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DESIGN AND ACCESS STATEMENT

For the

CSB ELECTRICAL INFRASTRUCTURE UPGRADE PROJECT

at the

ROYAL FREE HOSPITAL
NHS FOUNDATION TRUST

Pond Street
Belsize Park
London NW3




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0.0 INTRODUCTION

This “Design and Access Statement” has been prepared on behalf of Royal Free Hospital, NHS Foundation Trust.

The Hospital is an “Acute” Hospital, providing treatment of acutely ill patients of all ages to the local community in Northwest London and wider areas.

The hospital is configured with thirteen 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.

This “Design and Access Statement” is for new Engineering Services to replace the existing dated Infrastructure reaching or exceeded its design life.

An existing Electrical Power Transformer No.21 located on the roof plant area, has reached end of life and cannot accommodate new loads due to its rating operating at near full capacity to serve patient medical and research facilities areas as well as to maintain a reliable and more efficient electrical supply for years to come.

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 that the existing dated system did not allow for.

The Hospital is therefore in urgent need of upgrading the Power Transformer to meet Statutory requirements and for the current and future demands of its critical services for patient care.

This project will provide greater security of electrical power to maintain vital services through a new robust, reliable and more efficient Electrical Power Transformer system.

The impact to the public and critical areas is they will experience significant disruption in the above mentioned services should the Power transformer not be replaced with a larger suitable replacement.

1.0 SITE LOCATION

The Hospital is located in Northwest London at the following address:

Royal Free Hospital, Pond Street, London, NW3 2QG.

2.0 BUILDING USE

The building is a multi-story “Acute” Hospital, providing multidisciplinary assessment, stabilization and treatment of acutely ill patients of all ages to the local community and wider areas.

In addition, the NHS Foundation Trust is a teaching Hospital with medical research facilities.

3.0 DESCRIPTION OF EXISTING MAIN ELECTRICAL INFRASTRUCTURE

The Hospital is configured with several Electrical Sub-stations strategically located around the Hospital, served from normal electrical mains power provided by the Utility Supplier/District Network Operator UKPN (DNO).

The Hospital's electrical demand is spilt across "Non-Essential" Electrical Loads (such as general Lighting and Power for non-critical areas) and "Essential" Electrical loads serving critical patient care facilities such as Fire Alarms, Emergency Lighting, Lifts, Accident and Emergency, High Dependency Unit, Intensive Care Unit, Operating theatres and Special Care Baby Unit departments to name a few.

Electrical Power Transformer 21, provides electrical power to patient care areas, educational Medical school and critical medial research services.

However, the existing transformer has reached end of life as well as approaching its power rating and is therefore operating near maximum capacity, hence cannot meet the demands of the increasing electrical loads.

4.0 PROJECT OBJECTIVES AND SCOPE

4.1 Project Objectives

The key objective of this project is the Hospitals Capital & Estates department need to upgrade the existing end of life Medical School High Voltage Power Transformer System with a new "Super low energy loss" Power Transformer located in a position that can be easily accessed and maintained that the existing Power Transformer located on the upper roof did not allow for, as well as to meet current Statutory requirements/industry guidance to ensure the Hospitals current electrical load is served from a new robust system with capacity for expansion.

In addition, an existing patient and staff fire escape route on the lower roof has minimal escape lighting, and the project will improve the emergency escape lighting to meet current Statutory requirements/industry guidance.

Beyond this objective, this project will also engineer out a number of single points of failure risks by providing a resilient system with a degree of redundancy to allow suitable maintenance to be carried out by the Hospital on the system without compromising the Medical schools critical services and patient care.

4.2 Project Scope

The main items of the project scope are as follows:

a) Remove an old High Voltage Transformer located externally on the upper roof level of the building.
b) Removal of existing cabling from the internal plant room to the existing external High Voltage Transformer and associated equipment.
c) Installation of new support gantries to support the High Voltage Power Transformer on the lower roof level.
d) Installation of new GRP enclosure to house the High Voltage Transformer and associated equipment.
e) Installation of new cabling from the internal plant room to the new external High Voltage Transformer and associated equipment.
f) Install new Emergency lights part of a fire escape route associated with existing location.

5.0 DESIGN PROPOSALS

5.1 Design Guidance

The Department of Health/NHS England, publishes technical standards and guidance documents referred to as Health Technical Memoranda (HTM). The HTM's give comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare.

The focus of the HTM's guidance remains on healthcare-specific elements of standards, policies and up-to-date established best practice. They are applicable to new and existing sites and are for use at various stages during the whole building lifecycle.

In addition, other industry guidance such as "The Building Regulations" will be incorporated into proposals where applicable.

5.2 Design Proposals

It is proposed to replace the existing end of life Medical School High Voltage Power Transformer System with a new "super low energy loss" Power Transformer and its associated electrical cabling located on the 3rd floor roof plant area installed within a GRP enclosure.

Alternative locations in the area were considered however, due to the weight and size of the Power Transformers they could not be located in any other space available in the vicinity to site for the required plant therefore, after extensive consideration, the location indicated on the proposed drawing on the 3rd floor roof was chosen.

