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National Hospital For Neurology And Neurosurgery (NHNN): Electrical Mains Infrastructure Replacement

Statement of Clinical Need

The NHNN, which is located in Queen Square, London and is part of the University College London Hospitals NHS Foundation Trust (UCLH), is the UK's largest dedicated neurological and neurosurgical hospital. It has been established for circa 160 years and provides comprehensive services for the diagnosis, treatment and care of all conditions that affect the brain, spinal cord, peripheral nervous system and muscles. Some of the specific services provided include specialist neurosurgery, a brain tumour unit, the Hyper-acute Stroke Unit (HASU), an acute brain injury unit, the National Prion Clinic, a pioneering neuro-rehabilitation unit, the UK's first interventional MRI scanner, the largest specialised neurosurgical ITU and the only neuromedical ITU in the country; these services, and together with its neighbour, The Institute of Neurology, makes Queen Square a major international centre for neuro research and training.

The NHNN is the biggest single provider of neuroscience care in the UK and has 270 ward beds, 48 day care chairs and 7 theatres. These services are supported by 2,400 staff, including 237 consultants who provide care for nearly 200,000 outpatient appointments, 13,000 in-patients, 16,000 day cases and 6,000 telephone consultations per year to patients from throughout the UK and internationally.

The background to this application is that, in 2016, there was a major failure within the NHNN's Guilford Street substation, which resulted in a power outage across the Hospital, UCL's Queen Square House and 33 Queen Square, all of which obtain their electricity supply from the same utility power hub; this impelled the Trust to put in place some immediate and interim mitigation for the failure, and to commence planning for the replacement of the Hospital's electrical

infrastructure to provide a long term solution per se, to permanently address the identified issues, which in summary are as follows:

- Capacity - The load requirements on the existing substation are exceeding safe limits;
- Resilience – The substation is currently unable to provide the N+1 resilience which critical care hospitals are required to have and, as such, this means that, should one transformer fail, the other transformer would be unable to supply all areas of the hospital with power, necessitating load shedding to take place, which would affect services;
- End of life – The existing plant is at the end of its serviceable 25-30 year life and, as such, obtaining spares is difficult, if not impossible.
- Future Expansion – The existing system is unable to offer opportunities to add additional equipment supplies due to limitations in capacity and available spare ways in existing switchgear.

Indeed, further to the above and, to reinforce how critical the situation is, even after the urgent stabilising interim works were undertaken (re-balancing the load across the main switch panels), it should be noted that currently, there is so little capacity left within the NHNN's electrical infrastructure, that there is an electrical embargo in place at Hospital, preventing the following:

- The use of plug in electrical space heaters in Winter;
- The use of plug in desktop fans in the Summer;
- The use of plug in cooling units to cool areas, that are affected by the trend in increasing Summer temperatures that the UK now experiences;
- The implementation of any new schemes that add electrical load to the infrastructure, such as cooling and imaging projects. Indeed, further to this and due to the same, the following steps have had to be taken, to ensure that the NHNN continues to offer the clinical services required by today's standards:

    - The supplementary power required to operate the replacement and additional imaging equipment required by the NHNN, is temporarily being taken from the Royal London Hospital for Integrated Medicine (RLHIM), which is fed by another substation.
    - The supplementary power required to operate the additional 2 no. Angio Bi-planes is temporarily being taken from a builder's supply.
    - The Mobile MRI is also temporarily being fed from the same builder's supply.
    - The Queen Mary Wing (QMW) CT Scanner is temporarily also being supplied from the RLHIM substation supply.
    - The cooling to the QMW 2nd Floor Autonomics Department, is also being fed from the RLHIM substation supply.
    - Due to the above, the demand on the RLHIM substation network, is now also considered to have reached its maximum.
    - For the avoidance of doubt, and once the new NHNN substation is in place, the plan is to migrate all the RLHIM supplies noted above, back to the NHNN's electrical infrastructure.

As a consequence of the above, the key drivers for this project were established as follows:

- To increase electrical capacity to address the current shortfall in power provision, in addition to allowing for future growth in the same, to cater for the continued development in medicine and

equipment at the NHNN; i.e. such as in imaging, which greatly assists in early diagnosis and treatment of conditions, and which also needs additional power;
- To design the new electrical infrastructure to provide the necessary N+1 resilience that this community asset is required to have;
- To ensure that all obsolete and defective plant that is at the end of its service life, is replaced with their modern and reliable equivalents;
- To ensure that, whilst the infrastructure is upgraded, the Hospital's clinical activity is not impaired in anyway whatsoever, by maintaining the operational status of the existing substation, until the new substation can be fully energised.

From a clinical perspective and, as the incidence of neurological diseases, such as stroke and dementia rise, we need to increase the services we deliver at the same time as looking after the well-being of our staff, to continue the circa 160 years of work which have taken place at Queen Square. The services we provide at Queen Square include world-leading "first in man" clinical trials of experimental therapies for incurable neurological diseases and offer recovery and hope for people who have often tried all other avenues of care in the UK. Improving our electrical infrastructure now is vital to enable our teams to continue to deliver these services safely and effectively for the coming years.

Therefore, in conclusion, the urgent need for the NHNN, a critical community asset to have its electrical infrastructure upgraded, is clearly demonstrated by the foregoing as, without it, both patient and staff comfort, safety and the implementation of advancements in medical equipment, diagnosis and treatment will be adversely affected.

Finally, for all the reasons stated above, I trust you will look favourably upon this application.

Yours sincerely

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