ANSELL + BAILEY

CRF NIHR LOW FIELD MRI

Design and Access Statement

Royal Free Hospital

Pond Street

London NM3 2QG

Royal Free London NHS Foundation Trust

July 2024

Rev 02

Royal Free London
NHS Foundation Trust

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1 DESCRIPTION OF THE PROJECT

1.1 Overview

This project involves the installation of a prefabricated cabinet unit, provided by Lamboo Medical, designed to house a Siemens Low Field MRI system and its ancillary equipment. The installation aims to enhance the hospital's research capabilities by providing advanced imaging facilities necessary for cutting-edge medical research.

The unit will be located at the corner between the West Wing and the South Wing of the tower block. The internal Finished Floor Level (FFL) of the Lamboo cabinet will be 68.870m, which is almost the same as the Ground Floor level of 68.660m, to facilitate patient flow between the main building and the cabinet.

Other works included in the project to facilitate the installation of the Lamboo unit are:

- Demolition of the existing IT services prefabricated cabinet located in the same area.
- Installation of an open canopy (roof) connecting the prefab cabinet and the main building. The canopy will protect staff and patients from the weather while moving between the main building and the prefabricated unit.
- Enabling works, including replacement and new pavement, demolition of part of the existing retaining wall, relocation of seven condensers, and connection to the hospital's Mechanical, Electrical, and Plumbing (MEP) services.

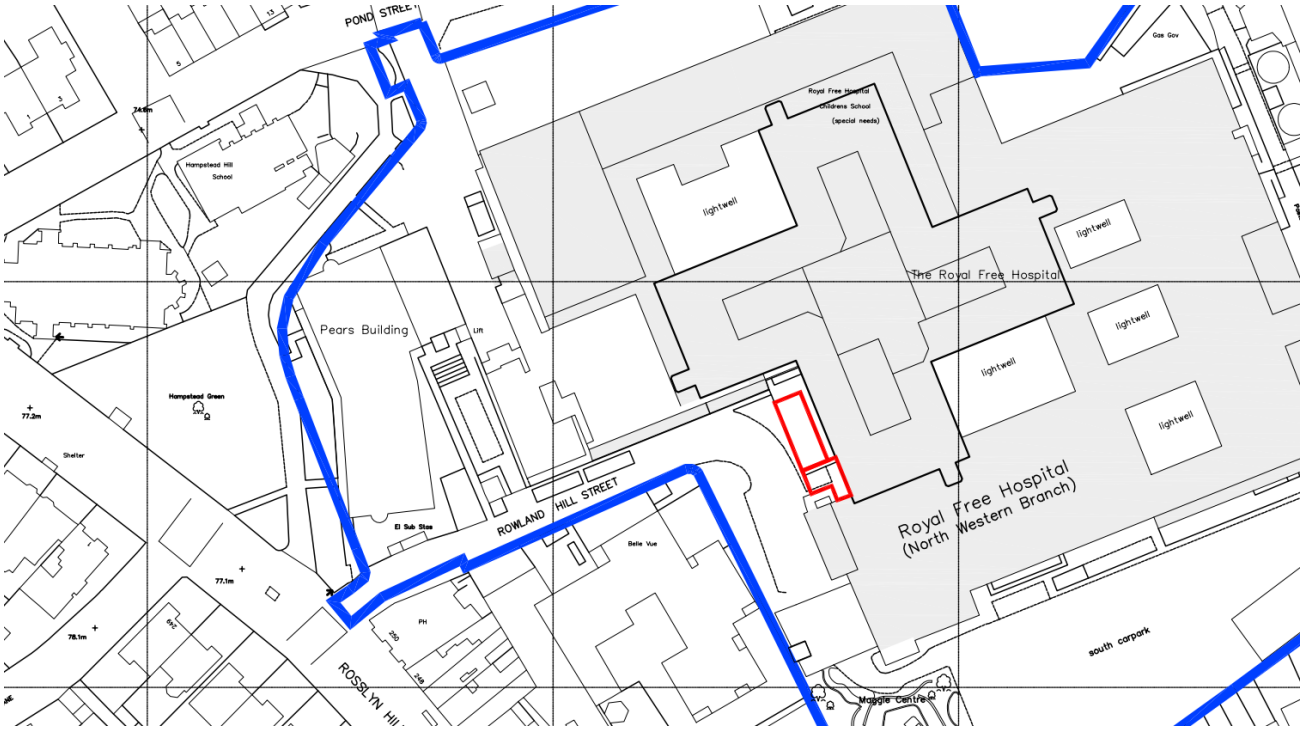

Image 1. Location of Low Field MRI prefab cabinet and marked in red.

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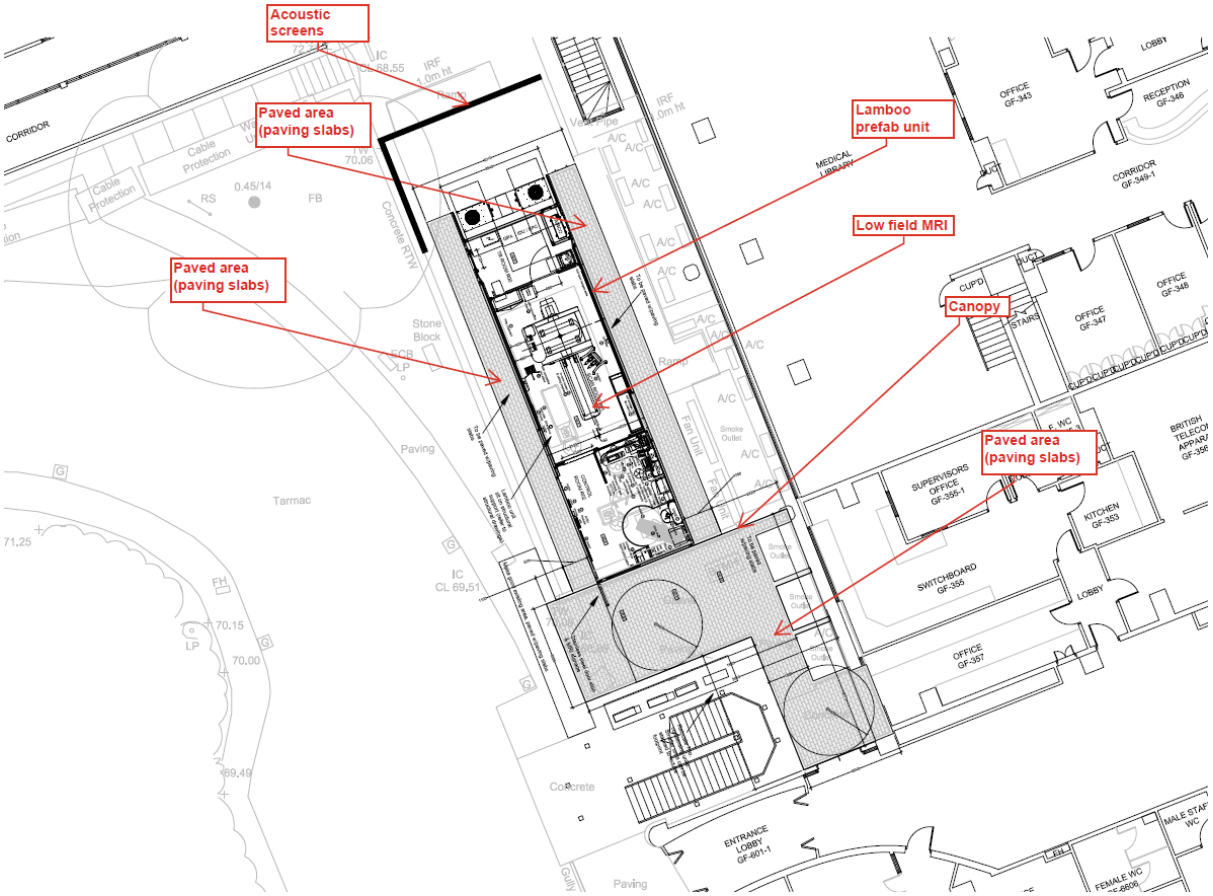

Image 2. Location of Low Field MRI prefab cabinet, canopy and paved areas.

