GIG CYMRU NHS WALES
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Shared Services Partnership
Specialist Estates Services

Independent Review of Fire Precautions at Gorseinon Hospital

Brynawel Road
Swansea, SA4 4UU

Stage 1 Report: Prior to Agreement of Action Plan

February 2020

NWSSP – SPECIALIST ESTATES SERVICES

INDEPENDENT REVIEW OF

FIRE PRECAUTIONS

AT

GORSEINON HOSPITAL
Brynawel Road, Swansea, SA4 4UU

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1.0 INTRODUCTION

During February 2020, on behalf of the Welsh Government, NWSSP[1] – Specialist Estates Services (NWSSP-SES) commenced an independent review of the fire precautions at Gorseinon Hospital, in accordance with the monitoring procedures outlined in FSN12/10[2].

This report sets out the overall findings of that review, which have been established following a combination of a desktop review, site surveys and discussions with the fire management team, ward staff and estates personnel.

Whilst the review has focussed on the managerial fire controls and emergency procedures, in addition to examining the main passive and active fire precautions, it is not intended to be a risk assessment. However, the observations and recommendations made may support or influence the Board's Fire Risk Assessment (FRA) and related '*significant findings*' as required by the Regulatory Reform (Fire Safety) Order 2005 (FSO). Details of signage, measured travel distances, dead end and inner room situations, etc. are not specifically addressed in this report. These are elements that should be considered through the FRA process.

Each of Chapters 4 through to 9 are set out in the form of a brief commentary setting out generic context and background information, followed by detailed observations and a series of recommendations considered necessary to further enhance fire safety.

Following examination of the review by the Health Board, it has been agreed that the Board will provide NWSSP SES with an action plan and programme for addressing each of the recommendations.

[1] NHS Wales Shared Services Partnership
[2] Facilities Services Notifications - Independent Reviews of Fire Safety

2.0 EXECUTIVE SUMMARY

2.1 The findings of this report undertaken by NWSSP-SES for Swansea Bay University Health Board (SBUHB) relate to a number of measures necessary to improve fire safety standards at Gorseinon Hospital.

2.2 The concept of FRA is a fundamental requirement of the FSO; accordingly, recommendations are made to ensure the FRA's are undertaken and improved for all parts of the site, reflecting the issues identified in this report and adhering to the recommended frequencies.

2.3 The report promotes the importance of a proactive approach to the provision of up-to-date information. It therefore makes a series of recommendations to enhance this aspect including the provision of a bespoke fire manual and improvements to fire drawings.

2.4 The report recognises the Board's fire response procedures for Gorseinon are out of date and not fit for purpose, with recommendations made to provide a comprehensive review of the procedures.

2.5 The report discusses the Board's fire policy and the importance of robust governance and managerial controls, noting the inadequacies in the Board's current arrangements, particularly in relation to the recommended structure as detailed within WHTM 05-01[3]. The report also identifies the Board's failure to conduct annual site wide fire audits since 2016.

2.6 The report recognises the good standard of housekeeping and waste management within the ward area, but also highlights the necessity for improvements in other areas such as; access to and use of disused buildings and the management of combustible materials located within inappropriate areas.

2.7 The report recognises the issues with the current fire alarm system, its zonal arrangements/boundaries and device addressing. Recommendations are made with regard to a coordination exercise to improve all aspects of the fire alarm system, including the Cause and Effect (C&E) Matrix.

2.8 The importance of robust compartmentation is addressed along with a series of recommendations to conduct a full compartmentation survey, rectifying such issues as compartment/sub-compartment lines that do not go full height.

2.9 The report has identified the absence of any evidence regarding evacuation exercises and highlights concerns relating to interdepartmental and Fire and Rescue Service (FRS) cooperation and coordination.

2.10 NWSSP-SES suggests the earliest possible implementation of the recommendations, prioritised according to risk. The Board should develop a prioritised action plan for implementing these remedial measures, in addition to

[3] Welsh Health Technical Memorandum (WHTM) 05-01 Firecode: Managing healthcare fire safety

addressing the significant findings identified through the Board's FRA, in an acceptable timeframe agreed with the FRS.

3.0 BUILDING DESCRIPTION

3.1 Building Description

Dating back to the 1930's, the Gorseinon Hospital site comprises one larger building with a connecting annex, a small number of outlying bungalows and a boiler house situated to the rear of the main hospital building. The main hospital is constructed over 2 storeys, with inpatient/outpatient and therapy departments located on the ground floor, and administration services located over both floors. Of the 3 bungalows, 2 are utilised for the provision of care for Parkinson's sufferers and Looked After Children, the third bungalow being disused and in a poor state of repair.

The hospital building and bungalows are of traditional construction comprising brick and block external walls with pitched, tiled roofing and concrete flooring. Construction at ceiling height for the main hospital is of lath and plaster with suspended ceilings in certain parts of the premises and skimmed plasterboard for the bungalows. Internal partition walls are a mix of stud and solid construction.

The boiler house comprises of a flat roof and is of brick construction, with some portions made up of corrugated metal sheeting.

4.0 OVERVIEW OF FIRE RISK ASSESSMENT (FRA) DOCUMENTATION

4.1 Health Board FRA's

In October 2006, the Regulatory Reform (Fire Safety) Order 2005 (FSO) came into force. This requires the *responsible person* to put in place *general fire precautions* as deemed necessary to safeguard *relevant persons* in case of fire. FRA is the mechanism for determining an acceptable level of fire safety.

Recognising the enhanced emphasis on FRA's, HTM 05-03 Part K[4] was published replacing the former HTM 86. This has been supplemented by an online FRA module (refer to WHEN 09/08[5]), which is supported by the Chief Fire Officers Association (Wales), and provides a consistent approach to FRA's across the NHS in Wales.

4.2 Observations

Utilising the online format, the Board have compiled a set of FRA's for all departments within this hospital; however there is no site wide FRA, nor are there FRAs for the Boiler House, Bungalow A and an external store. Accordingly it is recommended that FRA's are completed for each identified area.

In accordance with the FSO, FRA's have to be suitable and sufficient. Numerous significant findings have been identified for Gorseinon and prioritised accordingly, however content could be more robust in detailing the findings for each area. Furthermore, this report identifies other aspects which should also be referenced in the FRA's. Accordingly, the recommendation is that content of FRA's be reviewed and where necessary strengthened.

It is a requirement of the FSO that FRA's are periodically reviewed and maintained up-to-date. Accordingly, the individual assessments stipulate a review frequency of 12 months for West Ward and Outpatients and 18 months for all remaining areas of the site, relating to occupancy and process for each identified location. The Board should continue to ensure risk assessments are periodically reviewed and maintained up-to-date, in accordance with the review frequency stipulated in the FRA's.

Within healthcare buildings, internal alterations or changes of use frequently occur whereby the resultant change invalidates the FRA. Section 5.1.3 of the Board's fire safety policy states '*Risk assessments will also be reviewed if changes such as the design of the building, patient types, incident etc make the existing risk assessment and control measures no longer valid*'. However, there appears to be no formal process to ensure this occurs. The Board should ensure risk assessments are reviewed following refurbishments, alterations or other changes that may invalidate the original assessment.

Furthermore, the Board should also implement a procedure to ensure that FRA's and related significant findings are considered when refurbishments are undertaken.

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[4] Health Technical Memorandum (HTM) 05-03 Part K: Guidance on fire risk assessments in complex healthcare premises

[5] Welsh Health Estates Notification (WHEN) 09/08: Web based Fire Risk Assessment Module

4.3 Recommendations

4.3.1 The Board should ensure that suitable and sufficient FRA's are completed for all areas of the site, reflecting the findings of this report

4.3.2 The Board should continue to ensure risk assessments are periodically reviewed and maintained up-to-date, in accordance with the review frequency stipulated in the FRA's.

