Infrastructure Report University Hospital Wales & University Hospital Llandough

July 2021

Cardiff and Vale University Health Board Infrastructure Report

Contents

1. Summary of Pressing Issues

	Issues	Current State	Implications / Risks	Resolutions
1.	Ward & Theatre size	Non-compliant with current HBNs due to limited footprint in critical spaces i.e wards, theatres & anaesthetic rooms in particular.	Requirement for significantly more space due to modern equipment and ways of working and flexibility. Limited space increasing risk of IPC outbreak.	Reduce ward capacity by 50% to meet HBNs. Remodelling of Theatre suites.
2.	ITU	Non-compliant as there is no or a limited ventilation system in UHW. There is no space available to house ventilation system.	Air change rates that do not meet current HTM's. Lack of temperature control within department with high levels of heat gain due to medical equipment.	Relocation of ITU to allow for refurbishment. Currently no suitable locations where ITU patients could safely be relocated.
3.	Electrical	The majority of the current electrical infrastructure is original. Being over 50 yrs old it is Non-compliant with current HTM's and beyond its life expectancy.	Lack of spare parts due to age of system results in lengthy & costly repairs and upgrades. Often parts unavailable so alternative system required. Critical failure would result in closure of wards and critical departments.	Closure of large sections of the Hospital at once significantly reducing capacity.
4.	Concrete Façade	Main tower and link blocks are constructed of cast concrete. Sections of	Regular inspection and remediation required. Sections of concrete breaking	Closure of large sections of buildings and access roads/paths

		the structure have deteriorated resulting in the façade starting to break away.	away and falling cause risk to patients, staff and public.	to remove and make good un sound façade.
5.	Asbestos	Asbestos is present in many areas in the hospital which have low or no access during normal working procedures.	Prior to all works, maintenance, refurbishment or capital in nature checking, surveying and often removal of asbestos is required. This work is both time consuming and costly to all projects.	Employment of external contractors for removal of all asbestos on a rolling programme. This would involve closure of departments and major disruption to services throughout the Hospital.
6.	Drainage	Waste pipe infrastructure is original (1970's) and cannot accommodate current requirements. Blockages are a regular issue for our maintenance team due to reduced diameter of the internal bore of the pipework.	When blockages occur sections of the pipework are replaced as necessary. Staff and patients have reduced access to services such as working toilets while issues resolved causing major disruption to wards and clinical areas. The result of major leaks causes disruption and an environmental risk to the space.	Replacement of main arteries within the infrastructure. This will result in closure of many wards / clinical spaces as the pipe runs pick up the soil from outlets on all eight floors.
7.	Pipework	Pipework infrastructure particularly in tunnels and risers are original. Being over 50 yrs old it is beyond life expectancy. Much of the pipework have asbestos contamination which has been encapsulated.	Repairs and / or replacement of pipework is difficult due to congested services in tight area, compounded by potential asbestos contamination. This prolongs work and disrupts services to patients and staff longer than would be normally expected. Interruption of water supplies and heat to critical areas and additional damage caused to affected surrounding areas. .	Isolation and replacement of main arteries of the pipework. Major temporary works to supply hospital with required service and / or closure of large major sections of the Hospital.

8.	Lifts	The majority of the lifts within the main Hospital are original and beyond life expectancy. Due to existing building structural constraints it is not possible to fully comply with current British Standards.	Due to insufficient resilience within the Hospital core lift demand is extremely high. This causes major disruption during maintenance or breakdown. Major disruption and logistical issues are encountered by clinical staff to ensure continuity of service.	Closure of lifts for a sufficient period of time to ensure a fully refurbished installation. Temporary lifts installation to enable clinical activities to continue. Due to structural restriction a complete replacement of the lift to current British Standards is not achievable.

2. Background

This report aims to give a high level overview of the infrastructure challenges faced daily by the Capital Estates team at Cardiff and Vale University Health Board (CAVHB), specifically regarding the University Hospital of Wales (UHW) and the University Hospital Llandough (UHL).

UHW and UHL were constructed in 1968 and 1933 respectively, to Health Building Notes (HBN) & Health Technical Memoranda (HTM) standards of the time. There have been several iterations of these standards and as such the Capital Estates team have completed remedial works to replace and improve the hospitals infrastructure. While the ongoing work is sufficient to maintain service, there is a limit to what can be done due to the buildings age, lack of replacement parts and physical footprint – this all generates clinical risk.