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2 PROJECT CONTEXT & CLINICAL NEED

There is a fundamental and critical need to deliver the MRI scanner (and associated works) at the Site. The Low Field MRI scanner at the Royal Free Hospital (RFH), housed within a Temporary Lamboo prefabricated cabinet, was awarded to RFH by the National Institute for Health and Care Research (NIHR) to undertake advance imaging research as part of the Royal Free Clinical Research Facility (CRF) activities.

The NIHR CRF service at RFH provides innovative facilities, equipment, and experienced staff to enable early-phase clinical research in healthy adults and patients with acute, complex, and long-term conditions. The Low Field MRI allocated inside the prefab unit will become an integral part of the NIHR CRF service, facilitating cross-sectional imaging including Cardiovascular Magnetic Resonance (CMR) imaging. The Royal Free has a world-leading clinical academic CMR program, with this type of scanning now used to assess endpoints in therapeutic trials of rare diseases including amyloidosis, lysosomal storage disorders, and pulmonary hypertension. The RFH is a national specialist centre for these rare medical conditions, all of which are prominent in the CRF's research objectives. By leveraging the advantages of Low Field MRI, researchers aim to gain deeper insights into the progression of these illnesses and the effectiveness of various treatments, ultimately contributing to improved patient outcomes.

The installation of the Low Field MRI will support NIHR CRF research in the following ways:

- Enhanced CMR Research: RFH has a strong track record of delivering high-quality CMR research and has established innovative MRI-guided cardiac catheterization and MRI exercise clinical academic programmes. Low Field MRI (0.5T) offers several advantages over conventional 1.5T or 3T MRI, including: lower costs; the potential to perform image-guided interventions that are not feasible at conventional MRI field strengths; imaging patients with lung disease normally studied with modalities using ionising radiation; and an improved patient experience with a larger scanner bore particularly helping patients with claustrophobia or larger body habitus.
- Cost-Effective Scanning: Utilizing 0.5T MRI will allow more cardiac trial patients to be scanned at a lower cost while obtaining more sophisticated imaging biomarkers. This capability is vital for ongoing studies and will make the CRF attractive for externally funded studies, ensuring long-term sustainability.
- Value for Money: Installation and maintenance costs are lower compared to conventional MRI, providing exceptional value for money.

The installation of this equipment is crucial for NIHR CRF research because it addresses critical needs in combating the life-limiting illnesses listed above. Early and accurate diagnosis is essential for effective treatment, and the Low Field MRI provides a non-invasive, detailed imaging method to achieve this. With the advent of more novel therapies, imaging-guided research is key to better understand the mechanisms and degrees of treatment response. This may potentially help personalize treatment plans for patients, thus increasing the likelihood of successful outcomes. The data gathered from these studies will not only advance scientific knowledge but also inform clinical practices, leading to better healthcare strategies and an enhanced quality of life for patients.

The Low Field MRI is strategically located at RFH because the hospital's staff members are highly skilled and experienced in handling advanced medical equipment. The location of the scanner ensures that the research benefits from the existing infrastructure and expertise of the hospital, nearby to the clinical radiology and cardiology diagnostic units. Although the MRI is housed in a temporary cabinet due to space constraints, this setup is designed to be as permanent as possible. The unit is prefabricated by a leading healthcare manufacturer to help ensure that it is fit for purpose and ready for operation as quickly as possible, to help address critical need.

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3 DEMOLITION WORKS

The area currently occupied by the IM&T Training cabin at the bottom of Rowland Hill Street, as depicted below, will be cleared. Due to its age and unsuitability for reuse, the cabin will be demolished and removed, creating an empty space for the installation of the Lamboo prefab cabin.

Demolition works will include the following:

3.1 Demolition of IM & T Training cabin:

The complete demolition of the existing IM&T Training cabin is necessary due to its age and poor condition, which impedes its relocation or repurposing. The cabin, having served its purpose over the years, is no longer structurally sound or suitable for reuse. Demolition works will include the careful dismantling and removal of the cabin to ensure minimal disruption to surrounding areas. Proper waste disposal procedures will be followed to responsibly manage any materials removed during demolition. This process will clear the site effectively, making way for the installation of the new Lamboo cabinet.

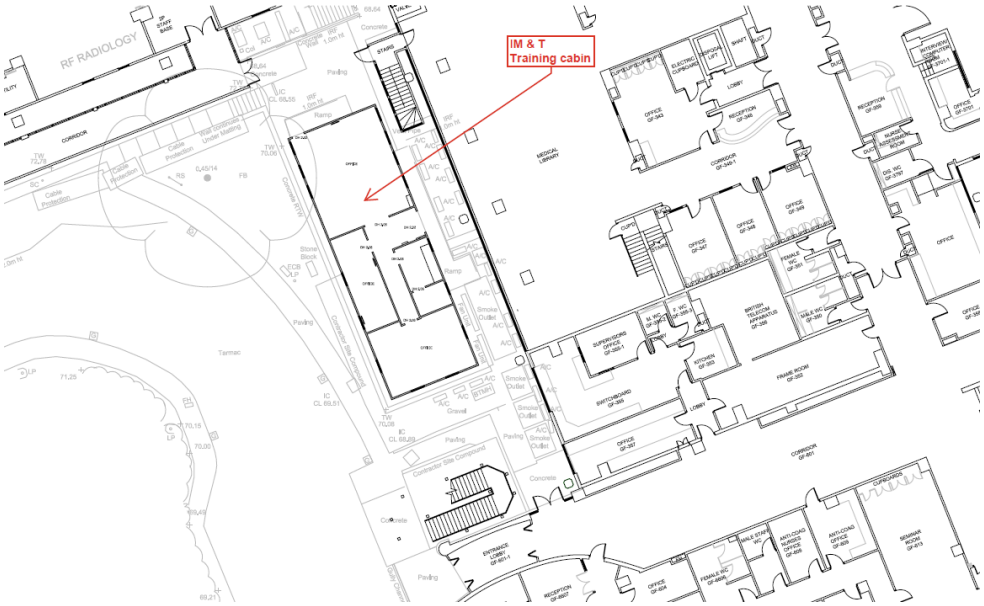

Image 3. Existing IM & Training Cabinet

Image 4. Existing IM & T training cabinet

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Image 5. Existing IM & T training cabinet. Aerial view

3.2 Partial removal of external retaining wall

To accommodate the new unit length, it is proposed to remove the return section of the external retaining wall. The section of wall to be removed is highlight in red below, approximately 7.09m long x 2.0m high and is to be undertaken using diamond saw cutting techniques. All cut surfaces are to receive a remedial cementitious repair to protect exposed reinforcement bars. The location of the condenser units is not only functional and operationally preferable, but is also visually discrete (resulting in limited adverse impacts on local visual amenity)