4.3.3 The Board should ensure risk assessments are reviewed following refurbishments, alterations or other changes that may invalidate the original assessment.

4.3.4 The Board should implement a procedure to ensure that FRA's and related significant findings are considered when refurbishments are undertaken.

5.0 SITE-SPECIFIC FIRE SAFETY MANUAL

5.1 Commentary

Firecode recommends that fire safety manuals be developed for all healthcare premises. A site-specific fire safety manual is an essential tool for managing the fire safety of an occupied building.

BS 9999:2017 'Code of practice for fire safety in the design, management and use of buildings' states:

"The fire safety manual should:

- *provide a full description of the assumptions and philosophies that led to the fire safety design, including explicit assumptions regarding the management of the building, housekeeping and other management functions;*
- *explain the nature of fire safety planning, construction and systems designed into the building and their relationship to the overall safety and evacuation management;*
- *draw on documentation produced at design stage to describe the use of various protection systems in each type of potential incident;*
- *set out the responsibilities of management and staff with regards to fire safety;*
- *provide a continuously updated record of all aspects of the building and the building users that affect its fire safety."*

The fire safety manual should support the Board's overall fire strategy and form part of the information package that contributes to the FRA to support and justify the significant findings.

5.2 Observations

There is no formally documented fire safety manual developed by the Board, which would include a description of the local fire response procedures. There are copies of documentation, dated June 2005, located at the main fire alarm panel that would normally sit within a fire safety manual, none of which is structured or current. Therefore, it is recommended that the Board develops appropriate documentation, considering the guidance issued in WHEN 09/16[6] which presents the relevant information in the following three distinct sections:

1. Organisational-wide documentation - i.e. the Board's Fire Policy and reference to any other related policies such as smoking or hot works;
2. Site-specific documentation - detailing the fire strategy, passive and active fire precautions and any specific site risks etc;
3. Fire response procedures and responsibilities.

The provision of accurate drawings is an essential element of a robust fire safety manual. Drawings were available for viewing, however they were not up to date. Accordingly, it is recommended that the Board ensure the drawings reflect the 'as installed' standards for all fire related provisions and the drawings

[6] Welsh Health Estates Notification (WHEN) 09/16: Guide to the production of site specific fire safety manuals

are maintained up-to-date. In addition, it is also recommended that the Board develop departmental escape and evacuation drawings/signs in accordance with the standards promoted in BS ISO 23601[7]. Reference should also be made to the drawing recommendations made throughout this report.

It is recommended that a hard copy of the above information should be retained on site, and that consideration is given to the documentation being made available on the Boards intranet website.

In addition to supporting the FRS as noted in Section 5.16 of the Board's Fire Safety Policy (HB 115), this documentation (and related FRA's) should be referred to when future alterations are considered. This will ensure that the fire safety protection measures are neither negated nor diminished as a result of future alterations.

To maintain the validity of the documentation, the Board should introduce a process for periodically reviewing and updating the fire procedure document as necessary. It is recommended this process also extends to periodically reviewing the drawings and fire precautionary measures as referenced above, in addition to considering the wider recommendations of this report.

5.3 Recommendations

5.3.1 The Board should introduce a bespoke fire safety manual containing relevant documentation, considering the format of the model fire safety manual promoted in WHEN 09/16 and WHTM 05-01.

5.3.2 The Board should develop 'as installed' drawings illustrating all fire related provisions.

5.3.3 The Board should develop departmental escape and evacuation drawings/signs in accordance with the standards promoted in BS ISO 23601.

5.3.4 The Board should ensure a hard copy of the above information is retained on site, and consider making it available on the Boards intranet website.

5.3.5 The Board should ensure any future building alterations/proposals are considered in light of the fire documentation.

5.3.6 The Board should implement a process to periodically review the documentation and include a method for referencing revisions.

[7] BS ISO 23601:2009 - Safety identification. Escape and evacuation plan signs

6.0 MANAGERIAL CONTROLS

To comply with the mandatory requirements of Welsh Health Circular WHC(2006)74[8] all NHS organisations must:

- *have a clearly defined fire safety policy covering all buildings they occupy;*
- *nominate a Board Level Director accountable to the Chief Executive for fire safety;*
- *nominate a Fire Safety Manager to take the lead on all fire safety activities;*
- *have an effective fire safety management strategy which enables:*
    - *the preparation and upkeep of the organisation's fire safety policy, procedures and FRA's;*
    - *adequate means for quickly detecting and raising the alarm in case of fire;*
    - *means for ensuring emergency evacuation procedures for all areas, at all times the premises are occupied, without reliance on external services;*
    - *all staff to receive fire safety training appropriate to the level of risk and duties they may be required to perform;*
    - *reporting of all fire and unwanted fire signals incidents via the 'Fire & UwFS incident reporting system' database;*
    - *submission of data via the 'Fire audit information system';*
    - *the development of partnership initiatives with other bodies and agencies involved in the provision of fire safety*.

6.2 Observations

6.2.1 Policy Documentation and Management Structure

The Board's current Corporate Fire Safety Policy HB 115 dated 20th October 2016, was scheduled for a review in October 2019; however, it remains out of date. It should be noted that the document references the organisation as still being Abertawe Bro Morgannwg University Health Board (ABMUHB), whereas from 1st April 2019, the Board title transferred to that of Swansea Bay University Health Board (SBUHB). It should also be noted that the existing policy pre-dates publication of the latest edition of WHTM 05-01, which contains recommendations on the development of a suitable policy document.

The following comments are primarily based upon the Board's current Fire Safety Policy HB 115, albeit reference is also made to any pending updates that may be in progress.

The fire policy documentation addresses the fire safety management structure including management responsibilities, and also cross-references generic issues that impact upon fire safety such as, but not limited to smoking and house-keeping.

[8] Welsh Health Circular (WHC) (2006) 74: Fire safety policy for the NHS estate in Wales

The Board's fire management structure broadly follows the principles of the exemplar outlined in WHTM 05-01, albeit the Fire Safety Manager's role and responsibilities are split between various posts, these being:

- Strategy Directorate
- Assistant Director of Strategy (Estates)
- Assistant Director of Strategy (Capital)
- Head of Health and Safety

The policy also recognises the responsibilities of the Board's wider management structure with regard to fire safety. The current version details the role of Service Delivery Units and Senior Management having responsibility for fire safety under their control.

The documentation also recognises that fire safety management cannot exist in isolation, and makes reference to the following forums where fire safety is a standing agenda item:

- Fire Safety Health and Safety Committee (FSHSC)
- Health and Safety Committee (HSC)
- Quality and Safety Committee/Assurance and Learning Committee (QSC/ALC)

The Board's policy stipulates that a Site Manager (and deputy) will be identified. At Gorseinon, the Hospital Manager fulfils the Site Manager role, supported by the Unit Manager in the role of Deputy. Currently, there is no formal structure for specific site level fire group meetings; however, the Board have confirmed fire safety at Gorseinon is discussed in the quarterly fire safety group meetings, albeit this forum is not specifically referenced within the Board's Fire Safety Policy.

Overall, the policy is to be read in conjunction with each hospital's Site Fire Safety Management Plan (FSMP), and as referenced at Section 5, Gorseinon's FSMP is yet to be developed.

The documentation (ABMUHB Fire Safety Policy) references Fire Wardens appointed by departmental managers to support fire management. There are currently 6 nominated members of staff, who have received the requisite training and are nominated as Fire Wardens for Gorseinon Hospital. From discussions with the Hospital Manager, the desire is to train up additional members of staff, thereby providing for a better pool of resilience across the site.

Upon appointment, Fire Wardens are invited to attend a training session, and are presented with a Fire Warden handbook. The handbook provides comprehensive guidance on relevant duties and is generic to the Board.

It is recommended that a comprehensive review of fire safety policy documentation is undertaken, in order that roles and responsibilities are clearly defined in accordance with WHTM 05-01.

