NHS Scotland Assure
Quality in the healthcare environment

NHS National Services Scotland

NHS Lanarkshire Monklands Replacement Hospital Project Key Stage Assurance Review

OBC KSAR Report

V2.0

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Document Control Sheet

Revision History

Version	Date	Revision Details	Originator	Changes Marked
V1.0	07/10/2022	Version 1 – Issued to NHS Lanarkshire for Factual Accuracy Checks	NHS Scotland Assure (NHS SA)	N/A
V2.0	02/11/2022	Issued to CIG and NHS Lanarkshire following confirmation of factual accuracy.	NHS Scotland Assure (NHS SA)	N/A

Approvals

This document requires the following signed approvals:

Version	Date	Name and organisation	Role	Signature
V1.0	07/10/2022	Thomas Rodger, NHS SA Ian Storrar NHS SA	Head of Engineering Assistant Director Engineering and Assurance	TGR IGS
V2.0	07/10/2022	Thomas Rodger, NHS SA Ian Storrar NHS SA	Head of Engineering Assistant Director Engineering Assurance	TGR IGS

Distribution

This document has been distributed to:

Version	Date of Issue	Name and organisation	Role / Area
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V2.0	02/11/2022	[redacted], NHS Lanarkshire	Senior Responsible Owner and Director of Planning, Property and Performance
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1. Executive Summary

As a result of the Outline Business Case (OBC) Key Stage Assurance Review (KSAR) and based on the information presented to NHS Scotland Assure (NHS SA), we are able to support the Monklands Replacement Project (MRP) at this stage, subject to NHS Lanarkshire's confirmation of their action plan and commitment to address and resolve the issues identified.

NHS Lanarkshire have demonstrated a patient centric approach to design through a "*room use matrix*" which helped to define the clinical requirements upon which the technical solutions were developed. Relevant stakeholder input, including from Infection Prevention and Control (IPC) colleagues, was demonstrated through this process and provides a foundation for the project to build upon during subsequent design stages.

There are however issues that have been identified during the KSAR that will require resolution to ensure the project continues to develop in accordance with NHS Lanarkshire's brief and in accordance with the relevant statutory and guidance requirements. The most significant of the identified issues being as follows:

Fire Strategy Evacuation Strategy

A fire strategy has been produced, which provides assurance that statutory and mandatory guidance will be followed. There are however elements of the fire strategy that do not demonstrate how compliance with the guidance will be achieved, particularly with regards to progressive horizontal evacuation. This will require resolution as a priority to ensure any potential impact on building form and layout is addressed.

Emergency Planning and Planning for a Resilient Healthcare Estate (HBN 00-07)

In relation to planning for emergencies and resilience of the new hospital, NHS Lanarkshire have held meetings with the Police, Scottish Fire and Rescue Service (SFRS), Ambulance Service, and Inver House Distillery. NHS Lanarkshire have prepared a summary report in relation to the hospital's adjacency to the Inver House Distillery, which recommends a short life working group within NHS Lanarkshire is developed to create a site emergency plan. NHS SA consider this work should be undertaken as soon as possible to mitigate potential impact on the existing design strategies.

NHS Lanarkshire have also noted constraints with respect to the available water and electrical utility infrastructure, specifically that the respective utility providers cannot provide two separate connections from diverse points on their networks. Whilst this has been noted in several documents and outline mitigation strategies developed, NHS Scotland Assure recommend that this is fully detailed in a risk assessment and included within the emergency planning/resilient estates documentation.

Ventilation Design – Compliance with SHTM 03-01 2022

The OBC MEP design strategies have been developed prior to the updated interim *Scottish Health Technical Memorandum (SHTM) 03-01* guidance being released in February 2022. NHS Lanarkshire confirmed that these guidance updates will be assessed and considered during Royal Institute of British Architects (RIBA) Stage 3 to determine what impact they may have on the current concept design strategies that have been developed to date. Until this exercise is undertaken, a risk to existing developed strategies will remain.

Dynamic Thermal Modelling & Building Energy Performance

Whilst dynamic thermal modelling analysis has been completed during the OBC stage, the energy in use modelling confirms that the energy benchmark figures targeted in the *"MRP Net Zero Carbon Public Sector Buildings* (*NZCPSB) Pathfinder Report"* are currently not achieved.

There has been limited modelling analysis provided for review that confirms that various aspects of the building design, (such as form, orientation, building fabric and servicing strategies), have been fully assessed in an iterative manner to inform and optimise the proposed solutions. This level of critical analysis is necessary to ensure the project net zero aspirations are realised. If this level of analysis is not addressed during the early part of RIBA Stage 3, it will become more challenging to evolve and develop the proposed strategies to meet the requirements of legislation and guidance in subsequent RIBA stages.

Further Observations

In addition to the significant issues noted above, the KSAR has identified further aspects requiring development and decision making that NHS Lanarkshire should prioritise during the forthcoming design stages.

NHS Lanarkshire provided evidence of several documented governance processes throughout the KSAR response. Whilst the health board were generally able to demonstrate adherence to their defined processes, there were instances where the implementation was not documented, particularly where approvals may span multiple stakeholder groups. NHS SA recommend that this is reviewed throughout the project lifecycle to ensure all key decisions and processes are fully documented.

Whilst the Health Board have provided evidence to demonstrate that structures are in place for clinical and IPC colleagues to be integrated into the project, there are some gaps in assurance provided by NHS Lanarkshire. Particular attention is drawn to the further work required on elements of the project where IPC input is essential, notably the High Consequence Infectious Disease (HCID) suite and peri-operative care areas.

As noted above, a *"room use matrix"* was used to help inform the development of the associated building services and fire engineering strategies. There are a several areas that require further detailed considerations with respect to patient flows, room/spatial adjacencies that will have consequential impact on the building services strategies.

Whilst this is not uncommon at OBC stage, there are areas of the design that NHS SA recommend are prioritised early in the Stage 3 design to ensure any impact on the spatial co-ordination of the facility is addressed quickly. This includes the theatre spaces based on the peri-operative model and the HCID suite.

NHS SA acknowledge that the *"room use matrix"* is a critical briefing document that directly informs the environmental matrix. The environmental matrix contains critical data that forms the engineering basis of design, and therefore needs to be fully defined moving into the next design stage through effective document management and controls. Currently there are elements of the environmental matrix that requires further clinical input to inform the briefing requirements and decision-making process. The control measures and governance around this therefore need significant input in the forthcoming design stage.

NHS Lanarkshire have acknowledged that the brief in relation to the projects net zero aspirations requires further development by setting clear targets and deliverables in accordance with the *Scottish Government's NZCPSB standard*. This may have an impact on the mechanical and electrical equipment selected and potentially the building envelope(s) and should be developed as a priority.

NHS SA note that there was no evidence of a nitrous oxide mitigation plan in accordance with Scottish Government policy as outlined in *DL(2021)41*.

In addition, the revised building regulations (*Building Standards Technical Handbook 2022: Non-Domestic Buildings* and associated key supporting technical guidance documents), effective 1 December 2022, will require certain performance aspects of the heating system which the current proposed design will not meet. As a result, in our opinion, the current heating strategy will require to be reviewed and the associated impact on the project fully appraised. Whilst NHS Lanarkshire have noted further engagement with Building Control is required on this matter, this remains a significant project risk that could impact on the current infrastructure configuration.

The impact of the building regulation changes will extend beyond the design of the heating system and will therefore require a full appraisal of all aspects of the current design (including architectural, civil and structural strategies) to be undertaken to assess and document the overall impact on the MRP project.

Whilst NHS Lanarkshire have in place a domestic water management strategy, which has been collated to incorporate stakeholder engagement through a series of technical workshops, it is unclear what input NHS Lanarkshire's Water Safety Group have provided to date on the proposed strategies. NHS SA have also noted several aspects of the strategy that will require further supporting evidence to demonstrate compliance with *SHTM 04-01* and the *Health and Safety Executive Approved Code of Practice L8 (HSE ACoP L8)*.

Overall Summary

From our review there are still key decisions to be resolved in the next stage with many assumptions requiring further clarity and definition. NHS Lanarkshire should allocate dedicated time and resource to the project to ensure the appropriate governance processes are in place and allowance for timeous close out of key decisions during RIBA Stage 3.

NHS SA would like to acknowledge that NHS Lanarkshire have been fully engaged in the KSAR process. The OBC documentation reviewed is well developed and commensurate with the level of detail expected at this stage.

The information provided by NHS Lanarkshire to inform this KSAR was submitted in a format that matched the KSAR review structure. This transparent and structured response to the KSAR greatly assisted the NHS SA review process.

NHS SA would like to note that the KSAR has been very collaborative and would like to thank NHS Lanarkshire and their wider Lead Advisor team for their help, cooperation and commitment to the review process.

1.1 Summary of Findings

The findings of this report have been collated based on information provided by NHS Lanarkshire. The following table outlines the status of key findings as derived from the KSAR and identified within the NHS SA recommended action plan issued to NHS Lanarkshire under separate cover:

Review	No. of Issues per category				
	1	2	3	4	5
Project Governance and General Arrangements	-	3	12	21	2
Water and Internal Plumbing / Drainage Systems	-	-	17	22	18
Ventilation	-	4	13	24	9
Electrical	-	3	15	12	1
Medical Gases	-	-	10	3	-
Fire Safety	-	2	8	10	3
Infection Prevention & Control Built Environment	-	3	3	1	1

The following categories were used in relation to the findings:

Category	Definition
1	Significant – Concerns requiring immediate attention, no adherence with guidance.
2	Major – Absence of key controls, major deviations from guidance.
3	Moderate – Not all control procedures working effectively, elements of noncompliance with guidance.
4	Minor – Minor control procedures lacking, or improvement identified based on emerging practice.
5	Observation and improvement activity.

1.2 Project Overview

The Monklands Replacement Project is NHS Lanarkshire's vision for University Hospital Monklands and the local and wider community it serves, proposing a major investment in Lanarkshire's hospital estate by rebuilding the hospital on the Wester Moffat site.

The existing Monklands Hospital is now more than forty years old and cannot adapt to the rapidly changing needs of the future healthcare environment and its associated infrastructure.

The new hospital will provide accommodation with the main departments including:

- Assessment unit
- Cancer care
- Clinical research facility
- Critical care
- Decontamination
- Education
- Emergency department
- Endoscopy
- Generic inpatients
- Haematology
- Infectious diseases
- Laboratories
- Maggie's centre
- Medical physics and medical illustration
- Outpatient dialysis
- Outpatients
- Pharmacy
- Planned investigations unit
- Radiology
- Radiotherapy
- Research
- Renal
- Theatres.

Non-clinical accommodation includes:

- Catering and restaurant
- Command and control
- Facilities management
- Mortuary
- Nursery
- Offices
- Research and education
- Spiritual care
- Staff facilities
- Green gardens and play spaces will also be provided.

2. Review Methodology

2.1 Overview of NHS Scotland Assure and the KSAR Process

Good management and effective control of projects is an essential element to the successful delivery and maintenance of healthcare facilities across NHS Scotland estates.

NHS Scotland Assure (NHS SA), Assurance Service was launched on 1 June 2021 following a letter issued by Scottish Government to Health Board Chief Executives, Directors of Finance, Nursing Directors and Directors of Estates. The letter outlined the purpose of NHS SA, with an overarching aim to deliver a co-ordinated approach to the improvement of risk management in new builds and refurbishment projects across NHS Scotland. The new service will underpin a transformation in the approach to minimising risk in our healthcare buildings and environments, protecting patients from the risk of infection and supporting better outcomes for patients in Scotland.

From June 2021 all NHS health board projects that require review and approval from the NHS Capital Investment Group (CIG) will need to engage with NHS SA to undertake key stage assurance reviews (KSARs). Approval from CIG will only follow once the KSAR has been satisfactorily completed. The KSARs have been designed to provide assurance to the Scottish Government that guidance has been followed. The Scottish Government may also commission NHS SA to undertake reviews on other healthcare-built environment projects. This does not change accountability for the projects. The NHS health board remain accountable for their delivery. NHS SA will be accountable for the services it provides that support delivery of the projects.

NHS SA will also work closely with health boards to identify where a KSAR may be required for projects under their Delegated Authority, utilising a triage system to assess risk and complexity of projects.

The KSARs will assess if health boards project management teams (inclusive of clinicians, appointed construction consultants, and contractors) are briefed and following best practice procedures in the provision of facilities. We will review if projects are compliant in all aspects of safety, if specific engineering systems are designed, installed and commissioned, and for ongoing safety maintenance including Infection Prevention and Control (IPC).

The KSAR focuses on key topics, specifically – IPC, water, ventilation, electrical, plumbing, medical gases installations and fire safety. This ensures they are designed, installed and functioning from initial commissioning of a new facility and throughout its lifetime. Health boards are required to have appropriate governance in place at all stages of the construction procurement journey.

The purpose of the KSAR at Outline Business Case (OBC) stage is to confirm there is a good and comprehensive understanding of the category of patient who will use the proposed facility, and that the project team consider how appropriate quality and safety standards will influence the design. It looks to provide assurance that the project can proceed to the Full Business Case (FBC).

Whilst the KSAR focusses on actions to improve the end product, it is not intended to detract from the merits of a development that will add significant benefit for the healthcare of the population served, and which has many exemplary elements. Rather, it is a reflection of the complexity of healthcare construction projects and the stage of development at which it was reviewed. Some conflicts and changes are to be expected as complex projects develop and project teams have in place mechanisms to identify and address these. This report adds a layer of scrutiny and assurance to that process to address the above requirement from government.

2.2 KSAR Process

The OBC KSAR for NHS Lanarkshire's Monklands Replacement Project took place between 13 June 2022 and 7 October 2022.

2.2.1 To inform the findings of the KSAR, the health board were issued with key documents outlining the assurance question set and expected level of evidence and supporting documents in accordance with relevant legislation and guidance. This included the OBC KSAR Workbook and OBC Deliverables list.

The KSAR report includes an overview of the main findings of the review, with a further itemised list of detailed observations provided under separate cover to the health board. The detailed observations are recorded in an action plan that should be adopted by the health board following the review and subsequently monitored by them to ensure appropriate actions are completed in a timeous manner.

2.3 Application of Standards & Legislation

2.3.1 Health Facilities Scotland (HFS) currently provides a range of advisory and delivery services across a wide variety of topics from a portfolio which covers the built estate, engineering and environment and facilities management. With some exceptions these services are largely advisory in nature, identifying best practice and developing national guidance and standards.

2.3.2 Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) Scotland currently provides advice and guidance on all aspects of infection protection and control nationally in Scotland, inclusive of expert advice and guidance on the topic of Healthcare Associated Infections (HAI) and antimicrobial resistance.

