

List them and summarise the discussion (go onto additional pages if necessary)

We went through the Data Centre FAQ.

Fuel Oil is stored in individual tanks for each generator – BAT for deliveries and bunding is part of the permitting. Storage provision is 72 hours – deliveries could extend this.

Noise covered in local planning – units appeared to be fully containerized - 87db(A) and located in a central location acting as shielding.

The stacks were short and below building roof height – thermal uplift for dispersion was provided from the engine cooling. We expect BAT justification in permitting for dispersion.

Discussion of Site Condition Report and subsequent GW/soil monitoring. Likely that due-diligence data available, but options for GW monitoring boreholes limited due to site arrangement. IED requires "Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil, unless such monitoring is based on a systematic appraisal of the risk of contamination."

The site has not had a grid-outage for over 7 years – providing details of reliability of the grid and multiple feeds and HV ring mains etc allows justification of the unlikely need for the standby role and peak impacts. The key risk is 18 exceedances of the hourly ambient air quality objectives (200ug/m^3).

We discussed nationally critical infrastructure and security during the permitting process. Permits do not detail data centre operations only the standby role – so broadly the address, generator emission points. Site has ISO27001.

Location	Suite	Ref	Model	MW Elec (Standby Rating)	MW Thermal	MWh/year (Export)	Hours/year (Export)	MWh/year (Customer Load)	Hours/year (Customer Load)
Maylands	1	Gen 1-1A	X1100C	0.88	2.49	0	0	2.14	22
Maylands	1	Gen 1-2A	X1100C	0.88	2.49	0	0	1.37	18.5
Maylands	1	Gen 1-1B	X1100C	0.88	2.49	0	0	2.24	20
Maylands	1	Gen 1-2B	X1100C	0.88	2.49	0	0	2.11	20
Maylands	2	Gen 2-1A	X2200C	1.76	4.98	0	0	16.76	69.5
Maylands	2	Gen 2-1B	X2200C	1.76	4.98	0	0	19.82	71.5
Maylands	3	Gen 3-1A	X2200C	1.76	4.98	0	0	30.82	78.5
Maylands	3	Gen 3-1B	X2200C	1.76	4.98	0	0	24.1	68
Maylands	4	Gen 4-1A	X2200C	1.76	4.98	0	0	50.89	101
Maylands	4	Gen 4-1B	X2200C	1.76	4.98	0	0	37.22	92.5
Maylands	5	Gen 5-1A	X2200C	1.76	4.98	0	0	21.69	77.5
Maylands	5	Gen 5-1B	X2200C	1.76	4.98	0	0	14.91	69
Maylands	6	Gen 6-1A	X2200C	1.76	4.98	0	0	14.56	67.5
Maylands	6	Gen 6-1B	X2200C	1.76	4.98	0	0	15.39	72.5
MAYLANDS	**TOTAL**			**21.12**	**59.76**	**0**	**0**	**254.02**	**848**
Centro	N/A	Gen 1	X1100C	0.88	2.49	0	0	8.17	31.5
Centro	N/A	Gen 2	X1100C	0.88	2.49	0	0	8.29	32.5
Centro	N/A	Gen 3	X1100C	0.88	2.49	0	0	12.42	47

Centro	N/A	Gen 4	X1100C	0.88	2.49	0	0	12.43	47.5
CENTRO	**TOTAL**			**3.52**	**9.96**	**0**	**0**	**41.31**	**158.5**
Campus	HA	Gen-HA	X1100C	0.88	2.49	13.81	23	2.39	17
Campus	HB	Gen-HB	X1100C	0.88	2.49	18.31	30.5	3.21	12.5
Campus	1	Gen 1-1A	X1850C	1.464	4.14	59.47	61.5	18.58	34.5
Campus	1	Gen 1-1B	X1850C	1.464	4.14	36.83	38	28.75	72.5
Campus	1	Gen 1-1C	X1850C	1.464	4.14	59	61	9.85	19
Campus	3	Gen 3-1A	X1850C	1.464	4.14	58.68	60.5	0.52	20
Campus	3	Gen 3-1B	X1850C	1.464	4.14	59.92	62	0.97	29
Campus	3	Gen 3-1C	X1850C	1.464	4.14	61.08	63	0.47	18.5
Campus	5	Gen 5-1A	X1850C	1.464	4.14	58.97	61	0.68	16
Campus	5	Gen 5-1B	X1850C	1.464	4.14	60.56	62.5	0.26	17.5
Campus	6	Gen 6-1A	X1850C	1.464	4.14	52.9	54.5	1.87	19.5
Campus	6	Gen 6-1B	X1850C	1.464	4.14	55.61	57	0.11	12.5
Campus	6	Gen 6-1C	X1850C	1.464	4.14	49.21	50.5	0.19	11.5
Campus	8	Gen 8-1A	X1850C	1.464	4.14	43.14	44.5	5.45	22.5
Campus	8	Gen 8-1B	X1850C	1.464	4.14	43.82	45.5	7.22	30.5
Campus	8	Gen 8-1C	X1850C	1.464	4.14	31.88	33	14.99	42
Campus	10	Gen 10-1A	X1850C	1.464	4.14	38.25	39.5	1.95	8
Campus	10	Gen 10-1B	X1850C	1.464	4.14	38.2	39.5	1.17	11
CAMPUS DC1	**TOTAL**			**25.184**	**71.22**	**839.64**	**887**	**98.63**	**414**
Campus	F	Gen-F	KD1800E	1.44	4.1				
Campus	11	Gen-11-1	KD1800E	1.44	4.1				
Campus	11	Gen-11-2	KD1800E	1.44	4.1				
Campus	13	Gen-13-1	KD1800E	1.44	4.1				
Campus	13	Gen-13-2	KD1800E	1.44	4.1				
Campus	15	Gen-15-1	KD1800E	1.44	4.1				
Campus	16	Gen-16-1	KD1800E	1.44	4.1				
Campus	16	Gen-16-2	KD1800E	1.44	4.1				
Campus	18	Gen-18-1	KD1800E	1.44	4.1				
Campus	18	Gen-18-2	KD1800E	1.44	4.1				
Campus	20	Gen-20-1	KD1800E	1.44	4.1				
CAMPUS DC2	**TOTAL**			**15.84**	**45.1**				
GYRON ESTATE TOTAL				**65.664**	**186.04**	**839.64**	**887**	**393.96**	**1420.5**

Emissions Standards

Engine Model	Gen Model	N0x (mg/m^3) at 5% 0_2	CO (mg/m^3) at 5% 0_2	HC (mg/m^3)	Dust (mg/m^3) at 5% 0_2	Formaldehyde(mg/m^3) (at 5% 0_2)
16V4000 G23	X2200C	<1700	<300	<150	<50	<60
16V2000 G25	X1100C	<1500	<300	<150	<20	<60
12V4000 G23	X1850C	<1700	<300	<150	<50	<60

Emissions Standards DC2 SETS (KD1800E)

	100% ESP	100% PRP	75% ESP	75% PRP	50% PRP
Power	1547	1406	1160	1055	703
Speed	1500	1500	1500	1500	1500
N0x (g/kWh)	13.1	12.8	6.4	6.3	5.6
CO (g/kWh)	0.2	0.2	0.5	0.3	0.4
HC (g/kWh)	0.02	0.03	0.03	0.03	0.05
PM (g/kWh)	0	0.01	0.03	0.02	0.05

	at 5% 0_2	at 15% 0_2	at 5% 0_2	at 15% 0_2	at 5% 0_2	at 15% 0_2	at 5% 0_2	at 15% 0_2	at 5% 0_2	at 15% 0_2
HC (mg/Nm3)	8	3	10	4	8	3	10	4	16	6
N0x (mg/Nm3)	4323	1621	4255	1596	1994	748	1969	738	1746	655
CO (mg/Nm3)	51	19	74	28	163	61	93	35	113	42
PM (mg/Nm3)	1	0	2	1	10	4	5	2	16	6

Checklist of common items to discuss (from standard and bespoke permit tables in OI)

Ref	Item	Tick
	Conservation and biodiversity pre app screening	yes
	Standard rules and risk assessment service	
	Application forms and guidance to forms – different parts for new, changes to a permit, transferring a permit and surrendering a permit.	yes
	Charges	yes
	Guidance – How to Comply, horizontal and technical guidance – where to find on web or how to get a copy.	yes
	Operator ability – management systems, technical competence and financial competence (if applicable)	yes

	Scope of facility, other permits on site, consolidation	yes
	Planning issues	
	Conservation issues	
	Confidentiality issues	yes
	Sites of high public interest	
	Installation specific issues	yes
	Waste specific issues	
	Mining waste specific issues	
	Surface water specific issues	
	Groundwater specific issues	
	Radioactive substances specific issues (NB refer to RSR officer)	

Recording time spent on pre-application discussions			
Date	**Officer name**	**Summary of information provided and issues discussed**	**Time (hours)**

Charging for pre-application discussions	Y or N	Date
Standard Rule risk assessment service form received?		
Standard Rule risk assessment service payment received?		
Pre-application time exceeds 15 hours?		
Letter sent explaining need to commence charging?		
If no, why was decision made not to charge? Provide written justification for decision.		
Operator agreement to charging received and filed?		
If no, have you stopped pre-application discussion? If not provide written justification for decision.		

From:	Tee, Howard
Sent:	03 January 2018 15:21
To:	'Scott McLauchlan'
Cc:	Henderson, John; 'jenny.smith@gyron.net'
Subject:	Telecon Hemel Data Centres with export of electricity Pre-app Gyron - EA permit

Dear Scott,

Thank you for the telecom and opportunity to discuss permitting and MCPD. I think it would be good to visit the sites, Jan Wednesday 17th am is free for me; and after that I can generate a formal "pre-app" form for the details (and then get you an application number from NPS). I will however provide an initial email below to get the ball rolling.

We broadly discussed the Hemel Sites (total about 170MWth – approx. 45 generators) which I took to have, at the standby rating:

1. Maylands at 56MWth (top left)
2. Campus at 95MWth + 10% standby rating uplift = about 110MWth by April 2018 (middle)
3. Centro at 8MWth (top right)

01 | Site location plan

The important consideration that came up was that **these data centre sites do export electricity under the balancing market**. E.g. Maylands might split its notional 13MWelec as 5MWelec to customers and 8MWelec for export line maximum. I expressed that this appeared unique for data centres in my experience (but this emphasised the basis of the EA & IED not focusing on an apparent 'customer load' output restriction as a MW limit on installed thermal input). The export may have implications regarding the 'specified generators' under MCPD; if permitting under EPR/IED is not otherwise allowing MCPD plant to be 'excluded generators' the timescales and requirements might be a lot tighter (than the old/existing MCPD plant alone with a date of nearer 1/1/24 you might be thinking) based on existing or new definition dates in the MCPD legislation specifically Tranche B (new contracts) might

be 1/10/19 or Tranche A (existing >5MWth) 1/1/19. A query I answered was that the MCPD legislation makes no mention of 'primary use' to not be a 'specified generator' - logically all sorts of diesels arrays would seek to find an alternate 'primary use' to avoid coming under MCPD – being a data centre "primarily" is only covered under 'excluded generators' for backup and <50 hours testing alone i.e. thus not voluntarily exporting electricity! It was complicated that you were bringing in new generators for expansion so each site may have Tranche A, B and completely new plant operating for electricity export.

You mentioned that you had the Slough Data Centres site, Ajax Avenue at 28MWth – this will come under the specified generators of MCPD if you wish to continue with electricity export – I do need to be a little clearer myself about MCPD permits in this case e.g. will such an application effectively fall completely within the National permitting service (NPS) process with what timescales? etc. in the first instance John Henderson manages the MCPD helpline.

It is clear to me that Campus site and Maylands site unambiguously fall under the requirement for an IED/EPR Chapter2 1.1A(1) >50MWth combustion permit. The sites are presently operating without a permit and thus technically illegally. However as discussed we can take a regulatory position that, provided a permit application is made in a timely fashion, no formal enforcement action will be undertaken at present. Please keep me informed as you assign a consultant etc and that application progress is being maintained. It is broadly a 13 week determination period so I would expect a workable deadline for us to receive an application by June 2018 (as an initial timescale for 'timely fashion').