The Online Fire Audit System is an all-Wales facility used for monitoring, and ultimately enhancing, fire safety standards through a series of questions promoting best practice and identifying corrective actions. The Board's Fire Safety Policy notes that of the above groups, the FSHSC are not required to provide a review of the audit. Consequently, it is recommended that this omission be corrected in the amended Fire Safety Policy.

A site level audit has not been submitted for Gorseinon since 10th November 2016, which can only be held as a true reflection of conditions on the site at that time. This represents a direct failure in complying with SESN 16/01[9] and subsequent editions.

As a result of discussions with staff, it would appear that the Board's current resource of Fire Safety Advisors (FSA), is inadequate to address these issues. Accordingly it is recommended that an increase in resource of competent FSA's be given high priority.

To support the effective dissemination of fire safety information across the organisation, consideration should be given to the development of a dedicated fire safety section on the Board's intranet system, giving access to information such as policies, fire safety manuals, drawings and managerial aids. This has proved extremely useful where adopted in other health boards and assists in achieving consistency.

6.2.2 Fire Prevention

The first line of defence, must be the prevention of fire. This is best achieved by effective procedures addressing issues such as good housekeeping, waste management, security and arson control, appropriate maintenance and adequate staff training.

6.2.3 Good Housekeeping including Cylinder and Waste Management

It was evident during the review that the standard of house-keeping arrangements and waste management throughout the Ward and other patient areas of the hospital, appeared to be generally well managed. However there was a lack of attention to the management of fire load in other areas, noting the following examples:

- Bungalow A - storage of excessive amounts of combustible material (refer to Section 6.2.5 Arson and Security)
- District Nurse Corridor - Kitchen containing portable appliances in close proximity to combustible materials in filing cabinets and on shelving
- External Store - containing beds on charge in close proximity to combustible materials.

Departmental fire safety management checklists can support effective fire management and play an important role in maintaining staff awareness of fire safety issues. Documentation being utilised for periodic tests and inspections, confirmed a good approach to the required checks, albeit not filed in a dedicated

[9] Specialist Estates Services (SESN) 16/01 Fire Safety Audit System

fire manual. Furthermore, the inspection procedure should be enhanced in order to identify the issues highlighted above.

Cylinders were identified as being used for both piped and portable purposes. A dedicated secure cage was in situ for the storage of larger cylinders in use for the manifold supplying the piped systems. Use and storage of cylinders appeared to be well managed, however it was noted that the manifold room, accessed externally, was some distance away from the store. It is recommended that the guidance detailed in Section 8 of HTM 02[10] is followed.

Isolation valves for the piped system were located in the connecting corridor between West Ward and the Rehab Day Unit. In addition, consideration should be given to the preparation of schematic drawings illustrating the medical gas installation.

Furthermore, the site specific procedures should reference the use and emergency procedures for cylinder management during a fire incident. Information regarding storage arrangements will support the FRS with operational firefighting.

6.2.4 Smoking

The Board's Smoke-Free Policy (HB 94) dated March 2017 states that: *"ABMU Health Board's policy is that smoking is not allowed by any person on any sites used by the ABMU Health Board nor by any employee whilst engaged in Health Board business (with those limited exceptions as set out in section 8 below). Throughout the policy the term smoking incorporates the use of ENDS/e-cigarettes".*

During the review there was little evidence of smoking taking place around the site, an indication that it is being well managed.

6.2.5 Arson and Security

It is acknowledged that malicious fire-raising has not been a significant issue at Gorseinon. However, the potential arson risk must be considered. Section 5.14 of the Board's Fire Safety Policy provides a brief commentary on deliberate fire raising.

Robust storage and waste management controls are essential factors for restricting access to sources of combustibles available for the potential arsonist. Waste management arrangements appeared to be effective; however, externally located waste receptacles were in close proximity to the physiotherapy corridor, with the potential of attracting malicious activity. It is recommended that alternative arrangements are made for the storage of waste receptacles externally, thereby limiting access to malicious activity and reducing the risk of arson, in close proximity to the building.

Bungalow A is currently disused, but contains excessive amounts of combustible material. It has been subject to unauthorised access by vandals,

[10] Health Technical Manual (HTM) 02: Medical gas pipeline systems (Parts A & B)

evidenced by smashed windows and widespread internal damage. SESN 19/06[11] provides guidance on effective management arrangements for vacant premises. Accordingly it is strongly recommended that Bungalow A is emptied of all combustible materials and ignition sources, with improvements in security implemented to help prevent any further malicious activity.

6.2.6 Portable Appliance and Electrical Testing

One of the main causes of healthcare fire incidents is attributed to electrical equipment failure (portable and fixed installations) highlighting the importance of robust testing and maintenance regimes. Through a visual inspection of randomly examined equipment, it was evident that the majority of electrical appliances inspected displayed evidence of satisfactory PAT testing.

The Boards' Low Voltage Systems Management and Operational Policy (HB 158) details that: *"Fixed Electrical Testing and surveys shall be carried out for all health boards premises not less than once every five years in line with the Electricity at Work Regulations and BS7671 Requirements for Electrical Installations".* The last recorded 5 yearly test was undertaken by Phillips Services (Wales) Ltd. The next test was due October 2019, identified via a servicing label attached to a distribution board. It is recommended that the Board ensures fixed electrical testing is completed for Gorseinon Hospital, with certification provided in accordance with HB 158 and BS 7671.

6.2.7 Maintenance

Robust maintenance of passive and active fire precautions is considered essential for ensuring appropriate fire safety standards and is a legal duty imposed under Article 17 of the FSO.

Specific maintenance issues are further discussed in Sections 7 and 8 below.

6.2.8 Staff Training

Staff training is essential for effective response procedures, also maintaining an awareness of fire prevention issues. Recognising this, the Board's Fire Safety Policy identifies the need for adequate training, which is broadly addressed through a risk based training delivery plan (i.e. Training Needs Analysis).

Open attendance fire training sessions are organised at various sites within the Health Board, albeit not held at Gorseinon; however, staff are encouraged to attend one of the designated sites for an arranged session where practicable.

With regard to training performance, the latest fire audit records overall Board wide compliance at 79%. Staff training performances are managed through the ESR recording system. Due to limitations of the reporting system, the Board were unable to provide specific figures for Gorseinon based staff.

The policy references specific training for those with key roles to fulfil with regard to fire safety such as Fire Wardens. Specific training is organised and

[11] Specialist Estates Services Notification (SESN) 19/06 Fire management of derelict or unoccupied buildings

provided on a monthly basis, to those nominated as Fire Wardens, with a handbook detailing associated duties, published for each person.

Section 9 of this report addresses the importance of evacuation exercises, the lessons from which should form an integral part of the staff training. Furthermore, evacuation exercises can also form a useful method for assessing the effectiveness of the training regime.

6.3 Recommendations

6.3.1 The Board should ensure that a comprehensive review of fire safety policy documentation is undertaken, including a reinforcement of roles and responsibilities, in accordance with WHTM 05-01.

6.3.2 The Board should recognise that an increase in resource of competent FSA's is of high importance.

6.3.3 The Board should ensure that the recommendations detailed within SESN 16/01 and subsequent editions are followed, relating to fire audit submissions.

6.3.4 The Board should consider supporting the effective dissemination of fire safety information through the development of a dedicated fire safety section on the Board's intranet system.

6.3.5 The Board should ensure standards of housekeeping are maintained and improved where necessary, also making sure regular inspections continue to be completed and recorded.

6.3.6 The Board should ensure the medical gas cylinders are stored in accordance with HTM 02 and the site specific procedures updated to reference the location, use and emergency procedures for cylinder management during a fire incident.

6.3.7 The Board should ensure that Bungalow A is given a high priority and emptied of all combustible materials and ignition sources, with improvements in security implemented to help prevent any further malicious activity.