A new, sustainable replacement hospital would provide a range of benefit to:

- Staff, by improving their working environment,
- Provide better facilities and care for patients,
- Operate at reduced costs (when compared to current running costs),
- Have access to better transport links and supporting services,
- Will help Welsh government meet there zero carbon emissions target

This document discusses:

1) Compliance issues faced by the CAVHB to meet current HBN & HTM standards.
2) Our approach to addressing the daily infrastructure challenges.
3) Future life expectancy of UHW and UHL.

3. Context

In conjunction with the Programme Business Case (PBC) previously submitted to Welsh Government, we believe both documents set a compelling case for investing in the hospital infrastructure as an enabler for service transformation.

Our infrastructure must enable our staff to meet the challenge of elevating Wales to a position of one of best health and care systems in the world. All CAVHB staff work to ensure they provide the best services they can for their colleges and our patients, however their best efforts are constrained and challenged by outdated and inadequate facilities which make their jobs much harder.

With a growing population, Cardiff Council's local development plan (LDP) alone has identified a future population increase as a result of 41,415 homes and 40,000 new jobs. The city's forecasted population growth (15%) is one of the greatest in the United Kingdom. The increase of permanent and transient populations with associated health needs must be taken into account when planning future infrastructure and services.

With an increase in the number of older people and school age children, we know that standing still is not an option. Our estate is failing at an increasingly regular rate impacting business continuity. Our ability to respond to the delivery of novel and new treatments and technologies will diminish at an increasing rate due to the lack of space for suitable accommodation.

Our current infrastructure will not adequately serve our future generations, however, we have a once in a several-generation opportunity to invest in future models of care, and the infrastructure to support it, in a way that is exemplary in terms of our responsibility to protect the planet, and facilitates post-Brexit, post-COVID19 economic growth as a significant contribution to Wales as a thriving, culturally diverse country.

4. Building Design

HBN/HTM Infrastructure Compliance

At the time of construction UHW and UHL were compliant with all HBN standards. At present we are currently in breach of the following standards:

4.1. Ward Size: Health Building Note 04-01 Adult in-patient facilities 2008 Ward sizes.

We are currently unable to achieve HBN 04-01 compliance due to the limited footprint of our building/wards. In order to achieve compliance, ward beds would need to reduce from 38 to c17 beds per ward, a reduction in patient capacity of 50%.

Given the ongoing pressures and expected population growth, CAVHB cannot safely close 50% of its bed capacity to meet the current standards without causing serious detrimental implications to patients.

During the last inspection of rooms[1] within the wards of UHW, the following were found to be in breach of HBN standards:

- 16 in poor condition
- 67 Average condition

4.2. Theatres: Health Building Note 26 Facilities for Surgical Procedures

Since the building's construction, the use of IT and communications in an operating department has increased dramatically, with the biggest changes occurring over the past 10 years. Some of the new technology now used across CAVHB includes:

- Voice-activated control of equipment and room environment,
- Robotic surgery,
- Electronic patients records/smart cards,
- CCTV for training and world-wide consultation.

The main implication of these developments is the need for significantly more space than previously recommended in operating theatres and anesthetic rooms.

As well as the need for greater space, flexibility is key to accommodating the technology. Unfortunately, the restriction in our current footprint and lack of flexibility within the Theatres cannot accommodate the HBN requirements. Examples are given below.

[1] Rooms includes: dirty utility, staff WC, visitor WC, treatment room, interview rooms, breakout spaces for patients and staff.

Activity Space	Area m^2 HBN 26	Typical UHW theatre Size	Compliant / Not Compliant
Operating Theatre	55	42	Not compliant
Anesthetic Room	19	18	Not compliant
Scrub	11	11	Compliant
Prep Room	12-20	10	Not compliant
Sluice	12	10	Not compliant

4.2.1. Theatres: Air Handling Units

The Air Handling Units (AHU) currently in use were not designed to produce the 25 Air Changes required under the current HTM's.

CAV currently adhere to the HTM guidance that theatres should achieve no less than 75% of the design air change rate. It is difficult to maintain no less than 75% because the air plant was not designed to produce the rate of changes required, and often requires re-balance (manual alterations of components) to ensure compliance.

4.3. ITU: Health Building Note 04-02 Critical Care Units

There are currently no ventilation systems in the UHW ITU due to the fact that there isn't the required space to install them.

If the required space was available then ITU would need to be relocated to another area while the work was undertake, and we do not currently have a suitable area where ITU patients could safely be relocated and cared for.

HBN standards recommend that a ventilation system should include:

- A mechanical cooling system
- that can provide a range of temperatures
- and is adjustable by staff

Staff would then have the ability to establish and accommodate the unusually high heat gains that occur from continuous use of life saving medical equipment. Today, our ITU suffers from extreme heat, especially in the summer.

