

Design and Access Statement

The hospital is configured with twelve sub-stations strategically located around the hospital. The sub-stations have main and emergency power support to serve patient areas in the event of external loss of mains power from the utility supplier or an internal fault.

The hospital's maximum load demand has been recorded at 7.5MVA and Capital & Estates department is in the final stages of upgrading the existing electrical intake infrastructure from the external utility supplier to 10MVA. This is required to maintain resilience and a degree of redundancy to allow suitable maintenance to be carried out by the Trust on the system without compromising critical services and patient care.

The existing Transformer TX9 is coming to end of life and cannot accommodate new loads due to its rating operating at near full capacity to serve patient areas as well as to maintain a reliable and more efficient electrical supply for years to come.

The key objective of this project is to add a new low loss transformer, it is to be installed and commissioned on the 3rd floor roof space enclosed in an enclosure that can be easily accessed and maintained that the existing location within the plant room did not allow for.

The transformer is to be energized and will operate 24/7 and provide power to the Trust plant room equipment.

The transformer sound level will be as per ENATS 35 standard with a maximum sound pressure of 61dbA @ 1m.

Transformer noise is caused by a phenomenon called magnetostriction. In very simple terms this means that if a piece of magnetic sheet steel is magnetized it will extend itself. When the magnetization is taken away, it goes back to its original condition. A transformer is magnetically excited by an alternating voltage and current so that it becomes extended and contracted twice during a full cycle of magnetization.

To prevent noise pollution breakout, the new transformer is to be installed at 3rd floor plant room roof level within an acoustically lined/screened enclosure. The transformers elevated position and acoustic lined enclosure will prevent any horizontal sound emission impacting the adjacent areas.

Beyond this objective, the investment required will also strengthen the resilience of the power system by interlinking to another power system via cables, engineering out a number of single point failure risks.

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In summary, the key elements of this project are:-

- The installation of a new 1.25MVA power transformer and integrate into existing system.
- Upgrade existing G1/G2 generator controls arrangement and associated switchgear.
- Strengthen power resilience to the lifts, clinical wards ventilation plant, emergency lighting systems,
- Via an interlink strengthen power resilience to the lifts, operating theatre ventilation system, medical gasses air compressors.

This project will also improve and simplify the operational aspects of the power system to restore power in event of an external mains failure or an internal fault event.