6.3.8 The Board should ensure that fixed electrical installation testing is completed for Gorseinon Hospital, with certification provided in accordance with HB 158 and BS 7671.

7.0 DETECTION AND ALARM

7.1 Commentary

In healthcare buildings, analogue addressable fire alarm and detection systems should be provided to an L1[12] *standard (total coverage with a few exceptions) in accordance with Firecode HTM 05-03 Part B*[13] *which supplements BS 5839:1*[14]*.*

The purpose of the alarm system is to provide the earliest possible warning of an incident to enable emergency response procedures to be implemented as necessary.

Fire alarm systems are often interfaced with other 'active' fire precautions/devices to maintain fire safety through the 'cause and effect'. As the hospital fire alarms are intended to alert staff, Firecode permits reduced audibility of sounders in patient areas.

7.2 Observations

7.2.1 General Description

Gorseinon Hospital currently has a Static analogue addressable fire alarm system with 114 actuation devices. The standard of coverage was to the majority of areas, albeit not to an L1 standard.

The fire alarm system is connected to an alarm receiving centre, which automatically relays a call to the FRS upon activation.

The system is maintained by Static Systems Group with a service contract in place; the Board have indicated that responsibility for the fire alarm system rests with Estates who complete mandatory weekly tests of the system. Users responsibilities are contained within BS 5839-1 Section 7, which details a full list of duties and responsibilities, including maintaining appropriate documentation plans, servicing records, and rectification of faults/Unwanted Fire Signals(UwFS), etc.

7.2.2 Zoning Arrangements and Addresses

Zone plans for the site were available, however they were not up to date. The 'zoning' arrangements indicate that the site is divided into 15 zones, which includes the Bungalows and Boiler House to the rear of the premises.

'Zoning' arrangements should generally reflect departmental boundaries and be defined by compartment/sub-compartment fire walls. However, within the West Ward area, the lack of clarity regarding the extent and integrity of compartmentation, presents difficulty in accurately defining zone boundaries. In addition, there were small sections of the main hospital building, according

[12] BS5839 L1 - Category L systems are intended for the protection of life. L1 systems are installed throughout all areas of the building. The objective of a category L1 system is to offer the earliest possible warning of fire, so as to achieve the longest available time for escape.
[13] Health Technical Memorandum (HTM) 05-03 Operational Provisions Part B Fire detection and alarm systems
[14] BS 5839-1:2017 Fire detection and alarm systems for buildings Part 1: Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises.

to the supplied drawings, that were not assigned to a specific zone - in effect being left in a 'no man's land' scenario. Accordingly, it is recommended that the current zoning arrangements are reviewed and coordinated with compartmentation arrangements.

Upon completion, the zone plans should be displayed adjacent to all fire alarm panels and also be retained in the fire manual.

Furthermore, from a review of the device address schedule, numerous irregularities were evident.

Accordingly, it is recommended that a coordination exercise be undertaken to ensure device addresses align with room identification, also taking into account the anomalies with the zone boundaries.

7.2.3 Cause and Effect (C&E)

In addition to the sounders, a visual inspection of the premises resulted in the identification of a number of détentes (hold open devices) installed throughout the hospital, that are interfaced with the fire alarm system.

The current C&E matrix provides for a simplified view of actions upon activation of the fire alarm, with what appears to be the correct operation of détentes throughout the hospital. However, there is confusion over the relationship between the two output groups for sounders and ward sounders and their continuous or intermittent operation. Ensuring the correct function of sounders and other interfaced devices, is critical to the effective implementation of response procedures.

It is recommended that the C&E matrix be updated, utilising the format referenced at Appendix C. This should detail all ancillary devices linked to the fire alarm, reflecting the correct zoning arrangements. The C&E should then be validated annually.

7.2.4 Sounders

In hospital premises utilising Progressive Horizontal Evacuation (PHE), sounders are usually configured to emit a continuous signal in the affected area and an intermittent alert in immediately adjoining areas, noting that the fire alarm sounders should have distinctive yet similar sound characteristics, for example, bells and electronic sounders should not be mixed.

In consultation with staff at the time of the review, it was clear their perception of sounders and their meaning, do not align with that of the documented C&E. As noted above, this should be addressed through the reconfigured zoning arrangements and C&E and explained in staff training.

7.2.5 Extent of Coverage

A mix of 'as-installed' and 'existing' drawings were available illustrating the fire alarm system and extent of coverage in each area. As previously noted, the site is not fitted with an L1 standard fire alarm, with rooms on both ground and 1st floor not fitted with any detection. It is recommended that in accordance with

BS 5839-1, an L1 standard system is installed, complete with the provision of 'as installed' drawings.

It should also be noted that domestic type smoke detectors were fitted alongside the installed automatic fire detection, within Bungalow B (Looked After Children (LAC)) and Bungalow C (Parkinson's Clinic). The Board have confirmed that the domestic detectors were installed as a temporary solution due to faults with the main system. Accordingly, it is recommended that the domestic type detectors are removed, in order to avoid confusion and unnecessary activations.

7.2.6 Repeater Panels

The hospital has a main panel located at the main reception, with repeater panels located at the following points:

- Reception area - West Ward
- Bungalow C - Parkinson's Clinic

This provides good access to facilities where staff can gather relevant information relating to fire alarm actuations. However, there was no repeater panel located anywhere on the 1st floor. Accordingly, consideration should be given to the installation of a Repeater Panel on the 1st floor of the main building.

7.2.7 Maintenance and Testing

Weekly tests, activating Manual Call Points (MCP), are undertaken and recorded by Estates staff from Morriston Hospital, testing individual MCP's on rotation. The test confirms sounder activation in the relevant zone and that the signal is communicated to the main panel.

The system is also maintained under contract with Static Systems Group who complete periodic service visits during which all devices are functionally tested.

At the time of the review, the fire alarm panel was indicating a sensor disablement to the Boiler House, with more disablements indicated, but not listed on the main screen.

As noted previously, reference should be made to BS 5839 Section 7, with regard to user responsibilities.

7.2.8 Unwanted Fire Signals (UwFS)

All fire alarm activations, through whatever cause, should be recorded via the online Fire & UwFS Incident Reporting System. A review of the data relating to Gorseinon indicates that there were only 2 UwFS reported during 2019 with no previous records of UwFS since 2015. However discussions during the review, indicated more frequent activations, but without any robust recording.

A review of the recording arrangement should be implemented to ensure all fire alarm activations are reported fully and in a timely manner.

7.3 Recommendations

7.3.1 The Board should review the current fire alarm zoning arrangements, ensuring these are coordinated with the compartmentation. Upon completion, zone plans should be displayed adjacent to each fire alarm panel.

7.3.2 The Board should undertake a coordination exercise to ensure device addresses align with room identification and reconfigured zone boundaries.

7.3.3 The Board should update the C&E matrix, detailing the sounders, all ancillary devices and reconfigured zoning arrangements.

7.3.4 The Board should ensure that in accordance with BS 5839-1, an L1 standard system is installed, complete with the provision of as installed drawings.

7.3.5 The Board should ensure that the domestic type detectors are removed, in order to avoid confusion and unnecessary activations.

7.3.6 The Board should consider the installation of a Repeater Panel on the 1st floor of the main building.

7.3.7 The Board should initiate a review of the recording arrangements to ensure all fire alarm activations are reported fully and in a timely manner.

7.3.8 The Board should ensure the complete fire alarm system is maintained in accordance with BS 5839, including annual validation of the C&E.

8.0 FIRE PRECAUTIONS AND MEANS OF ESCAPE

8.1 Commentary

Means of escape in healthcare premises is based on the concept of Progressive Horizontal Evacuation (PHE). PHE is reliant on the provision of 60 minute compartmentation and 30 minute sub-compartmentation to limit the spread of fire and smoke and also reduce travel distances. Compartmentation should also provide separation between high life risk areas and high fire hazard areas.