The location also facilitates easier access for maintenance compare with the previous transformer location to ensure the plant continues to function efficiently.

In addition, an existing fire escape route on the roof area has minimal escape lighting, and the project will utilise the new Power Transformer cabling path to install additional luminaires along the route to improve the emergency escape lighting provision for patients and staff.

5.3 Design Requirements

To prevent noise pollution breakout from new systems and changes to aesthetics of the building, the following mitigation measures shall be incorporated into the design and are as follows:

ITEM	PROJECT REQUIREMENT	DESIGN MITIGATION
1	A new upgraded Power Transformer and robust electrical system to replace the existing dated end of life system to meet the Hospital's electrical power demand for the Medical School and research facilities is required. An Eco-design Directive from the European Commission, came in to force for small and medium power transformers to save energy and reduce network losses in 2015 (since superseded with 2021 directive). The directive stipulates the maximum permissible level of losses for power transformers "Placed on The Market" through stringent efficiency and performance criteria that manufactures must design to known as Tier 2 (super low loss) transformers.	The new transformer will meet this new performance criteria to provide a more efficient use of energy consumption compared with the existing circa 1990's dated end of life transformer. This project will also improve and simplify the operational aspects of the power system to restore power in event of an internal fault event. Beyond this objective, the investment required will also strengthen the resilience of the power system by providing a means of interlinking to another power system on site via cables, engineering out single point of failure risks. The new system will be connected to the Hospitals Building Management systems and generate an alarm for abnormal power conditions i.e loss of mains supply. The new larger Power transformer will strengthen power resilience to the served areas including lifts, ventilation plant, emergency lighting systems, patient areas, medical research facilities etc.
2	The new transformer sound level and noise is caused by a phenomenon called magnetostriction. In very simple terms this means that if a piece of sheet steel is magnetized it will extend itself. When the magnetization is taken away, it goes back to its original condition. The transformer sheet steel is magnetized and de-magnetized by a continually alternating voltage and current so that the sheet steel becomes extended and contracted during the magnetization electrical cycles creating sound.	The new transformer sound level will be as per the Energy Networks association standards (ENATS 35) with a maximum sound pressure of 61dbA @ 1m. To prevent noise pollution breakout from this process, the location of the new transformer is to be installed at 3rd floor plant area roof level on a new support system within an GRP enclosure. The transformers elevated position and enclosure will minimize any horizontal sound emission that may impact the adjacent areas. In addition, there is an existing transformer at the upper 3rd floor roof which will be removed therefore the net change will be minimal.
3	Installation of new cabling from the internal plant room to the new external High Voltage Transformer and associated equipment and new Emergency lights part of a fire escape route associated with existing location.	The electrical cabling commence from the existing external dated transformer and route externally and enter the building to connect to the hospital electrical infrastructure. These cables shall be fully removed once the new transformer is in service. The new cabling is required to connect to the new externally located transformer within the new GRP enclosure and route externally at high level, fixed to the north west face of the medical school building façade as indicated in the drawings. The containment system for the cabling is of the heavy-duty galvanized type similar to the existing containment systems already installed in the vicinity. The new emergency lighting shall be installed and fixed to the new external containment system to minimize installing any additional containment and meet current emergency lighting standards.
4	The project will be executed in phases. First phase will be to install and commission the new Power Transformer. Second phase will be to put into service the Transformer to serve the current electrical loads followed by the existing transformer to be de-energised and removed from site.	To minimize the impact of the construction phase, the works will be split in to phases however the works will not impact the general public pedestrian access to the hospital as the works are confined to plant room areas. There will be a crane lift to lift and remove plant to the plant room roof however will be coordinated out of normal working hours to mitigate disruption. The Electrical installation will comply with the previously mentioned standards/guidance.

6.0 LAYOUT

The is no change of building use or alterations to the existing building footprint where the alterations increase the size of the building as the new steel gantry will be raised over an existing roof.

The layout of the Transformer and associated installation is attached to this application pack.

7.0 LANDSCAPING

There is no soft or hard landscaping proposed in connection with this application.

8.0 APPEARANCE

The main change to appearance of the building is the new GRP enclosure to be located on 3rd floor roof plant area.

The new transformer will be enclosed in a GRP for acoustic mitigation measure and for aesthetics. It is proposed that the enclosure will be in Grey (shade subject to manufactures standard) similar to other GRP enclosure on site to blend in with the existing building façade.

The new enclosure will be mainly visible from the West side and the size the new enclosure will not require any new building space as will fit within the existing footprint as seen in the plan view layout attached to this application pack.

9.0 ACCESS

Access to the 3rf floor roof area plant area will only be required during the installation and for ongoing maintenance requirements using existing access routes therefore the new equipment does not impact on public access around or within the Hospital.

Vehicular and pedestrian access to the site including access for the disabled and means of escape remains as existing.

9.1 Inclusive access

Access to the plant area will be from the existing Hospital and restricted for maintenance personnel.

Access to the Hospital will not be affected by the introduction of the new GRP enclosure.

9.2 Emergency Services Access

Emergency services access will not be impacted as the GRP enclosure will be built on the existing footprint of the building.