It maintains and continues to develop a practice guide (National Infection Prevention and Control Manual – NIPCM) as well as a HAI Compendium of all extant guidance and policy appropriate for use in NHS Scotland. Like HFS, these services are largely advisory in nature, identifying best practice and developing national guidance and standards.

The NHS Scotland NIPCM was first published on 13 January 2012 as mandatory guidance, by the Chief Nursing Officer (CNO (2012)1), and updated by a second edition on 17 May 2012 (CNO(2012)01-update). The NIPCM provides guidance for all those involved in care provision and should be adopted for infection, prevention and control practices and procedures.

The NIPCM is mandatory policy for NHS Scotland. The authority of guidance produced by National Services Scotland (NSS) and other national organisations e.g. Healthcare Improvement Scotland is best described by the definitions outlined below (SHTM 00 – Best practice guidelines for healthcare engineering):

Regulations are law, approved by Parliament. These are usually made under the Health and Safety at Work etc Act following proposals from the Health & Safety Commission. Regulations identify certain risks and set out specific actions which must be taken.

Approved Codes of Practice give advice on how to comply with the law by offering practical examples of best practice. If employers follow the advice, they will be doing enough to comply with the law.

Approved Codes of Practice have a special legal status. If employers are prosecuted for a breach of health and safety law, and it is proved that they did not follow the relevant provisions of an Approved Code of Practice, they will need to show that they have complied with the law in some other way, or a court will find them at fault.

Standards (British or European), institutional guides and industry best practice play a large part in how things should be done. They have no direct legal status (unless specified by Regulations). However, should there be an accident; the applied safety practices at the place of work would be examined against existing British or European Standards. It would be difficult to argue in favour of an organisation where safety was not to the described level.

Guidance is issued in some cases to indicate the best way to comply with Regulations, but the guidance has no legal enforcement status.

2.3.3 Whilst guidance is deemed not compulsory by the Health and Safety Executive (HSE), where compliance with guidance is specified in a contract, as is the case here, it becomes a contractual requirement. Therefore, any permitted deviation from it would be expected to follow a formal process with input from all relevant parties, with clarity around how the outcome was reached, including risk assessments where appropriate and sign off by all those authorised to approve it.

2.4 Project Technical Outline Summary

A high-level summary of NHS Lanarkshire's OBC technical proposals for the facility is noted below:

Electrical

- The incoming electrical infrastructure in respect to Utility supplies, mains power, generator backup, Uninterruptible Power Supplies/Medical IT supplies (UPS/Medical IT), High Voltage/Low Voltage (HV/LV) distribution and resilience strategies proposed for the new development is as follows;
    - A Distribution Network Operator (DNO) primary substation will be established on the site to serve the new facility. The DNO have advised that due to the large load requirements and available capacity in the area they are only able to provide a single supply into the site.
    - From the primary substation, an HV network will be provided with A+B strings. HV generators will be provided to back up the supply on a N+N basis with back up provided to A+B strings.
    - This resilience will not include the electric heating and hot water system. In the event of an HV mains failure this load will be dropped off and will be picked up by the back-up oil fired boiler system.
    - A+B supplies are provided throughout the facility to provide resilience in the event of a mains or sub-mains failure. Medical IT systems with a UPS back up have been provided to Category 5 areas. NHS Lanarkshire have indicated they intend to review the requirement for UPS/tertiary supplies to Category 4 areas as part of an ongoing risk assessment process developed from the clinical needs of the facility. NHS Scotland Assure have noted some inconsistencies in how NHS Lanarkshire intend to action this, these are noted within the body of the main report.
- LED lighting and emergency lighting is provided throughout, with local battery packs utilised to provide initial emergency lighting in the event of a loss of mains power prior to the generators energising.
- A nurse call system will be provided throughout. Nurse call stations are proposed to have multiple alarm handling capability for components such as, CCTV, Access Control, Drug Cabinets, pneumatic tube system and patient call systems. Follow me lighting will be provided to easily identify the source of a patient call.
- Induction loop systems will be provided at locations to be agreed with NHS Lanarkshire and following the principals outlined in the *Equality Act 2010*.
- Security systems will be provided which include CCTV, access control, intruder detection, panic alarms.
- A structured cabling system is to be provided throughout the new facility, which will also support the connectivity for the digital/intelligent hospital strategies.
- A lightning protection system is to be installed.
- A Category L1 Fire Detection and Alarm system in accordance with *BS5829-1* is to be utilised within the facility. The fire detection and alarm system interfaces

with the Public Address and Voice Annunciation (PAVA) system and other electrical and mechanical systems such as ventilation plant. Gas suppression will be provided to all LV switchrooms and UPS rooms.

Mechanical

- The new MRP facility is primarily mechanically ventilated. Mechanical ventilation plant such as Air Handling Units (AHUs) and fans are located within dedicated ventilation plantrooms located throughout the facility, generally located at roof level within each zone.
- The incoming mains water supply is derived from the existing Scottish Water network infrastructure. The water supply company (Scottish Water) have confirmed that they can only provide a single source of supply from their network, with the connection being taken from the 15” cast iron mains on Towers Road to the South of the site.
- The cold-water services system consists of a bulk raw cold-water storage tank, filtered bulk water tank and filtration plant and associated packaged booster sets. The bulk raw and filtered water tanks and associated ancillary plant are located within the basement of Block D. A number of compartmentalised storage tanks (and associated booster sets) are distributed throughout the building, located within roof plantrooms local to each department/block. Dedicated filtered cold-water storage plant is provided for the renal department.
- The proposed domestic cold-water system is a recirculating system which is cooled via an air-cooled chiller and plate heat exchanger arrangement.
- Hot water is generated from various plate heat calorifiers located within dedicated plantrooms distributed throughout the hospital to serve outlets within the various departments in the building.
- Above ground drainage (foul) is provided throughout the facility via a gravity system consisting of a number of primary, ventilated stacks distributed around the building connecting to the new below ground drainage network serving the facility. Stacks will be ventilated to atmosphere. All rainwater downpipes are routed internally within the building.
- The current proposal is for the low temperature hot water (LTHW) for heating to be generated by fifty Air Source Heat Pumps (ASHP’s) and ten Water Source Heat pumps (WSHP’s) including associated ancillary plant such as circulating pumps and buffer storage vessels. Oil fired boilers (and associated oil storage) are provided for resilience purposes. This primary heating plant is in a central energy centre building/compound.
- The primary LTHW is distributed throughout the hospital via basement services tunnels rising within the cores of each zone/department to heat stations located in roof top plant areas in each zone. The secondary distribution from the heat stations is split into separate circuits to serve ventilation plant (AHU’s), space heating and domestic hot water demand to each department.
- Cooling is provided via air-cooled chillers (and associated plant such as circulating pumps) located in the energy centre. The air-cooled chillers generate chilled water (CHW) to serve ventilation plant (AHU cooling coils) for maintaining

environmental conditions in clinical areas and peak lopping for general areas to maintain comfort conditions. Chilled water will also be distributed to other cooling equipment such as fan coil units (FCUs).

- Medical gas systems include oxygen, nitrous oxide, medical air, surgical air and medical vacuum. The oxygen generation is via vacuum insulated evaporators (VIE) in a duplex arrangement. The medical gas storage facility and is located within the energy centre with external VIE plant within the footprint of the energy centre compound. An anaesthetic gas scavenging system (AGSS) is also provided to serve the new facility with the plant located within the roof plantrooms. NHS Scotland Assure note that there was no evidence of a nitrous oxide mitigation plan in accordance with Scottish Government policy as outlined in *DL(2021)41*.
- A Pneumatic Air tube transport system capable of transporting various liquids, solids and documents will be provided, designed and installed in accordance with *SHTM 08-04*.
- An integrated management system (IMS) including all necessary controls and cabling will be provided within the building. The IMS will integrate and interface with all major systems within the building including the Mechanical and Electrical (MEP) systems and other Clinical support systems.

Fire Safety

- MRP is to be designed to comply with current *NHS Scotland Fire Code* and *Non-Domestic Technical Handbook guidance*. Three derogations from guidance are noted by the fire strategy report, including extended travel distance in the Radiotherapy Bunkers, extended hose lengths to specific areas, and a fire engineered design for the Public Street. A progressive horizontal evacuation strategy will be adopted. This will be supported by a category L1 fire detection and alarm system and fire-resistant compartmentation/sub-compartmentation.
- A double height Public Street will be designed to provide general circulation/access to hospital accommodation at Level 0. This will be designed according to *SHTM81 Part 3 Atria in Healthcare Premises*.
- Elements of structure are to be designed to achieve 60mins loadbearing fire resistance.
- Compartmentation will also be provided to specific areas, including fire hazard rooms, places of special fire risk, theatres and sleeping accommodation.
- Firefighting access and facilities will be provided, include fire vehicle access routes, hydrants, firefighting shafts (including firefighting stairs, lobbies and dry fire mains).

3. KSAR Review Summary

The following narrative relates directly to the OBC KSAR workbook and the evidence indicated therein. The comments associated with the points are because of the evidence presented by the Health Board and their advisors during the review process.

3.1 Project Governance and General Arrangements

3.1.1 Project Governance and General Arrangements KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
1.1	Evaluation of changes detailed from previous KSAR.	Assessment of any substantive changes in highlighted areas from previous review stage and all actions have been implemented.
NHS Scotland Assure Observations: N/A. This is the first KSAR undertaken on the project. ***Documents referenced are:*** *N/A*		

Workbook Ref No.	Areas to probe	Evidence expected
1.2	Verification that CIG recommendations have been implemented with respect to prescribed in scope areas.	Review of the implementation of all CIG recommendations. Evaluation of any deviation from previous submissions or reviews.
NHS Scotland Assure Observations: NHS Lanarkshire provided evidence of previous CIG interactions. The key points relevant to the OBC stage of the project are indicated in the IA approval letter (*05.10.2017 Director General H&S letter)*. These were that: 1) The OBC is undertaken in the broader context of achieving the aims of the Health and Social Care Delivery Plan. 2) The OBC should include an assessment of all delivery options taking account of the population needs assessment of the West of Scotland and associated regional service planning.		

3) The OBC should be staged in its development with gateways at specific milestones and with the development of the regional planning component as the first stage.

Whilst NHS Lanarkshire provided evidence that these points had been considered during the development of the OBC, the KSAR evidence submitted did not demonstrate full close out of the comments.

Documents referenced are:

Chronology of responses to CIG IA recommendations (contains range of embedded documents)
NHSL Monklands Replacement OBC Programme Rev AB(1)
Clinical Briefs
MRP Governance Structure (extracted from PEP v13.0
MRP MEP Workshop Programme 2021-2022

Workbook Ref No.	Areas to probe	Evidence expected
1.3	Has cross-referencing with NDAP and AEDET recommendations been implemented?	An assessment if there is full compliance with the applicable recommendations and actions from the preceding step.

NHS Scotland Assure Observations:

At the time of the KSAR, the NHS Scotland Design Assessment Process (NDAP) and Achieving Excellence Design Evaluation Toolkit (AEDET) processes were ongoing with a number of key points yet to be addressed. Some of these may have a consequential impact on the strategies relevant to the KSAR topics. NHS SA recommend that as the NDAP and AEDET are progressed, NHS Lanarkshire look to update their developed KSAR action plans to take cognisance of any interdependencies.

As (at the date of writing), the NDAP process is yet to be concluded, this remains an open risk that could have a consequential impact on developed strategies such as the building form, fire strategy and sustainability strategies.

Documents referenced are:

20220616AEDET - LK06 Monklands Replacement Project OBC
AEDET- MRP-KEP-XX-XX-PP-A-852103_AEDET Design Update
AEDET Refresh spreadsheet - Monklands Replacement Project
Monklands IA Design Statement V2 030817 with updated images - PPF comments update
1. KEP-XX-XX-RP-A-852001_DRAFT NDAP report_Rev P05
NHSL, Monklands Replacement OBC Programme Rev AB (2)

Workbook Ref No.	Areas to probe	Evidence expected
1.4	Does the Health Board continue to demonstrate service / clinical input into design decisions based on a current and comprehensive knowledge of patient cohorts?	Recorded and updated input taken from service lead(s) / clinician(s) about relevant patient cohort characteristics and their typical needs in terms of the accommodation's environment, safety and infection control standards. Demonstrable expertise of service lead(s) / clinician(s) in providing this advice.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided evidence that there has been service/clinical input into design decisions based on current and comprehensive patient knowledge. The KSAR has identified some gaps in the way governance is formally recorded, which we recommend that NHS Lanarkshire consider during future design stages to ensure the “golden thread” of decision making and governance is maintained across all elements of the project.

From analysis of the *MRP 1-200 Workshop Reviewable Design Data (RDD) Front Sheet – Attendance* provided by NHS Lanarkshire, a number of 1:200 workshops took place, representing a wide range of service areas and patient cohorts, overall, it is evident that both service leads and clinicians from a number of different services were in attendance at the workshops. This demonstrates that a wide range of patient cohorts were represented. However, there are number of attendees who have no role or job title noted within the RDD attendance register. Such details are key in being able to fully understand the extent of clinical input to design.

NHS Lanarkshire have not provided records, such as minutes, or notes from these workshops to demonstrate the extent, of consideration of patients’ characteristics and clinical needs in terms of the accommodation’s environment having been considered. NHS Lanarkshire did provide a draft *Room Use Matrix V4*.

NHS Lanarkshire demonstrated through the *Bed Modelling Presentation* that they have considered the current patient cohorts, their needs and future changes in their care.

NHS Lanarkshire has provided further supporting evidence, with the formation of the Clinical Advisory Group (CAG). CAG provides assurance and guidance during the development of the Clinical model for MRP. Aims, roles and responsibilities have all been clearly set out and an organogram provided depicting representation from several patient cohorts and groups, this provides direction, and a clear inclusion of service leads and clinicals who represent a broad range of patient cohorts and needs.

Meeting notes were provided for one Clinical Advisory Group meeting held on the 10 March 2021.

NHS Lanarkshire held a number of Crosscheck Workshops and provided evidence in the form *of ECROSS~1.ppt, FCROSS~1.ppt* to demonstrate wide stakeholder engagement. This is particularly evident within the PowerPoint slides provided during the workshops which demonstrate the direct input from service and clinical users.

NHS Lanarkshire held multiple Schedule of Accommodation (SoA) workshops and provided evidence of what issues were discussed. Meetings were well documented and covered a range of patient issues and needs across several departments.