In addition, WHTM 05-02[15] recommends that localised fire hazards such as store rooms and ward pantries are enclosed in 30 minute fire resisting construction to contain any fire and further enhance the means of escape. 60 minute protected shafts are recommended where vertical movement through the building is required and/or where essential services penetrate compartment floors to maintain the fire resisting integrity of the hospital.

WHTM 05-02 recommends that elements of structure for hospitals with floors up to 12m above ground attain a 60 minute period of fire resistance. Firecode also stipulates maximum travel distances and requirements for adequate illumination.

8.2 Observations

8.2.1 Fire Compartmentation and Elements of Structure

Accurate fire drawings are essential for understanding and ensuring a robust fire strategy, illustrating the extent of passive protection required. At the time of the review, the Board were unable to provide detailed fire drawings indicating the compartmentation, sub-compartmentation or hazard room arrangements.

To validate the integrity of passive fire containment, a ceiling void inspection was conducted above West Ward. In the absence of fire drawings, the inspection focussed on walls that would be expected to have a period of fire resistance and be installed to full height. The inspection resulted in deficiencies with regard to walls not going full height and/or correctly aligned and unstopped breaches above suspended ceilings.

Accordingly, it is recommended that a full set of fire drawings is prepared indicating the existing and required compartmentation, sub-compartmentation and hazard room enclosures, followed by a compartmentation survey, the findings of which should be prioritised for action accordingly.

8.2.2 Mechanical Ventilation

From a visual inspection, Mechanical Ventilation appears to be limited to a Heat Recovery Ventilation (HRV) unit, housed within the ceiling void, above Cubicle 7. This type of system should be subject to routine maintenance in accordance with the manufacturer's instructions and part of the PPM scheduling.

[15] Welsh Health Technical Memorandum (WHTM) 05-02 Firecode - Fire safety in the design of healthcare premises

There were no drawings available illustrating the mechanical ventilation; however, the compartmentation survey should identify where ducting may be installed and the necessity for associated fire dampers.

8.2.3 Fire Door Condition and Maintenance

Effective fire doors are vital for maintaining the integrity of compartmentation.

Numerous fire door deficiencies were evident, typically comprising missing smoke seals, self-closers not working properly and doors wedged open. Many of these shortfalls are detailed within the respective FRA's.

The absence of accurate fire drawings and a fire door identification system, creates confusion as to which doors are actually designated as fire doors. Therefore, it is recommended that the previously referenced revised fire wall drawings should be used as the basis for identifying where fire doors should be installed. Ideally, all fire doors should also be identified on a schedule/register which will support the future maintenance regime.

With regard to maintenance, the latest edition of BS 8214[16], published in December 2016, promotes a risk based approach for determining inspection frequencies, whereby doors typically prone to damage or considered critical to the fire strategy may require more frequent inspection than lesser used or less critical fire doors. PPM data indicates that fire doors around the Gorseinon site are being inspected on a 6 monthly basis.

Accordingly, it is recommended that the Board reviews the existing maintenance arrangements to ensure all designated fire doors are installed and maintained as necessary and the deficiencies identified through the risk assessment process are rectified.

8.2.4 Emergency Escape Lighting

Gorseinon Hospital has traditional manual key switch test emergency escape lighting. External emergency lighting has also been provided in part.

There are no up-to-date 'as installed' drawings illustrating the extent of emergency escape lighting.

No illumination level assessments were undertaken during this review. Since the lighting system was installed, the national standards for emergency escape lighting have increased the locations and level of illumination expected. Therefore, the Board should assess lighting levels, to confirm compliance with the latest standards.

Emergency escape lights are subject to periodic monthly inspections, with records available to indicate these are being completed. It is unclear from the PPM data as to whether annual 3 hour full discharge tests are being carried out. Accordingly it is recommended that the Board ensures completion of annual testing for all emergency escape lighting.

[16] BS 8214 Timber-based fire door assemblies. Code of practice

Manual test systems are resource intensive, therefore consideration should be given to upgrading the emergency lighting to a networked automatic self-testing system.

8.3 Recommendations

8.3.1 The Board should develop a full set of CAD fire drawings, indicating the compartmentation, sub-compartmentation and hazard room enclosures. A compartmentation survey should then be implemented, the findings of which should be prioritised for action accordingly.

8.3.2 The Board should review the existing maintenance arrangements to ensure all designated fire doors are installed and maintained as necessary and the deficiencies identified through the risk assessment process are rectified.

8.3.3 The Board should assess the emergency lighting illumination levels for compliance with the latest standards, including the provision of adequate lighting to all external escape routes.

8.3.4 The Board should ensure emergency lighting is tested as necessary. Consideration should also be given to a programme for renewing the escape lighting to a networked self-testing system.

8.3.5 The Board should develop ‘as installed’ emergency escape lighting drawings.

9.0 EVACUATION AND RESPONSE PROCEDURES

9.1 Commentary

The concept for means of escape in healthcare premises is based upon Progressive Horizontal Evacuation (PHE). This is achieved by moving patients on their beds or in wheelchairs from the affected fire area through fire resisting compartments and sub-compartments to an adjoining area on the same level. Only if absolutely necessary would external evacuation be considered.

Firecode currently promotes mattress evacuation; however, within the NHS there is a vast array of evacuation aids available, consequently there is no one standard approach. For example, some Boards adopt the concept of mattress evacuation utilising evac-sheets permanently located under every bed, whilst other Boards consider the evac-sheets to be an infection control problem thereby adopting an alternative approach.

Whatever evacuation strategy is adopted the Board should ensure and be able to demonstrate that all patients are able to be evacuated safely within a 'reasonable time', without reliance on support from external agencies.

Furthermore, a well-rehearsed and co-ordinated response to a fire emergency is a key element to safeguard the occupants and fabric of the building and is a requirement of Firecode. All staff should know what their specific responsibilities are during a fire incident and should be competent to fulfil those duties accordingly.

9.2 Observations

9.2.1 Occupants and Staff Levels

<u>Patients</u>

Firecode classifies patients as *independent*, *dependent* or *very high dependency* based on their mobility and alertness. The degree of dependency can be further sub-divided by assessing the age profile and the number of ambulant and non-ambulant patients that can be present at any one time.

Gorseinon has approximately 38 inpatient beds; all of which are located in West Ward. The majority of these patients are classed as 'dependent'.

Patients treated in other departments, such as out-patients and physiotherapy, are generally classed as *independent* or *dependent*.

<u>Visitors</u>

The Board operates protected meal times. Visiting hours are typically between 11:00 - 20:00, although there can be a degree of flexibility with visitors present outside of the allocated visiting times, subject to the patients' condition. There are proposed changes being considered, altering visiting times to 13:00 - 15:00 and 19:00 - 20:00.

Staffing Levels (West Ward)
West Ward has three 'staffing' shifts; early, late and night. Staffing levels are at their lowest during the 'night' shift.

The following table provides data on the patient/staff ratios and an indication of the degree of non-ambulant patients typically present within the ward.

Inpatient Ward Occupant/Staff Profile Data

Location	*Floor*	*24/7*	*Max Patients*	*Staff Early*	*Staff Late*	*Staff Night*	*% non-ambulant*	*Comments*
West Ward	Grd	24/7	38	10	10	7	20%	Elderly Rehab Ward

Other non-inpatient departments such as out-patients and physiotherapy etc. are excluded from the above table.

The percentage of non-ambulant patients is estimated - it is acknowledged that the patient profile can change from day to day; however, as referenced previously, the above figures were provided by the Hospital Manager based on the patient profile at the time of the review and are therefore considered typical for the purpose of this review.

Fire legislation requires that an organisation's fire procedures for safe evacuation of occupants must not be reliant on support from external agencies such as the FRS. Therefore, any strategy for evacuation will be reliant on adequate numbers of staff. This is even more so where patients may need to be transferred from beds, baths, etc. to wheel chairs or other evacuation aids where applicable.