4.4. Electrical infrastructure:

4.4.1. Health Technical Memorandum 06-03:2005 Building Component Series Fitted storage system

4.4.2. Health Technical Memorandum 06-02:2006 Electrical safety guidance for low voltage systems

4.4.3. Health Technical Memorandum 06-02:2006 Electrical safety handbook

4.4.4. Health Technical Memorandum 06-01:2018 Electrical services supply and distribution plant.

The majority of the current electrical infrastructure is original from when the hospitals were first built. As standards have changed over the years the infrastructure has remained the same, this is due to the limited footprint of the building, disruption to patient care, and as a result, is not in compliance with any of the current Welsh Health Technical Memorandum Guidance documents issued by NWSSP for Electrical Services.

A lack of spare parts (no longer available from manufacturers) and critical failure would result in total collapse of the system – this would mean, the closure of a third of our wards, potential closures of laboratories and other patient critical facilities.

4.5. Fire dampers (smoker dampers – access):

4.5.1. Health Technical Memorandum 05-02:2014 Fire code - Fire safety in the design of healthcare premises

4.5.2. Health Technical Memorandum 05- 03:2011 FIRECODE Part A: General fire safety

4.5.3. Health Technical Memorandum 05- 03:2011 FIRECODE Part K: Guide on fire risk assessment in complex healthcare premises.

The original design of the buildings has resulted in some smoke dampers being inaccessible, due to obstruction or other services impeding access. CAVUH is therefore unable to maintain 22% of our fire dampers in accordance with the current standards.

4.6. Further HBN/HTM Compliance Breaches:

The below are further areas where CAVHB is not able to meet HBN/HTM standards, resulting in compliance breaches.

- **AHU (Air changes – plant layout):**
  - HEALTH TECHNICAL MEMORANDUM 03-01:2007 PART A Specialist ventilation for healthcare premises, Part A: Design, installation , validation and verification
  - HEALTH TECHNICAL MEMORANDUM 03-01:2007 PART B Specialist ventilation for healthcare premises, Part B: Operational management and performance verification.
- **Backup systems**:
  - Health Building Note 00-07:2006 Resilience planning for the healthcare estate: Welsh edition
- **Building Regulations:**
  - Government website
- **Compliant space (plant rooms):**
  - Health Building Note 00-01:2017 General design guidance for healthcare buildings
- **Consultation rooms**:
  - Health Building Note 12 Out-patients Department
- **DDA**:
  - Health Building Note 12 Out-patients Department
- **Dual circuit** (med gas):
  - Health Technical Memoranda 02-01:2006 Part A - Medical gas pipeline systems, Part A - Design, installation, validation and verification
  - Health Technical Memoranda 02-01:2006 Part B - Medical gas pipeline systems, Part B - Operational management
- **Emergency lighting:**
  - HTM06 – 01 & BS5266 Pt 1. Health Building Note Lighting and colour for hospital design R&D Report B(01)02:2004
- **Lack of zoning:**
  - Health Building Note 00-01:2017 General design guidance for healthcare buildings Part 6 Evidence-based design ideas for a therapeutic environment
- **Limited single occupancy rooms/ En Suites**:
  - Health Building Note 04-01 Adult in-patient facilities 2008 Ward sizes.
- **Refuse (waste):**
  - Health Technical Memorandum 07-01:2013 - Safe management of healthcare waste.
- **Storage (cluttered areas):**
  - HEALTH TECHNICAL MEMORANDUM 62 Building Component Series Demountable storage system 2005 also HEALTH TECHNICAL MEMORANDUM 63 Building Component Series Fitted storage system 2005.

5. Infrastructure Failure

The Capital Estates team maintain, and where possible improve the infrastructure of our hospitals. While the majority of the work is currently sufficient, there is a limit to what can be done due to materials coming to the end of their natural life, difficulties accessing service areas, and significant disruption to patient care.

5.1. Fabric

5.1.1. Windows (Single Glazed/Timber Frame)

Within the UHW Site, the majority of the Main Tower and Link Blocks are constructed with traditional and original steel frames with single glazed panels. Due to the age of these units and they're life expectancy, we regularly find throughout the winter months, a significant proportion of these windows present us with draft issues, reducing temperatures within the main Ward Areas. The buildings loose a significant amount of heat due to its thermal inefficiency, resulting in higher overall running costs to the hospital and an unpleasant patient experience.