The MRP team held public representation design reviews with service users, inclusive of staff, patients, former patients, carer associations, charities, etc. Questions and pointers were put forward by those involved and notes documented for most of the design reviews. No documentation was provided to show how feedback from the workshops has been provided to stakeholders.

Clinical Output Specifications (COS) have been provided which clearly identify the current service models of each department, what they are doing well and where improvements are necessary. Service leads, clinicians and users in the form of senior staff have contributed to the documentation. There is no evidence of a COS stakeholder register identifying individuals who should be involved in the production of the COS's. In absence of a stakeholder register, NHS Lanarkshire provided an organogram, outlining generic roles within *MRPLG ToR - V1 - Approved by PPRC July 2021* which outlines groups of stakeholders who are involved in creating the COSs, which demonstrates the vast amount of relevant stakeholders involved.

NHS Lanarkshire have created an "*Achieving Excellence*" report which aims to develop a healthcare strategy that supports the development of integrated health and social care system. NHS Lanarkshire have provided workstream summaries, which cover many patient cohorts within the report. The document, although well put together fails to identify the service leads and clinicians who provided input into the creation of the *Achieving Excellence Report.*

Documents referenced are:

MRP 1-200 Workshop RDD Front Sheet -
MRP Bed Modelling Presentation 20211103 v3.0
CAG Terms of Reference V1 final
2021_03_10 MRP Clinical Advisory Group Note of Meeting (final)
CAG Distribution List 2020
e. Crosscheck Workshop Day 1 Slidedeck Final 180521v1.3 (Part 2)
f. Crosscheck Process Slide deck DAY 2 v6 180523 (Part 2))
2019_12_06 Minutes MRP Schedule of Accommodation Exec Review
050220 MRP SoA Review Meeting & Clarifications
Achieving Excellence, NHS Lanarkshire, Strategic Framework, 2017
MRPLG ToR - V1 - Approved by PPRC July 2021

Workbook Ref No.	Areas to probe	Evidence expected
1.5	Project team continues to demonstrate a unified and recorded understanding of needs of main users and patient cohorts of the proposed accommodation and how this has influenced the design of critical building, engineering and infection prevention and control quality and safety standards.	Updated and current list available of all stakeholders, service users and patient cohorts impacted by this project, plus the identification of any high risk groups and their specialist needs. Updated and recorded engagement on these designs issues having taken place between the project team and service lead(s) / clinician(s), infection prevention and control team, and other key stakeholders (e.g. Estates, Medical Physics, IPC, the AEDET, NDAP or other design briefing workshops). Details available of how service users / patient cohort needs, and their expected use of the accommodation are influencing the design brief, including critical building, engineering and infection prevention and control quality and safety standards.

NHS Scotland Assure Observations:

NHS Lanarkshire provided an extensive list of stakeholders involved in the project identifying their current position within their organisation, department, and their contact details.

Within the Project Execution Plan (PEP) documentation *MRP PEP v 13.2* it is noted that a stakeholder mapping process was carried out by the soft-landing group which ensured all stakeholders were identified, and an organogram has been created. The *MRP Soft Landings Stakeholder impact / probability matrix* sets out key roles required to ensure delivery of the soft landings strategy and is inclusive of key teams such as IPC, Property Support & Services Division (PSSD) and Facilities Management (FM). The *MRP Terms of Reference Register* provides details of the individuals in each of the groups. *MRP PEP v 13.2* noted that the matrix/organogram will be reviewed at each stage of the project to ensure all stakeholders, service users and patient cohorts are identified.

The recommendations provided within the *Room Ventilation Strategy meeting record* noted that there had been consideration of 'lessons learned' as a result of the Covid-19 pandemic from those who worked throughout the pandemic. This is an example of NHS Lanarkshire project team engaging with the project leads, clinicians and wider stakeholders.

A short-life working group was created as a result of the of the *Room Ventilation Strategy meeting* and produced the *Room Use Matrix.* The group was formed to review all clinical rooms contained within the draft schedule of accommodation, the

purpose of this was to determine what clinical procedures would be undertaken in each room and to indicate the designation of each room.

NHS Lanarkshire have provided attendance logs for meetings held by sub-groups, such as the IPC Subgroup. All attendance registers for sub-group meeting are included until Autumn of 2021. These identify stakeholders that were invited to sub-groups, however NHS SA note that there was little attendance from the head of IPC and IPC Nurse within the IPC Subgroup meetings. NHS SA note that the outputs from these meetings were not provided as part of the KSAR response.

NHS SA note that in connection with understanding how stakeholders are influencing design NHS Lanarkshire held several *Crosscheck Workshops* as part of the AEDET and NDAP process.

As noted in KSAR question 1.4 clinical outputs specification documents are also in place for the project.

NHS SA note that in connection with understanding the needs of patient cohorts NHS Lanarkshire have carried out work on the resilience of technical services, complimenting the requirements of *Health Building Note (HBN) 00-07.* NHS SA note that further work and planning around operational resilience is required. (Refer to 3.1.2.1 for more detailed commentary).

NHS Lanarkshire have provided an output specification templates for multiple clinical and non-clinical areas, and agendas & attendance sheets for stakeholder engagement events. The Infection Prevention and Control Team (IPCT) is listed in the stakeholder impact matrix.

The Scottish Health Facilities Note (SHFN) 30 (HAI-SCRIBE) review group is multi-disciplinary and meets periodically to review the project and has representation from key stakeholders.

NHS SA notes that item HAI AD 012 on the *HAI Stage 2 Action Tracker*, which is the compilation of a mapping out report detailing patient flow, procedures to be undertaken and allocation of perioperative rooms, is now unlikely to be completed before FBC stage. This information has a consequential impact on critical elements of the design brief and should be completed at the earliest opportunity.

Documents referenced are:
MRP PEP v.13.2
1.3 MRP Soft Landings_Stakeholder Impact Matrix v1
1.4 MRP Soft Landings Strategy Version 1.0
1.5 MRP TOR Register
1.5 MRP TOR Key Decisions Sub-group
1.5 MRP TOR Infection Prevention and Control Group
2.8 Room Use Ventilation Strategy SBAR v4.1 (20210624)
2.8 Room Matrix v 4.1 (20210623)
3.1 20212501-HAI-Scope-Report
3.2 HAI_STANF_FEB2015
2.4 MRP IPC Sub-group Attendance Log 2021
Cross-check Workshop agendas and attendance lists

Clinical output specification documents
HAI-SCRIBE Stage 2 Design & Planning 20th June 2022
HAI Stage 2 Action Tracker

Workbook Ref No.	Areas to probe	Evidence expected
1.6	Planned approach towards determining the necessary standards for this accommodation.	Updated and current list of the relevant NHS and non-NHS guidance that is being used and adopted (see previous section of workbook OBC KSAR (Page 9) for examples of appropriate guidance). Updated and current list of all proposed derogations from NHS guidance with a detailed technical narrative on each derogation and/or list of known gaps in guidance that will need to be resolved in order to meet the needs of the patient / user cohort. Knowledge of the role of infection prevention and control and microbiologist advisors to be used throughout the design stages, and details of the resource plan in place to ensure this advice will be available.

NHS Scotland Assure Observations:

NHS Lanarkshire have demonstrated that a process for managing derogations is in place. It is noted the *PEP (section 7.5)* sets out a summary of the process for managing derogations. This is supplemented by the process set out in the document, *MRP Derogations Rev1 23.06.2022(1)*

NHS SA note there is a lack of clarity as to who is the '*Project Manager*' as described in the derogation approval process, specifically whether this refers to the lead Advisor PM or the NHS internal PM. The process notes the derogation schedule is approved by the '*Project Team*' and then issued to Monklands Replacement Project Board in line with the workplan.

NHS SA has found a process is in place to establish applicable guidance as set out in the document *Applicable Guidance V5*. The process describes that NHS Lanarkshire undertook a review of the register engaging stakeholders and service leads. However, there is no evidence of who was consulted, and the document has a sign off section (section 7.0) which has not been completed by any of the subgroups (including IPC subgroup), or Authorised Engineers identified as required to provide ratification.

The list of guidance included within *Appendix 1 (Applicable Guidance)* of the derogations process is noted as the current available healthcare guidance as of 3 October 2020. NHS SA would note that the *NSS HFS Guidance Index* which lists the current available healthcare guidance was updated on 21 September 2021 and there have been further updates to guidance after this date (e.g. *SHTM 03-01 Part A and Part B* interim versions published in January 2022). The list of relevant guidance within the derogation process focuses on healthcare guidance only and does not include any other relevant statutory and industry guidance such as building regulations, British and European standards etc. There is also no formally defined process for reviewing any changes to guidance or statutory requirements during the design process.

A derogation schedule is provided with items for architecture, MEP and Fire. All proposed derogations are noted as work in progress as none are shown as having an 'outcome' and appear still to be in discussion. No associated 'approval' forms have therefore been provided at this stage documenting formal approvals. There is reference in some items to a *NHSL Approved Key Decisions Tracker* which has not been made available for this review.

There was no evidence provided as to how NHS Lanarkshire are managing or identifying the potential risk of derogations not being approved during the subsequent design stages that may have consequential impacts on other developed strategies.

The Prevention and Control of Infection work Programme 2021-2022 has been provided and reviewed. Section 2c.1 on Page 22, identifies a person seconded into the MRP IPC Nurse consultant role as an interim measure until a suitable candidate is recruited. It is also noted this person has multiple other lead roles detailed. The role of the IPC and microbiology advisors is unclear in the documentation provided and was also discussed during the IPC KSAR Workshop; NHS Lanarkshire stated that the IPC advisor reviews the project designs as part of the structured review process to ensure that they are compliant with relevant national guidance, in relation to location and function of the departments. NHS SA note that whilst NHS Lanarkshire have considered IPC resource within the IPC team annual work plan, there is no equivalent project level resource plan in place to demonstrate that available resource (as noted in the IPC workplan) matches the actual project resource demand**.**

An MRP IPC sub-group is established, and Terms of Reference (TOR) is in place. No detail is provided to identify all specific individuals on this sub-group and to evidence their qualifications and experience to fulfil the required roles in relation to IPC and microbiology. Outputs from this group were not provided for this review.

NHS Lanarkshire's work plan for the IPCT demonstrates that resources have been allocated to the project, specifically a Nurse Consultant in Infection Prevention and Control. There is no specific medical microbiology resource allocated to the project; however, discussion at the IPC Workshop provided verbal assurance that a medical microbiologist attends workshops and has the same access to the designs and is available to provide medical microbiology input when requested.

It is unclear how proactive this input is, but it was reported by NHS Lanarkshire that they deem this to be sufficient, albeit ad hoc.

NHS Scotland Assure recommend that the allocation of this resource and roles/responsibility of the individual involved is fully defined as part of the project governance documentation, this will help to ensure the process is robust through subsequent stages of the project.

Documents referenced are:

MRP Derogations Rev1 23.06.2022(1)
Applicable Guidance V5
MRP Derogation Schedule-v3.0 May 22
Prevention and Control of Infection Work Programme 2021-2022
MRP IPC Subgroup TOR v3 10th November 2021
MRP SoA v4.0 20211217
PEP – 13.2 April 2022
IPCT Work Plan
IPC Workshop Minutes
Derogation Process
MRP Derogation Schedule
MRP IPC subgroup ToR
MRP Schedule of Accommodation

Workbook Ref No.	Areas to probe	Evidence expected
1.7	How does the Health Board demonstrate that there is an effective infection prevention and control management structure in place and how does it relate to the development of the project? How does the Health Board demonstrate leadership and commitment to infection prevention and control to ensure a culture of continuous quality improvement throughout the organisation and that there is an effective IPC structure in place and how does it relate to the design development?	Evidence IPC and clinical teams have been integrated into all decisions regarding any derogations through the design process and are satisfied this will not impact on patient safety such as, specific sign off, supporting meeting minutes, risk assessments, risk registers relating to IPC with evidence of escalation through the agreed NHS board governance process.

NHS Scotland Assure Observations:

NHS Lanarkshire provided clear documentation of IPC management and reporting structures within the Health Board, which also demonstrated how these structures relate to the project.

Documentation provided showed IPC representation clearly integrated into decision making process and indicated that the minimum requirement for design approval includes the Head of IPC and the Infection Control Doctor.

The documentation provided to show the derogation process did not specify a need for IPC approval but did show IPC representation on the groups where derogations will be approved.

Documents referenced are:

IPC Work Programme 21-22
IPCT Organogram
MRP IPC subgroup ToR
Derogation process
MRP Design Approval Process
MRP Organogram

Workbook Ref No.	Areas to probe	Evidence expected
1.8	Integration with Authority Policies and Operation How does the Board demonstrate implementation of evidence based infection prevention and control measures?	The Health Board can demonstrate the current version of the National Infection Prevention and Control Manual (NIPCM) has been adopted by the organisation and all staff are aware of how and where to access this. (Ask staff) IPC are fully embedded in the project team and the OBC programme-taking cognisance of any actual or perceived risks identified provided.

NHS Scotland Assure Observations:

NHS Lanarkshire provided documentation which demonstrated IPC support throughout the project as noted earlier in this report, including evidence of local policies. However further development of the Peri-op and HCID areas are still required and essential for IPC consideration/inclusion.

NHS Lanarkshire were also able to demonstrate compliance with the National Infection Prevention and Control Manual (*NIPCM)* as evidenced by an extract from the Health Board's audit system showing compliance with specific elements of the *NIPCM* in different clinical areas within the Health Board.

NHS Lanarkshire have demonstrated an understanding of various IPC risks through the stakeholder engagement processes, however these are not consistently transposed into the overarching project risk register to ensure full visibility of risk across the spectrum of the project and to demonstrate that a fully documented process is in place to track/monitor/mitigate/close these risks.

Documents referenced are:

Project organogram
NHSL LANQIP extract
HAI SCRIBE Training Session presentation and attendance register
Test Treatment Room Plan with comments

Workbook Ref No.	Areas to probe	Evidence expected
1.9	The Health Boards Infection Prevention and Control Strategy.	Assessment of the Health Boards approach to all IPC related matters in relation to the development of the design, HAISCRIBE etc. IPCT annual programme of work.

NHS Scotland Assure Observations:

As noted previously in this report, NHS Lanarkshire have provided documentation that demonstrates they have in place an IPC structure and strategy, evidenced by the *IPCT organogram and work plan*, however it is noted the microbiology resource for the project remains unplanned and a risk for the project.

Engagement in the HAI-SCRIBE process is clear, as evidenced by the *HAI-SCRIBE SOP* and the HAI-SCRIBE documents themselves, and by direct observation by NHS SA at HAI-SCRIBE review meetings.