With regard to the evacuation of disabled employees, Section 5.6 of the Board's Fire Safety Policy references a PEEP[17] system in place, responsibility for which is delegated to the respective line management and individual concerned.

9.2.2 Horizontal Movement and Means of Escape

Firecode guidance for means of escape is based on the concept of PHE, only considering one fire at any one time.

The provision of robust compartmentation and sub-compartmentation is intended to restrict fire spread and reduce the distance for the occupants to reach safer areas within the building.

Whilst a full set of plans detailing the compartmentation arrangements are not available, subject to the location of a fire, the internal layout provides reasonable potential for progressive horizontal evacuation. That said, access to the roof void above inpatient areas, revealed some significant failings in compartmentation as noted previously.

[17] Personal Emergency Evacuation Plan

Although there are final exits leading out from West Ward to a short external pathway and the covered colonnade area, further travel is via grassed terrain, which does not lend itself to providing an effective means of escape away from the building. This is of particular concern due to horizontal evacuation being undertaken on this route, utilising beds, wheelchairs or staff-assisted walking. It is therefore recommended that high priority be given to the development of more suitable hard standing surface areas, for egress routes leading out and away from the Ward areas.

The evacuation of patients is briefly addressed in the Gorseinon procedures, albeit out of date with regard to the current use and occupancy of the hospital. Accordingly, it is recommended that evacuation procedures are redeveloped and brought up to date.

As previously referenced, the provision of departmental fire plans detailing escape routes in accordance with BS ISO 23601, will further support effective evacuation and response procedures.

9.2.3 Evacuation Exercises

In risk assessment terms, the criteria for assessing whether a means of escape is acceptable are no longer judged solely on travel distance. It now includes the concept that escape must be achieved within a 'reasonable time', although 'reasonable time' is not actually defined.

Various factors will impact upon the time for evacuation, i.e.

- the dependency, age profile and number of ambulant and non-ambulant patients to be evacuated;
- the time to prepare patients for evacuation and/or utilise evacuation aids;
- the time of the fire incident which influences the number of staff present;
- fatigue, which can have a considerable impact on staff undertaking repeated evacuation.

The effectiveness of the response procedures can only be demonstrated through practical exercises; however, there are no records available regarding completed exercises at Gorseinon, including those involving the FRS. Accordingly, it is recommended that regular exercises are completed for staff and patients, with the involvement of the FRS and in association with the redevelopment of procedures recommended at Section 5.2.

9.2.4 Response Procedures

As detailed at Section 5.2, the current response and evacuation procedures are out of date and not fit for purpose. However, verbal confirmation at the time of the review provided the following information with regard to actions taken by staff, when the fire alarm activates:

- Designated persons inspect the fire alarm panel(s) to ascertain location of the activation
- An alarm receiving centre is automatically contacted, who have the responsibility of raising the alarm with the FRS.

- In hours of darkness, the above remains the same, however, the only area occupied is West Ward, with no porters on duty after 15:00.

It should also be noted that there is no robust or documented co-ordination between the Ward and other areas of the site, therefore no assistance would be forthcoming from other departments in the event of an alarm. It is recommended that a cooperation and coordination procedure is developed for all departments.

9.2.5 FRS

Upon arrival, the FRS will be met at the Main Entrance by either the Hospital Manager, Ward Sister or Nurse in Charge (dependent on time of day and availability), who will inspect the panel for the location of the activation. If the incident does not involve the inpatient area, Ward staff will return to the Ward, the FRS being left to investigate the alarm activation further.

As noted previously, to support the FRS's operational procedures, a fire safety manual should be available, including fire plans which detail up-to-date information about the building and associated fire precautions installed.

The Board's procedures should also reflect the operational procedures of the FRS. For example, subject to the location of the incident, fire hoses may be laid along the corridors used for escape; which may impact upon the evacuation strategy. Therefore, as noted previously, the FRS should be invited to participate in future evacuation exercises to ensure effective coordination.

9.3 Recommendations

9.3.1 The Board should ensure that high priority is placed upon the development of more suitable hard standing surface areas, for egress routes leading out and away from the Ward areas.

9.3.2 The Board should redevelop and bring up to date evacuation procedures.

9.3.3 The Board should ensure that regular exercises are completed for staff and patients, with the involvement of the FRS and in conjunction with the redevelopment of procedures.

9.3.4 The Board should develop cooperation and coordination procedures for all departments.

10.0 GUIDANCE ON PRIORITISING THE RECOMMENDATIONS

To accord with the ethos of the FSO, the Board should develop a prioritised action plan for implementing the recommendations identified in this report in an acceptable timeframe agreed with the FRS.

It is suggested that all of the recommendations made in this report be addressed as soon as possible.

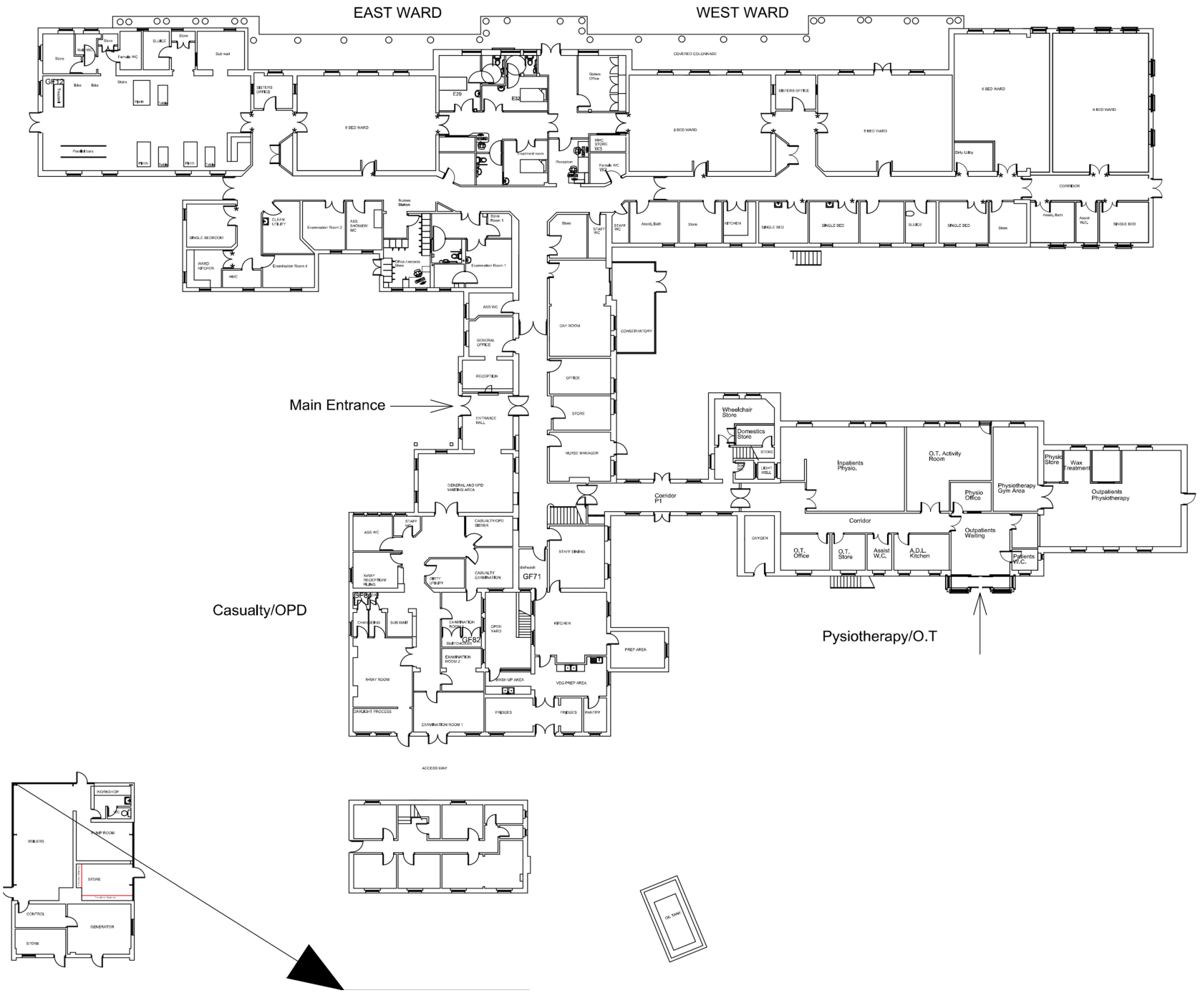
Appendix B details the suggested prioritisation of these recommendations.