I suggested that the permit application would almost certainly need to be split into notionally 2 parts: the absolute requirement to get the data centre standby role permitted, but seek to separately request the addition of the export of electricity. Both need justification under impacts to human health, legal ELVs and BAT etc. Something I didn't expressly mention is that the EA does not have to grant a permit; I would be less worried about the Data Centre backup, but it is conceivable that the export component is unpermittable and/or otherwise restricted significantly i.e. install SCR across all generators, periods of operation. *I know we are working on a "Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators" for MCPD but I don't think technically under IED Chapter 2 we need follow this.*

It was discussed regarding proximity, coherence and management that the 3 sites (you have our FAQ) could fall under a single permit (about 400m between Campus and Maylands is larger than the indicative distances in the FAQ but not excessively so). We both felt it advantageous to have a single application to avoid double fees, to assess the impacts as a set and to avoid a split of the generators (Centro) to potentially the tighter unambiguous MCPD timescales as it were. IED Chapter 2 permits do mean deeper impacts' assessment but equally should allow greater flexibility overall e.g. improvement condition implementation periods, less tight ELVs based on BAT (although legislated ELVS, from for example MCPD, may well be the initial baseline expectation under IED chapter 2 regardless even though technically an 'excluded generator' as it were)

Some important links for our permitting which your consultants will know all about are:

Permits: https://www.gov.uk/government/collections/environmental-permit-application-forms-for-a-new-bespoke-permit

Guidance: https://www.gov.uk/government/publications/combustion-activities-additional-guidance

We discussed OPRA and our new strategic review of charging see https://consult.environment-agency.gov.uk/engagement/environmentagency-charging-proposals-fromapril2018/. Assuming this draft proposal remains little changed you'll see that for a large combustion site the application fee would be about £19103 with £11879 annual subsistence fees. I think it now unlikely that I really need to go into OPRA given it's unlikely you'll get an application in this side of April.

When I visit the site I can discuss permits in more depth i.e. fuel oil storage, how Data Centres are regulated, emergency response plans for outages, BAT for generator emissions, standards i.e. go through the FAQ in detail; but I will need to bear in mind that we may now also need to discuss abatement and emissions monitoring too (for the export role).

You also mentioned that you were likely to be adding two new facilities coming online in 2019 at:-

1) Hemel (phase 4) about 1km from Maylands about 200MWth
2) Dagenham about 200MWth

Now would certainly be the time to start matching local planning applications with the necessary EA permits applications; permit should be in place ready and not retrospective. If permitting whether IED or MCPD is likely to impact on the installed infrastructure e.g. fit SCR and/or decide not to go for electricity export at all, then this can only really come out of the determination process (or what your consultants & experience otherwise indicate). I feel it unlikely that the phase4 at Hemel could fall under the single permit above as 1km is rather far apart.

In the first instance I think it would be informative if you could provide me a more detailed breakdown list of generators, MW th and elec size and ratings, location, emission standard, total hours used under backup/outage, total hours under export, total hours under customer load etc. Please can you also provide your hourly 2017 total export and internal generation profiles as a group – i.e. what was the whole site peak MWth usage and for how long?

Kind regards,

Howard

Howard Tee

Regulatory Officer (Combustion Sector)

Environment Agency

Alchemy

Bessemer Road

Welwyn Garden City

Hertfordshire

AL7 1HE

020847 47319 (direct)
07876 397771 (mobile)

From: Emma Fryer [mailto:Emma.Fryer@techUK.org]
Sent: 18 December 2017 11:41
To: Tee, Howard <howard.tee@environment-agency.gov.uk>; Scott McLauchlan <scott.mclauchlan@gyron.net>
Subject: EA and Gyron

Dear Howard, Scott

Emails above

Kind regards

Emma

Emma Fryer

Associate Director

See our recent data centre outputs:

Compliance: Data Centre Compliance Health-check

Activity review: Data Centre Programme Overview Q3 2017

Brexit: 2017 update to Silver Linings report (Silver Linings: The Implications of Brexit for the UK Data Centre Sector)

CCA: Report of progress against second target

Performance metrics: Data Centre Performance Metrics for Tiny Tots

Skills: Why work in a data centre?

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Sharon Abram

Subject: FW: Key regulatory Position summary 30-11-18 RE: Permitting expectations - BAT and deadlines RE: Gyron - Hemel Hampstead Generator Status/ELV Compliance

From: Tee, Howard <howard.tee@environment-agency.gov.uk>
Sent: 30 November 2018 10:55
To: Sharon Abram <sabram@slrconsulting.com>; Scott McLauchlan <scott.mclauchlan@gyron.net>
Cc: Pemberton, Emma (National Permitting Service) <emma.pemberton01@environment-agency.gov.uk>
Subject: Key regulatory Position summary 30-11-18 RE: Permitting expectations - BAT and deadlines RE: Gyron - Hemel Hampstead Generator Status/ELV Compliance

Dear Sharon and Scott,

I think your points align with our discussions.

But something it is worth mentioning is that I think we need you to get a permit passed the duly making stage soonest for our permitting risks and your business risks; because although it will probably get rather confused on BAT expectations and implementation we both need to understand as quickly as possible the overall scope of the issues particularly SCR. I did the pre-app back in January and although clearly we've progressed things we absolutely don't want this permitting process to drag on and we want it to be concluded very, very latest by the deadline of 1/10/19 for obvious reasons (>5MWth Tranche A equivalent and new Triad period being two).

It would seem to me it is unlikely that you'll get a permit application to us before end of January and 14 week determination means if all goes well end April 2019. Based on this realistic date I think we can safely say Gyron's Tranche A equivalent plant, will have got through, and benefitted from, the 2018 Triad period (Nov18/Feb19) before the EA and yourselves have concluded the BAT etc assessment and projected CBA implementation for 2019 and beyond. So on that basis I conclude it is reasonable to state:

Gyron at Hemel should not consider operation in future any new Triad, STOR, BM or demand side response operations after January 2019* for any generator which has not been evaluated through our permitting. Otherwise only standby operation as a data centre role should be considered without an EPR permit formally determined, unless (based on level-playing field Tranche B criteria) the plant is fitted with SCR (as indicated below such fitting will meet ELV requirement and probably, but doesn't guarantee, it will meet our AQ assessment). Please advise me if you envisage such new elective power operations (Tranche B equivalent after 1st Jan 19) awaiting already committed/purchased SCR to be fitted but not yet commissioned falling significantly after this date**.**
{*Should Triad not conclude by Jan 19 it may be reasonable to extend this deadline to include Feb 19 for Triad only Tranche A equivalent}.

For business planning I would also advise that if AQ assessment does indicate that the fitting of SCR or other mitigation for existing plant (Tranche A equivalent i.e. not standby role) is needed it would be extremely unlikely that the EA would allow the implementation of SCR to extend out to 1/1/24, but rather be within about year at most depending on the AQ impacts and plant emission specs e.g. SCR fitted in two stages to the worst plant first. SCR again would be needed to meet benchmark ELV irrespective of AQ impacts for non-standby plant.

I hope this is a fair summary of the key regulatory position we're in but do get back to me if you need to discuss further.

Kind regards,

Howard

Howard Tee

Regulatory Officer (Combustion Sector)
Environment Agency
Alchemy
Bessemer Road
Welwyn Garden City
Hertfordshire
AL7 1HE

020847 47319 (direct)
07876 397771 (mobile)

Paul May

From: Sharon Abram
Sent: 28 October 2019 16:03
To: Tee, Howard
Cc: Scott McLauchlan
Subject: Gyron - proposed Hemel 4 datacentre and approach to environmental permit application

Hello Howard

following on from our call last Wednesday with regard to the proposed datacentre HH4 coming on line and the approach to permitting, I have taken a look at the guiding criteria (Proximity, Coherence and Management Systems) and undertaken a screening exercise to understand if a joint application for all 4 Hemel datacentres would be the best approach or if HH4 could be a stand-alone permit application.

Looking at the **Proximity** guidance:

"*For combustion activities in the urban/commercial environment 'proximity' may be considered as immediately adjacent to (with or without fencing demarking individual buildings on a campus); or broadly seen as a road width (up to around 100m segment*) and/or uninterrupted line of sight between buildings (plan view up to around 250m*). Outlier buildings, some distance apart, can be connected by other sites closer together on the basis of 'linking' chains of proximity (i.e. all buildings do not need to be in 'proximity' with each other). The role of permitting is ultimately to prevent or minimise pollution and harm to human health, so for air quality, consideration of proximity can take account that premises share sensitive receptors or could reasonably have adverse joint impacts or conversely are so far apart as to not have in-combination effects. A final factor may be that individual buildings/premises' short term process contributions (PC) do screen out as insignificant under our H1 guide ..*"

The proposed HH4 datacentre is located circa 500m SSW of the Campus datacentre, this being the nearest datacentre to HH4, and will not be directly in line of sight of any of the three existing datacentres (a number of existing buildings and roads will exist between the datacentres). Therefore, this does not satisfy the 250m rule for Proximity. However, the datacentres do have shared receptors (please refer to the screenshot below – the locations of all 4 datacentres are included on the drawings (red line boundaries), around each of which a 500m radius is drawn – this shows that HH4, Campus and Centro share common human receptors. There are also a number of shared ecological receptors including:

1. For European/International ecological receptors, MAGIC revealed the following receptors within 10km:
    - Chilterns Beechwoods (Special Area of Conservation) 8.3km northwest

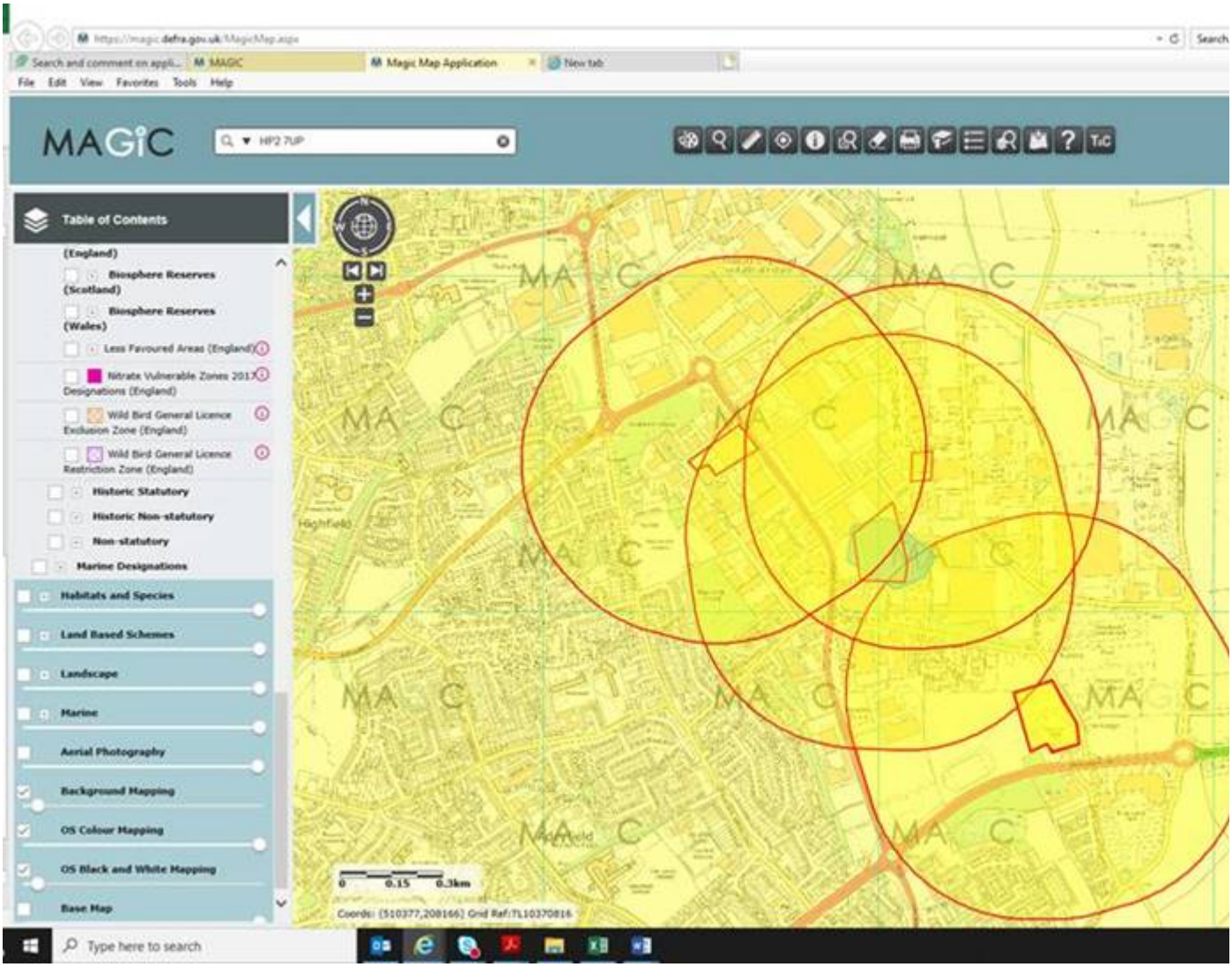
2. For national/local ecological and cultural receptors, MAGIC revealed the following receptors within 2km:
   Ancient Woodland
    - Maylands Wood 875m northwest of HH4
    - Widmore Wood 1,265m northwest of HH4
    - Nameless, 1,705m northwest of HH4
    - Blackwater Wood 1930m southeast of HH4.