NHS SA note that whilst NHS Lanarkshire have considered IPC resource within the IPC team annual work plan, there is no equivalent project level resource plan in place to demonstrate that available resource (as noted in the *IPC workplan*) matches the actual project resource demand. There was no evidence of how NHS Lanarkshire had considered what knowledge and skills may be required by IPC specialist advisers working on the project.

NHS Lanarkshire informed NHS Scotland Assure at the IPC Workshop that lack of IPC resource (e.g., due to illness) a risk. NHS Lanarkshire should ensure that this is formally documented in the project risk register and that there is appropriate mitigation and governance in place for this risk.

NHS Scotland Assure notes that item 2c.1 in the *IPCT Work Programme 21-22* that the consultant nurse currently assigned to the project is interim 'until suitable candidate is recruited'. NHS Lanarkshire should ensure that this recruitment process is expedited or, if the current post holder has been confirmed in the post, that this is reflected in the relevant documentation.

Documents referenced are:

HAI-SCRIBE
HAI-SCRIBE SOP
HAI-SCRIBE Stakeholder List
HAI-SCRIBE Register
HAI-SCRIBE Recording Process
IPCT Organogram
IPCT Work Programme 21-22
MRP 1-200Workshop RDD Front Sheet (attendance log)
MRP Derogation Schedule

Workbook Ref No.	Areas to probe	Evidence expected
1.10	The Health Boards Monitoring and Records.	Evidence that the Health Board integrating this project with wider IPC requirements within the context of the OBC. For example, evidence that the proposals for equipping incorporate IPC requirements?

NHS Scotland Assure Observations:

NHS Lanarkshire provided documentation that demonstrated that the IPC work plan integrates the IPC requirements of the project into the wider IPC agenda within the Health Board and that this is monitored by the Infection Control Committee.

Documentation provided indicated that the Core Equipment Group responsible for equipping the project includes IPC representation and demonstrated the process through examples of key decisions made by the group.

Documents referenced are:

Core Equipment Group Terms of Reference.
Core Equipment Group minutes
Key decisions example provided
IPCT Work Programme 21-22
IPCT Organogram
Decontamination Environmental Monitoring Group Terms of Reference, Minutes and Action Logs
Infection Control Committee Terms of Reference, Minutes and Action Logs

Workbook Ref No.	Areas to probe	Evidence expected
1.11	Planned approach for managing the design process to ensure successful compliance with agreed and approved standards.	The project governance arrangements and resource plan in place to ensure that the necessary decision-making authority and technical expertise is available to take responsibility for and deliver the project as planned and agreed. Details of how gaps in expertise are being filled. Details of how compliance with the appropriate guidance, design brief and other standards are being agreed, signed off, monitored, reported against and if necessary escalated / adjudicated throughout the design, construction and commissioning stages. Details of how all stakeholders' interests are being agreed, signed off, monitored, reported against and if necessary escalated / adjudicated throughout the design, construction and commissioning stages.

NHS Scotland Assure Observations:

NHS SA note that an overall governance structure is provided with reference to associated TOR for all governance groups and for reporting. It is also noted these TOR have been provided along with attendance logs for a selection of the sub-group meetings.

It is noted the MRP resource structure gives more detail on the '*Project Team*' including in relation to the individuals undertaking the various roles. NHS Lanarkshire have not provided additional detail on meetings or reporting in relation to the Project Team. Client advisors are shown as reporting into the Project Team. It is noted the *PEP* contains some information in relation to planned meetings and the role of the 'project team'.

An organisation structure is provided for the lead advisor team covering lead advisor, cost advisor, architect, services engineer, civil & structural engineer (including associated skills) and principal designer. In addition, a (Responsible, Accountable, Consulted, Informed) *RACI matrix* is provided for this team which does capture the responsibilities of the NHS Lanarkshire team including in relation to management, commercial and design matters.

NHS Lanarkshire demonstrated that via the *MRP Design Approval Process* that they have in place a process for concept design approval including involvement of

stakeholders and sign off has been established. At the time of the KSAR, NHS Lanarkshire were in the process of finalising their internal OBC approvals in accordance with this process.

A change control process has been demonstrated and noted as being initiated following conclusion of the 1:200 departmental design reviews. It is not clear from the information provided, if the 1:200 drawings have yet been signed off and that the change control process is being implemented.

Where derogations are proposed, a process is in place and based on the derogation schedule provided, none of the potential derogations have been agreed at this stage. This process to agree derogations includes key stakeholders via the established sub-groups. Refer also to comments in section 1.6 of this report.

NHA SA have found that the information provided generally indicates appropriate roles are included in the MRP team. The individuals in the internal NHS Lanarkshire team are named alongside their roles, in the project structures provided however level of competence/expertise is not provided. Please also note comments in section 1.6 regarding gaps in relation to microbiology services.

NHS Lanarkshire have provided assurance that their Lead Advisor and Health Care Planner teams, have demonstrated relevant skills, experience and resource required for the project.

NHS SA note some documentation has been provided for Authorising Engineers and Competent Persons which demonstrates a process for appointment and individuals in place. Information is provided illustrating audits of systems, but this appears to relate to existing facilities and does not demonstrate how these named individuals are engaging with the MRP design process.

NHS Lanarkshire have demonstrated that a risk management process is in place including a risk register which is noted as being reviewed monthly by the Project Team. It is noted last updates to the risk register are dated 29 April 2022 although it is stated that monthly reviews are part of the process.

Documents referenced are:

MRP Governance Structure
MRP Resource Structure
MRP Team Structure – Currie & Brown
NHSL MRP C&B RACI Matrix
Buchan+Associates Monklands EOI
Q4.C.1.2_Project Experience CurrieBrown
Q4.C.8.1_CurrieBrown
MRP Designer Competency Questionnaire
AE Offer of Appointment Letter
AE Proposed Specification
AP Template Letter
Certificate of appointment as competent person
Sample CP Letter of Appointment
202201.19 Statutory Compliance

MRP Risk Management Process
MRP Joint Risk Register v6.0
MRP Derogations Rev 1 23.06.2022(1)
MRP Design Approval Process v0.5
MRP Change Control Process
NHSL Monklands Replacement OBC Programme Rev AB(1)
TOR for various sub-groups
Attendance logs of various sub-groups

Workbook Ref No.	Areas to probe	Evidence expected
1.12	The Health Boards approach on the procurement journey with evidence of the plans on how the Board will provide assurance, particularly emphasis on the critical system identified earlier.	Evidence on how Infection Prevention and Control are involved with the conceptual procurement approach to the design stage and future plans for project. Plans to identify any gaps in the procurement approach that may require to be addressed. Evidence on how the Infection Control procedures and management will fit with the conceptual procurement approach and initial thinking on how it will be managed. Evidence of a detailed procurement strategy report. Evidence that the Health Boards selected procurement route has gone through the Health Board's Governance channels.

NHS Scotland Assure Observations:

NHS LA have procured their Lead Advisor through an OJEU restricted two stage procedure and provided evidence that demonstrates the use of appropriate processes throughout. However, evidence of IPC involvement in the procurement of the Lead Advisor was not found.

NHS LA investigated competency of the Lead Advisor team members through the *ESPD (European Single Procurement Document) Completion Guide,* probing qualification requirements, project experience for disciplines and assessed competency of individuals (although no specific references to experience or competency in relation to IPC were found).

The *LA Tender Outcome Report 10.04.18* for the Lead Advisor appointment provides assurance that the process was undertaken appropriately. NHS Lanarkshire did not provide evidence to confirm the appointment has gone through the Health Boards Governance channels.

The Health Board noted at the progress meeting on 2nd August 2022 that the Health Board are considering novating the Design Team to the construction delivery partner at the completion of the FBC stage.

Evidence of IPC involvement in the conceptual procurement approach was not seen, and no evidence was found of contractors' expertise in IPC or experience relating to IPC in previous projects.

It is evident from the KSAR response that NHS Lanarkshire has undertaken dialogue with both internal and external stakeholders, through to the workshop evaluation of the procurement routes and the identification of the preferred procurement route.

NHS SA note that the process of procurement and appointment of a Main Contractor is ongoing.

NHS Lanarkshire noted at the KSAR progress meeting of 2 August 2022 that shortlisting has been undertaken with two organisations remaining, and that they are currently developing the technical briefing pack and their employer's requirements for the final phase of the procurement of the Main Contractor, the focus of which thus far has been on commercial, contractual, and legal governance. However, it has not been demonstrated how assurance will be provided in relation to the critical systems covered by the KSAR.

NHS Lanarkshire should ensure competency of the Main Contractor and their supply chain through suitable investigations, including in relation to IPC, as part of the procurement process and develop a formal process to ensure competencies are tested and demonstrated throughout all subsequent project stages.

Documents referenced are:

Procurement Workshop Summary Report 21-08Aug25
ESPD Completion Guide Lead Advisor
MRRP Lead Advisor - Pre-Qualification Brief
LA Tender Outcome Report 10.04.18

Workbook Ref No.	Areas to probe	Evidence expected
1.13	The Health Boards approach on those areas of design that the procurement route has provided identification as possibly being Contractors Designed Portions (CDP's).	Evidence that the Health Board integrating this project with wider IPC requirements within the context of the OBC. For example, evidence that the proposals for equipping incorporate IPC requirements. Evidence that the procurement of the lead designer will encompass these areas in their oversight and sign off on the complete design.

		Evidence that a clear demarcation of design responsibility is being developed.

NHS Scotland Assure Observations:

NHS SA note that the evidence provided by NHS Lanarkshire demonstrates they have a process in place with respect to CDPs, albeit the detail has not been fully resolved at this stage. NHS Lanarkshire note in the document *MRP CDP KSAR* that design is at RIBA Stage 2 and that currently the anticipated CDP is set out in stage 2 outline specifications which have been signed off by NHS Lanarkshire. NHS Lanarkshire also note in this document that the final position on CDP responsibilities will evolve and be finalised prior to construction.

NHS SA note the *Board Construction Requirement's (BCRs)* highlight that the Health Board will be responsible for 'sign off' and acceptance of the developing design in terms of 'clinical functionality' only. NHS Lanarkshire have not provided any assurance as to who will be responsible for the technical review and approval of CDPs.

NHS SA recommend NHS Lanarkshire seek assurance that all the roles and responsibilities surrounding CDP are fully documented and monitored through the life of the project.

NHS SA notes that an Equipment sub-group has been established and TOR's in place. It is also noted that IPC representation is integrated into this sub-group. The sub-group is responsible for developing an equipping strategy and programme and for monthly reporting. No specific mention is made in relation to CDP in the TOR.

NHS SA note that a 'key decision' worked example has been provided in relation to '*changing places'*. This demonstrates a planned process but does not evidence how IPC were involved and formally ratified the recommendation. Meetings of the 'key decision' sub-group are shown on a schedule which ended in November 2021. No evidence is provided of decisions from these meetings and how they were formally ratified by the IPC sub-group and then approved by the '*key decisions*' subgroup. NHS Lanarkshire should produce evidence on how this process is working in practice including in relation to wider CDP issues.

Documents referenced are:

1.13 MRP OBC KSAR Evidence and Summary
Infection Prevention Control Annual Work Plan 2021/22
MRP IPC Sub-Group TOR v3 10th November 2021
MRP Equipment Sub-Group TOR v2
ICC Terms of Reference V2
1 Minutes Core Equipment Meeting (24/02/21)
2 Minutes Core Equipment Meeting (23/04/21)
3 Minutes Core Equipment Meeting (08/06/22)
P1.102 Summary Changing Places MP
KDS Process Chart
KDS TOR 23.11.20 GR

MRP KDS Attendance 2021
HRA Reg 310122 UPDATE (Hazard Risk Register)
MRP-TUV-XX-XX-RP-CS-60007 Risk Assessment
Draft NHSL BCR's V1.0
[PEP v 13.0] Lead Advisor RACI Matrix v1
MRP CDP KSAR
MRRP Lead Advisor HLIP (stage 2)

Workbook Ref No.	Areas to probe	Evidence expected
1.14	Evaluation of the Health Boards commissioning plan.	Evidence that the Health Board has recorded plans that are comprehensive and adequate to address the needs of the project and that they are fully resourced.

NHS Scotland Assure Observations:

NHS Lanarkshire have undertaken work in developing plans for commissioning, although gaps were identified that require further work by NHS Lanarkshire to address, including further development of commissioning requirements and specialist technical assistance required to support soft landings, for inclusion in the Main Contractor tender documents.

NHS Lanarkshire provided the draft *MRP OBC 6 Management Case v0.0-LS_All Comnts*, which includes their commissioning strategy and notes that work is underway to develop a bespoke Soft-Landing Programme. Both the Commissioning Strategy and Soft-Landing Programme will be developed in the FBC stage along with a detailed Technical Commissioning plan. NHS Lanarkshire also state this will include the requirement for the Main Contractor to appoint an engineering consultancy to lead or support the technical commissioning process.

NHS Lanarkshire recognise in their *MRP Soft Landings Strategy Version 1.0 (SLS)* the need to bring in specialist assistance early as part of the selection process of the Main Contractor, particularly for the control's designer or engineer, medical gases, lighting controls supplier, and catering and IT suppliers.

NHS SA note from the *MRP Soft Landings Delivery Plan v1.0 (SLP)* that an Outline Commissioning High level plan has been developed as part of OBC, this document was not provided for the review. However, in relation to commissioning NHS Lanarkshire provided the *MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy* produced by the Building Services Design Engineer, which provides more detail of the requirements for commissioning during the construction stage.

NHS Lanarkshire noted at the KSAR progress meeting of 30 August 2022 that they have appointed a Commissioning and Migration Manager who will oversee service commissioning on behalf of NHS Lanarkshire. NHS SA understand this role to be separate to that of a Building Services Commissioning Manager who will be appointed at a later date.

Within their documentation, NHS Lanarkshire note that a Facilities Management output specification and a *Post Occupancy Evaluation (POE) Plan* were to be developed at OBC Stage. No evidence of these documents was provided at review.

NHS Lanarkshire state in the *Soft Landings Delivery Plan (SLP)* that Functional Commissioning planning will commence early in the construction phase and will be co-ordinated by a designated NHS Lanarkshire officer (Commissioning Manager) and the project team in close collaboration with appropriate operational management teams.

Documents referenced are:

MRP OBC 6 Management Case v0.0-LS_All Comnts
MRP Soft Landings Strategy Version 1.0
MRP Soft Landings Delivery Plan v1.0
MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.