Due to the height of the windows, access to fix/replace a number of the windows is not safe, and therefore not appropriate, thus reducing the amount of repair works that can be undertaken at any time.

Within a number of the outlying buildings the window construction is timber, with single glazed units. These present additional issues as the timber frames rot (due to their age) and glass panels are becoming insecure. This in turn is posing a danger to patients, staff and property below.

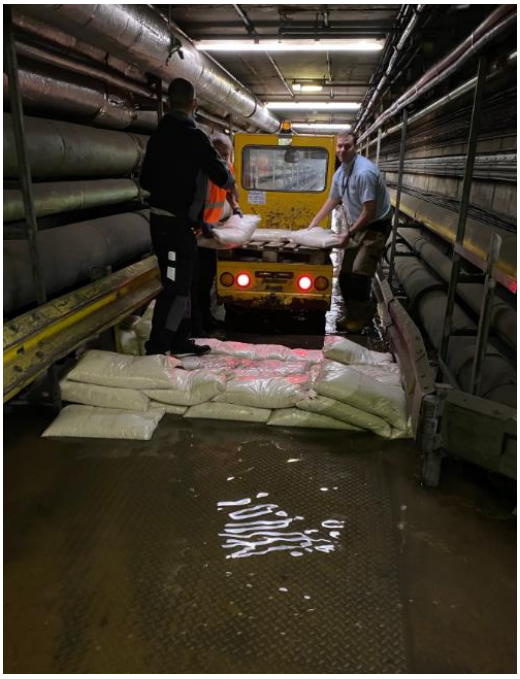
5.1.2. Concrete Façade

Within the UHW Site, the majority of the Main Tower and Link Blocks are constructed of cast concrete with a cement rendered finish. The life expectancy of concrete, weather conditions and lack of maintenance due to access, have contributed to the deterioration of sections, resulting in the concrete façade starting to break away from the main structure of the tower and falling from a height to the ground. This poses a potential life threatening danger to patients, staff and visitors.

5.1.3. Lower Ground Floor Tunnels

There are ongoing issues with ground water ingress into the tunnels under UHW, primarily due to the age of the tunnels, the high volume of traffic (tugs, patient movement etc.) 24/7 use to keep hospital logistics running smoothly, have all contributed to their expected deterioration over time.

The tunnels are made of cast concrete sections that are showing clear evidence of breaking down, this is accelerated by the added increase and change of water table. The water table will continue to rise due to ongoing construction within the hospital grounds to meet the increasing demand for a greater footprint/ treatment space.



Increases to the water table cause frequent flooding issues in the tunnels, preventing access and impeding the daily logistical flow of the hospital.

5.1.4. Asbestos

Due to the age of the hospital's construction and its infrastructure, we are presented on numerous occasions with items of plant and equipment and general maintenance requests that are hindered by the presence of asbestos contaminated material.

Whilst attending a planned or reactive maintenance activity it is not uncommon to discover that asbestos is present in that area. This can usually be confirmed before going to site when reviewing the asbestos management report. Repair work will then take much longer due to the precautions required.

These precautions generally require the below additions:

- training
- support from the asbestos manager
- PPE
- potential restriction of areas in plant rooms and clinical areas
- evacuating before works can commence
- bringing a licensed contractor in to support when the work cannot be done by our staff.

All these precautions increase cost, time to respond, potentially not able to undertake the works.

4.2. Mechanical

4.2.1. Drainage

The hospitals carry the original waste pipe infrastructure, which was fit for purpose at the time of construction, however is not designed to accommodate our current requirements.

There are regular mechanical breakdowns brought on by general deterioration and corrosion of the waste pipes, resulting in a significant reduction in the internal diameter of the pipe. The reduced diameter in conjunction with inappropriate items being disposed of into the drainage/ toilet system results in frequent blockages. See photo below

Our mitigations of using macerators (reduces solids to small pieces in order to deal with rags and other solid waste) is not sufficient to meet current capacity, and the blockages significantly and severely impact on patient service including the availability of showers, wash hand basins and toilets.

4.2.2. Pipework replacement

The UHL tunnels have pipework that is over 50 years old. The pipework and tunnels themselves have asbestos contamination, which has been encased (see photo below) by the white encapsulation paint. The asbestos and congestion within the tunnels makes any repairs extremely difficult, a simple repair can now take days to complete, and would in some cases stop services.

The photo below shows a failure on the condense steam pipe work. At the time it was necessary to shut down the theatre surgical sterilisation unit and Public Health decontamination units (TSSU) services at UHL for a weekend.