   Registered Parks and Garden
    - Gorhambury, 1,600m east of HH4.

   Scheduled Monuments
    - Romano-Celtic temple complex at Wood Lane End, 280m SW of Woodwells Farm, 175m northwest of HH4.
    - High Street Green Roman Barrow, 1,405m northwest of HH4.

Listed Buildings

- North , east, south and west. Closest is 685m east ‘Breakspears’.



In light of this, the approach we will take to permitting the HH4 datacentre (which will be on line at the end of 2021), is to include this in the current Environmental Permit application for the 3 existing datacentres.

Please do let me know if you would like to discuss this further.

Many thanks and kind regards
Sharon

Please note my normal working days are Monday - Thursday.

APPENDIX 02

CCA Agreement

UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR
Agreement Dated: 14th day of May 2019
Agreement Identifier: DATC/T00015 v6
TU Identifier: DATC/T00015

THIS AGREEMENT is made on the 14th day of May 2019

BETWEEN:

(1) the Environment Agency ("the Administrator"); and

(2) the operator set out in Schedule 2 ("the Operator")

RECITALS

(A) Section 30 of and Schedule 6 to the Finance Act 2000 ("the Act") make provision for a tax known as the climate change levy ("the Levy"). The Levy is charged on the supply of taxable commodities as defined in paragraph 3 of Schedule 6 to the Finance Act 2000.

(B) Paragraphs 42(1)(ba) and 42(1)(c) of Schedule 6 to the Act provide that the amount payable by way of the Levy shall be discounted from the full rate where the supply is a reduced-rate supply. A reduced-rate supply is a taxable supply supplied to a facility specified in a certificate given by the Administrator to the Commissioners for Her Majesty's Revenue and Customs as a facility which is covered by a climate change agreement for a period specified in the certificate in accordance with paragraphs 42 to 52F of Schedule 6 to the Act.

(C) A climate change agreement is defined in paragraph 46 of Schedule 6 to the Act. It may consist of a combination of agreements that falls within paragraph 48. A combination of agreements falls within paragraph 48 if a number of conditions are satisfied. The first condition is that the combination of agreements is a combination of an umbrella agreement and an agreement that, in relation to the umbrella agreement, is an underlying agreement.

(D) This agreement is an underlying agreement in relation to an umbrella agreement, entered into for the purposes of the reduced rate of Levy. It is not intended to give rise to contractual obligations between the parties.

(E) The facility or facilities set out in Schedule 4 to this agreement are a facility or facilities to which an agreement applies.

(F) The Operator is a representative of each facility to which this agreement applies, as defined in paragraph 47(2) of Schedule 6.

AGREED TERMS

IT IS AGREED as follows:

1. INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires:

"account" means the account in the Register of a sector association or an operator;

"agreement" means an umbrella agreement or an underlying agreement;

"base year" in respect of a target unit which does not include a greenfield facility means a 12 month period agreed between an operator and the administrator, ending prior to the date of an underlying agreement, for which data is supplied by an operator to the administrator prior to the operator entering into the underlying agreement;

"base year" in respect of a target unit which does include a greenfield facility means the 12 month period starting on the date of an underlying agreement";

"buy-out fee" means the fee calculated in accordance with Rule 7;

"certification period" means, any of the following periods:

(a) 1st April 2013 to 30th June 2015;

(b) 1st July 2015 to 30th June 2017;

(c) 1st July 2017 to 30th June 2019;

(d) 1st July 2019 to 30th June 2021; or

(e) 1st July 2021 to 31st March 2023;

"charges" means charges due to the Administrator under the charging scheme;

"charging scheme" means the Climate Change Agreements Charges Scheme 2012 made by the Administrator or any replacement or revision of that charging scheme;

"emissions" means the total emissions in tCO_2 equivalent for a target period;

"EU ETS Directive" means Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emissions allowance trading within the Community and amending Council Directive 96/61/EC, as amended from time to time;[1]

"facility" means a facility within the meaning of paragraph 50(2) to (6) of Schedule 6 to the Act;

"facility number" means the unique identification number of a facility set out in schedule 6 of this Agreement;

"greenfield facility" means a facility which started to carry out the process by virtue of which it is a facility within the meaning of paragraph 50 of Schedule 6 during the 12 month period ending on the date the operator applies for the facility to be covered by an agreement"

"Novem ratio target" has the meaning set out in the technical annex;

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[1] *OJ No L 275, 25.10.03, p 32. The Directive was amended by European Parliament and Council Directives 2004/101/EC (OJ No. L 338, 13.11.2004, p 18), 2008/101/EC (OJ No L 8, 13.1.2009, p 3) and 2009/29/EC (OJ No L 140, 5.6.2009, p 63), and by Regulation (EC) No 219/2009 of the European Parliament and of the Council (OJ No L 87, 31.3.2009, p 109).

"operator" means, as the context requires, either:

a) the party to this Agreement other than the Administrator; or

b) a party to an underlying agreement other than the Administrator;

"personal information" means:

a) the address of the registered office of the sector association or operator;

b) the name, address and email address of:

i) in the case of a sector association, a person who can be contacted in respect of the sector association;

ii) in the case of an Operator, the responsible person; and

c) the name, address and email address of a person who can be contacted in respect of the facility or each facility covered by an agreement;

"the Register" means the electronic system established and operated by the Administrator for the administration of agreements;

"the Regulations" means the Climate Change Agreements (Administration) Regulations 2012 S.I. 2012/1976;

"responsible person" means an individual who is legally authorised by the Operator to enter as the Operator's agent into an underlying agreement, to agree any amendments to an underlying agreement, and to accept service of notices on behalf of the Operator;

"Rule or Rules" means the Rules for the Operation of Climate Change Agreements or any of them set out in Schedule 1 to this Agreement as varied from time to time;

"Schedule 6" means Schedule 6 to the Finance Act 2000;

"sector" means the sector consisting of facilities which are covered by the same umbrella agreement;

"sector association" means the sector association set out in Schedule 3;

"sector commitment" means the commitment set out in Schedule 5 of the umbrella agreement, as varied from time to time;

"surplus" means the amount by which the emissions have fallen below the target for any target period;

"target" means the percentage improvement in energy efficiency or carbon efficiency from the base year applicable to the target unit, set out in Schedule 6 to this Agreement, as varied from time to time;

"target period 1" means the target period from 1st January 2013 to 31st December 2014;

"target period 2" means the target period from 1st January 2015 to 31st December 2016;

"target period 3" means the target period from 1st January 2017 to 31st December 2018;

"target period 4" means the target period from 1st January 2019 to 31st December 2020.

"target unit" means the facility or group of facilities to which this Agreement applies;

"tCO_2 equivalent" means tonnes of carbon dioxide equivalent;

"technical annex" means the technical annex dated 6 March 2013 and published by the Administrator or the Secretary of State, available via the Administrator's website;

"throughput" means the measure of production, or factor related to production, used to determine the relationship between the amount of energy used by the target unit and the levels of activity of the target unit, as set out in Schedule 6 of this agreement;

"the Tribunal" means the First-tier Tribunal established under the Tribunal Courts and Enforcement Act 2007[2];

"umbrella agreement" means an agreement that is an umbrella agreement for the purposes of paragraph 48 of Schedule 6 to the Act;

"underlying agreement" means, as the context requires, either:

a) this Agreement; or

b) an agreement that is an underlying agreement for the purposes of paragraph 48 of Schedule 6 to the Act.

1.2 Other words and expressions used in this Agreement have the same meaning as they bear in Schedule 6 to the Finance Act 2000 or the Regulations.

[2] Appeals are assigned to the General Regulatory Chamber of the First-tier Tribunal by virtue of article 3(a) of the First-tier Tribunal and Upper Tribunal (Chambers) Order 2010 (S.I. 2010/2655). The Tribunal Procedure (First-tier Tribunal) (General Regulatory Chamber) Rules 2009 (S.I. 2009/1976) sets out procedural rules relating to such appeals.

2. FACILITIES TO WHICH THIS AGREEMENT APPLIES

2.1 This Agreement applies to the facility or facilities set out in Schedule 5 to this Agreement which carry out some or all of the activities set out in Schedule 4 to this Agreement.

3. TARGET

3.1 The target is set out in Schedule 6 to this Agreement, as varied from time to time.

3.2 Whether the target has been met must be determined in accordance with Rule 6.

3.3 The Secretary of State may carry out a review of the sector commitment during 2016 for the target periods 1st January 2017 to 31st December 2018 and 1st January 2019 to 31st December 2020. The target may be varied to take account of the review in accordance with the procedure set out in Rule 12.

3.4 The target may also be varied in accordance with Rules 6, 9, 10 and 11.

4. THE RULES

4.1 Schedule 1 to this Agreement which sets out the Rules for the operation of Climate Change Agreements has effect.

4.2 The Operator agrees to comply with the Rules.

5. DURATION AND TERMINATION OF THIS AGREEMENT

5.1 Subject to clause 5.2 below, this Agreement comes into force on 1 April 2013 or the date on which it is made, if later, and ends on 31 March 2023.

5.2 This Agreement may be terminated before 31 March 2023:

5.2.1 at any time by a notice served by the Operator giving at least 20 working days notice served on the Administrator; or

5.2.2 in accordance with the Regulations.

6. VARIATION OF AGREEMENT

6.1 Subject to clauses, 6.2 and 6.3 below, this Agreement may be varied at any time if agreed between the Administrator and the Operator.

6.2 The facilities to which this Agreement applies may be varied in accordance with Rules 9 and 10.

6.3 This Agreement may be varied by the Administrator at any time to take account of changes to the terms specified in the Regulations.

7. AUTHORITY

7.1 The Operator warrants that it has the power to enter into this Agreement and is authorised and has obtained all necessary approvals to enter into this Agreement on behalf of the included facilities and the responsible person warrants that he or she is authorised to sign this Agreement on behalf of the operator.

Signed on behalf of
the Environment Agency

Karl Sydney
Operations Manager (Energy Efficiency)

Signed by the responsible person on behalf of the Operator

……

Jenny Smith
Finance Director
jenny.smith@gyron.net

SCHEDULE 1

RULES FOR THE OPERATION OF CLIMATE CHANGE AGREEMENTS

1. OBLIGATIONS OF A SECTOR ASSOCIATION AND OF AN OPERATOR

1.1 An Operator and a Sector Association must:

1.1.1 supply such information to the Administrator as the Administrator may request in connection with an agreement, by the date specified in the request;

1.1.2 notify the Administrator of any changes to its personal information within 20 working days of the change;

1.1.3 co-operate with any person appointed by the Administrator to undertake an independent audit of information provided to the Administrator; and

1.1.4 comply with the provisions of the charging scheme. If a charge remains unpaid after the date on which it is due, it may be recovered by the Administrator as a civil debt.