Workbook Ref No.	Areas to probe	Evidence expected
1.15	Evaluation of the Health Boards duty holder matrix.	Evidence that the Health Board have a fully recorded matrix of the required roles and responsibilities and have a clear governance structure that is fully resourced together with plans in place for the implementation. Evidence that Health Boards have appropriate number of competent, qualified staff to carry out specific duties throughout the life cycle of the project e.g., IPC, Engineers, Estates staff etc. The number of competent, qualified staff will depend on the type and size of the Build Project.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided several documents to demonstrate their approach to project governance, including key roles and responsibilities. This includes the *Project Execution Plan* and *RACI Matrix*. These documents do not specifically identify the "*Duty Holders*" with respect to the core services reviewed under the KSAR.

The version of the *RACI matrix* provided is noted as "*under review*" by NHS Lanarkshire and contains limited detail on the NHS Lanarkshire team and should be developed to cover all key members of the NHSL MRP senior team, including respective Duty Holders.

The *RACI Matrix* for the Lead Advisor team focuses on services during the initial design stage (RIBA Stage 2). It does not clearly articulate services required beyond

this stage, particularly once the contractor/and their design team are identified. For example, the NEC Supervisor/clerk of works is not included in the matrix.

NHS Scotland Assure also note that the *RACI matrix* does not detail all individuals and roles, particularly within the architectural and building services sections.

It is noted a digital estate implementation advisor and their role is set out in the *PEP (6.1)* however there is a lack of evidence on how this role is operating in practice including outputs. There is also a digital sub-group established and evidence of meeting attendance in part of 2020 and 2021. There is a lack of clear evidence from the information provided regarding outputs produced, approvals obtained, and how it is intended to operate going forward, including resources.

A range of documentation is provided to demonstrate a process for appointing Authorising Engineers (AE) from the national framework. This includes a matrix of nominated Authorised Persons for the MRP.

NHS Lanarkshire did not provide any evidence to note how they will ensure they have an appropriate number of competent/qualified staff to carry out specific duties for example a resource plan. As noted in Q1.9, whilst the project is referenced in the *IPC team annual work plan*, there is no corresponding project level resource plan.

Documents referenced are:

Q4.C.8.1_CurrieBrown
Q4.C.1.2_Project_experience_CurrieBrown
Lead Advisor RACI Matrix v1
MRP Team Structure-Currie & Brown Org
MRP Governance Structure
Monklands Replacement Project (Team Organogram v4, April 2022)
NHSL MRP OBC- RACI Matrix v1.0
MRP OBC 6 Management Case (1 October 2021)
MRP PEP v13.2 (Stage 2 OBC)
2022.01.19 Statutory Compliance
AE Proposed Specification
AE Offer of Appointment Letter
Sample of CE letter of appointment
AP template letter
MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy Report
2022.06.17-KSAR-Stat Compliance Info
2022-05-04 NP813A AE Services (Water only) Extension letter PRO-LP Consulting STS701-113.04
CAREB NP813A18 Authorising Engineer Water Final Final Approved
MEP Workshop programme 2021-2022
MRP MEP Workshop Attendees
NP813-17 Authorising Engineers Specification General
NP813-17 Authorising Engineers Technical Questions
NP813A-18 Authorising Engineers Specification General v.3
Competence Questionnaire SKE&R_Designer_Mech & Elect Eng_Wallace Whittle_Review

Monklands Hospital Replacement Project-CDM- Appointed Designer Competency SKE&R – Designer and Mechanical & Electrical Engineer, Wallace Whittle Notice_APR317298 *IPCT Programme 21-22* *IPC Workshop minutes*

3.1.2 Project Governance and General Arrangements: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.1.2.1	**Core guidance - Planning for a resilient healthcare estate (HBN 00-07) - Resilience Planning and Emergency Planning** NHS SA notes the '*Outcome Summary in Relation to Adjacency to Inver House Distillers Ltd'* document, which recommends NHS Lanarkshire to establish a short life working group in developing a Site Emergency Plan. NHS Lanarkshire confirmed that the document referred to a joint party action plan and stated conversations around the emergency planning continue with NHS Lanarkshire, Police, Scottish Fire Service, Ambulance Service, and Inver House distillery and the emergency plan would be developed in the FBC stage. NHS Lanarkshire noted that all parties have signed off the report and the action to create the short life working group, but the group is not yet established. NHS Lanarkshire confirmed in terms of resilience planning they do not have a document that addresses the key points relevant to *HBN 00-07* and intend to develop this in the FBC stage. NHS SA note a fire at the distillery could have an adverse effect on the operation of the hospital and its building services such as ventilation systems, from smoke and other pollutants. NHS Lanarkshire provided their *Resilience Report and Utility Report* and noted that these deal with the main technical areas of section 5 of *HBN 00-07*. NHS Lanarkshire confirmed that the hospital is out with the blast area risk from the distillery, and that analysis of smoke travel, and contingency plans are to be considered in detail in the next stage. NHS Scotland have also not seen any evidence of a completed air quality assessment, although NHS Lanarkshire have indicated this exercise is currently underway. There is therefore no assurance provided at this stage as to how this may impact on developed strategies such as ventilation and air quality. NHS SA note that work has been carried out to ensure the resilience of technical services, however further work around planning to ensure operational resilience should be undertaken as a priority to ensure the

	risks are minimised in respect to any potential unintended consequences on strategies already agreed. ***Documents referenced are:*** *Outcome Summary in Relation to Adjacency to Inver House Distillers Ltd* *Resilience report (MRP-TUV-XX-XX-RP-CS-60011)* *Utility report (MRP-TUV-XX-XX-RP-CS-60001)*
3.1.2.2	**East Airdrie Link Road – Consequential Impact on Developed Engineering & IPC Strategies** NHS Lanarkshire noted in the *MRP OBC 6 Management Case v0.0-LS_All Comnts* that the alignment of the Link Road is a key activity. NHS Lanarkshire confirmed NLC are responsible for all works on the link road. NHS SA note that if a delay were to occur during construction of the Link Road, this could have a consequential impact on how other strategies pertaining to the facility are developed. ***Documents referenced are:*** *MRP OBC 6 Management Case v0.0-LS_All Comnts*
3.1.2.3	**Enabling works and Geotechnical Investigations – Consequential Impact on Developed Engineering & IPC Strategies** NHS SA notes in *MRP OBC 6 Management Case v0.0-LS_All Comnts* NHS Lanarkshire are considering enabling works. NHS Lanarkshire stated that they have had discussions with various stakeholders, including Scottish Government as to how enabling works may be undertaken if required. NHS Lanarkshire noted that the intention would be for any enabling works to be undertaken by the Main Contractor, under an extension to the main contract as opposed to a separate appointment. NHS Lanarkshire continue to review the sequence of activities, particularly with respect to required groundworks, and noted there may be an opportunity to commence levelling of the site next year or early 2024, dependant on procurement. NHS SA noted the importance of co-ordinating other design activities and to consider any potential engineering & IPC consequential impacts proceeding with enabling works may create. At the time of the KSAR the process for doing this had not been fully co-ordinated by NHS Lanarkshire. ***Documents referenced are:*** *MRP OBC 6 Management Case v0.0-LS_All Comnts*

3.2 Water and Internal Plumbing / Drainage Systems

3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
2.1	Has the Health Board completed competency checks on the water and drainage consultant designers?	Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards. Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers? Recorded evidence that input from the Health Authorising Engineer for Water (AE(W)) has been requested.

NHS Scotland Assure Observations:

Whilst the information submitted provides the Health Board a level of assurance on the competency of the building services consultant designers, NHS SA would highlight that there is limited evidence to confirm how the competencies specific to the water and drainage design consultants have been assessed by NHS Lanarkshire as part of the lead advisor procurement process.

The evidence provided by the Health Board primarily relates to the technical and quality submissions produced by the Health Board's appointed Lead Advisor as part of the response to the Lead Advisor procurement exercise.

The Lead Advisor has provided a *Design Competence Questionnaire pro-forma* completed by the building services design consultant which relates to the skills, knowledge and experience of Lead Advisor's design team members. Correspondence from the Lead Advisor's Construction Design and Management (CDM) consultant confirms that they consider the building services design consultant has demonstrated the appropriate skills, knowledge, experience, and resource for the project undertaking in their capacity as designers. Whilst this provides a level of assurance that competency checks have been undertaken, it is not clear as to how this links to the Health Boards own governance processes, particularly how NHS Lanarkshire assessed the competency of individuals involved prior to appointment.

Curriculum Vitaes (CVs) of the building services consultant designer's personnel have been provided which confirms the key individuals for the various building services design disciplines for the project including the lead public health engineers.

However, there is no specific level of detail in relation to the building services consultants overall team structure, such as a project organogram, which confirms the number of public health engineers working on the project, their respective roles and their relevant experience and qualifications. The health board has provided no assurance as to whether training plans are in place to address any deficits in healthcare experience.

Documents referenced are:

2.1 MRP OBC KSAR Evidence and Summary.doc
SBAR MRP Governance and Assurance SHTM 00.doc
MRP MEP Workshop Attendees.xls
MRP MEP Workshops Programme 2021-2022.xls
8. WW Healthcare CVs_1 per page Rev 01.pdf
10. MRP Team Structure.pptx
Competence Questionnaire SKE&R_Designer_Mech & Elec Eng_Wallace Whittle_Review.pdf
Competence Questionnaire SKE&R_Designer_Landscape Architect_Review.pdf

Workbook Ref No.	Areas to probe	Evidence expected
2.2	How does the Health Board ensure that water services are designed in a fashion, which will retain space for minor additions and modifications to services in the future?	Evidence that the engineers are presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the Board. Evidence that the Design Consultant has considered and agreed with the Board, space for future flexibility in the service installations. Evidence that the designers have presented each of the main service runs plus plant rooms to the Board's FM team, to highlight space for future flexibility. Evidence that the Board has agreed a strategy (percentage) for spare capacity and a documented allowance to be incorporated into the design.

		Are plant/tank rooms, IPS sections, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe adequate maintenance.

NHS Scotland Assure Observations:

Whilst the Health Board have provided assurance that the water services are designed in a fashion that retains space for minor additions and modifications in future, NHS SA would note that there are areas that will require validation and resolution. NHS Lanarkshire have acknowledged that the current design strategies have been developed using 'rules of thumb' approaches which is a consistent and appropriate level of detail for an OBC design, in accordance with *BSRIA BG/6 Design Framework for Building Services*. However, these approaches need verified at the early stages of RIBA Stage 3 to ensure there is no impact on the current building form and the general arrangement layouts.

The Health Board have provided several documents in response to this question including primary distribution layouts, plantroom layouts, schematics, and reports. The documentation provided has been presented to the wider stakeholder groups at focussed technical workshops. The minutes of these workshops confirmed there was representation from the Health Board's FM team

The key observations identified by NHS Scotland Assure in respect to general MEP services co-ordination are as follows:

- There is only evidence of two-dimensional combined services coordination drawings, with no evidence that three-dimensional Building Information Modelling (BIM) has been used. There are also no project specific BIM protocols provided for review.
- Combined services coordination drawings limited to Zone A and Zone C only so limited assurance has been provided by NHS Lanarkshire that demonstrates co-ordination of services within other zones.
- Ceiling type and subsequent void access and details of how services within the voids will be accessed & maintained is unclear.
- From the evidence provided it is unclear whether services cross-over zones have been allowed and structural zones accounted for within ceiling void coordination.
- Limited consideration as to how the configuration of fire protection measures such as fire/smoke dampers and pipework intumescent collars may impact on co-ordination of services.
- 25% spare capacity noted within risers; however, no such statement is provided on the detailed sections confirming similar spare capacity is being provided within arterial routes such as ceiling voids. It is not clear from the evidence provided where the 25% spare capacity value has been derived from, nor whether this is in keeping with NHS Lanarkshire's requirements.

- *MRP-TUV-XX-XX-RP-CS-60003 Overview of Plant Capacity and Spatial Provisions* report sets-out the basis of design for spare capacity allowance in relation to water and drainage.
- *The MRP Water and Drainage Strategy Approval document* and the *Mechanical Electrical Public Health (MEP) Spare Capacity Strategy Approval document* confirms that the proposals have been shared and presented to the key project stakeholders. No assurance was provided in relation to formal sign-off of this document by the Health Board.
- *MRP-TUV-XX-XX-RP-CS-60013 Plant Access & Maintenance Strategy report* provides a high-level overview of proposed maintenance activities required, which NHS Lanarkshire have confirmed will require further development and coordination as the design progresses.
- The documentation provided has been presented to the wider stakeholder groups at focussed technical workshops. The minutes of these workshops confirmed there was representation from the Health Board's FM team.
- During the KSAR Workshops NHS SA queried the level of spatial tolerance within the services distribution routes. NHS Lanarkshire confirmed that the level of tolerance provided is reflective of the stage the design has been currently developed to and noted they were confident that the space allocations allowed for services distribution includes for sufficient tolerance to accommodate future design development. However, the level of tolerance included within the design proposals is not formally documented in the information provided.

NHS Scotland Assure also identified the following specific points in relation to water and drainage services.

MRP-TUV-XX-XX-RP-CS-60003 Overview of Plant Capacity and Spatial Provisions states that *'to avoid associated risk with over sizing domestic water service pipework, the recommendation is that the domestic water services pipework is sized to the load with an allocated 10% within the pipework for future expansion'*. It should be noted that *SHTM 04-01 Part A para 9.23* states '*the installed hot water capacity should be sized for current needs and should not be designed with built-in capacity for future extensions'*. There is therefore no assurance that the requirements of *SHTM 04-01* have been addressed.

NHS Lanarkshire were unable to provide assurance on how they considered any future expansion to the mains water infrastructure, or whether they had considered the risk of biofilm growth/reduced flow rate if not sized appropriately. This should be reviewed as final capacities are defined during the detailed design stages.

There is no evidence of a typical Integrated Plumbing System (IPS) design / services arrangement. Whilst this level of detail would not be anticipated at RIBA Stage 2, the overall strategy does have a consequential impact on IPC and clinical strategies and therefore the principals should be considered at this stage of the project. A review of Zone C layouts does highlight that the majority, if not all ensuite IPS, will only be accessible through bedroom spaces. *SHPN 04-01 para. 4.30* notes: "*Provision for inspection, rodding and maintenance should ensure 'full bore' access; also, these inspection points should be located outside user accommodation."* This requirement

should be considered when developing the drainage design and given the impact this requirement may have on the architectural layouts, must be supported by a HAI-SRIBE risk assessment.