Below is an example of the crawl spaces where services run. These areas are out of bounds to staff as they are confined spaces and contaminated with asbestos. When failures occur in these crawl spaces, it takes a minimum of 48 hours to plan and employ a specialist contractor to repair the failures. Failures result in the loss of hot and cold water services to patients.

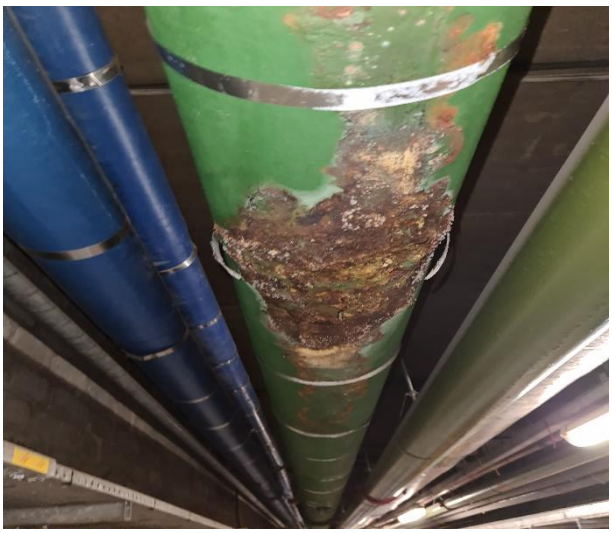
The photo below is a crawl space, 3ft high and 2ft wide, previously there have been blockages in the drainage system in this area. These blockages take in excess of a week to resolve due to the size and conditions of the crawl space. Our staff are unable to work in these spaces and specialist contractors are brought in when needed to complete works.

Despite best efforts, staff morale is currently low. The maintenance team are chased for updates on completion time, and find it difficult to keep up with the continuous demand placed on they by the failing infrastructure.

While clinical staff are understanding of the ongoing issues, their job of caring for patients is impeded while they wait for repairs to be completed. When pipework fails, the loss of hot and cold water services has a direct impact on patient care.

4.2.3. Water safety issues

Photos below illustrates failures within the hot water system which resulted in patients losing the ability to wash while the repairs were carried out. The repair was made easier due to asbestos removal previously and the removal of redundant pipework.



4.2.4. Unable to deliver heat to patient areas

Due to the age of the system, the addition of pipework, and increased build up/ deposits of material inside the pipes, has resulted in a reduction on the pipes' overall thermal efficiency and ability to distribute heat effectively.

Flow restriction is particularly restricted on the higher floors of UHW providing further challenges during the winter months. Extra facilities have historically been added to the original system in an effort to keep up with demand, however this has stretched the system as a whole to its limits. It no longer meets any carbon zero initiatives.

4.2.5. Leaks on Major Plant

Due to the age of the system, availability of spare parts and overall performance, major plant frequently fails due to leaks. This is as a result of corrosion within the equipment which occurs over time.

There has been lots of capital investment in some of the major plant rooms over the last 4 years. This was because the plant itself reached a point of failure, where we could no longer supply heating or hot water to the hospital.

Staff were subjected to unnecessary pressure and patient care was detrimentally impacted for a significant length of time. The new plant remains connected to the old infrastructure and this impedes us from being able to upgrade to a more modern and efficient system, which hinders us from reducing our carbon footprint.

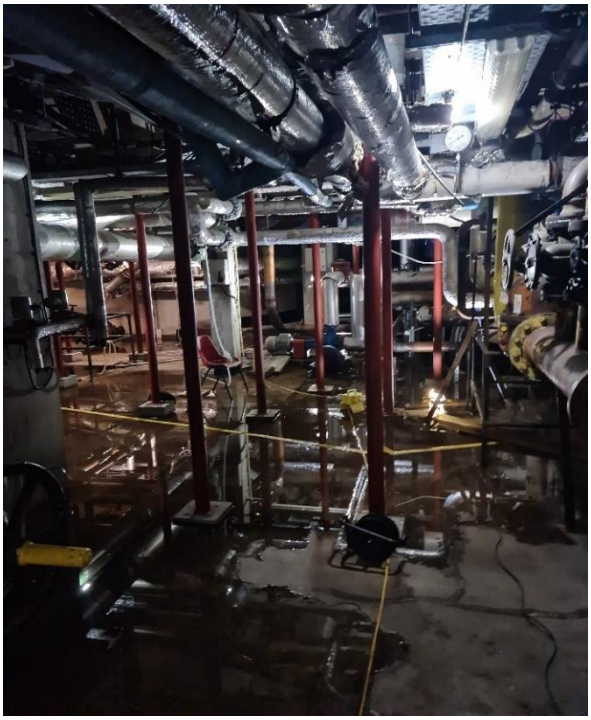
The pictures below show where we have failures within the plant rooms and you can see the ongoing repairs, as well as outdated control panels.