2. OBLIGATIONS OF A SECTOR ASSOCIATION

2.1 Following the setting of the sector commitment by the Secretary of State, or following a variation of the sector commitment under Rule 12.1, a Sector Association must distribute the sector commitment between each target unit under the umbrella agreement.

3. OBLIGATIONS OF AN OPERATOR

3.1 An Operator must:

3.1.1 notify the Administrator and the Sector Association within 20 working days of the date when the Operator has reason to believe that a facility covered by an underlying agreement may not be eligible for inclusion in the underlying agreement;

3.1.2 notify the Administrator within 20 working days of becoming aware of any structural change or other change set out in the technical annex which may give rise to a variation to the target in accordance with Rule 11;

3.1.3 notify the Administrator within 20 working days of discovering any error in the data provided to the Administrator for the base year;

3.1.4 provide to the Administrator on or before 1st May following the end of a target period such information as has been requested by the

Administrator in order to determine whether progress towards meeting the target is, or is likely to be, taken to be satisfactory;

3.1.5 provide any other information requested at any time by the Administrator by the date specified in the request to enable the Administrator to determine that:

(a) the target has been met; or

(b) the Operator is complying with the terms of the underlying agreement;

3.1.6 notify the Administrator within 5 working days of the Operator or a facility in a target unit becoming a firm in difficulty, within the meaning of the European Commission Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty (2004/C 244/02);

3.1.7 provide the responsible person with full authority to carry out his or her functions, including authorisation to accept on behalf of the Operator the service of any notice; and

3.1.8 provide a current UK postal address and an operational email address of the responsible person for service of any notice.

3.2 If the Administrator enters into an underlying agreement before a target has been agreed, conditional upon the Operator providing sufficient information within a specified period in order to set the target for the target unit, the Operator must supply any data requested by the Administrator within the period specified by the Administrator on energy use and throughput of the target unit.

4. OPERATION OF THE REGISTER

4.1 Subject to Rules 4.2 and 4.3, to the extent possible, a Sector Association and an Operator must communicate with the Administrator using the Register.

4.2 Until a Sector Association and an Operator have been notified by the Administrator that the Operator is able to operate an account on its own behalf, an Operator must provide all information to the Sector Association to comply with the obligations of an Operator under an underlying agreement. The Sector Association must then operate the register on behalf of the Operator to provide the information to the Administrator.

4.3 After receiving notification from the Administrator that an Operator is able to operate an account on its own behalf, an Operator must notify the Administrator if it wishes to access its account directly to comply with its obligations under an underlying agreement. If an Operator makes such notification, the Operator must then operate the Register on its own behalf in order to comply with its obligations under an underlying agreement. If an Operator does not make such notification, the Operator must continue to provide all information to the Sector Association to comply with the obligations of an Operator under an underlying agreement and

the Sector Association must continue to operate the register on behalf of the Operator to provide information to the Administrator.

5. CERTIFICATION OF A FACILITY

5.1 The Administrator must certify that a facility is covered by an agreement from the signing of an underlying agreement to the end of the certification period in which the underlying agreement is signed.

5.2 The Administrator must certify that a facility is covered by an agreement for any certification period other than the certification period in which the underlying agreement is signed, where it appears to the Administrator that progress made in the immediately preceding certification period, whether under the underlying agreement or under any previous underlying agreement, towards meeting targets set for the target unit is, or is likely to be, satisfactory.

5.3 For the purposes of this Rule, progress made in the immediately preceding certification period towards meeting targets set for the target unit is, or is likely to be satisfactory only where condition 1 and condition 2 are satisfied.

5.4 Condition 1 is that:

5.4.1 the target set for the target unit for the relevant target period is met, in accordance with Rule 6; or

5.4.2 if the target set for the target unit has not been met, the target unit has paid the buy-out fee in accordance with Rule 7.

5.5 Condition 2 is that obligations imposed under or by virtue of regulations made for the purpose of implementing the EU ETS Directive have been complied with in respect of each facility comprising the target unit.

5.6 If:

5.6.1 a target unit has failed to meet its target in accordance with Rule 6 and the Operator has failed to pay the buy-out fee in accordance with Rule 7;

5.6.2 obligations imposed under or by virtue of regulations made for the purpose of implementing the EU ETS Directive have not been complied with in respect of any facility in a target unit; or

5.6.3 the underlying agreement or umbrella agreement is terminated in accordance with Regulation 17(1)(2), or (3) or Regulation 18,

the Administrator must not certify that the facility or facilities comprising the target unit are covered by an agreement or, where a certificate has been issued, the Administrator must vary the certificate in accordance with paragraph 45 of Schedule 6.

5.7 If:

5.7.1 a facility is not or ceases to be eligible for inclusion in an agreement; or

5.7.2 a facility is excluded from an underlying agreement under Rule 10;

the Administrator must not certify that the facility is covered by an agreement or, where a certificate has been issued, the Administrator must vary the certificate in accordance with paragraph 45 of Schedule 6.

5.8 If the information supplied to the Administrator is insufficient to determine whether:

5.8.1 the target for the target period has been met; or

5.8.2 obligations imposed under or by virtue of regulations made for the purpose of implementing the EU ETS Directive have been complied with in respect of each facility comprising the target unit;

the Administrator may refuse to certify that the facility or facilities are covered by an agreement or, where a certificate has been issued, the Administrator may vary that certificate in accordance with paragraph 45 of Schedule 6.

5.9 Subject to Rule 5.10, if the Administrator does not certify a facility or varies a certificate that has been issued, the Administrator must serve a decision notice on the Sector Association and the Operator of the facility setting out the reasons for the decision, unless a notice of termination has already been served.

5.10 The Administrator is not required to serve a decision notice where a facility has been certified under this Rule and it is subsequently discovered that the target unit for the relevant target period had not been met because of an error in the information originally supplied to the Administrator provided that:

5.10.1 the Sector Association and the Operator have satisfied the Administrator that the error was unintentional; and

5.10.2 the Operator has paid any buy-out fee in accordance with Rule 7.

6. MEETING THE TARGET

6.1 A target unit meets its target for the purpose of Rule 5 if it meets or exceeds the percentage improvement in energy efficiency or carbon efficiency from the base year set out in Schedule 6 to the underlying agreement.

6.2 The Administrator must determine whether the target has been met in accordance with the principles, methodologies and procedures set out in the technical annex.

6.3 An Operator must notify the Administrator on or before 31st January in the year following the end of a target period of any circumstances which may give rise to an adjustment to the target for the previous target period, as set out in the technical annex.

6.4 If an Operator makes a notification under Rule 6.3, the Administrator may adjust the previous target in accordance with the principles, methodologies and calculations set out in the technical annex and must serve a notice on the Operator, setting out:

6.4.1 whether or not it had decided to vary the target; and

6.4.2 any revised target (as varied) for the target unit.

7. BUY-OUT MECHANISM

7.1 If the administrator finds that the target unit has failed to meet its targets:

7.1.1 at any time in the period beginning with 1st May in the year following the end of a target period and ending immediately before the first day of the next certification period; or

7.1.2 at any other time,

the obligation to make progress towards meeting targets may instead be satisfied by the payment to the administrator of a fee in accordance with Rule 7.2.

7.2 If Rule 7.1 applies, the administrator must serve a notice on the Operator containing the following information:

7.2.1 that the target unit has failed to meet its target;

7.2.2 the fee to be paid, calculated in accordance with Rule 7.3 or Rule 7.4;

7.2.3 the date by which the fee must be paid, determined in accordance with Rule 7.5 or Rule 7.6;

7.2.4 to whom the fee must be paid;

7.2.5 how the fee is to be paid; and

7.2.6 that failure to pay the fee in accordance with the notice will result in the issue of a variation certificate in accordance with paragraph 45 of Schedule 6.

7.3 If Rule 7.1.1 applies, the amount of the fee is:

$$A \times (W - S)$$

Where:

(a) A is £12 where the finding is of a failure to meet a target for target period 1 (1st January 2013 – 31st December 2014) or target period 2 (1st January 2015 – 31st December 2016), or £14 where the finding is of a failure to meet a target for

target period 3 (1st January 2017 – 31st December 2018) or target period 4 (1st January 2019 – 31st December 2020);

(b) W in units of tCO_2 equivalent represents the amount by which the emissions for the target period exceed the target and

(c) S in units of tCO_2 equivalent represents any surplus.

7.4 If Rule 7.1.2 applies, the amount of the fee is:

$$A \times W$$

Where:

(a) A is £12 where the finding is of a failure to meet a target for target period 1 (1st January 2013 – 31st December 2014) or target period 2 (1st January 2015 – 31st December 2016), or £14 where the finding is of a failure to meet a target for target period 3 (1st January 2017 – 31st December 2018) or target period 4 (1st January 2019 – 31st December 2020);

(b) W in units of tCO_2 equivalent represents the amount by which the emissions for the target period exceed the target.

7.5 If Rule 7.1.1 applies, the fee must be paid on or before 1st July in the year in which the target unit is found to have failed to meet its targets.

7.6 If Rule 7.1.2 applies, the fee must be paid within 30 working days beginning with the date of the notice.

7.7 Payment of the fee is deemed to have been made when the person to whom the fee must be paid as specified in the notice receives full cleared funds.

7.8 For the purposes of calculating the buy-out fee under this Rule and for calculating the amount of any surplus, the Administrator must calculate the difference between the target for the target period and the actual performance achieved during the target period, where the target and the actual performance achieved are expressed in the same units, and convert any difference between the two into a quantity of carbon dioxide equivalent, expressed in units of tCO_2 equivalent, using the principles, methodologies and calculations set out in the technical annex.

8. SURPLUS

8.1 If a facility is excluded from a target unit, the Operator must determine how any surplus should be distributed between the facilities that have been excluded from the target unit and the facilities remaining in the target unit and must notify the Administrator of the redistribution within 20 working days of the facility being excluded from the target unit.

8.2 If an Operator fails to notify the Administrator of the redistribution in accordance with Rule 8.1 any surplus remains with the facilities remaining in the target unit.

8.3 If facilities join a target unit, any surplus attributable to those joining facilities may be used by the target unit as a whole.

9. VARIATION BY INCLUSION OF ADDITIONAL FACILITIES

9.1 A facility which is not already included in another umbrella agreement is eligible at any time to be considered for inclusion in an umbrella agreement where:

9.1.1 it is a facility within the meaning of paragraph 50 of Schedule 6; and

9.1.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement.

9.2 A facility which is not already included in another underlying agreement is eligible at any time to be considered for inclusion in an underlying agreement where:

9.2.1 it is a facility within the meaning of paragraph 50 of Schedule 6;

9.2.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement; and

9.2.3 it has the same operator as the operator of the underlying agreement under which it will be included, as set out in the technical annex.

9.3 A facility which is already included in another underlying agreement is eligible to be considered for inclusion in a different underlying agreement on or before 30 September 2013 where:

9.3.1 it is a facility within the meaning of paragraph 50 of Schedule 6;

9.3.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement; and

9.3.3 it has the same operator as the operator of the underlying agreement under which it will be included, as set out in the technical annex.

9.4 A facility which is already included in another underlying agreement is eligible to be considered for inclusion in a different underlying agreement on or after 1 October 2013 where:

9.4.1 it is a facility within the meaning of paragraph 50 of Schedule 6;

9.4.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement;

9.4.3 it has the same operator as the operator of the underlying agreement under which it will be included, as set out in the technical annex; and

9.4.4 there has been a change of operator of the facility.

9.5 An additional facility cannot be added to an umbrella agreement or an underlying agreement:

9.5.1 during the final target period under the umbrella agreement or the underlying agreement; or

9.5.2 during the last two months of a target period.

9.6 The administrator may vary the target of a target unit to take account of the inclusion of additional facilities following the principles, methodologies and calculations set out in the technical annex.

9.7 If a Sector Association wishes to add an additional facility to an umbrella agreement or an Operator wishes to add an additional facility to an underlying agreement the Sector Association or the Operator must notify the Administrator not less than two months before the commencement of the next target period setting out:

9.7.1 the name of the Operator of the facility;

9.7.2 the address of the facility;

9.7.3 a description of the facility;

9.7.4 such information as will enable the Administrator to reach a decision on establishing eligibility of the facility, as requested by the Administrator; and

9.7.5 such information as will enable the Administrator to determine the revised target for the target unit, as requested by the Administrator.