Documents referenced are:

Combined Services Drawings (14no – 50000 series drawings)
Proposed water services schematic drawings (7no – 53 series drawings)
Proposed tank room drawings (2no – 53 series drawings)
MRP-TUV-XX-XX-RP-CS-60003 Overview of Plant Capacity and Spatial Provisions.pdf
MEP Spare Capacity Strategy Approval.doc
MEP Water and Drainage Strategy Approval.doc
2-6 .MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.pdf
MRP-TUV-XX-XX-RP-CS-60013 Plant Access & Maintenance Strategy.pdf

Workbook Ref No.	Areas to probe	Evidence expected
2.3	How does the Health Board assure itself that all variations / derogations, which may be required to water systems, are investigated and agreed by all parties before they are incorporated in the design?	Evidence that each variation / derogation has a detailed technical analysis, has been referred to the Board, and agreed with their water management group clinical, engineering, Estates, infection prevention, control, and FM teams.

NHS Scotland Assure Observations:

Whilst the information submitted for review provides the Health Board assurance that there is a formal derogations process in place, NHS Lanarkshire have confirmed during the KSAR review that their final governance reviews for the OBC submission is still being finalised.

There are currently no derogations listed relating to water and drainage. There are elements of the drainage and water design proposals that may not be compliant with relevant guidance, with no recorded derogations or evidence of review by NHS Lanarkshire. These are as follows:

- Reduced domestic cold-water storage duration of 12 hour (as per *HSE ACoP L8 guidance, clause 80c*) & *7.3 of SHTM 04-01 Part A*)
- Single source of mains water supply to site (*2.3 of SHTM 04-01, Part A*)
- No bypass provided around water meters (*7.54 of SHTM 04-01, Part A*)
- Drainage access points located within user accommodation (*4.30 of SHPN 04-01*)
- The use of strainers (*9.56 of SHTM 04-01, Part A*)

- Chemical dosing (*15.4 of SHTM 04-01 Part B*)
- Hot water requirements sized for current needs only and not future extensions (*9.23 of SHTM 04-01 Part A*)

Documents referenced are:

MRP Derogation Schedule – v3.0 May 22.xls
Derogations Process Document - Final
1.1 MRP Team Minute 25th August 2021 v1 Approved.doc
MRP Derogations Rev 1 23.06.2022

Workbook Ref No.	Areas to probe	Evidence expected
2.4	Water Management Strategy	Assessment of Health Board proposed water management strategy and how this relates to the specification, guidance and project requirements. What involvement has there been from the water management group?

NHS Scotland Assure Observations:

The Health Board has acknowledged during the KSAR review that they have yet to develop the formal written scheme associated with the Water Management Strategy, however they have produced documentation such as the designer's water management report that will ultimately support the collation of this document. The Health Board have also still to define the individuals and parties dedicated to the MRP project who will have responsibility for developing the written scheme.

A water management plan report *(MRP-TUV-XX-XX-RP-CS-60015 Water Management Plan Report – Designer Input)* has been produced by NHS Lanarkshire's building services design consultant. The document has been developed based on the guidance contained within *BS8680: 2020 Water Quality – Water Safety Plans – Code of Practice* and has been developed in a checklist format following the template contained within the British Standard.

This document demonstrates that the Health Board has begun to consider the requirements for a project specific Water Management Plan. The document identifies a number of actions for NHS Lanarkshire to address, however it is unclear how these actions will be addressed, and the to what extent the Water Safety Group has inputted into this document.

The water and drainage strategy approval document and other supporting documentation confirms that there has been engagement with key stakeholders including the Authorising Engineer (AE) for water during the OBC stage. Formal sign off of the concept stage proposals from the Water Safety Group and other key

stakeholders is still required which NHS Lanarkshire has confirmed is part of their ongoing final governance procedures in advance of the conclusion of the OBC milestone.

Documents referenced are:

Proposed water services schematic drawings (7no – 53 series drawings)
Proposed tank room drawings (2no – 53 series drawings)
MEP Water and Drainage Strategy Approval.doc
2-6 .MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.pdf
MRP-TUV-XX-XX-RP-CS-60014 Domestic Water Services Temperature Risk Assessment
MRP-TUV-XX-XX-RP-CS-60015 Water Management Plan – Designer Input
Monklands Hospital Block C TM52 Report_v1
MRP TBV_Thermal Balancing Valve Summary
Stage 2 Issue – Environmental Matrix P01
Bacterial Control on Domestic Water Systems – Treatment Options

Workbook Ref No.	Areas to probe	Evidence expected
2.5	Water governance arrangements	Has the Health Board commenced its water governance planning and recorded and how it will ensure appropriate numbers of trained staff (AP and CP) and AE(W) will be appointed? Is there an established project water management group that ensures the water management strategy is adhered to for the Board, and is it clear how this project will interface with this existing group? Evidence that the Health Boards AE(W) have been involved with and reviewed the design proposals to date.

NHS Scotland Assure Observations:

As per Section 2.4, the Health Board has confirmed that their water governance arrangements are at an early stage, in particular the development of the written scheme has yet to commence and will be progressed at the next stage. The Health Board have not yet identified how they will ensure a suitable number of appropriately

trained staff, such as Authorised Persons (AP) and Competent Persons (CP), are in place.

A series of design workshops has been undertaken by the Health Board during the development of the OBC design strategies which confirms input by a number of stakeholders including NHS Lanarkshire's current Authorising Engineer for Water (AE(W)). The Health Board have also provided a *Situation-Background-Assessment-Recommendation (SBAR) document* that identifies the requirement for service specific AE resource dedicated to the project to act as ongoing independent professional advisors to the Health Board, however further secured resource dedicated to the project going forward is unclear.

NHS Lanarkshire have also confirmed during the KSAR process that a number of the stakeholders who have been consulted during the OBC stage, including their AE(W), will form part of a water safety group specific to the project. NHS Lanarkshire confirmed this group and the governance around the group will be formally established during RIBA Stage 3.

No documentation has been provided that defines the roles and responsibilities of the individuals who would form part of an MRP water safety sub-group that would constitute a project specific *'Water Safety Group'* and would liaise directly with NHS Lanarkshire's Water Safety Group. Roles and escalation paths should be defined and provide further transparency around the decision-making process across all levels of the water governance arrangements and the wider project governance process.

There is no documentation that defines the required competencies of key roles involved in the water governance processes. There is also no evidence that a skills gap analysis has been undertaken of the key stakeholders involved in the decision-making processes and development of the written scheme.

Documents referenced are:

2022.01.19 Statutory Compliance AP Matrix
Attendance MEP Workshops 2021-2022
MEP Workshops Programme Oct and Nov 21
MRP MEP FM Water & Drainage Strategy Workshop 1 2021.12.09
MRP MEP FM Water & Drainage Strategy Workshop 2 2021.01.07
MRP MEP FM Water & Drainage Strategy Workshop 3 2022.02.16
MRP MEP Workshop Attendees
SBAR MRP Governance and Assurance SHTM 00

3.2.2 Water and Internal Plumbing / Drainage Systems: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.2.2.1	**Domestic Water Temperature Risk Assessment** A *domestic water temperature risk assessment* has been produced by the designer. Within this document it notes: *'After initial commissioning it is anticipated there will be a significant period from water system filling to full building occupancy, and as a result measures should be put in place by the Contractor and their commissioning specialists to continually monitor and treat the system from the time of initial commissioning through to handover to NHS Lanarkshire'* This is a significant risk item where appropriate and considered mitigation measures must be in place. A robust, co-ordinated, and well thought out commissioning and handover process for the water systems is crucial to the successful and safe delivery of the systems that must be led by NHS Lanarkshire, who should define their expectations and ensure the process is fully considered at the earliest opportunity. NHS Scotland Assure recommend that as part of the Contractor selection process, this particular element is probed to help establish the Contractor's competency with respect to management of water systems from first fill through commissioning and handover.
3.2.2.2	**Cold Water Temperature Management** The cold-water temperature management strategy detailed within the drawings and building services strategy report appears to conclude and accept a recirculating system with the provision of cooling. It is not clear what passive measures have been considered by the designers to assist with cold-water temperature management. No evidence has been provided confirming if any assessments have been undertaken in relation to passive design measures such as dynamic thermal modelling to predict ceiling void temperatures. It is also unclear as to whether NHS Lanarkshire have considered any residual risks associated with a recirculating system should an adverse microbiological condition develop within the pipework system. These factors should be considered as part of the designer's water risk assessment. *HSE L8 Clause 75 (b)* notes, *'Provide adequate information for the user about the risk and measures necessary to ensure that the water system will be safe and without necessary risk to health when used at work.*' The current assessment does not mention water hygiene considerations that

	have influenced their design such as, contamination, amplification, transmission, exposure or susceptibility of patients.
3.2.2.3	**Designers Commissioning Brief** Limited commissioning information in relation to water systems has been provided at this stage. NHS Scotland Assure recommend that a designer's commissioning brief should be developed in accordance with *SHTM 04-01*. Commissioning documentation should begin to be developed as early as possible in the next design stage for the water services and drainage strategies.
3.2.2.4	**HCID Drainage** The drainage schematics show waste from the HCID departments combined with general waste stacks. This contradicts the *MRP MEP Water and Drainage Strategy Approval and Building Services Strategy* documents which indicate dedicated stacks are intended. NHS Lanarkshire should ensure strategies are documented consistently across the various documents. This is of particular importance when considering areas such as the HCID where there are additional IPC and Control of Substances Hazardous to Health (COSHH) considerations.
3.2.2.5	**Strategy for Locating Outlets** During the KSAR review NHS Lanarkshire confirmed that the number of outlets, and in particular wash hand basins, has undergone a review with their clinical stakeholders. A schedule (*BAS101.xls*) lists wash hand basin quantities for various areas of the hospital. The intent of this document is unclear, and the process followed to determine wash hand basin quantities is undefined. An outline specification for the wash basins is also included within this document however it is unclear how the development, verification, and procurement of sanitaryware will align with the Clinical brief and requirements noted within guidance (including what guidance has been used to inform decision making process). Whilst the intent of the process is to ensure that the wash hand basins are only provided where required, the supporting documentation does not clearly demonstrate the flow of the governance process. NHS Scotland Assure recommend the approach is refined at the next stage design stage to ensure clarity of approach and decision making. NHS Lanarkshire should also ensure that the specification of sanitaryware is co-ordinated between the architectural and MEP design packages.

3.2.2.6	**Pipework Riser Access** The combined services coordination drawings show consideration has been given to riser access with door access to risers for various service types, however pipework risers currently show no access.
3.2.2.7	**Segregation of Hot & Cold-water Pipework** Drawing *MRP-TUV-XX-XX-DR-Z-50001* Combined Services General Notes states '*domestic cold-water pipework should be kept away from hot services as far a practical within the ceiling void*'. Schematics note '*separating wall within mechanical riser between hot and cold services*', however, this is not clear within the combined services layouts. A further note states '*CWS (cold-water services) shall not run through heat station*', however there are no layout drawings with pipework distribution to allow NHS Lanarkshire to provide assurance on this.

3.3 Ventilation

3.3.1 Ventilation: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
3.1	Has the Health Board completed competency checks on the ventilation consultant designers?	Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards. Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers? Recorded evidence that input from the Health Boards Authorising Engineer for Ventilation (AE[V]) has been requested.
NHS Scotland Assure Observations: The observations noted in response to question 2.1 apply to this question with respect to ventilation consultant designers. ***Documents referenced are:*** *3.1 MRP OBC KSAR Evidence and Summary.doc* *SBAR MRP Governance and Assurance SHTM 00.doc* *MRP MEP Workshop Attendees.xls* *MRP MEP Workshops Programme 2021-2022.xls* *8. WW Healthcare CVs_1 per page Rev 01.pdf* *10. MRP Team Structure.pptx* *Competence Questionnaire SKE&R_Designer_Mech & Elec Eng_Wallace Whittle_Review.pdf* *Competence Questionnaire SKE&R_Designer_Landscape Architect_Review.pdf*		

Workbook Ref No.	Areas to probe	Evidence expected
3.2	How does the Health Board ensure that ventilation services are designed in a fashion, which will retain space for minor additions and modifications to services in the future, and there is an appropriate plant access strategy?	Evidence that the design engineers have presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the Board. Evidence that the design consultant has considered and agreed with the Health Board, space for future flexibility in the service installations.

		Evidence that the design engineers have presented each of the main service runs plus plant rooms to the Board's Estates team and / or FM team, to highlight space for future flexibility. Evidence that the Health Board has agreed a strategy (percentage) for spare capacity and a documented allowance to be incorporated into the design. Are plant rooms, IPS sections, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe adequate maintenance? Evidence that a plant access strategy for the entire ventilation system has been provided to ensure safe, adequate access, including access for cleaning.

NHS Scotland Assure Observations:

The general services co-ordination observations noted in response to question 2.1 apply to this question.

With respect to specific ventilation observations, NHS SA also note the following:

Some ceiling void sections appear to have limited consideration of spatial requirements for ductwork insulation or how safe access will be provided to both sides of fire/smoke dampers, which may be restricted by the location of other pipework and electrical containment installed within the ceiling voids at a lower level

NHS SA also have concerns that tested fire stopping details will necessitate greater spacing between ductwork which could impact on ceiling void space and potentially erode any spare capacity requirements or introduce the need to increase ceiling void depths or corridor widths.

Whilst the drawings provided are generally representative of the level of detail defined within *BSRIA BG/6* for a RIBA Stage 2 design they are limited to Zones A and C. The preliminary plantroom layouts provided for the project also focus on the central energy centre where the primary heating and cooling plant is located and a roof level ventilation plantroom layout for a typical ward block (block C). Limited assurance has been provided by NHS Lanarkshire that demonstrates co-ordination of services within other zones.

The Plant Capacity and Spatial Provisions report sets-out the basis of design for spare capacity allowance in relation to the ventilation, heating and cooling systems.

The report indicates that this has been developed and shared with NHS Lanarkshire's wider stakeholders.

The report has also been reviewed and discussed at a *Site Resilience and Environmental Parameters Workshop*, with comments made by NHS Lanarkshire being incorporated within the report provided for review.

The report defines the spare capacity allowances for future modifications and future expansion currently included within the design for distribution systems (e.g. pipework, ductwork etc), plant capacity (e.g. air handling units, air source heat pumps, chillers etc) and the physical spatial provision that has been accounted for within risers and distribution zones such as ceiling voids. There was no evidence that an assessment of the acoustic implications of the air source heat pumps had been considered.

Whilst these requirements are clearly documented in the Plant Capacity and Spatial provisions report it is unclear from some of the drawing information provided that the spare capacity allowances noted in the report is achieved e.g., sectional information provided on the combined services drawings does not confirm the allocated future space allowed within arterial routes such as corridors.

The *Building Services Strategy Report* also notes that '*service routing will be configured to ensure that ductwork systems are routed from separate directions to avoid possible contamination of alternate systems during cleaning/maintenance of individual systems*'. No assurance was provided as to how this would be achieved based on the drawing information provided for review.