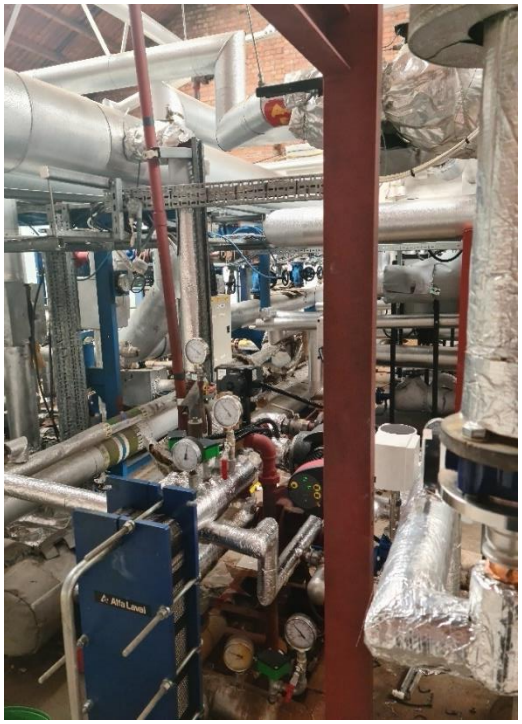
Below is the Anaesthetic gas scavenger, even though it looks in good condition is 20+ years old and parts are becoming obsolete as they ceased to be manufactured several years ago.

Below are photos of the energy centre at UHW, again as you can see the plant has had constant repairs and suffers with constant leaks. The boilers are 30 years old and have outdated controls and burners. The electrical systems in some cases date back 51 years.

This photo shows a work around that is currently in place to prevent a leaking pipe disrupting the plant below it. A sharps bin has been suspended from the leaking pipe and a drainage hose attached to the bottom to allow the water to run out and prevent overflow.

Below are examples of leaks within the basement of the energy centre and the props installed as the floor needed extra support due to additional equipment above.





Below is the UHL energy centre, as you can see from the photo there has been major additions to the plant, this puts more demand on the aged infrastructure. The boilers are again 30+ years old with obsolete controls. The CHPs (combined Heat Power Plant) have reached the end of their life and have been shut down for the last 5 years.

Below is the steam header. This is an example of where we are starting to put double valve isolation in as the current system is non-compliant. To complete the installation successfully with minimum disruption to patients, staff and services, several weeks of planning in collaboration with other services is essential as this work requires a site steam shutdown.

4.2.6. Building Management System

The current majority of our BMS system within the health board (90%), is now obsolete and there is no availability of parts for replacements if faults were to occur.

The existing system is sigma software which is now obsolete and no longer supported. The new software is Struxtureware software which needs to replace the Sigma software plus any associated hardware, IE sensors, controllers etc. This is being done but due to budgetary constraints can only be done once the system fails.

£15,000 worth of controllers were recently changed at Hafan Y Coed as they became inoperable due to outdated software. The current control system is not up to standards and cannot control the building systems as efficiently as it should. This again is a result of the age of the equipment and possible damage as a result of non-related leaks or damage.

4.3. Electrical

The electrical distribution system is rated “High” on the CAVHB risk register with an Impact: Potential disruption to wards should busbars fail leading to long disruption.

4.3.1. Lifts

Due to the constraints of the existing buildings construction it is impossible to fully comply with current British Standards for Lifts.

There are currently 76 lifts being maintained at the UHW site. 20% of these are up to ten years old/ have been refurbished in the last ten years. The majority of lifts are original, installed when UHW was first build.

UHW Lifts are an ongoing issue for the Health Board and rate high on our Risk Register. Over the past few years, mitigations have taken place to improve the reliability of the lifts, however there is a limit to what can be achieved and they remain a major risk.

At present there is a lift upgrade programme in place, however it is not feasible to take lifts out of service for any length of time due to the issues it creates for the clinical departments, the significant impact on patients, hospital logistics and clinical services.

There is insufficient resilience within UHW for core areas to cope with the demand on the lift services.