9.8 If the Administrator receives a notification under Rule 9.4, the Administrator must serve a notice on the Operator, copied to the Sector Association:

9.8.1 consenting to include the additional facility in an umbrella agreement or an underlying agreement and setting out whether or not it has decided to vary the target, and if so, the revised target (as varied) for the target unit;

9.8.2 refusing consent to include the facility in an umbrella agreement or an underlying agreement, giving reasons for the decision; or

9.8.3 requesting such further information as is required in order to establish eligibility of the facility or reach a decision on the target for the facility.

10. VARIATION BY EXCLUSION OF FACILITIES

10.1 If a Sector Association or an Operator wishes to exclude a facility, or part of it, from an umbrella agreement or an underlying agreement, it must notify the Administrator of the proposed exclusion, setting out:

10.1.1 the name of the Operator of the facility;

10.1.2 the facility number, or a description of the part that is to be excluded; and

10.1.3 the reason for the exclusion.

10.2 If:

10.2.1 a Sector Association or an Operator has notified the Administrator that it wishes to exclude a facility under Rule 10.1; or

10.2.2 the Administrator has terminated an agreement so far as it relates to an individual facility under Regulation 17(4),

the Administrator may vary the target to take account of the exclusion or termination following the principles, methodologies and calculations set out in the technical annex, and may request such information from the Sector Association or the Operator as it requires in order to determine the revised target.

10.3 If the Administrator decides to vary or not to vary the target under Rule 10.2, it must serve a notice on the Operator, copied to the Sector Association, setting out whether or not it has decided to vary the target, and if so the revised target (as varied) for the target unit.

11. VARIATION OF TARGETS IN OTHER CIRCUMSTANCES

11.1 The Administrator may vary the target to take account of:

11.1.1 any structural changes or other changes to the target unit which the Operator must notify to the Administrator under Rule 3.1.2;

11.1.2 any errors in the data provided to the Administrator for the base year; or

11.1.3 in respect of a target unit which has a Novem ratio target, the removal of a product produced in the target period which was produced in the base year.

following the principles, methodologies and calculations set out in the technical annex.

11.2 The Administrator may request any information of a Sector Association or an Operator as it requires in order to determine the revised target under Rule 11.1.

11.3 If the Administrator decides to vary or not to vary a target under Rule 11.1, it must serve a notice on the Operator, copied to the Sector Association, setting out:

11.3.1 whether or not it has decided to vary the target; and

11.3.2 any revised target (as varied) for the target unit.

12. VARIATION OF SECTOR COMMITMENT FOLLOWING A REVIEW

12.1 The sector commitment may be reviewed by the Secretary of State during 2016 for the target periods from 1 January 2017 to 31 December 2018 and from 1 January 2019 to 31 December 2020.

12.2 If the Sector Association and the Secretary of State agree on a variation to the sector commitment following a review, the Secretary of State may issue a direction to the Administrator that the sector commitment must be varied and then the Administrator must serve a variation notice on the Sector Association.

12.3 The variation notice must state:

12.3.1 the agreed variation; and

12.3.2 the date from which the agreed variation will take effect.

12.4 The Sector Association must, within 20 working days of receipt of a variation notice, serve notice on the Administrator setting out the proposed distribution of the revised sector commitment between each target unit under the umbrella agreement.

12.5 The Administrator must:

12.5.1 agree to the proposed distribution and vary the targets of each target unit accordingly;

12.5.2 request further information in relation to the proposed distribution; or

12.5.3 refuse the proposed distribution and propose an alternative distribution, giving reasons for the decision.

12.6 If the Sector Association and the Secretary of State fail to agree on a variation of the sector commitment, either party may refer any dispute as to matters of fact to an adjudicator for adjudication, in accordance with the procedure set out in guidance published by the Secretary of State.

12.7 The adjudicator must, on the basis of representations provided to the adjudicator and any additional information considered necessary by the adjudicator, make a finding on the disputed questions of fact and notify the parties of that finding.

12.8 The adjudicator's finding on a disputed question of fact shall be binding on the parties but it shall be for the Secretary of State and the Sector Association to agree, in the light of that finding, what variations to the sector commitment are required.

12.9 If the Secretary of State and the Sector Association fail to agree on the variation to the sector commitment, the Administrator may terminate the agreement in accordance with Regulation 18.

13. RIGHT OF APPEAL

13.1 If the Administrator:

13.1.1 decides not to certify a facility or to vary a certificate which has been issued;

13.1.2 serves a notice imposing a buy-out fee under Rule 7 upon determining that a target unit has failed to meet its target; or

13.1.3 decides to vary or not to vary the target for a target unit,

the Operator may appeal to the Tribunal against the decision.

13.2 In respect of an Operator which enters into an agreement after 1 April 2013, the Operator may appeal to the Tribunal against the target that has been set for the target unit by the Administrator.

13.3 For the purposes of Rule 13.2, the date on which notice of the decision is deemed to have been sent to the Operator is the later of the date the agreement is entered into or the date the Administrator sends notice to the Operator of the target for the target unit.

13.4 The grounds on which an Operator may appeal under Rule 13.1 and 13.2 are:

13.4.1 that the decision was based on an error of fact;

13.4.2 that the decision was wrong in law;

13.4.3 that the decision was unreasonable;

13.4.4 any other reason.

13.5 The bringing of an appeal suspends the effect of the decision pending final determination by the Tribunal of the appeal or its withdrawal.

13.6 On determining an appeal under these Rules the Tribunal must either:

13.6.1 affirm the decision;

13.6.2 quash the decision; or

13.6.3 vary the decision.

14. RECORDS AND INFORMATION

14.1 A Sector Association and an Operator must retain records of all information required to be supplied to the Administrator under these Rules.

14.2 In particular, an Operator must retain:

14.2.1 sufficient records to allow the Administrator to verify whether a target unit has met its target, including sufficient records to allow the accurate verification of throughput and annual consumption of energy of a target unit; and

14.2.2 records of energy saving actions and measures implemented during each target period.

14.3 A Sector Association and an Operator must make all records which it is required to retain under these Rules available for inspection by the Administrator or a person appointed by the Administrator and must provide copies of such records in response to a request by the date specified in the request.

14.4 All records required to be retained under these Rules must be retained throughout the duration of an agreement and for a period of four years following the termination of an agreement.

15. PUBLICATION AND DISCLOSURE OF INFORMATION

15.1 The Administrator must publish such information as required under the Regulations.

15.2 In respect of the disclosure of information other than disclosure of information required to be published under the Regulations, information supplied by a Sector Association or an Operator to the Administrator or the Secretary of State, to any agent of the Administrator or the Secretary of State, or to any person appointed by the Administrator or Secretary of State to carry out an independent audit, may be disclosed without the consent of the Sector Association or Operator, where such disclosure is:

15.2.1 by the Administrator to the Secretary of State, for any purpose connected with the functions of the Secretary of State;

15.2.2 by the Secretary of State to the Administrator, for any purpose connected with the functions of the Administrator;

15.2.3 to a relevant authority, for any purpose connected with the functions of the relevant authority;

15.2.4 to any person appointed by the Administrator or the Secretary of State to carry out an independent audit;

15.2.5 to an adjudicator appointed under these Rules;

15.2.6 to any person appointed by the Administrator or the Secretary of State to act as agent, consultant, adviser or contractor to the Administrator or the Secretary of State, in connection with the functions of the Administrator of the Secretary of State;

15.2.7 necessary for the purpose of or in connection with any legal proceedings, including the obtaining of legal advice;

15.2.8 required to comply with any Act of Parliament or subordinate legislation made under an Act of Parliament, including requests made under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004; or

15.2.9 required to meet any obligation to the European Union.

15.3 A relevant authority referred to in this Rule means:

15.3.1 either House of Parliament including any committee of either or both Houses;

15.3.2 any Government department;

15.3.3 the European Commission;

15.3.4 the Committee on Climate Change;

15.3.5 the Commissioners of Her Majesty's Revenue and Customs;

15.3.6 a person or body prescribed by or appointed under Part I of the Environmental Protection Act 1990 or regulations made under section 2 of the Pollution Prevention and Control Act 1999 or any corresponding legislation for Northern Ireland;

15.3.7 any regulator appointed under section 54 of the Competition Act 1998; or

15.3.8 any other public body, regulatory agency or government advisory body, where in the absolute discretion of the Administrator or the Secretary of State, as appropriate, the Administrator or Secretary of State considers that it would be obliged to disclose such information in response to a request for information under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004, if such a request were made.

16. COLLECTION OF CHARGES

16.1 A Sector Association may request the consent of the Administrator to collect charges due from Operators to the Administrator in respect of facilities under the charging scheme.

16.2 If a Sector Association wishes to collect charges due from an Operator to the Administrator under the charging scheme, the Sector Association may serve a notice in writing on the Administrator by the last working day in February in the calendar year in which the charges fall due.

16.3 A notice served under Rule 16.2 must specify the facilities in respect of which the Sector Association intends to collect charges, being not fewer than 50% of the facilities covered by an umbrella agreement.

16.4 Following receipt of the notice, the Administrator must:

16.4.1 consent to the Sector Association collecting charges; or

16.4.2 refuse consent to the Sector Association collecting charges, giving reasons for the decision.

16.5 If the Administrator consents to the Sector Association collecting charges the Sector Association must:

16.5.1 itemise charges separately in any invoices that it issues in respect of charges;

16.5.2 collect and remit all charges collected to the Administrator without deduction or set off by the last working day in September in each year;

16.5.3 prepare an annual report to the Administrator by the last working day in October in the year in which it has collected charges setting out which Operators it has collected charges from and which Operators have failed to pay charges due to the Sector Association.

16.6 A Sector Association must not actively pursue any outstanding charges after the last working day in September in any year in which they fall due. If a Sector Association receives charges after this date the Sector Association must accept the payment and remit this to the Environment Agency along with information identifying the Operator making the payment.

16.7 If a Sector Association fails to comply with any of its obligations under this Rule the Administrator may serve a notice on the Sector Association that consent to the Sector Association continuing to collect charges is withdrawn at the expiry of 20 working days from the date of the notice.

17. SERVICE OF NOTICES

17.1 Any notice served under these Rules must be in writing and may be served by sending it by post or electronically.

17.2 The address for the service of all notices on the Administrator is:

Postal: Environment Agency
Lutra House
Dodd Way, Off Seedlee Road
Walton Summit, Bamber Bridge,
Preston, Lancs
PR5 8BX

Electronic: CCA-operations@environment-agency.gov.uk

17.3 The address for the service of all notices on the Sector Association is the address of the person set out in Schedule 2 to the umbrella agreement.

17.4 The address for the service of all notices on the Operator is the address of the responsible person.

SCHEDULE 2

THE OPERATOR

Gyron Internet Ltd (Companies House 04239332)

Whose address for service of all notices under this Agreement is
By post:
3 Centro
Boundary Way
Hemel Hempstead
Herts
HP2 7SU
England

Administrative contact
Ms Jenny Smith

Electronically:
jenny.smith@gyron.net

SCHEDULE 3

THE SECTOR ASSOCIATION

Information Technology Telecommunications and Electronics Association (techUK)

Whose address for service of all notices under this Agreement is
By post:
10 St Bride Street
London
EC4A 4AD
England

Sector Contact
Ms. Emma Fryer

Electronically:
emma.fryer@techuk.org

THE UMBRELLA AGREEMENT

The Agreement dated 21 Sep 2017 made between the Administrator and the Sector Association.

SCHEDULE 4

ACTIVITIES UNDERTAKEN BY A FACILITY FALLING WITHIN THE SECTOR

The business activity is the leasing or licensing of a data facility which is being used as a data centre.

'data facility' means a room, or rooms sharing the same electricity supply circuit, occupied mainly or exclusively by computer equipment which is enabled to transfer data electronically, and where in respect of the room or rooms—
(a) the temperature and humidity is regulated in connection with the operation of the computer equipment;
(b) the electricity supply is at least 200kW; and
(c) electricity is supplied by a back-up electricity supply when the mains supply is interrupted.