A *Plant Access & Maintenance Strategy report (MRP-TUV-XX-XX-RP-CS-60013)* describes the provision for plant maintenance and replacement for the various MEP systems. The report provides a high-level overview of proposed maintenance activities required and the designer's proposed methodology for accessing plant and equipment to maintenance activities and for future removal for plant lifecycle replacement. The narratives also include annotated building layouts indicating FM lift locations providing access to plantrooms. The annotated layout notes areas of open roof and hard standing required for crane access. Whilst the locations for cranes have been indicatively shown the load bearing capacity of these locations is not yet defined. There is also no analysis provided on vehicular types, access requirements (including turning circles) and any impact of blue light routes. These aspects will need to be considered and documented in the next stage and prior to finalisation of the architecture and civil/structural designs.

The *Ventilation Strategy approval document* and the *MEP Spare Capacity Strategy Approval document* confirms that the proposals have been shared and presented to the key project stakeholders. These documents (and other supporting information) summarise the Lead Advisors proposed strategy recommendations and the discussions at the various workshops. The document includes a section for formal sign-off by the Lead Advisors design team and endorsement of these proposals by the Health Board and their wider stakeholders.

It is noted that this document provides an overview of the strategies from a governance perspective, however the documentation still requires formal sign off by the various parties noted in the document as part of NHS Lanarkshire's final governance approvals for the OBC stage and therefore the strategy remains at risk.

NHS SA have concerns that the ventilation solution reviewed for the two blocks may not fully representative of other areas of the hospital therefore there are aspects of the ventilation design that still required to be validated and proven.

There are still a significant number of areas that will require timeous validation and resolution at the earliest opportunity within the FBC stage, typically at the outset of RIBA Stage 3, to ensure there is no significant impact on building form and the general arrangement layouts. This will require further co-ordination with other disciplines including the architect, structural engineer and fire engineer.

Monitoring of the spatial co-ordination will be required as the design progresses into the next design stage to ensure that the desired spare capacity within the systems, distribution routes, plantrooms and risers is maintained and is not diluted as the design continues to be developed. The Health Board should consider effective control measures and processes to be implemented to ensure this is appropriately monitored and tracked, as there is currently no documented process to identify how this will be undertaken.

The plant access and maintenance strategy will require further development and co-ordination as the design progresses into FBC stage. The documentation reviewed provides a level of assurance that plant access has been considered from a concept design perspective, with respect to system maintenance and replacement. However, further consideration will be required in relation to the overall FM strategy particularly with respect to people flows associated with the maintenance activities and potential plant replacement component pinch points.

Documents referenced are:

Combined Services Drawings (14no – 50000 series drawings)
Proposed ventilation strategy drawings (55no – 56 series drawings)
Proposed heating and cooling strategy drawings (58no – 56 series drawings)
MRP-TUV-XX-XX-RP-CS-60003 Overview of Plant Capacity and Spatial Provisions.pdf
MEP Spare Capacity Strategy Approval.doc
MEP Ventilation Strategy Approval.doc
2-6 .MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.pdf
MRP-TUV-XX-XX-RP-CS-60013 Plant Access & Maintenance Strategy.pdf
Energy Centre Layout (MRP_TUV_XX_XX_DR_CS_96003.pdf)

Workbook Ref No.	Areas to probe	Evidence expected
3.3	How does the Health Board assure itself that all variations / derogations, which may be required to the ventilation systems, are investigated and agreed by all parties before they are incorporated in the design?	Evidence that each variation / derogation has a detailed technical analysis, has been referred to the Health Board, and agreed with their ventilation safety group, clinical, engineering, Estates, infection control and FM teams.

NHS Scotland Assure Observations:

Whilst the information submitted for review provides assurance that there is a formal derogations process in place NHS Lanarkshire have confirmed during the KSAR review that their final governance reviews for the OBC submission is still being finalised. As such the derogations relevant to the ventilation systems have still to be fully signed off in accordance with the Health Board's derogations process for the OBC milestone.

There are currently four derogations listed within the derogations schedule relating to ventilation.

There are elements of the ventilation design proposals where further evidence should be documented by NHS Lanarkshire to demonstrate compliance in the absence of any recorded derogations. These are as follows:

- Ventilation design with respect to the Peri-Operative model particularly where any non-standard layouts or process flows are being utilised e.g. compliance with theatre ventilation arrangements in accordance with *SHTM 03-01 Part A 2022*.

Documents referenced are:

MRP Derogation Schedule – v3.0 May 22.xls
Derogations Process Document - Final
1.1 MRP Team Minute 25th August 2021 v1 Approved.doc
MRP Derogations Rev 1 23.06.2022

Workbook Ref No.	Areas to probe	Evidence expected
3.4	Does the Health Board have a strategy for ventilation (for rooms where this is permitted within the SHTM/SHPN guidance)?	Evidence of agreed environmental matrix. Evidence that the Dynamic thermal modelling confirms what the design must include (e.g. structure, solar shading/protection, orientation, equipment optimisation, etc.) to ensure that room temperatures comply with SHTM guidance, in naturally ventilated rooms.

		Floor plans with associated plant locations highlighted plus simple schematic of strategy. This must also identify the air intake and exhaust strategy / locations.

NHS Scotland Assure Observations:

The level of information provided in relation to the ventilation strategies is representative of a RIBA Stage 2 concept stage proposal, however there are several aspects of the ventilation design that have been noted that will require further attention in a timeous manner during the next stage. A number of these items will require resolution at the earliest opportunity in RIBA Stage 3. These items would include further development of the strategies associated with the HCID, peri-operative care model, operating theatres and other specialist spaces where the clinical and operational briefing requirements require further co-ordination with the architectural and engineering disciplines.

The current ventilation strategies also appear to promote the adoption of a fully mechanically ventilated facility. NHS SA would recommend that further analysis, particularly in non-clinical areas, is undertaken at the next stage to ensure passive measures have been exhausted where possible with a view to reduce the operational energy demand and align with the project operational energy targets and net zero carbon aspirations.

Supporting the drawing information there is an *Environmental Matrix* and *Room Use Matrix*. The *Room Use Matrix* and *Environmental Matrix* are spreadsheet documents. The *Room Use Matrix* has been developed in conjunction with the Health Board's clinical team to define how the clinical spaces will be used. This document has informed the development of the *Environmental Matrix* which defines the mechanical and electrical requirements for the various space types within the hospital.

On the evidence presented for review, the *Environmental Matrix* will require further development as the project progresses into the next stage. The governance and quality assurance processes in relation to this document including document management, version control and the review and sign off process is critical to the successful implementation of the brief requirements.

NHS SA have several observations in relation to the development of the *Environmental Matrix* document. Currently the document only notes room names which may be applicable to multiple room types. The document currently does not include any room numbers and therefore there is a risk that the fidelity of the data could be compromised at a later date. As an example, occupancy levels are currently defined via the room name descriptor rather than being defined within the matrix for each individual space. The inclusion of room numbers and individually itemising each room type will provide the ability to reference the space to a layout drawing and mitigate against the potential for information being left open to interpretation.

NHS SA also noted at the Ventilation Technical Workshop on 19 July 2022 that the 2022 updates to *SHTM 03-01* has resulted in changes to ventilation guidance, including air change rates for specific spaces including treatment rooms and procedure rooms. The OBC MEP design strategies have been developed prior to the updated interim guidance being released in February 2022. NHS Lanarkshire confirmed that these guidance updates will be assessed and considered during RIBA Stage 3 to determine what impact they may have on the current concept design strategies that have been developed to date. Until this exercise is undertaken, a risk to existing developed strategies will remain.

There are also areas within the *Environmental Matrix* that are noted as 'To Be Confirmed'. At the KSAR Ventilation Technical Workshop held on the 18 August 2022 NHS Lanarkshire confirmed that there are several areas where the user and clinical briefing requirements are still to be determined. These include areas such as laboratories and pharmacy areas where items including containment and decontamination protocols, need to be determined to allow the MEP services strategies to be further developed. It is therefore unclear how the plant space allocation and service distribution zones for these specialist spaces have been determined in the absence of briefing information for these areas.

The current ventilation proposals for the HCID suite that have been provided for review are now superseded by development of a draft NHS Lanarkshire SBAR for these areas with associated room layout updates. These developments have provided some clarity in relation to the ventilation strategy and pressure regime for the spaces however it is noted that the development of the MEP services strategies for the HCID suite is lagging as the architectural layouts, defined patient pathways and briefing requirements are further defined. Further engineering detail is therefore still to be developed to provide the required assurance, including schematic representations of room adjacencies that confirms the air flow/air changes, pressures and direction of air. The services distribution routes for the ventilation ductwork and other spatial considerations including ceiling void depths, riser sizes/locations and fan and safe change filter locations also requires further co-ordination. COSHH requirements must also be considered given the patient cohort.

The peri-operative model proposed for the operating theatres was discussed at the Ventilation Technical Workshop on 19 July 2022. This model adopts a non-standard theatre layout. During the KSAR, several questions were posed to NHS Lanarkshire as to the clinical process flow and how that may impact upon the ventilation and IPC provisions. NHS Lanarkshire noted strategies were still being developed in this respect and further dialogue is continuing with NHS Scotland Assure post completion of the KSAR.

To support the proposed ventilation strategies and wider energy strategies a dynamic thermal model has been developed. The Dynamic Thermal Modelling software has been used to assess the risk of overheating within the building inclusive of the mechanically ventilated areas.

This analysis was assessed against *CIBSE TM52 - The Limits of Thermal Comfort: Avoiding Overheating in European Buildings*, which provides a methodology for determining whether the internal environmental conditions satisfy acceptable limits

of thermal comfort. The assessment covers the full building with a more detailed sensitivity analysis undertaken in Block C which was deemed to be the area of the building most susceptible to overheating and contains accommodation such as patient rooms where thermal comfort issues are an important consideration.

The analysis was assessed with and without cooling coils within air handling units (AHU's) to temper the air supply. This analysis has been undertaken for both current design summer year (DSY) weather files and future DSY weather files (2050 and 2080).

Whilst the modelling has confirmed that the key regularly occupied spaces passed the assessment criteria there are a number of transient areas with highly glazed areas where potential overheating is noted as a strong risk (particularly within glazed stairwells between ward blocks and some circulation areas) and will require further review and mitigation in the next stage.

The modelling carried out (*CIBSE TM52: The Limits of Thermal Comfort: Avoiding Overheating in European Building* analysis) confirms the inclusion of cooling within the air handling units to prevent over-heating. Whilst the TM52 modelling does consider alternative glazing specifications within highly glazed south facing areas of the building there is no consideration given within this analysis towards the use other passive measures e.g., improved fabric, structural frame options, solar shading/protection, building orientation and equipment optimisation etc. to assist with improving thermal comfort and potentially further reducing energy demand. The *CIBSE TM54: Evaluating Operational Energy Use at Design Stage* modelling analysis also does not appear to consider alternative strategies to assess the overall impact on the estimated operational energy of the facility.

NHS Lanarkshire noted that modelling of ceiling void temperatures has been undertaken, however no evidence of this review was provided and therefore there is no assurance as to how NHS Lanarkshire have considered the potential risks of overheating within the ceiling voids, or the potential impact on domestic cold-water temperatures.

Air intakes and exhausts associated with the ventilation system are not clearly defined at this stage. As noted in response to question 3.2 plantroom layouts have only been developed for a typical ventilation plantroom and therefore the overall strategy for air intakes and exhaust have yet to be defined.

NHS SA have noted some concerns around the impact of fungal growth from the nearby bonded warehouse and whether this may have any impact on the operational and maintenance aspects of ventilation plant and equipment.

In addition to the potential risks from the nearby bonded warehouse there are other aspects of the ventilation design such as location of air exhausts from the HCID suite and other potentially contaminated ventilation air paths that are a critical aspect of the developing design. There was no evidence presented to suggest that these points have been fully considered and risk assessed in the information submitted for review and will therefore require further review and assessment to be undertaken at

the earliest opportunity. There is also no evidence of an internal air quality assessment having been undertaken.

Documents referenced are:

Combined Services Drawings (14no – 50000 series drawings)
Proposed ventilation strategy drawings (55no – 56 series drawings)
Proposed heating and cooling strategy drawings (58no – 56 series drawings)
MRP-TUV-XX-XX-RP-CS-60003 Overview of Plant Capacity and Spatial Provisions.pdf
MEP Spare Capacity Strategy Approval.doc
MEP Ventilation Strategy Approval.doc
MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.pdf
Energy Centre Layout (MRP_TUV_XX_XX_DR_CS_96003.pdf)
15165_Monklands Hospital_TM52 Report_v2.pdf
15165_Uni Hospital Monklands_Op Energy_Report_v1.pdf
15165_Monklands Hospital_Section 6 & EPC_Report_v1.pdf
MEP Daylight Modelling Strategy Approval.doc
15165_Monklands Hospital_Daylighting_Report_v1.pdf
Oil Mains Concept Schematic (MRP-TUV-XX-XX-SC-M-50001.pdf)
Chilled Water Primary System Schematic (MRP-TUV-XX-XX-SC-M-50001.pdf)
Energy Centre & Heat Station Heating Schematics (MRP-TUV-XX-XX-SC-M-56001 to 56004.pdf)
Ventilation Schematics (MRP-TUV-XX-XX-SC-M-57002 to 56005.pdf)
ARMILA_Monklands University Hospital_NZCPSB Pathfinder.pdf
20220325 Stage 2 Issue - Environmental Matrix P01.pdf
Room Matrix v 4.1 (20210623).xls
Room UseVentilation Strategy SBAR v4.1 (20210624).doc
15165_Monklands Hospital_Daylighting_Report_v1.pdf
Oil Mains Concept Schematic (MRP-TUV-XX-XX-SC-M-50001.pdf)
Chilled Water Primary System Schematic (MRP-TUV-XX-XX-SC-M-50001.pdf)
Energy Centre & Heat Station Heating Schematics (MRP-TUV-XX-XX-SC-M-56001 to 56004.pdf)
Ventilation Schematics (MRP-TUV-XX-XX-SC-M-57002 to 56005.pdf)
ARMILA_Monklands University Hospital_NZCPSB Pathfinder.pdf
20220325 Stage 2 Issue - Environmental Matrix P01.pdf
Room Matrix v 4.1 (20210623).xls
Room UseVentilation Strategy SBAR v4.1 (20210624).doc

Workbook Ref No.	Areas to probe	Evidence expected
3.5	Is there evidence of stakeholder input to ventilation strategies?	Addition to or supplement to the Environmental Matrix which confirms the following, on a room-by-room basis: a) The type of ventilation (to SHTM 03-01) b) Patient group and / or function related to the space. c) Name of the Consultant, Clinical Lead or Department Lead who has agreed to the room requirements. d) Name of the Infection Prevention and Control Doctor or equivalent who has agreed to the room requirements. e) Name of the Infection Prevention and Control Nurse who has agreed to the room requirements. f) Name of the Estates / FM team representative who has agreed to the room requirements. g) Name of the NHS Project Manager who has agreed to the room requirements. h) Name of the Decontamination Manager who has agreed to the room requirements (where this is part of the project).