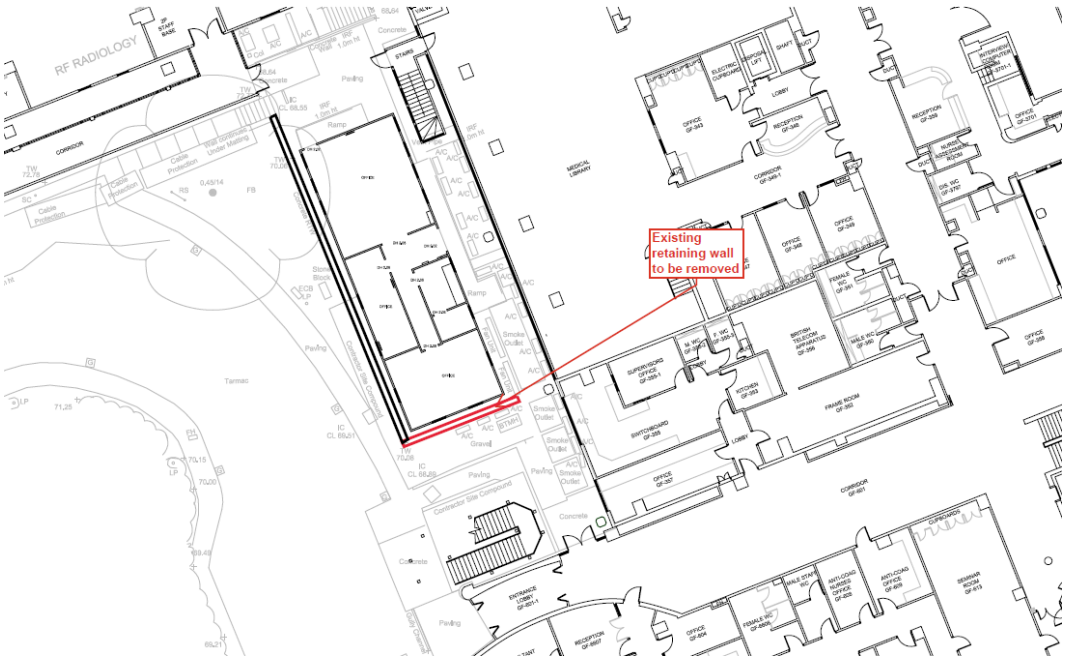

Image 6. Existing retaining wall to be demolished.

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Image 7. Existing retaining wall to be demolished.

3.3 Relocation of 7no. Condensers

To facilitate the delivery of the packaged container solution, it will be necessary to safely isolate and relocate seven split AC units (condensers). Each unit will need to be degassed, have its pipework modified, relocated, pressure tested, and recharged with refrigerant gas. Additionally, the existing electrical rotary isolator switches will be moved to the new location.

The proposed location for the condensing units is within an area below the existing 'open' staircase. This area is currently being used as storage by the Contractor working on the Fire Compliance contract, however it is understood this will have been vacated before the commencement of the low field MRI project.

Engineers have advised stacking them in two rows to conserve space, would be useful for installing additional plant or other equipment in the future.

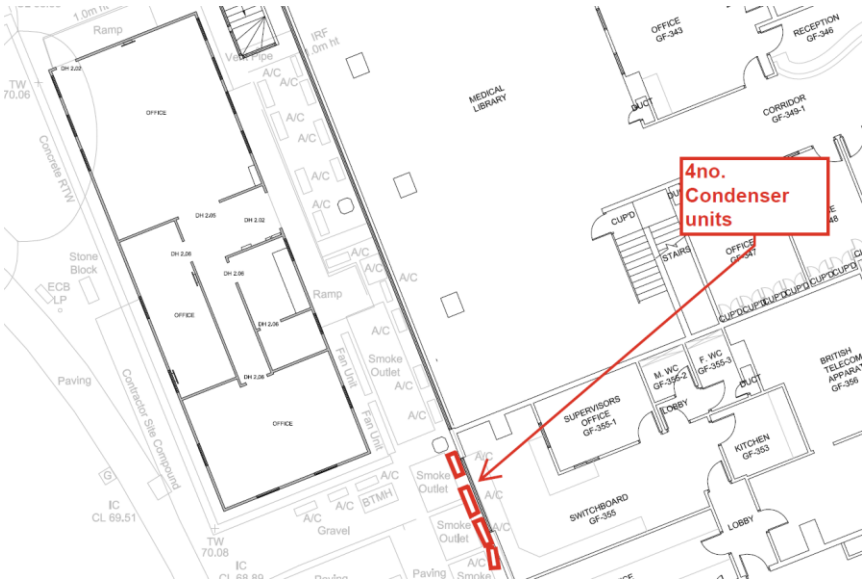

Image 8. 4no. units to be relocated. Location.

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Image 9. 4no. units to be relocated.

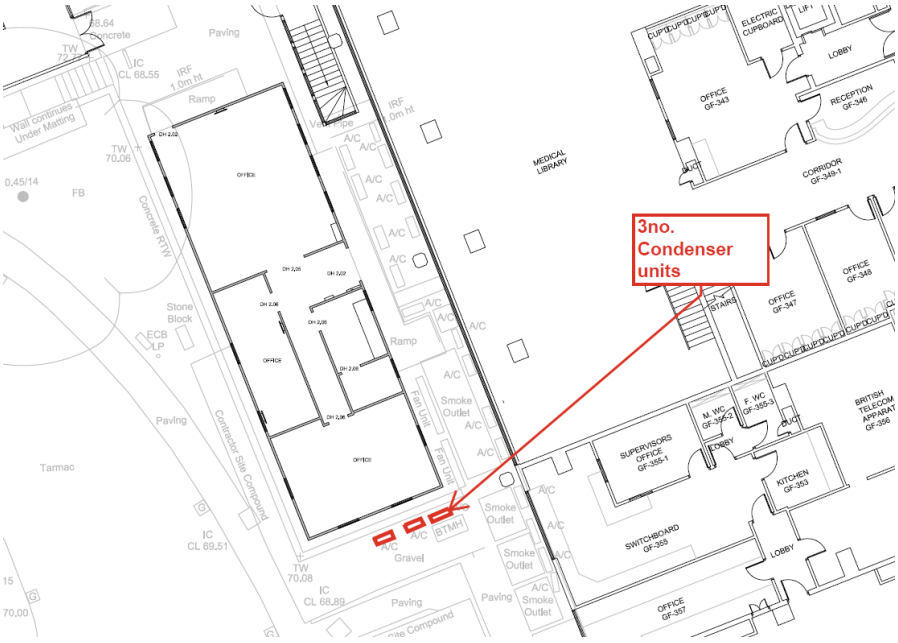

Image 10. 3no. units to be relocated. Location.