SCHEDULE 5

FACILITIES TO WHICH THIS AGREEMENT APPLIES

Facility Identifier	Site Name & Address	EU ETS Identification
DATC/F00065	Centro 3 Centro, Boundary Way, Hemel Hempstead, Herts, HP2 7SU, England	
DATC/F00066	Maylands 150 Maylands Avenue, Hemel Hempstead, Herts, HP2 7DF, England	UK-E-IN-13343
DATC/F00067	Ajax 665/670 Ajax Avenue, Slough Trading Estate, Slough, Berkshire, SL1 4BG, England	
DATC/F00137	Campus Spring Way, Hemel Hempstead, HP2 7TN, England	

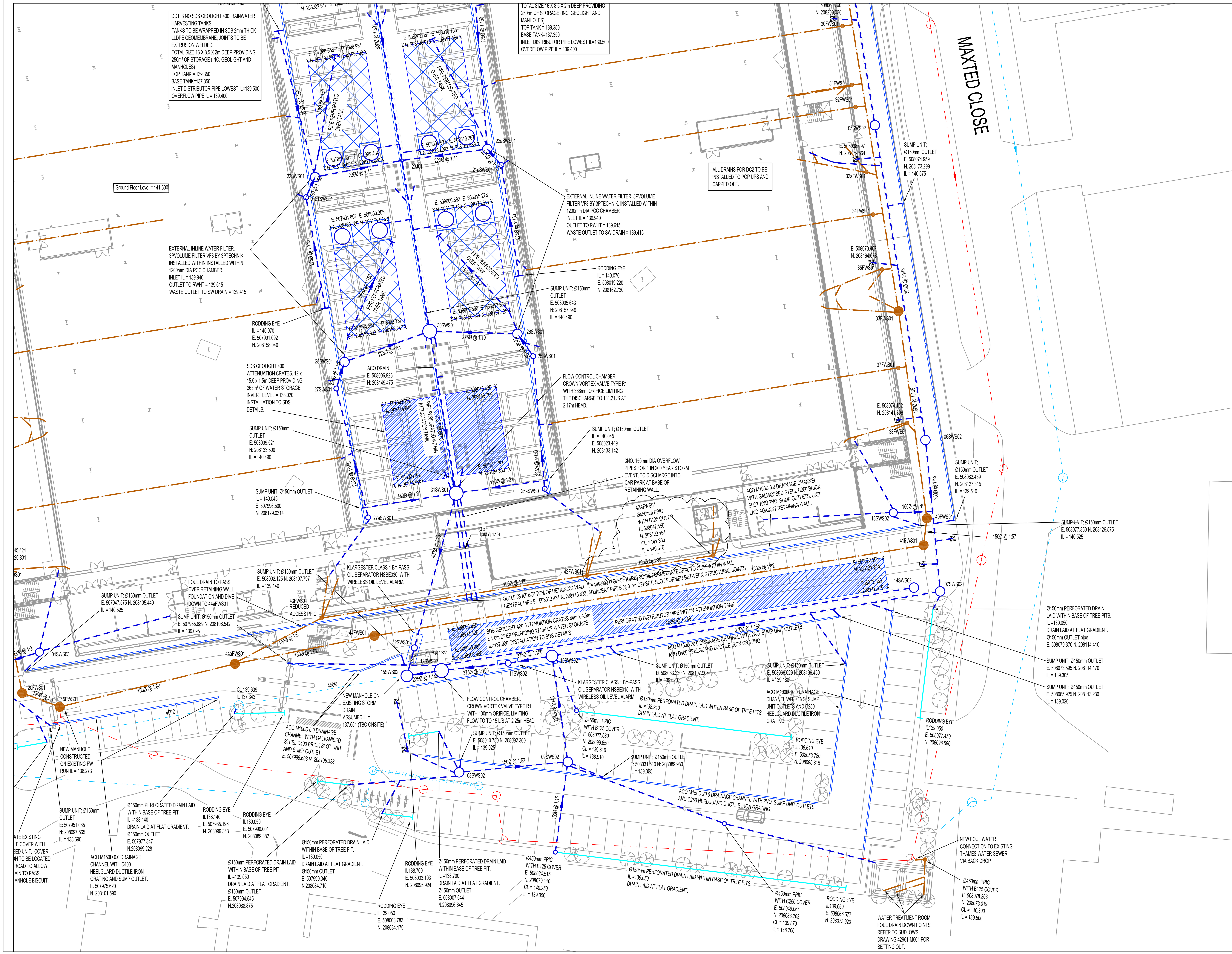
SCHEDULE 6

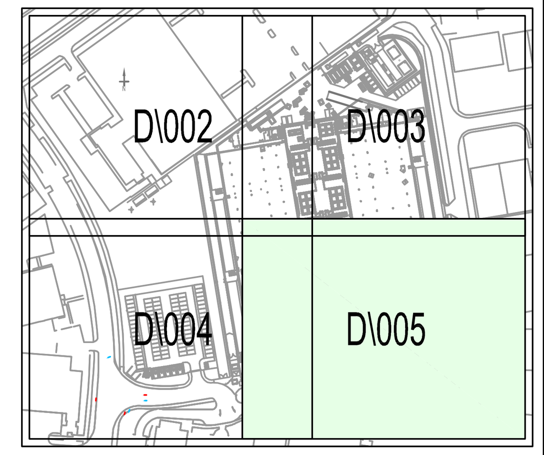
TARGET UNIT TARGETS

Target Unit Identifier	Target Period	Target Type	Throughput Unit	Baseline Throughput	Primary Energy Consumption Unit	Baseline Energy	Numerical target (Percentage reduction from base year)
DATC/T00015	TP1 (1 Jan 2013 to 31 Dec 2014)	Relative	IT energy (MWh)	23,741.115	kWh	42,246,645.184	1,763.882 (0.876%)
	TP2 (1 Jan 2015 to 31 Dec 2016)	Relative	IT energy (MWh)	38,025.286	kWh	74,107,327.8	1,790.753 (8.114%)
	TP3 (1 Jan 2017 to 31 Dec 2018)	Relative	IT energy (MWh)	38,025.286	kWh	74,107,327.8	1,687.950 (13.389%)
	TP4 (1 Jan 2019 to 31 Dec 2020)	Relative	IT energy (MWh)	38,025.286	kWh	74,107,327.8	1,664.227 (14.607%)

APPENDIX 03

Drainage Plans





This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

GENERAL NOTES

1. ALL FOUL WATER PIPES TO BE Ø100MM UNLESS STATED OTHERWISE.
2. ALL STORM WATER PIPES TO BE Ø150MM UNLESS STATED OTHERWISE.
3. ALL CONNECTIONS TO EXISTING PUBLIC SEWERS REQUIRE A SECTION 106 APPLICATION AND ARE SUBJECT TO APPROVAL FROM THAMES WATER.
4. PROPOSED DISCHARGE RATE IS 50% OF THE EXISTING SITE
5. ALL EXISTING DRAINAGE TO BE GRUBBED OR GROUTED UP, UNLESS SHOWN OTHERWISE.
6. REFER TO LANDSCAPE ARCHITECTS PLANS FOR PREFERRED MANHOLE COVER LOCATIONS.
7. ALL MANHOLE COVERS IN BLOCK PAVING AREAS TO BE RECESSED.
8. ALL EXISTING MANHOLE COVERS WITHIN PROPOSED BLOCK PAVING TO BE REINSTATED TO NEW LEVEL WITH RECESSED COVERS.

LEGEND

- SW MANHOLE
- FW MANHOLE
- PROPOSED SW PIPE
- PROPOSED FW PIPE
- EXISTING FW PIPE
- EXISTING SW PIPE
- ABANDONED FW PIPE
- ABANDONED SW PIPE
- PROPOSED SW RISING MAIN
- LINEAR DRAINAGE CHANNEL
- POROUS TARMAC WITH GRANULAR ATTENUATION LAYER (TANKED UNLESS STATED OTHERWISE)
- UNDERGROUND STORAGE CRATES (SDS LTD OR EQUIVALENT AND APPROVED)
- RAINWATER HARVESTING TANKS (SDS LTD OR EQUIVALENT AND APPROVED)
- PROPOSED ROAD GULLY
- YG PROPOSED YARD GULLY

rev	date	by	chk	description
C14	17.12.15	LWe	PCh	DC2 drainage added
C13	15.12.15	LWe	PCh	Revisions as Clouded
C12	18.09.15	LWe	PCh	Revisions as Clouded
C11	21.07.15	LWe	PCh	Gen yard drainage
C10	17.04.15	LWe	PCh	Trenches added
C9	12.01.15	LWe	PCh	RWHT added rwp drains removed
C8	24.11.14	LWe	PCh	Foul drains revised as clouded
C7	07.11.14	LWe	PCh	Revisions as clouded
C6	18.09.14	LWe	PCh	RWHTs finalised
C5	08.09.14	LWe	PCh	Foul drains finalised
C4	22.08.14	LWe	PCh	RWHT size confirmed
C3	15.08.14	LWe	PCh	Car park updated

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tel: 020 8544 0033. fax: 020 8544 0066. info@elliottwood.co.uk

project

Gyron Internet Limited

drawing title

Drainage Layout
Detailed GA Sheet 4

scale (s)	date	drawn
1:250@A1	November 2013	LWe

drawing status

CONSTRUCTION

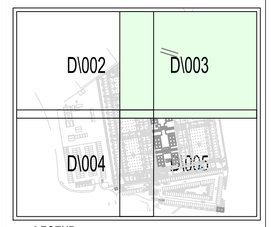
job no	drawing no	revision
213103	D/005	C14

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

GENERAL NOTES

1. ALL FOUL WATER PIPES TO BE Ø100MM UNLESS STATED OTHERWISE.
2. ALL STORM WATER PIPES TO BE Ø150MM UNLESS STATED OTHERWISE.
3. ALL CONNECTIONS TO EXISTING PUBLIC SEWERS REQUIRE A SECTION 106 APPLICATION AND ARE SUBJECT TO APPROVAL FROM THAMES WATER.
4. PROPOSED DISCHARGE RATE IS 50% OF THE EXISTING SITE
5. ALL EXISTING DRAINAGE TO BE GRUBBED OR GROUTED UP, UNLESS SHOWN OTHERWISE.
6. REFER TO LANDSCAPE ARCHITECTS PLANS FOR PREFERRED MANHOLE COVER LOCATIONS.
7. ALL MANHOLE COVERS IN BLOCK PAVING AREAS TO BE RECESSED.
8. ALL EXISTING MANHOLE COVERS WITHIN PROPOSED BLOCK PAVING TO BE REINSTATED TO NEW LEVEL WITH RECESSED COVERS.
9. SETTING OUT FOR DRAINAGE POINTS IS BY OTHERS. PROPOSALS SHOWN ARE BASED UPON ARUP / SUDLOWS DESIGNS.



