

Nominee: JCA

Nomination title: **Kao Data London One - Design and Construction**

Kao Data appointed JCA as its preferred Design and Build contractor for the design and construction of its first data centre. The approach was to be unique to the data centre industry for such a major development.

JCA is primarily an engineering services and data centre specialist that would not traditionally undertake the construction of a new build shell and core data centre, as this would generally be undertaken by a recognised large scale construction company. By allowing the project to be engineering-led, however, the client benefitted from a shell and core design and construction that was in harmony with the overall purpose of the facility and complementary to the mechanical, electrical and ancillary infrastructure services. In addition, Kao and JCA undertook a truly collaborative, open approach to enable the free-flowing of ideas, high levels of project dynamism and problem solving to achieve Kao Data's objectives of delivering on time and on budget. Two elements in projects of this nature that are often targeted but very rarely achieved.

The objective for Kao Data was to become the first entrant into the London UK wholesale data centre market for many years. The driving force for the project was to create a product that was market leading in terms of quality, efficiency and innovation. To be able to offer state-of-the-art carrier neutral data centre space at a strategic location just outside London and in doing so form one of the largest data centre campuses in the UK. Kao Data London One was completed in December 2017. It is the first of four planned data centres that will comprise the Kao Data Centre Campus, on the 36-acre Kao Park development which is located in the Harlow Enterprise Zone on the London - Stansted - Cambridge technology corridor.

Fittingly, the new campus is constructed on the former Nortel Networks/STC site synonymous with pioneering discoveries in telecommunications. In the 1940s it was the birthplace of the wartime navigation system OBOE, invented by Alec Reeves and in 1966, Nobel prize winning engineer Sir Charles Kao and his colleague George Hockham made one of the most significant technological breakthroughs in the post war era. They pioneered the use of optical fibres as a transmission medium for long range communications and thus paved the way for the digital age and the associated data centre industry that is thriving today.



Each data centre in the £200 million Kao Data Campus is split into four halls, totalling circa 150,000 square feet of net technical space. In addition, each technology suite will be capable of supporting a 2200kW IT load, representing a total technical load of 8.8MW per data centre.

JCA has designed Kao Data London One to deliver market leading efficiency, with the innovative use of technical infrastructure and building engineering expertise to provide Kao Data with a product that provides the highest standard of efficiency, resilience, operational sustainability and connectivity.

JCA's focus on delivering the highest levels of sustainability has also resulted in Kao Data London One achieving BREEAM Excellent Design Certification.

Importantly, the design and construction of the data centre follows the innovative principles of the Open Compute Project and as such is one of the first carrier neutral wholesale data centres to do so.

The Kao Data Campus is powered by a specifically installed UK Power Networks 33kV/11kV 43.5MVA substation within the campus security demise. The 33kV utility power supplies are diverse with N+1 33/11kV transformers in the UKPN adopted substation located within the security demise of the campus. The objective of the concurrently maintainable design is to offer 100% availability with N+1 11kV power generation specific to each data centre and each generator comes complete with 48hour fuel storage.

Rack densities up to 20kW and beyond can be accommodated within the data hall which is designed around hot aisle / rack exhaust air stream segregation with flooded style supply air distribution. Kao Data London One offers the latest incarnation of Indirect Evaporative Cooling systems that are so efficient that there is no requirement for any form of mechanical cooling, which assists towards total facility PUE of 1.20 even at part load.

The campus is compliant with the ASHRAE Technical Committee 9.9 (TC9.9) Thermal Guidelines (2011 and 2015) including the commonly overlooked International Society for Automation Environmental Conditions for Process Measurement & Control Systems: Airborne Contaminants (ISA 71.04 (2013)). Kao Data views the monitoring of airborne gaseous contaminants within the technology suite as a pre-requisite for data centre operations. All major volume server OEMs stipulate the minimum environmental operating conditions required to comply with their warranties. By strictly adhering to these requirements Kao Data is able to evidence to its customers that neither the reliability of the technology assets nor the warranties will ever be put



at risk and the environment is optimised for compute performance. Having consulted with subject matter experts, we believe this approach is a first for a wholesale data centre operator.

Whilst there were multiple challenges that had to be overcome throughout the design and construction phases of the project, the overarching principle of collaborative engagement and an engineering led approach to the design and construction has enabled Kao Data to achieve its objective and the business now operates one of the most advanced data centres anywhere in the world.

Why nominee should win

- Kao Data's unique approach. Appointing JCA, an engineering services and data centre specialist, to undertake all aspects of the project including the construction to achieve seamless integration of structure and services.
- The collaborative engagement was unprecedented and should be championed by the industry to demonstrate that adversarial contracting on major developments is not the only option.
- Highly efficient design offering 8.8MW of technical cooling without any compressors, even as back-up. A first for a wholesale data centre serving the London market.
- The incorporation of airborne gaseous contaminant monitoring systems, leading the data centre industry in service offering. A first for a wholesale data centre, potentially globally.
- Designed and built to the highest standards of sustainability, achieving BREEAM Excellent Design Certification. Kao and JCA evidenced that sustainability and energy efficiency are complementary to reliability and availability.