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Image 11. 3no. units to be relocated. Location

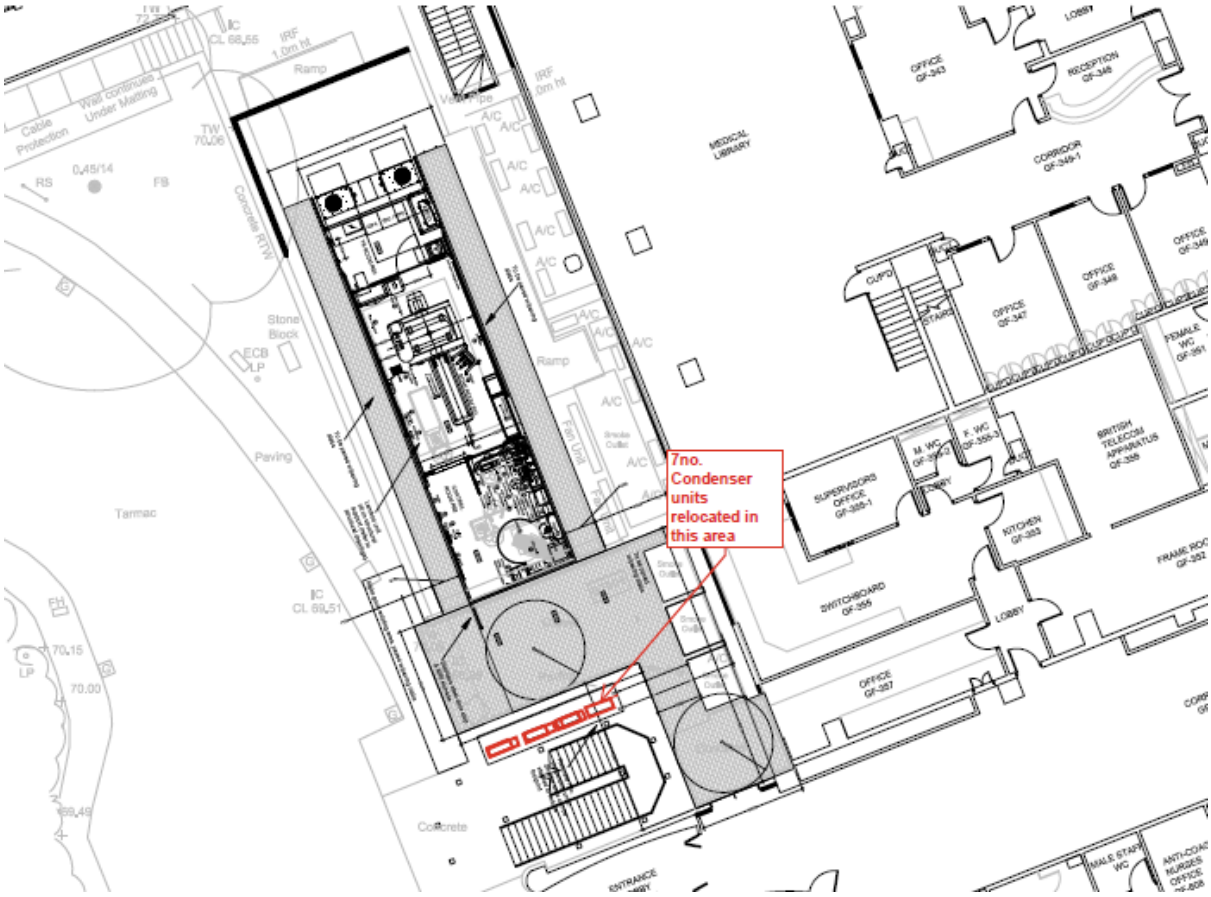

Image 12. 7no. units relocated

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3.4 Demolition of existing paving and removal of debris

Demolition of existing paving or any other debris on the IT footprint and replace them by new paved slabs.

The area between the main building and the Lamboo Cabinet will be clean of existing paving, gravel, debris or any other residue and repaved with paving slabs as per detail below.

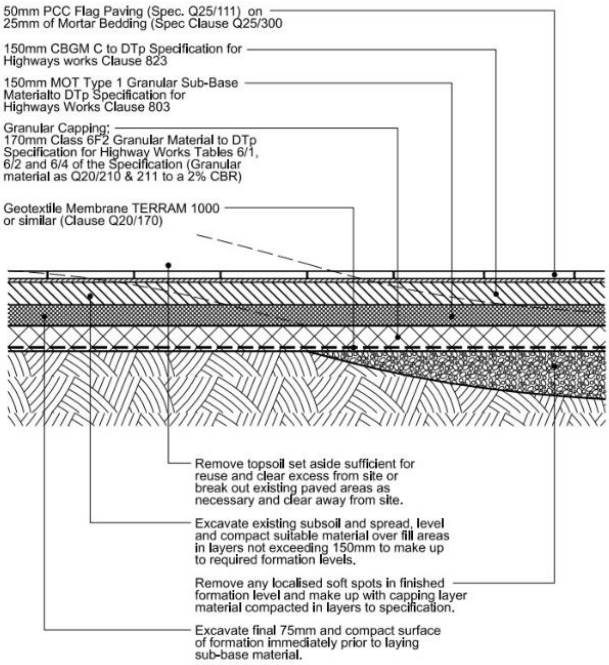

Image 13. Typical pedestrian paving construction

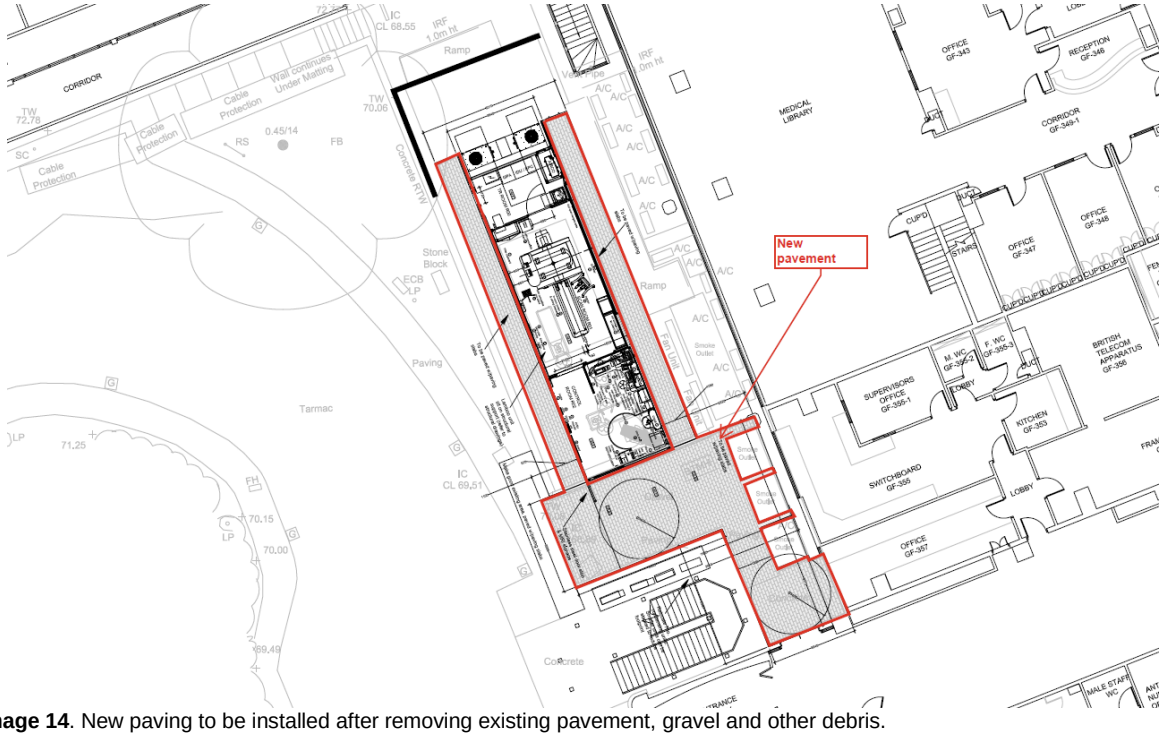

Image 14. New paving to be installed after removing existing pavement, gravel and other debris.