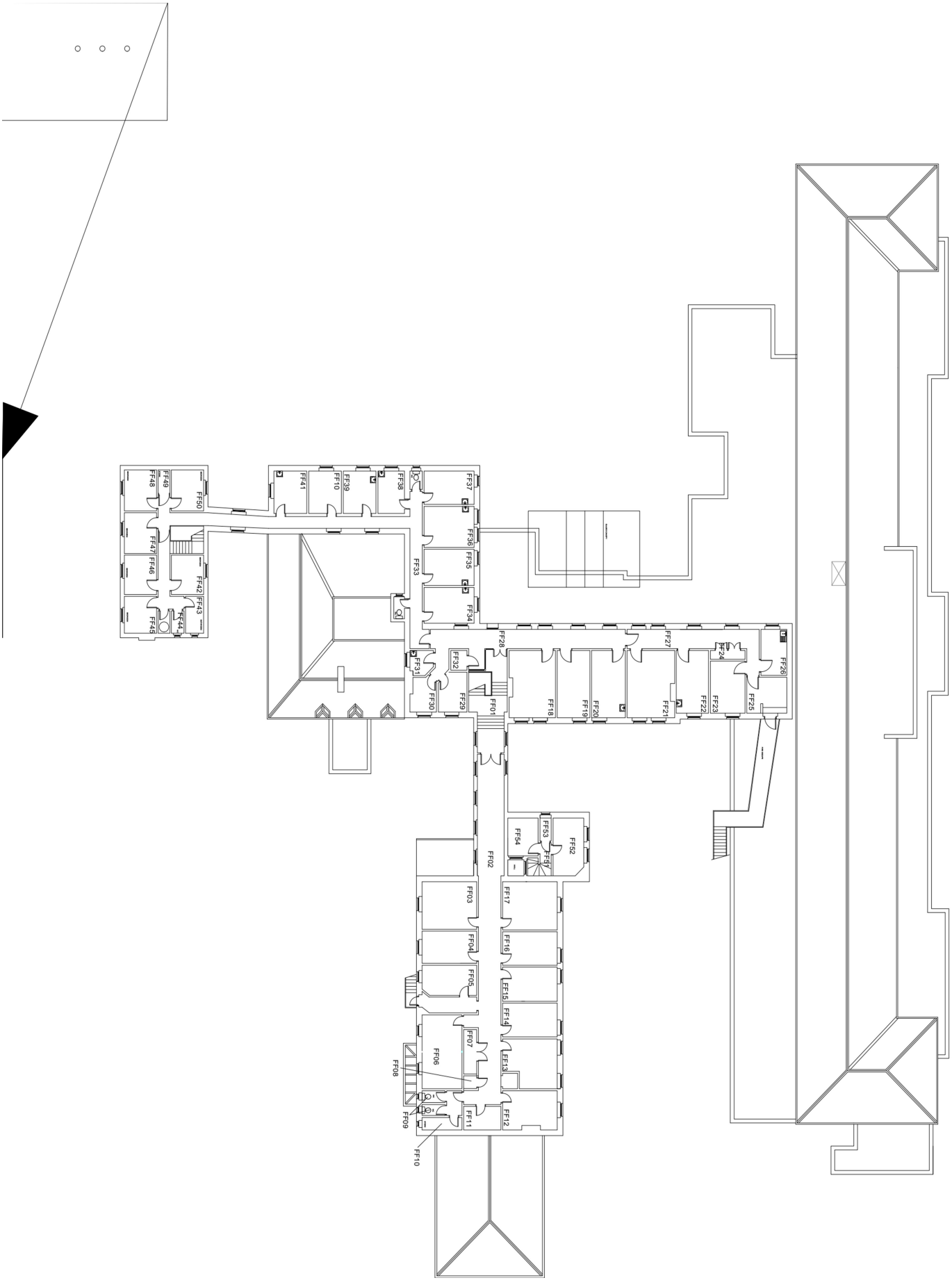
Appendix A

Site & Floor Plans

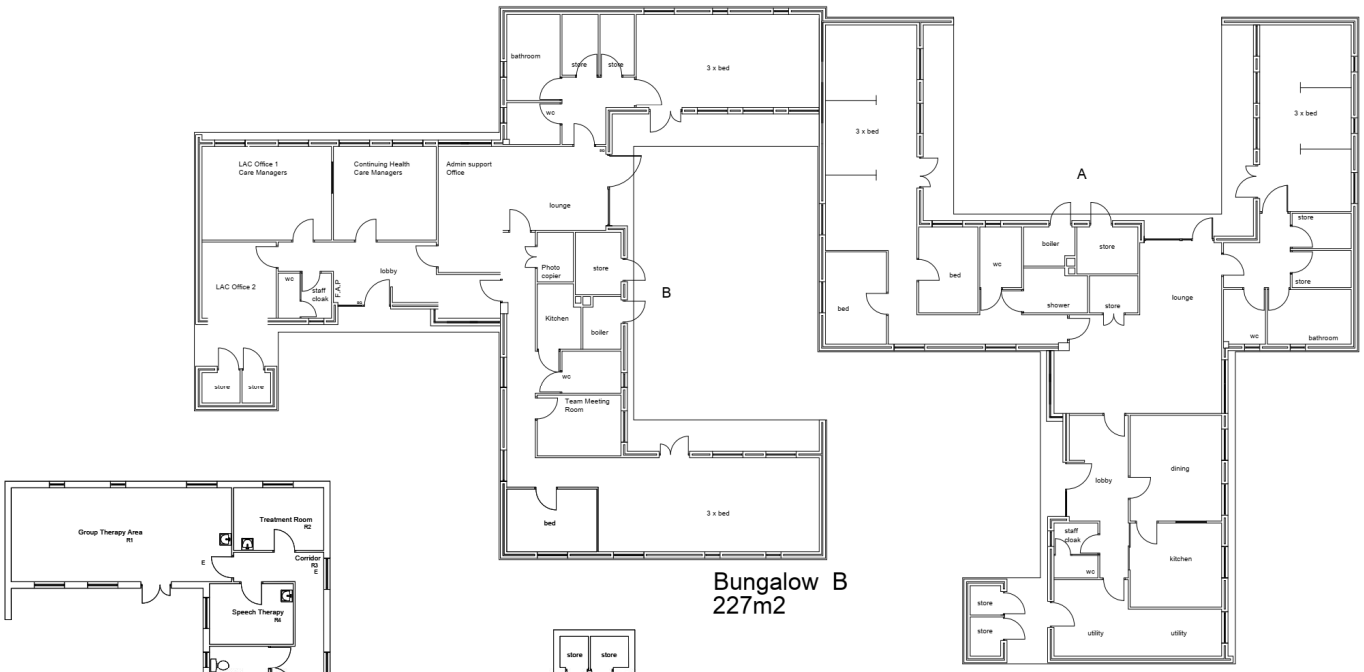
SITE PLAN

SITE LAYOUT PLAN - GROUND FLOOR



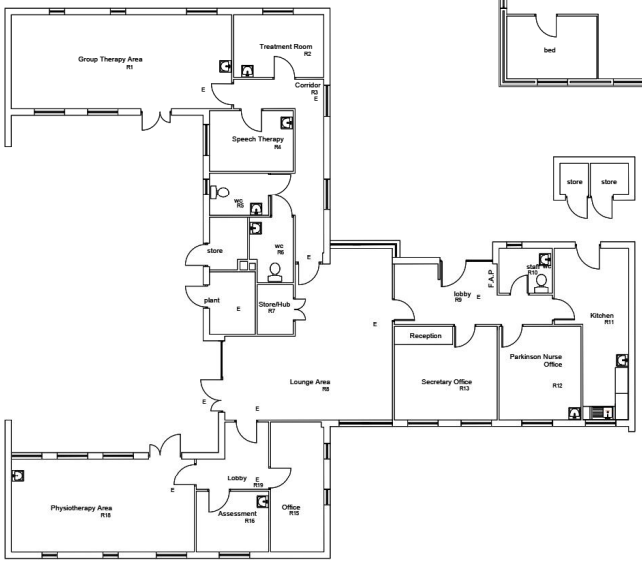


SITE LAYOUT PLAN - 1st FLOOR

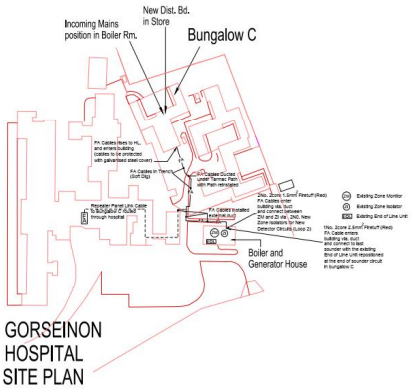


Bungalow B
227m2

Bungalow A
227m2



Bungalow C
227m2
Parkinson's Clinic



GORSEINON
HOSPITAL
SITE PLAN

BUNGALOWS

Appendix B

Prioritised Risk Rating

Ref. No.	Recommendation	Risk Rating
4.3.1	The Board should ensure that suitable and sufficient FRA's are completed for all areas of the site, reflecting the findings of this report.	**M**
4.3.2	The Board should continue to ensure risk assessments are periodically reviewed and maintained up-to-date, in accordance with the review frequency stipulated in the FRA's.	**M**
4.3.3	The Board should ensure risk assessments are reviewed following refurbishments, alterations or other changes that may invalidate the original assessment.	**M**
4.3.4	The Board should implement a procedure to ensure that FRA's and related significant findings are considered when refurbishments are undertaken.	**L**
5.3.1	The Board should introduce a bespoke fire safety manual containing relevant documentation, considering the format of the model fire manual promoted in WHEN 09/16 and WHTM 05-01.	**M**
5.3.2	The Board should develop 'as installed' drawings illustrating all fire related provisions.	**M**
5.3.3	The Board should develop departmental escape and evacuation drawings/signs in accordance with the standards promoted in BS ISO 23601.	**L**
5.3.4	The Board should ensure a hard copy of the above information is retained on site, and consider making it available on the Board's intranet website.	**L**
5.3.5	The Board should ensure any future building alterations/proposals are considered in light of the fire documentation.	**L**
5.3.6	The Board should implement a process to periodically review the documentation and include a method for referencing revisions.	**L**
6.3.1	The Board should ensure that a comprehensive review of fire safety policy documentation is undertaken, including a re-enforcement of roles and responsibilities, in accordance with WHTM 05-01.	**H**
6.3.2	The Board should recognise that an increase in resource of competent FSA's is of high importance.	**H**
6.3.3	The Board should ensure that the recommendations detailed within SESN 16/01 and subsequent editions are followed, relating to fire audit submissions.	**M**
6.3.4	The Board should consider supporting the effective dissemination of fire safety information through the development of a dedicated fire safety section on the Board's intranet system.	**L**
6.3.5	The Board should ensure standards of housekeeping are maintained and improved where necessary, also making sure regular inspections continue to be completed and recorded.	**M**

Ref. No.	Recommendation	Risk Rating
6.3.6	The Board should ensure the medical gas cylinders are stored in accordance with HTM02 and the site specific procedures updated to reference the location, use and emergency procedures for cylinder management during a fire incident.	**M**
6.3.7	The Board should ensure that Bungalow A is given a high priority and emptied of all combustible materials and ignition sources, with improvements in security implemented to help prevent any further malicious activity.	**H**
6.3.8	The Board should ensure that fixed electrical installation testing is completed for Gorseinon Hospital, with certification provided in accordance with HB 158 and BS 7671.	**M**