LEGEND

- SW MANHOLE
- FW MANHOLE
- PROPOSED SW PIPE
- PROPOSED FW PIPE
- ABANDONED 'AS INSTALLED' FW PIPE
- EXISTING FW PIPE
- EXISTING SW PIPE
- ABANDONED FW PIPE
- ABANDONED SW PIPE
- PROPOSED SW RISING MAIN
- LINEAR DRAINAGE CHANNEL
- POROUS TARMAC WITH GRANULAR ATTENUATION LAYER (TANKED UNLESS STATED OTHERWISE)
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- RAINWATER HARVESTING TANKS (SDS LTD OR EQUIVALENT AND APPROVED)
- PROPOSED ROAD GULLY
- PROPOSED YARD GULLY

rev	date	by	chk	description
C16	07.06.16	PDa	PCh	Revisions as clouded
C15	06.05.16	PDa	PCh	DC2 laterals amended
C14	15.12.15	LWe	PCh	Revisions as Clouded
C13	18.09.15	LWe	PCh	Revisions as Clouded
C12	21.07.15	LWe	PCh	Gen yard drainage
C11	24.06.15	LWe	PCh	Pit drainage added
C10	17.04.15	LWe	PCh	Trenches added
C9	12.01.15	LWe	PCh	RWHT added rwp drains removed
C8	24.11.14	LWe	PCh	Foul drains amended as clouded
C7	07.11.14	LWe	PCh	Revisions as clouded
C6	18.09.14	LWe	PCh	RWHTs finalised
C5	08.09.14	LWe	PCh	Foul drains finalised
C4	22.08.14	LWe	PCh	RWHT size confirmed

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tel: 020 8544 0033. fax: 020 8544 0066. info@elliottwood.co.uk

project

Gyron Internet Limited

drawing title

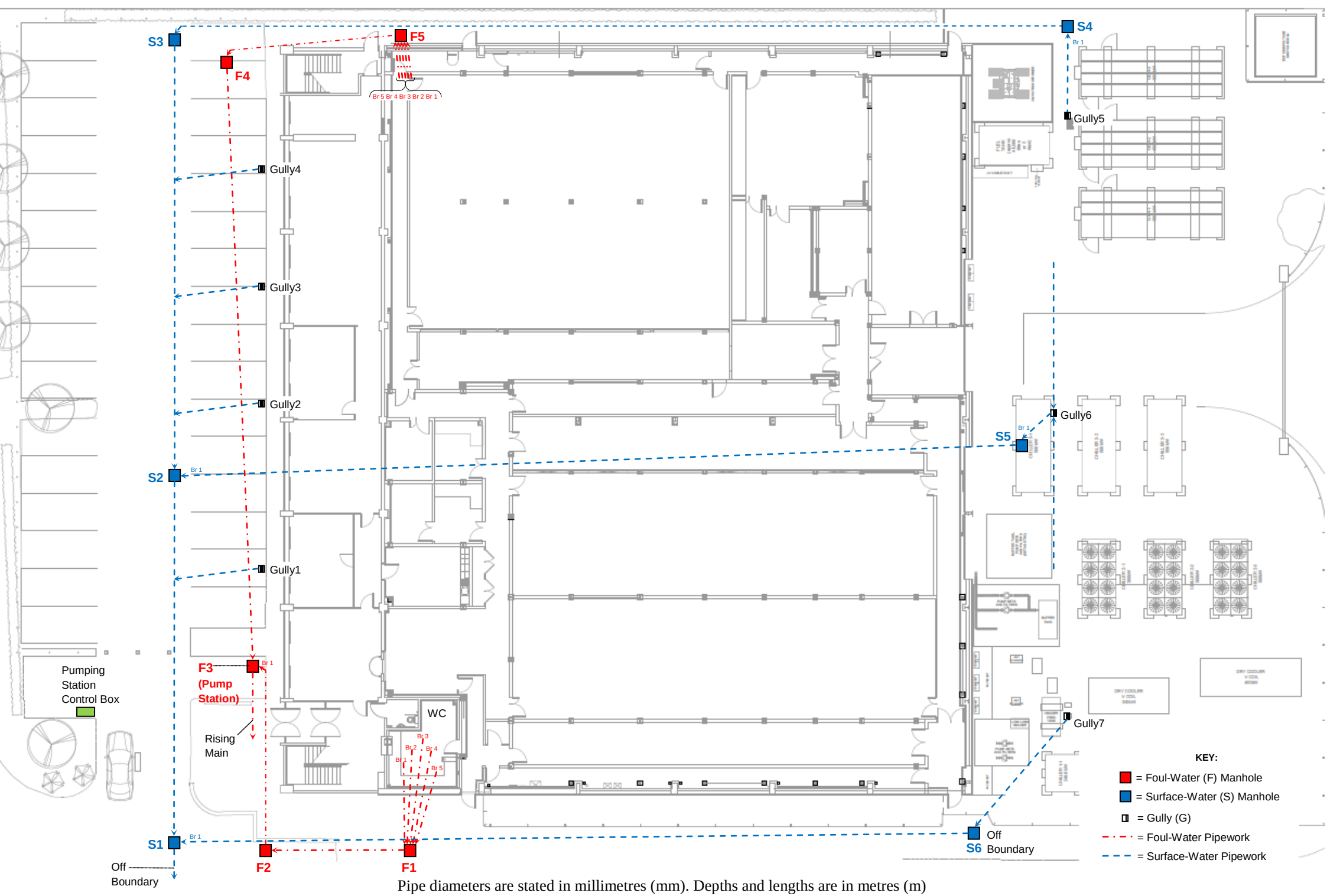
Drainage Layout
Detailed GA Sheet 2

scale (s)	date	drawn
1:250@A1	November 2013	LWe

drawing status

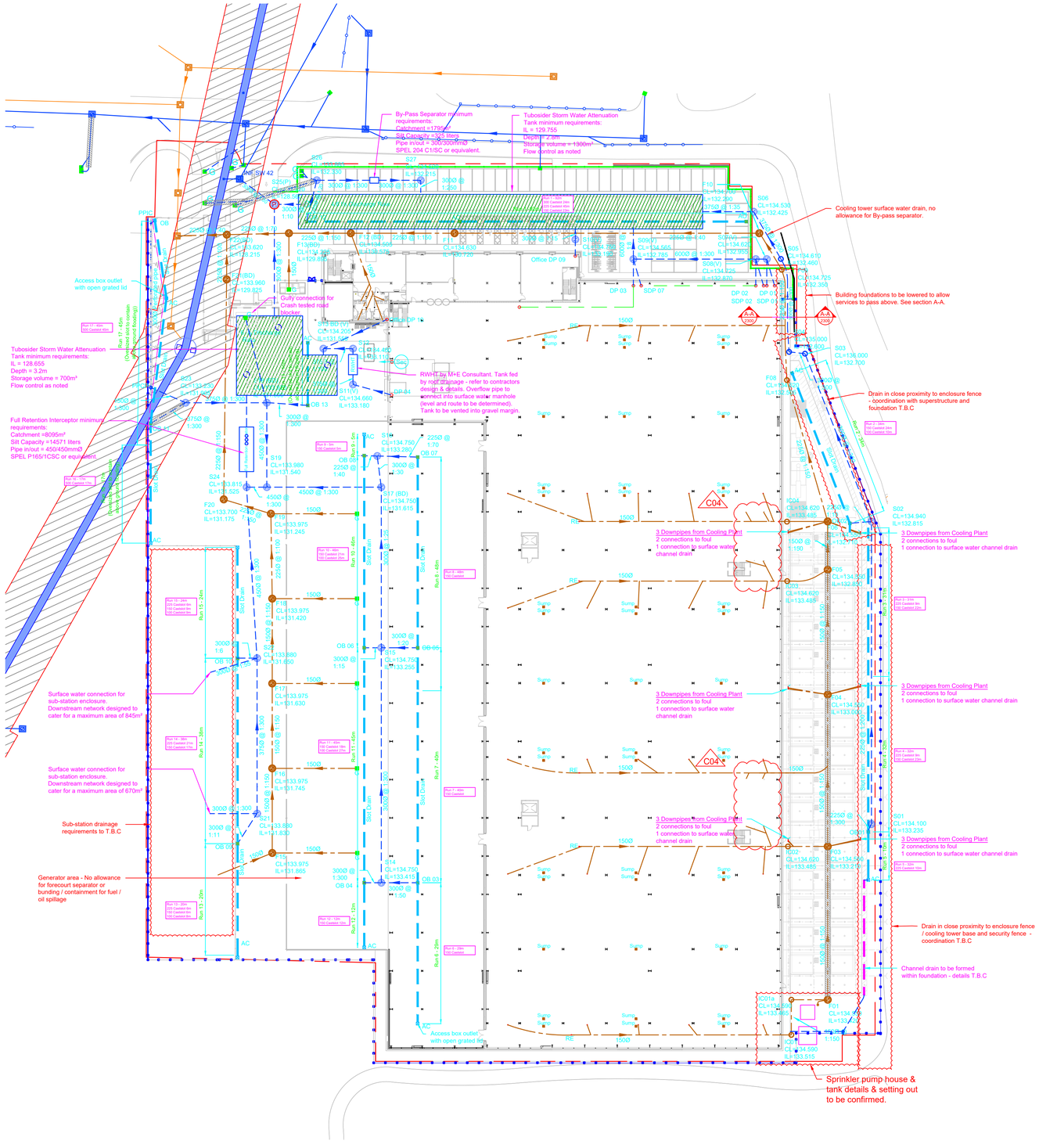
CONSTRUCTION

job no	drawing no	revision
213103	D/003	C16



Pipe diameters are stated in millimetres (mm). Depths and lengths are in metres (m)

OUTLINE DRAINAGE PLAN B – CENTRO BUILDING, MAXTED ROAD, HEMEL HEMPSTEAD



DC4 Enhanced Build Drainage Layout

Scale (1:500)

Above ground routing of foul drainage to be confirmed. Allowance to be made for venting head of each run through the roof.

All connections to existing infrastructure manholes FW08 and SW42 to be checked and existing levels verified prior to construction work commencing on site

All manholes located in service yards may require minor repositioning and alteration of cover levels to suit yard joint layout

Rainwater harvesting tank location and details to be confirmed

Sprinkler test drainage requirements to be confirmed

Process water foul drainage flows to be confirmed by the Tenant and any increase in discharge agreed with Thames Water.

Drainage runs to be coordinated with Service routes and pits etc.

Allowance to be made for all manholes/inspection chambers & access shafts located outside the security fence to have lockable manhole covers.

For Surface and Foul Water Manhole Schedule refer to RPS drawing MAYGT-RPS-DC4-XX-SH-D-2301.

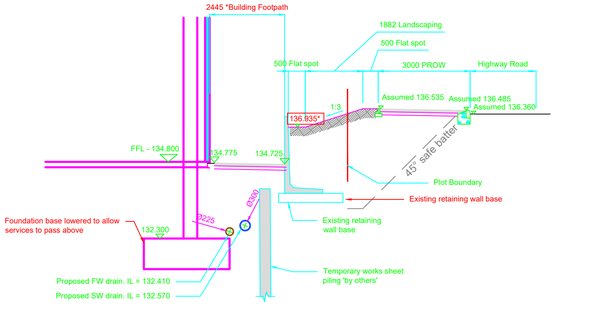
For Internal Foul Pop up locations refer to RPS drawing MAYGT-RPS-DC4-XX-DR-D-2340.

Drainage Key:

- Existing Thames Water Sewer (SW & FW)
- Existing Thames Surface Water Manhole (SW & FW)
- Infrastructure Foul Water Sewer
- Infrastructure Surface Water Sewer
- S278 Highway Surface Water Sewer
- Perforated Pipe (Porous Car Park)
- SW — Surface Water Manhole
- (CP) — Catchpit Manhole (Silt / debris trap)
- (V) — Vented Manhole cover
- (P) — Penstock Isolation Valve Chamber
- OB — Outlet box with Catchpit (Silt / debris trap)
- AC — Access chamber (for maintenance access)
- IC — Inspection Chamber
- PPIC — Polypropylene Inspection Chamber
- PPCP — Polypropylene Catch Pit
- FMH — FW Manhole
- Concrete encased pipes
- RWP — Rainwater Pipe (c/w RE)
- SDP — Syphonic Primary Downpipe
- RE — Rodding Eye
- G — Gully
- Assumed route of high level secondary syphonic drainage
- SEC — Syphonic Secondary Discharge (below ground discharge)
- H — Hydrobrake / Flow Control chamber
- Sec — Syphonic Secondary Discharge
- AC OB — Proposed Surface Water Slot Drain (OB= Outlet Box & AC= Access Chamber)
- Proposed Surface Water Channel Drain
- Existing Sewer Anticipated No Build Zone
- Hertfordshire Highway Authority highway drainage easement.
- Surface Water Drainage easement through DC4 demise

SUDS Features Key:

- Oil Interceptor (with alarm)
- Attenuation (silt / debris trap)



Section A-A

Scale (1:100)

1m SCALE 1:100

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Notes

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2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