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4 PROJECT DESCRIPTION

This project involves the installation of a prefabricated Lamboo unit designed to house a Siemens Low Field MRI system, and a canopy to protect the patients flow and new pavement.

4.1 Lamboo Unit

The Lamboo unit is a prefabricated structure specifically designed to accommodate the Siemens Low Field MRI system and its ancillary equipment, including ventilation and cooling systems. The unit is capable of operating independently from the main hospital building, provided that nurse call (if required), electrical, med gases, water supply, and drainage connections are available. The overall dimensions of the unit are 15 meters in length, 3.95 meters in width, and 3 meters in height.

4.1.1 Lamboo cabinet Construction Details

4.1.1.1 Framework

The base self-supported framework supports the entire structure and includes four connection points for hoisting the unit into position using a crane.

4.1.1.2 Superstructure and Insulation

The unit is constructed using insulated medical sandwich panels. The outer layer is seamless and made from a single piece. The exterior is finished with a polyester skin, easy to clean, that will be provided in white colour (RAL 9010).

4.1.1.3 Internal Walls

The internal walls consist of insulated medical sandwich panels integrated with RF and magnetic field shielding in the scan room.

4.1.1.4 Flooring

The floor is made of insulated medical sandwich panels with RF and magnetic field shielding. It is covered with antistatic PVC and finished with a medical plinth i/ Floor partly executed with steel magnetic shielding according to Siemens certified design.

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4.1.1.5 Roof

The roof also features insulated medical sandwich panels with integrated RF shielding in the scan room area. It includes a removable panel for loading the MRI gantry.

4.1.1.6 Ancillary Equipment and Services

4.1.1.6.1 AC Chillers

The unit includes an external area for ventilation and cooling equipment. This area has anti-slip polyester flooring, service doors with cooling air grids, and houses the Siemens chillers system for the Siemens Free.Max system.

4.1.1.6.2 Equipment Room

Equipment room is split in two parts: one exterior for AC systems (chillers provided by Siemens), one interior for technical cabinets. The external equipment room contains three condenser units for the independent AC systems (, accessible via a manual swing door externally and an RF service door internally to the scan room.

4.1.1.6.3 Mechanical, Electrical, and Plumbing (MEP) Services

The technical room accommodates system cabinets for the medical equipment and the main power cabinet, provided and installed by Lamboo Medical.

Lighting includes LED fixtures and emergency lights.

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An active smoke alarm sensor is installed, connected externally to the hospital.

A patch panel with external IT connections and an IT cabinet will be installed.

Connections for gases (vacuum and oxygen) as well as drainage and water pipe connections to the main building will be provided. Connections for gasses enter the unit in the control room near the AVSU.

4.1.1.7 Structural support

The current IM & T training cabin foundations are not fully understood at this time, but it is expected they consist of timber sleepers directly on the paving slabs. Once the IT cabin is removed, we will assess the foundations to confirm their nature and allow for additional contingency in case we encounter larger structures that require breaking out.

Based on the load specifications provided by Lamboo, the proposal for the new structure is using mass concrete strips measuring 3500x600x1000mm (LxWxD) running across the width of the unit provided by Contractor as part of the enabling works package.

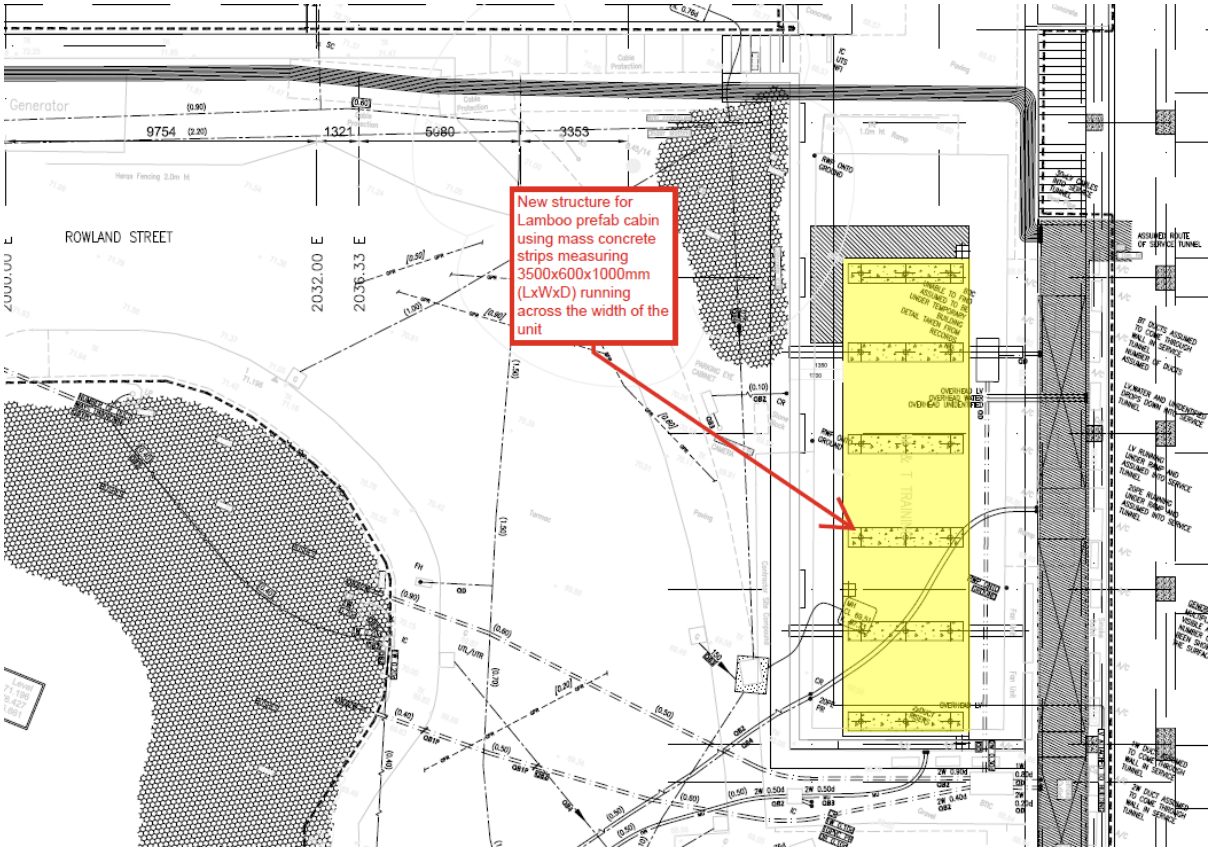

Image 15. Proposed support structure.

4.1.2 Canopy

Although current funding does not cover the canopy currently, it is considered essential for the MRI unit's functionality and patient flow protection. Therefore, the canopy is included in the planning application. Two canopy proposals shown below are under cost consideration:

4.1.2.1 Simple Linked Mono-Pitched Canopy Option

This design uses 6.4mm toughened glass with a gutter system adjacent to the contractor's hoarding/staircase.

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Image 16. 4.1.2.1 Simple Linked Mono-Pitched Canopy Option 1.