7.3.1	The Board should review the current fire alarm zoning arrangements, ensuring these are coordinated with the compartmentation. Upon completion, zone plans should be displayed adjacent to each fire alarm panel.	**M**
7.3.2	The Board should undertake a coordination exercise to ensure device addresses align with room identification and reconfigured zone boundaries.	**M**
7.3.3	The Board should update the C&E matrix, detailing the sounders, all ancillary devices and reconfigured zoning arrangements.	**M**
7.3.4	The Board should ensure that in accordance with BS 5839-1, an L1 standard system is installed, complete with the provision of as installed drawings.	**M**
7.3.5	The Board should ensure that the domestic type detectors are removed, in order to avoid confusion and unnecessary activations.	**L**
7.3.6	The Board should consider the installation of a Repeater Panel on the 1st floor of the main building.	**L**
7.3.7	The Board should initiate a review of the recording arrangements to ensure all fire alarm activations are reported fully and in a timely manner.	**L**
7.3.8	The Board should ensure the complete fire alarm system is maintained in accordance with BS 5839, including annual validation of the C&E.	**M**
8.3.1	The Board should develop a full set of CAD fire drawings, indicating the compartmentation, sub-compartmentation and hazard room enclosures. A compartmentation survey should then be implemented, the findings of which should be prioritised for action accordingly.	**M**
8.3.2	The Board should review the existing maintenance arrangements to ensure all designated fire doors are installed and maintained as necessary and the deficiencies identified through the risk assessment process are rectified.	**M**
8.3.3	The Board should assess the emergency lighting illumination levels for compliance with the latest standards, including the provision of adequate lighting to all external escape routes.	**M**

Ref. No.	Recommendation	Risk Rating
8.3.4	The Board should ensure emergency lighting is tested as necessary. Consideration should also be given to a programme for renewing the escape lighting to a networked self-testing system.	**M**
8.3.5	The Board should develop ‘as installed’ emergency escape lighting drawings.	**L**
9.3.1	The Board should ensure that high priority is placed upon the development of more suitable hard standing surface areas, for egress routes leading out and away from the Ward areas.	**H**
9.3.2	The Board should redevelop and bring up to date evacuation procedures.	**M**
9.3.3	The Board should ensure that regular exercises are completed for staff and patients, with the involvement of the FRS and in conjunction with the redevelopment of procedures.	**M**
9.3.4	The Board should develop cooperation and coordination procedures for all departments.	**M**

APPENDIX C

CAUSE & EFFECT TEMPLATE

FIRE ALARM SOUNDERS			ACCESS CONTROL DOORS TO RELEASE	FIRE DOORS DETENTES TO RELEASE	FIRE/SMOKE DAMPERS TO CLOSE	MECHANICAL PLANT TO ISOLATE	LIFTS TO OPERATE	ADDITIONAL ANCILLARY DEVICES TO OPERTATE	Remarks
Zone Of Activation - Evacuate (Continuous Tone)	Zones To Alert (Intermittent Tone)	Additional Sounders To Evacuate (Continuous Tone)	Door Ref No.	Door Ref No.	Damper Ref No:	AHU Ref.	Lift Ref. and function	Function And Location Of Ancillary Device (Gas valves, roller shutters etc)	
Zone 1 (OPD)									
Zone 2 (X-Ray)									
Zone 3 (Ward 1)									
Zone 4 (Ward 2)									
Zone 5									
Zone 6									
Zone 7									
Zone 8									