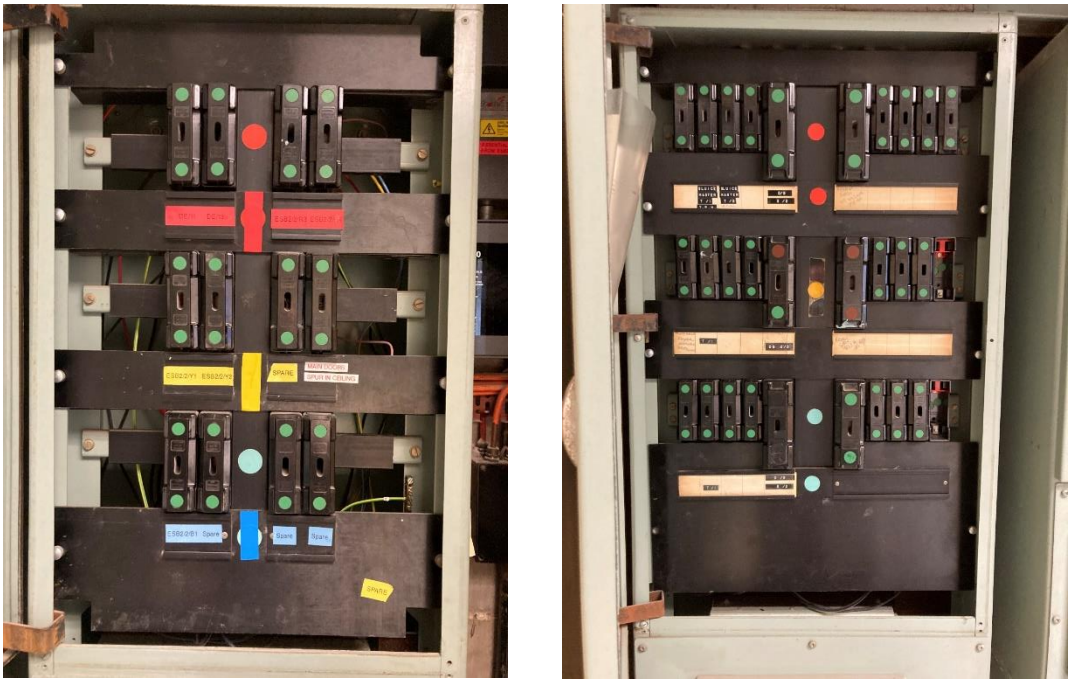
4.3.2. Low Voltage Distribution Boards

The existing electrical infrastructure at UHW consists of a private High Voltage Network that feeds stepdown distribution transformers and low voltage sub-stations across the site.

A number of Low Voltage sub-stations transformers have been replaced over the last 15 to 20 years, however, the majority of the switchgear onsite is original from when the hospital was first built. The existing substations are now undersized and provide little or no scope for future expansion.

The majority of the existing sub-main LV cabling is original AWA cabling from 1963. There are no separate circuit protective conductors installed with the cabling which was normal practice at that time, however this not compliant with current standards.

This is currently monitored on the electrical risk register as a high risk to the health board. Our current mitigation is to continue monitoring and maintain where appropriate.



Typical Ward Riser essential and non-essential Distribution Board

4.3.3. Riser Low Voltage Distribution Boards

The main Riser Low Voltage Distribution Boards are all original Ottermill BS88 Fuse Boards, there is no IP protection within the Boards and due to the age there are exposed live parts.

Any works or inspection of the Distribution Boards require a full shutdown to ensure the safety of staff, this causes significant disruption to the clinical services. There have been a number of occurrences where fuse carriers have overheated and have set the fire alarm system off due to the fumes being produced. We are unable to provide RCD / RCBO protection on final circuits due to the age of the riser distribution boards and constraints within the Risers. This increases the risk to staff and patient safety as the current protection measures do not comply with current protection standards which could result in a serious electrical shock in the event of a fault.

Typical LV main switch-room arrangement. Typical Ward Block riser main switchgear arrangement.

The manufacturer of the components in the photos above ceased their business 20+ years ago. Spare parts are limited at best and are a finite resource that will not be available in the future. Maintenance of these systems will then cease to be practical.

5. Life Expectancy

5.1. Fabric

5.1.1. Concrete structure

Due to age, elements of the main concrete structure are starting to fail, resulting in an ongoing potential danger for parts of the structure to fall from the building as they disintegrate and cause harm to people and property below. It is already past its life expectancy and will continue to fail. The rate of failure is indeterminable as it will depend on a number of factors including ongoing weather conditions.

To future proof the buildings, the concrete façade needs to be removed from the buildings and replaced. This will significantly impact the use of these buildings with potential significant disruption to the delivery of Clinical Services and patient experience. There may be instances where elements of the buildings will need to be closed to facilitate these works

5.1.2. Windows

As with the concrete façade, the single glazed windows and timber frames are already past their life expectancy. They will continue to deteriorate at an indeterminable rate and will eventually fail. Failure could manifest in rotting wood disintegrating from the windows causing a window pane to become loose and fall from the structure.