4.1.2.2 Low Profile Insulated Flat Roof Canopy Option 2

This option features a fully guttered perimeter with fewer structural posts to the ground, providing a cleaner aesthetic and functional design.

Image 17. Low Profile Insulated Flat Roof Canopy Option 2. Vertical panels would be omitted and just the roof would be installed.

The canopy will be a self-supported structure, not requiring any permanent foundation.

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4.1.3 Acoustic Screens

As indicated on RSK acoustic report (external plant noise) 2062434-RSKA-RP-001-(03), Siemens Chillers allocated on the external area of Lamboo prefabricated unit request Acoustic attenuation.

Acoustic screens will be placed as shown on drawings 23036(01)014A, 15A & 16A. Material, colour and dimensions will be confirmed once production drawings are available.

4.1.4 Enabling works

The following Enabling works will be required:

- Connection to MEP services.
- New pavement to the area marked on *image 14*. Paving slabs to be installed a per detail shown on *Image 13*.
- Demolition works described under *Section 3*.

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5 HAMPSTEAD CONSERVATION AREA, PROJECT IMPACT ON VIEWS

The wider RFL Hospital site abuts the boundary of the Hampstead Conservation Area. This Conservation Area, known for its architectural heritage and historical significance, includes several buildings situated on Pond Street. These buildings, located directly across from the Royal Free Hospital, play a vital role in maintaining the character and aesthetic value of the area and this particular Street.

It is important to note that the placement of the new Lamboo unit, designed to house the Siemens Low Field MRI system, has been carefully considered to ensure minimal visual impact on the surrounding environment. The buildings on Pond Street within the conservation area do not have direct views of the new unit. This is primarily due to the strategic positioning of the Lamboo unit, placed behind the plinth and the tower west wing, which effectively shields it from view.

Image 18. Proposed support structure.

Furthermore, the height of the buildings on Pond Street and RFH main building, combined with the natural topography and existing landscaping, create an additional buffer. This ensures that the historical vistas and sightlines from the conservation area remain uninterrupted, preserving the visual integrity that define Hampstead.

Overall, the setting, character and special interest of the adjacent conservation area will be preserved by this proposal.

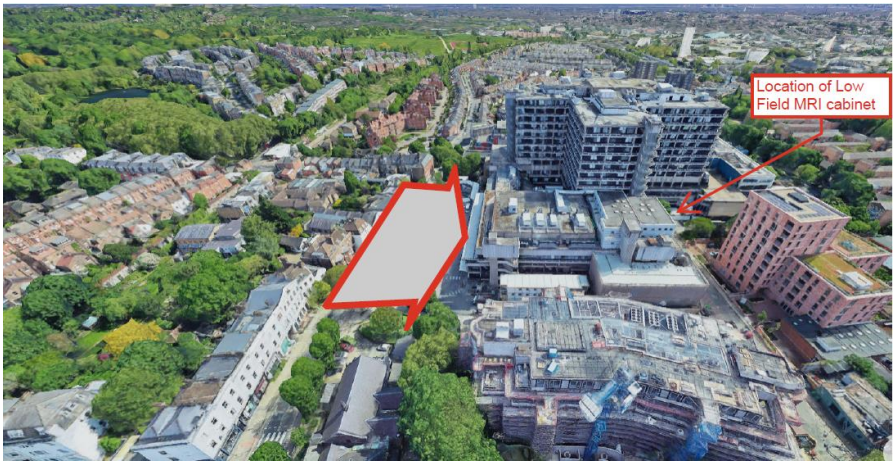

Image 19. The buildings on Pond Street within the conservation area do not have direct views of the new unit.

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6 VISUAL IMPACT OF LAMBOO UNIT AND CANOPY IN THE AREA

The appearance of the project is fundamentally driven by its functional requirements, with both the Lamboo prefabricated unit and the canopy designed to meet specific operational needs with a sensible cost impact.

The Lamboo unit has as main purpose to accommodate the Siemens Low Field MRI system and its ancillary equipment within a compact and efficient space. This prefabricated design ensures that all necessary components, including ventilation, cooling, and RF shielding, are integrated seamlessly, allowing the unit to operate independently from the main hospital building. The exterior, constructed from insulated medical sandwich panels, provides both durability and ease of maintenance, emphasizing practicality over ornamentation.

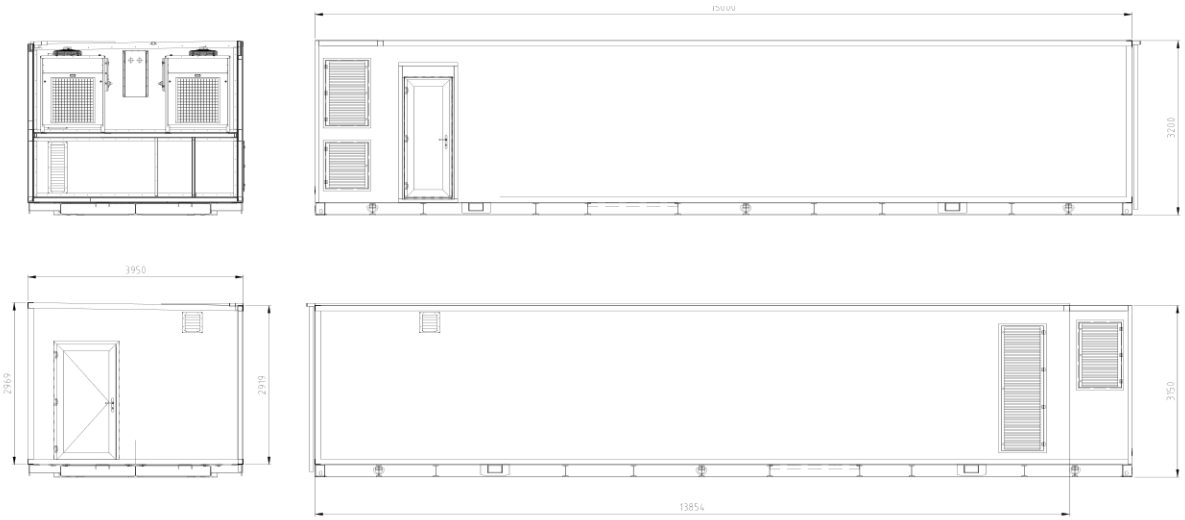

Image 19. Elevations of Lamboo unit

Similarly, the proposed canopy enhances the functionality of the project by providing essential protection and accessibility for patients and staff. Whether opting for the simple linked mono-pitched canopy or the low-profile insulated flat roof structure, the design remains focused on delivering effective shelter and efficient use of space. These prefabricated elements ensure quick installation and minimal disruption to hospital operations, embodying a design philosophy where form follows function. Together, the Lamboo unit and canopy present a cohesive, utilitarian aesthetic that underscores the project's commitment to operational efficiency and practical utility.

To achieve minimum visual impact 3 measures has been put in place:

- The unit and canopy are installed at level 66.8700m (FFL internally), situated lower than the adjacent kerb and Rowland Street pavement. This lower placement, combined with the area's natural topography, ensures that half of the cabinet remains obscured from view. Additionally, the canopy, being roofed without walls, minimizes its visual impact despite its full visibility.
- Currently, there is landscaping in front of the south elevation of the cabinet that includes shrubs which hide the existing cabin and will conceal the new MRI unit cabinet.
- The proposed pavement design mirrors the original existing in the area and aligns with the surrounding aesthetics of the hospital grounds.