Revision C04 Not Issued

Rev	Description	By	Ckd	Date
C04	Foul drain points in breakout area relocated to corners following comments from PPA dated 01.04.20	RB	JDC	02.04.20
C03	Foul connection for Sprinkler tank added. S14 and OB 03,04 relocated to avoid clash with new MV trench position. S24 and S19 relocated to avoid clash with CMCS.	RB	JDC	17.03.20
C02	Sumps positions added in corridor and data hall. Surface water manholes (S14,S15,& S17) and Slot drain outlet boxes (OB 03,04,05,06,) relocated to avoid clash with MV pits. Foul manhole 07 omitted.	RB	JDC	06.03.20
C01	Issued for Construction excluding items in abeyance. Surface water manhole S14,S15,S16 & S17 position updated to coordinate with MV cable access chamber. F14 omitted, foul sub-station connection taken straight into F15. Gully connection added for Crash tested road blocker. Slot drain sizes updated and confirmed to suit Gatic design.	RB	JDC	25.02.20
P05	Attenuation tank sizes updated to suit Tubosider design. Foul water manhole position below Cooling Tower base amended to coordinate with CMC pile layout (F02,F04 & F05). Foul drainage positions in Data Hall has been relocated into the corridors as requested. Surface run relocated between S17(BD) & S19 to pass below generator base. Foul water manhole F02 & F04a omitted. Surface and Foul water manhole schedule updated to suit.	RB	JDC	22.01.20
P04	Porous paving in car park removed. Slot drain / Gullys added at low point in car park. By-pass separator and S26 / S27 added. Slot drain added in yard to accommodate for the syphonic secondary discharge above ground.	RB	JDC	26.09.19
P03	Foul water manhole F04a added. Internal Condensate waste stack connections added.	RB	JDC	23.08.19
P02	Section A-A added. Foul water manhole cover level & invert level references added. Gatic slot drain sizes added.	RB	JDC	16.08.19
P01	First Issue	RB	JDC	13.08.19

MAKING COMPLEX EASY

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Client: PROLOGIS® winvic

Project: ProLogis Hemel Hempstead

Title: DC4 Surface and Foul Water Enhanced Build Drainage Layout

RPS Project Number	Scale @ A1	Date Created
NK018226-DC4	1:500	13.08.19
Task Team Manager	**Information Author**	**Task Information Manager**
MH	RB	JDC

Status: S4 (Construction)

Document Number: MAYGT-RPS-DC4-XX-DR-D-2300

Revision: C04

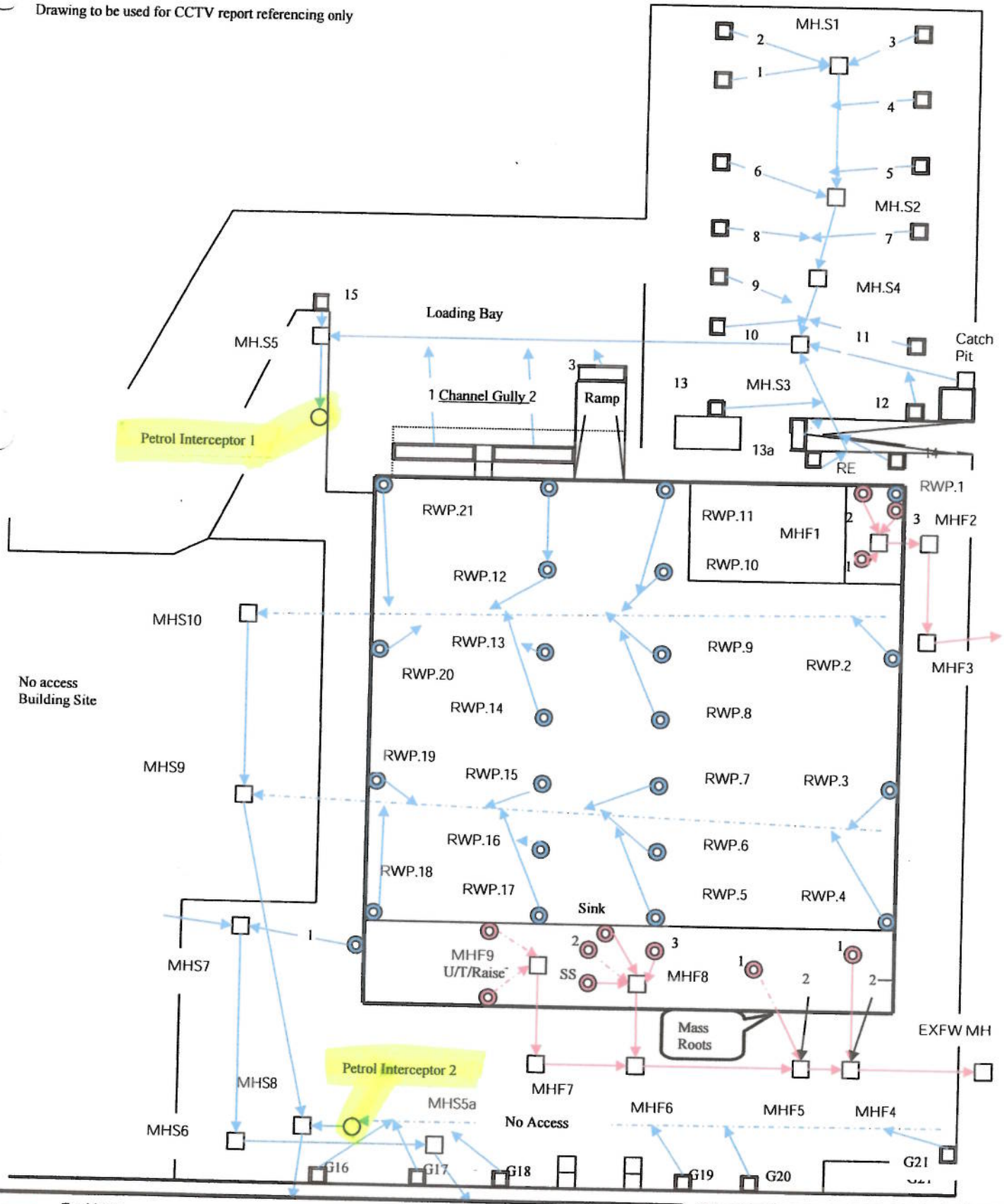
Project Code - Originator - Zone - Level - Type - Role - Drawing Number

rpsgroup.com

CLEARAWAY GROUP

Unit 6, Sunderlands Yard, Kings Langley, Herts, WD4 8JE
Tel: 01923 265796 Fax: 01923 267551
Email: surveys@clearawaydrainage.co.uk

Drawing to be used for CCTV report referencing only



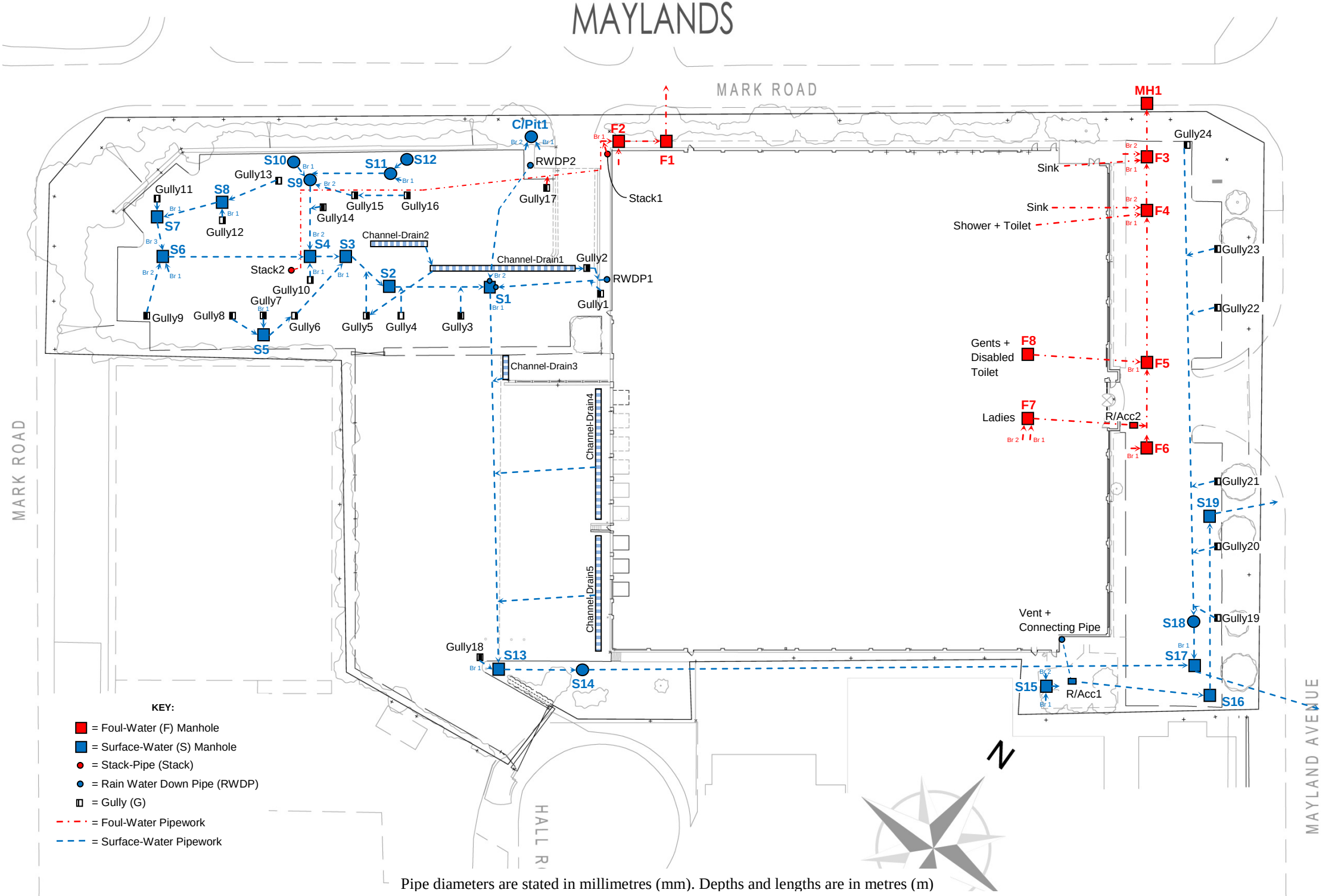
Foul Line
Foul Line – UnSurveyed (assumed route)
Surface Water Line
Surface Water Line – UnSurveyed (assumed route)

Not to scale

SVP Soil Vent Pipe
MH Manhole
RA Rodding Access Point
P/IC Petrol Interceptor
RWP Rain Water Downpipe
RG Road Gully

Client:
Orion Group

Site Address:
Unit D, Maylands Wood Estate
Hall Road, Hemel Hempstead
HP2 7BH



Pipe diameters are stated in millimetres (mm). Depths and lengths are in metres (m)

OUTLINE DRAINAGE PLAN A – 150 MAYLANDS AVENUE, HEMEL HEMPSTEAD

APPENDIX 04

Environmental Management System ISO14001 Certificate

CERTIFICATE OF REGISTRATION

This is to certify that

Gyron Internet Ltd

150 Maylands Avenue
Hemel Hempstead
Hertfordshire
HP2 7DF

012

has been audited and found to meet the requirements of standard
ISO 14001:2015 Environmental Management System

Scope of certification
The provision of secure, resilient and environmentally controlled facilities for hosting of customers business critical IT equipment.

Certificate number: 2699

Issue number: 2019-01

Certificate start date: 9 August 2019

Certificate expiry date: 8 August 2022

Date of initial certification: 9 August 2016

Karen Prendergast
Divisional Director - Certification
BM TRADA

Issuing Office: Warringtonfire Testing and Certification Limited t/a BM TRADA Chiltern House, Stocking Lane, High Wycombe, Buckinghamshire, HP14 4ND, UK
Registered Office: 10 Lower Grosvenor Place, London, United Kingdom, SW1W 0EN Reg.No. 11371436

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Multisite clients - The scope of certification shown above includes the participating sites shown in appendix A

Appendix A

The network of participating sites shown below is included in the scope of certification shown on certificate number **(2699)**

Branch	Address
Gyron Internet Ltd	Spring Way Hemel Hempstead Hertfordshire HP2 7TN
Gyron Internet Ltd	3 Centro Boundary Way Hemel Hempstead Hertfordshire HP2 7SU
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