To future proof, all single glazed, timber framed windows will need to be taken out and replaced. To allow this work to be completed, all adjacent areas would need to closed and isolated, this will have the potential to cause significant disruption to clinical services, patients, visitors and staff

5.1.3. Lifts

Lift equipment and in some cases the original lifts themselves are now obsolete, manufacturers are no longer trading and therefore spare parts are not available. As a result if any part fails and needs replacing the only option in some instances, is to have bespoke parts made by specialist contractors, at a significant cost to the health board with longer lead times. Another alternative is to replace the lift as a whole as part of a larger project.

5.2. Infrastructure

When issues occur (e.g. boiler controls in UHL boiler centre) parts are sourced second hand from Europe, increasing costs and resulting in unnecessary delays due to shipping and transportation – the full effects of Brexit are yet to be realised and could further exacerbate transportation delays. It is worth noting

that spares are becoming harder to source (due to their age) and in the future will no longer be available.

The Capital Estates team has undertaken a modernisation process over the last 3 years to ensure our staff are up to date with equipment, procedures and the industry. This has been changed to compensate for the extra breakdowns and delays in repairs.

Due to the failure of our outdated infrastructure, CAVHB is reliant on external contractors to assist full time staff in meeting the shortfall. This has a negative effect on CAVHB staff moral and impacts our limited budget. To future proof, we must invest in the recruitment of staff to cope with the additional work that results from our current infrastructure.

Patients will continue to be affected by faults and breakdowns, ranging from:

- Manageable issues: such as heating and hot water breaking, resulting in patients being unable to wash for several days. Lifts that are beyond their life expectancy entrapping patients and staff on a regular basis.
- Urgent issues: including theatres and critical areas becoming non-compliant putting patients at risk.

5.2.1. Pipework

The recommended life span for the steel and copper pipework is 20 to 50 years, most of this pipework and associated valves are not only beyond the recommended lifespans, but not supported by the manufacturer and spare parts now being obsolete.

5.2.2. Electrical

The existing substations are now undersized and provide little or no scope for future expansion.

5.2.3. LV distribution boards

Due to the constraints of the building with space and asbestos issues it is nearly impossible to replace the existing mains cabling or provide additional circuit protective conductors.

Due to the current acute services onsite, the building constraints and asbestos constraints it is impossible to replace the existing rising busbars without closing all floors that the busbars feed. For the Ward Blocks this would mean that 266 beds would lose electrical services to isolate the one rising bus-bar.

The majority of final circuit cabling is original (other than in new build and refurbished areas). This cabling is now 50+ years old and while we have a regular inspection and testing regime in place it falls far outside the recommended lifespan of the cabling.

The final circuit cabling trunking systems are all at capacity and due to the constraints of the building we are unable to provide any new containment limiting the number of additional electrical circuits that can be provided.

There is very limited/ no capacity for any future expansion of the electrical network throughout the UHW site. The current backup power system is undersized and a load shedding system is in operation on the HV Network which limits the expansion of critical electrical services. Currently (other than refurbished areas), none of the existing areas comply with HTM / HBN requirements or current British Standards.

5.2.4. Riser Low Voltage Distribution Boards

An average lifespan of our equipment is approximately 25 years, however due to the age of the hospital and the challenges faced to upgrade the system we are currently operation at 40+ years. The system is yet to have a critical failure due to the maintenance and monitoring work of the Estates team, however a critical failure is highly likely in the future.

When a critical failure occurs it will require a system wide change. Repairs will not be possible as spare parts are no longer available from the manufactures.

6. Conclusion

The report has shown that on the whole current conditions of the estate do not comply with all the HTM and HNB Guidelines that are set out to ensure hospitals and healthcare environments are up to the correct standards. An example of defects include non-compliant air changes, beyond life expectancy pipework, failing façade of buildings and rooms in poor conditions. There are major defects, that have been fixed with reactive working that are currently holding the hospital together but working this way is not a sustainable and is putting off inevitable larger failures. There is no timescale/lifespan that will predict when a critical failure may occur, only continuation of monitoring the estates would be able to assist with this.

It is the opinion of this report that UHW and UHL will suffer a critical failure in the near future despite best efforts and due to the issues raised. This report advises that a new hospital would be provide the safest route forward, to meet all current standards, and to ensure staff and patient safety.