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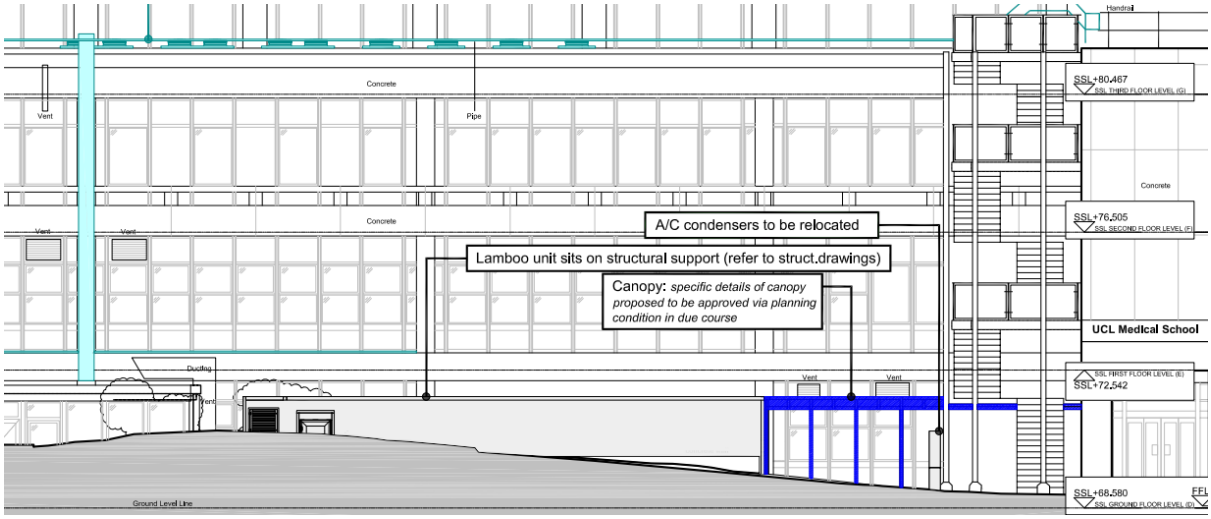

Image 20. Main elevation of Lamboo unit & Canopy (South-West)

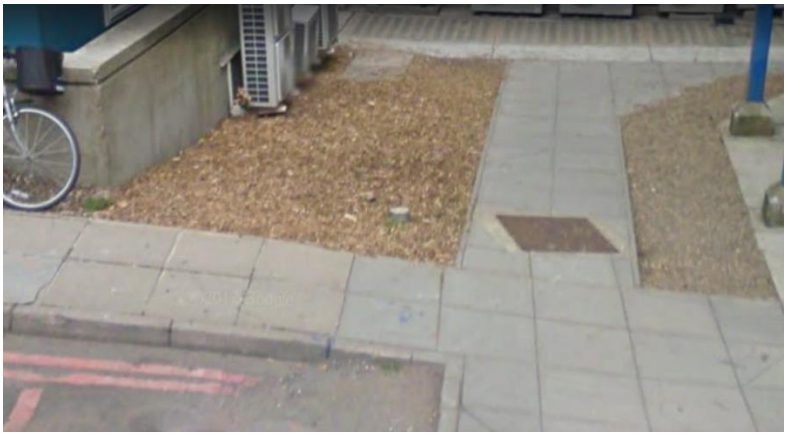

Image 21. Paving slabs used around the hospital as external pavement.

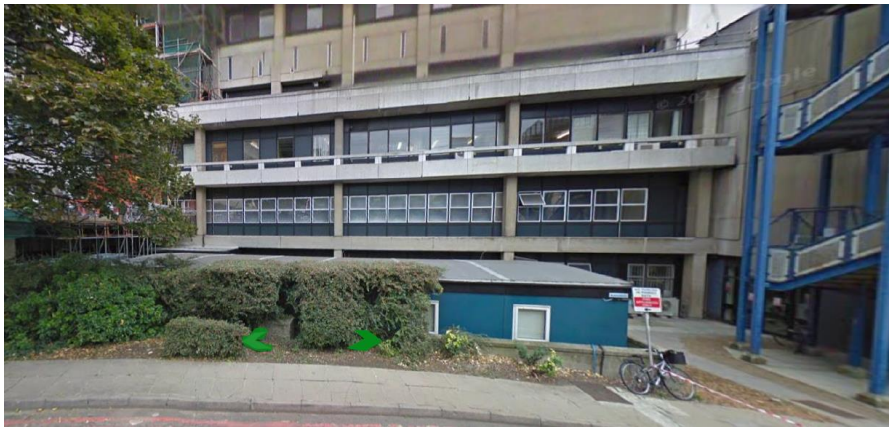

Image 22. Existing bushes and topography will shield the views partially from Rowland Hill road.

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7 ACCESS CONSIDERATIONS

Access considerations for the project have been meticulously planned to ensure minimal disruption to existing hospital operations and to maintain accessibility for all users and the existing car park and access arrangements. Firstly, it's important to note that the project does not involve the removal of any parking bays or bike spaces, preserving the current parking availability for hospital visitors and staff. This decision was made to avoid any inconvenience to those accessing the hospital grounds.

Secondly, the placement of the Lamboo unit and canopy has been carefully orchestrated to ensure it does not obstruct any access ways to the hospital. Emergency access routes and pedestrian pathways have been carefully assessed to guarantee unimpeded movement throughout the hospital premises.

In terms of user impact, the installation anticipates a maximum of five patients and two staff members utilizing the facility concurrently. This ensures that the number of vehicles and individuals seeking parking remains manageable, thereby minimizing any potential strain on parking facilities.

Access to the unit is facilitated by following a designated flow that directs patients and staff efficiently. Signage and clear markings guide individuals from the hospital entrance to the installation area, ensuring smooth navigation without causing congestion or confusion.

These considerations underscore our commitment to maintaining operational efficiency and ensuring a seamless experience for both patients and staff accessing the new Lamboo unit at the hospital.

7.1 Access for ambulatory/wheelchair users/patients (research purposes)

The general flow for ambulatory/wheelchair users/patients will be as follows:

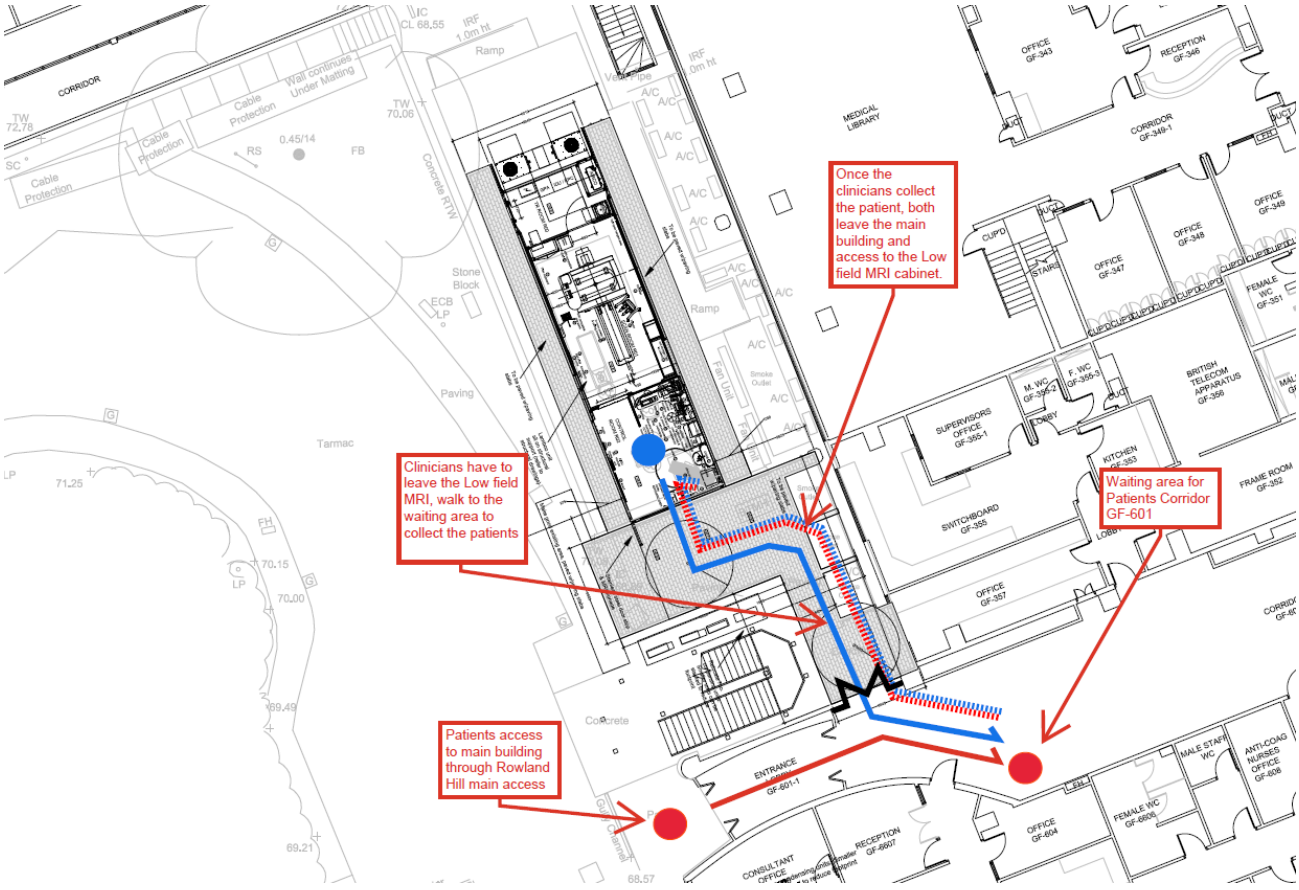

Image 23. Access for ambulatory/wheelchair users/patients (research purposes)

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1. Firstly, unescorted patients will enter the hospital through the main access on Rowland Hill Street.
2. Patients,accompanied or not by a relatives, will wait in the designated area in corridor GF-601.
3. A staff member assigned to the Low Field MRI will exit the Lamboo unit, proceed through the manual double-leaf door, and access the waiting area to escort a patient. Patient and staff member will be protected from the weather by the canopy,
4. The ambulatory patient and staff member will then proceed together to the Lamboo unit through the double-leaf door.
5. Both will enter the Lamboo cabinet together.

Ambulatory/Wheelchair users patients will exit the cabinet independently without re-entering the main hospital building

7.2 Access for trolley in-patients

These patients will be directed to Low field MRI from IRCU area.

1. They will be taken along the internal route marked below.
2. They will cross the double leave door and access, protected from the weather by the canopy, inside the Lamboo unit.
3. To come back to IRCU area they will follow the inverse route.

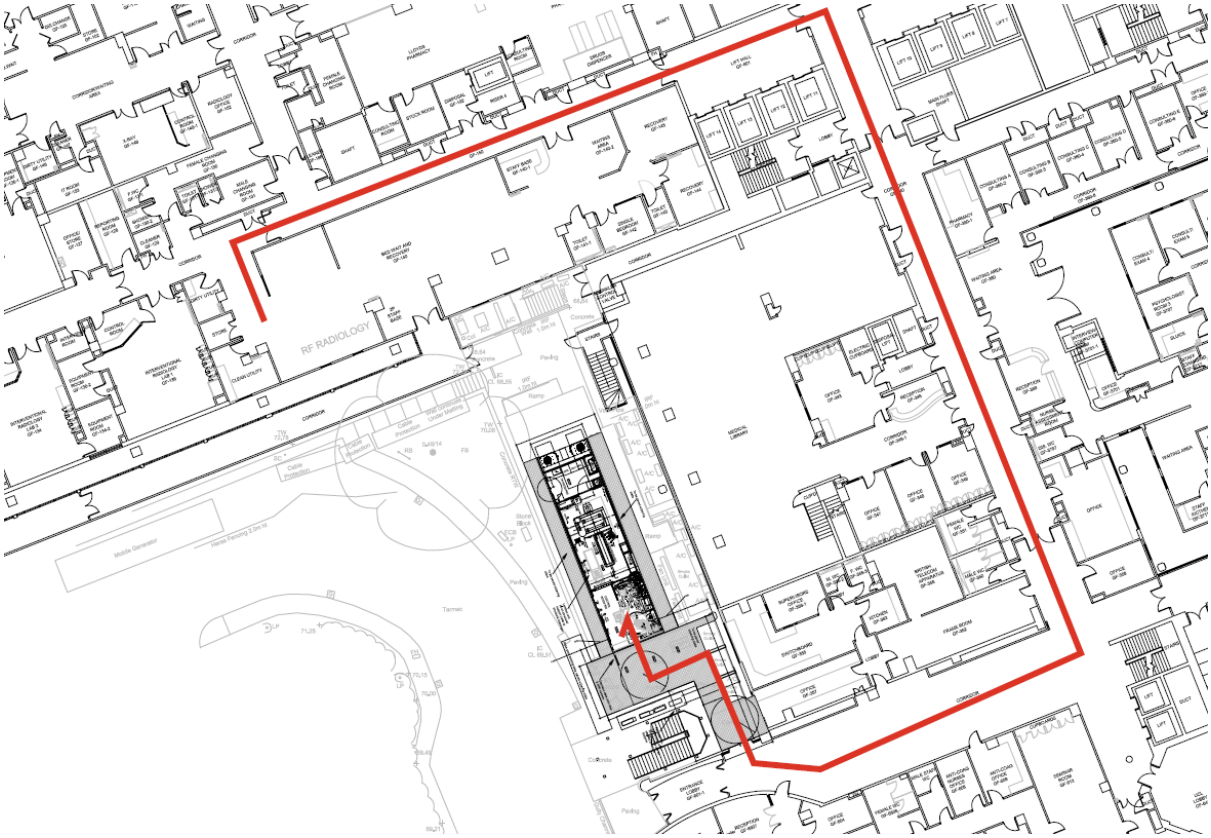

Image 24. Access for trolley in-patients from IRCU unit

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8 CONCLUSION

The installation of the Lamboo unit for the Siemens Low Field MRI system at RFH is a critical project aimed at advancing medical research.

The prefabricated unit and ancillary equipment are designed to meet high standards of insulation, safety, and functionality, ensuring minimal disruption to the main hospital operations and delivery much needed health service improvements on-site. The inclusion of the canopy, though currently unfunded, underscores the project's commitment to patient accessibility and workflow efficiency.

This Design and Access Statement outlines the thoughtful planning and design considerations undertaken to ensure the project's success and positive impact on medical research and patient care.

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