NHS Scotland Assure Observations:

NHS Lanarkshire have demonstrated and evidenced that there has been key stakeholder input in the development of the proposed ventilation strategies. As noted above and in questions 3.2 and 3.4, these documents (and other supporting information) summarise the Lead Advisors proposed ventilation strategy recommendations and stakeholder input including records of the discussions at various stakeholder engagement technical workshops. However, the strategy documents, which includes the environmental matrix, are still required to be signed by relevant stakeholders of as part of NHS Lanarkshire's final stages of governance prior to conclusion of the OBC milestone.

A *room use and ventilation SBAR document* has been produced that confirms input from the Health Board's clinical team including Consultant Microbiologists, Anaesthetist and Deputy Chief of Medical Services, Senior Nurse for the Medical Division and Head of Infection Prevention and Control. No evidence of final SBAR sign-off by required stakeholders was provided.

Correspondence has been provided by NHS Lanarkshire that confirms approval of the room use matrix from the various Clinical leads that have been consulted in the development of this document. In addition to this, and as noted in the question 3.2, a *Ventilation Strategy approval document* has been provided that confirms the proposals have been shared, presented and discussed in various workshops to the key project stakeholders including NHS Lanarkshire's project specific sub-groups representing facilities management, IPC etc.

Documents referenced are:
MRP OBC KSAR Evidence and Summary.doc
MEP Spare Capacity Strategy Approval.doc
MEP Ventilation Strategy Approval.doc
20220325 Stage 2 Issue - Environmental Matrix P01.pdf
Room Matrix v 4.1 (20210623).xls
Room Use Ventilation Strategy SBAR v4.1 (20210624).doc

Workbook Ref No.	Areas to probe	Evidence expected
3.6	Is there evidence of the Health Board developing Ventilation Commissioning Proposals?	Evaluation of the suitability of the proposed plans in the context of the OBC, are these sufficient do the meet the requirements of the project, guidance and the design of the system?

NHS Scotland Assure Observations:

Whilst there is evidence that the Health Board have commenced development of Ventilation commissioning proposals which would be commensurate with the stage the project is at there are a number of areas that will require input at the earliest opportunity in the next design stage.

The *Building Services Strategy Report (MRP-TUV-XX-XX-RP-CS-60010)* details the initial high-level requirements for MEP testing and commissioning. The information provided at this stage is generic and not specific to the ventilation systems. This will require further development into a dedicated and detailed ventilation commissioning briefing document, as per *11.3 of SHTM 03-01 Part A*.

The *Building Services Strategy Report* also identifies the need for a commissioning manager and an independent commissioning engineer. The roles and responsibilities of the commissioning manager and the independent commissioning engineer are not currently defined. As noted during the KSAR progress meeting on the 30 August 2022, consideration should be given if the independent commissioning engineer will validate certain systems or this will be a separate Health Board appointment.

The Health Board have confirmed that they have appointed a Commissioning and Migration manager who is dedicated to the project. No documentation has been provided that confirms the scope of this role or how this individual would interface with the other identified commissioning roles. NHS Lanarkshire clarified that the

individual fulfilling this role will be starting to develop a commissioning and migration strategy through the conclusion of the OBC milestone and into the forthcoming design stages.

From the documentation provided it is unclear how the commissioning roles identified to date will interface with a Contractor, who will be responsible for appointing these individuals and the contractual relationship of these key roles.

Documents referenced are:

MEP Ventilation Strategy Approval.doc
MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.pdf
Combined Services Drawings (14no – 50000 series drawings)
Proposed ventilation strategy drawings (55no – 56 series drawings)
Proposed heating and cooling strategy drawings (58no – 56 series drawings)
Chilled Water Primary System Schematic (MRP-TUV-XX-XX-SC-M-50001.pdf)
Energy Centre & Heat Station Heating Schematics (MRP-TUV-XX-XX-SC-M-56001 to 56004.pdf)
Ventilation Schematics (MRP-TUV-XX-XX-SC-M-57002 to 56005.pdf)

Workbook Ref No.	Areas to probe	Evidence expected
3.7	Has the Health Board started developing its ventilation governance arrangements?	Is the Heath Board considering how it will ensure appropriate numbers of trained staff (AP and CP) and AE(V) for the project? Evidence that the Health Boards AE(V) have been involved with and reviewed the design proposals to date.

NHS Scotland Assure Observations:
Refer to observations in 2.5. These observations also apply to the evidence submitted with respect to the development of the Health Board's ventilation governance arrangements. The Health Board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as APs and CPs, are in place.

The 2022 update to *SHTM 03-01* (February 2022) introduce the concept of a formal Ventilation Safety Group (VSG). Whilst it is recognised that NHS Lanarkshire have engaged and consulted with their AE(V) and other parties advising the Health Board on ventilation safety matters, the Health Board should review and consider their formal governance going forward to establish how their project team will interface with their Ventilation Safety Group as the design develops and evolves.

Documents referenced are:

MEP Ventilation Strategy Approval.doc
SBAR MRP Governance and Assurance SHTM 00.doc

3.3.2 Ventilation: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.3.2.1	**Heating System Operating Temperatures** The current heating system operating temperatures associated with the proposed Air Source Heat Pump (ASHP) and Water Source Heat Pump (WSHP) system is 85^{o}C flow and 65^{o}C return. The preliminary loads provided noted that the Hot Water Service (HWS) demand only represents around 25% of the peak heating load. The hospital is intended to be a highly insulated building with a thermally efficient envelope, where the estimated space heating load represents circa 12% of the overall heating load. NHS SA have concerns around running the plant at such high operating temperatures. This is illustrated in the *Operational Energy report* provided by NHS Lanarkshire which confirms heating accounts for the second largest energy use in the building. The report (12.2.1 Headline Observations) attributes this to the reduced heat pump seasonal efficiency (average Coefficient of Performance (COP) of 1.97). Poor seasonal heating efficiency will lead to excessive operational energy costs. High operating temperatures would also limit the potential for connection to a district heat network in the future. There is no evidence within the report to confirm if NHS Lanarkshire have analysed the impact of alternative system flow and return temperatures and the associated seasonal COP impact on the overall operational energy demands. Notwithstanding the above, the revised *Scottish Building Standards Technical Handbook 2022: Non-Domestic*, effective December 2022, require all heating systems to have a mean water temperature of no greater than 50^{o}C and a maximum temperature differential of 10^{o}C. NHS Lanarkshire's designers have interpreted that this requirement may not be applicable if the system is considered a heat network in accordance with *CIBSE CP1 Heat Networks Code of Practice for the UK 2020*. However, at the time of this KSAR this definition had not been agreed with NHS Lanarkshire or Building Control. Whilst this interpretation may provide a route to compliance for the current proposed strategy NHS SA would still have concerns that the strategy does not fully consider if it is the most efficient solution. The strategy will therefore require further review and the associated impact on the architectural scheme fully appraised.

3.3.2.2	**Achieving Compliance with Revised Scottish Building Standards Technical Handbook 2022: Non-Domestic** As noted above, updates to Section 6 of the *Scottish Building Standards Technical Handbook 2022: Non-Domestic* become effective on the 1 December 2022. The impact of these regulation changes will require a full appraisal to assess the impact on the project. This is of particular concern with respect to compliance with Section 6 of the *Building Regulations*, as the current compliance pass margin offers very tolerance with respect to future strategy changes or design development. The revised building regulations will implement an updated *National Calculation Methodology (NCM)* which introduces a Delivered Energy compliance metric alongside the existing carbon emissions standard. The notional building requirements that the hospital will require to be assessed against introduce more onerous requirements than the current regulations. NHS Scotland Assure recommend appropriate mitigation measures be reviewed and considered by NHS Lanarkshire in lieu of these changes, and a full appraisal undertaken at the earliest opportunity in RIBA Stage 3 once the updated compliance software is released for use.
3.3.2.3	**Dynamic Thermal Modelling Monitoring, Checking and Validation** The building services design consultant has engaged with a third party to undertake the dynamic thermal modelling analysis on their behalf. The process for checking and validating the input data within the model is undefined by NHS Lanarkshire. A roadmap for monitoring the dynamic thermal modelling through the forthcoming design stages, particularly with respect to item 3.3.2.2 above, should be clearly defined & documented to ensure design development is being considered holistically at key intervals.
3.3.2.4	**Net Zero Carbon Targets** MRP is defined as a 'Pathfinder' project with respect to the *Net Zero Carbon Public Sector Buildings (NZCPSB) standard*. The *draft NZCPSB Pathfinder report* has reviewed the project status and progress against two of the six objectives in the standard. The recommendations within this report are acknowledged in the *Building Services Strategy document* however the status of the brief in relation to the projects NZC aspirations requires further clarity.

	It is critical that the project net zero aspirations and targets are clearly understood, and the building services strategies, architectural design and other associated engineering disciplines are aligned at the beginning of RIBA Stage 3. Failure to address the NZC aspirations timeously introduces significant challenges to the project in subsequent design stages due to there being limited opportunities to further evolve and change the design. The "status quo" MEP design should be challenged to allow the Health Board to provide assurance that they will meet the NZC targets.
3.3.2.5	**Operational Energy Targets** The *draft NZCCPSB Pathfinder report* notes an operational energy target for an 'All electric' hospital of 134 – 178 kWh/m^2. These figures include 85 kWh/m2 for non-heating electricity, accounting for the estimated regulated (60 kWh/m^2) and unregulated (25 kWh/m^2) demands. The TM54 modelling exercise predicts an estimated operational energy target of 203 kWh/m^2, which is potentially between 25-69kWh/m^2 over the pathfinder targets. The Operational Energy targets for the project therefore require further clarity at the earliest opportunity to inform the ongoing development of the building into RIBA Stage 3.
3.3.2.6	**Heating Resilience Strategy – Use of Oil-Fired Boilers** Whilst NHS Lanarkshire have documented a resilience assessment to support the provision of an alternative heating source, there is no evidence to demonstrate if the use of oil-fired boilers has been considered from an environmental perspective or whether alternative strategies were considered (from a backup infrastructure perspective). There is also no evidence to demonstrate if NHS Lanarkshire have fully considered the risks of storing such a large volume of fuel oil, including maintaining fuel quality. KSAR workbook question 4.5 notes similar concerns with respect to the electrical backup generation strategy.
3.3.2.7	**Heating Resilience Strategy – Time for Backup Supply to go Online** It is unclear from the evidence provided as to whether NHS Lanarkshire have considered the time for the oil-fired boilers to come online in the event of an ASHP failure, including consideration of any "temperature dips" in the intervening period.

3.4 Electrical

3.4.1 Electrical: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
4.1	Has the Health Board completed competency checks on the electrical consultant designers?	Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards. Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers? Recorded evidence that input from the Health Boards Authorising Engineer for Electrical (AE(E)) has been requested.

NHS Scotland Assure Observations:

The observations noted in response to question 2.1 apply to this question with respect to electrical consultant designers.

Documents referenced are:

SBAR MRP Governance and Assurance SHTM 00.doc
MRP MEP Workshop Attendees.xls
MRP MEP Workshops Programme 2021-2022.xls
WW Healthcare CVs_1 per page Rev 01.pdf
MRP Team Structure.pptx
Competence Questionnaire SKE&R_Designer_Mech & Elec Eng_Wallace Whittle_Review.pdf
Competence Questionnaire SKE&R_Designer_Landscape Architect_Review.pdf

Workbook Ref No.	Areas to probe	Evidence expected
4.2	How does the Health Board ensure that electrical services are being designed in a fashion which will provide ease of access for future maintenance, and which will retain space for minor additions and modifications to services in the future?	Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board. Evidence that the designers have presented each of the main service runs plus plant rooms to the Health Board's FM team. Evidence that the Board has agreed a strategy (percentage) for spare capacity

		and a documented allowance has been incorporated into the design. Are sub stations, switch rooms, distribution board cupboards, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe, adequate maintenance.

NHS Scotland Assure Observations:

The general services co-ordination observations noted in response to question 2.2 apply to this question.

With respect to specific electrical observations, NHS Scotland Assure also note the following:

The *Overview of Plant Capacity and Spatial Provisions report* includes electrical plant room layout drawings showing equipment layouts and space for maintenance and access. It details spare capacity provision of 30% made up of 20% future growth and 10% spare capacity for all other electrical systems.

During the electrical KSAR workshop on the 01 August 2022 the spare capacity provision on the electrical systems was discussed. With 20% set aside for known future expansion and only 10% for general growth, NHS SA queried whether NHS Lanarkshire considered the requirements for 6% growth p.a. as per the *SHTM 06-01*. As 10% could be used up in a short space of time. NHS Lanarkshire advised that they had considered this and made reference to the SHBN which states an overall spare capacity of between 20-30%. NHS Lanarkshire were satisfied with the overall allowance. It was agreed that this level of spare capacity would be monitored and tracked through the next stages of design to ensure that it was being maintained.

The *Overview of Plant Capacity and Spatial Provisions report* includes layout drawings for Substations, High Voltage (HV) switchrooms, Low Voltage (LV) switchrooms, Generator rooms, fuel storage and UPS equipment rooms. The drawings show equipment layouts and space for access and maintenance and demonstrate a level of assurance that these spaces have been considered in some detail for this stage of design. HV and LV schematic drawings also note spare capacity and provision for future ways to be included.

Whilst there is assurance that the electrical plant rooms have been considered in terms of size for equipment and access there are further works required to ensure that cabling into and between these rooms is achievable. HV cabling on drawings is currently shown as single lines on drawings. The HV cables between the primary substation and the intake rooms will most likely be a number of single core cables in parallel based on the full load for the hospital. Detailed coordination of these cables and installation details will be required to ensure adequate space and separation is provided including allowance for diverse cable routes where required. The LV connections from the external substation locations to the LV switchrooms located within the basement have not been shown on the drawings provided for the review.

Given the distance between the rooms and the size of the load, these LV cables will be substantial in physical size and quantity and with A + B strings to be accommodated with diverse routes routing these cables and maintaining separation of the A + B strings will be difficult. NHS SA would recommend that the A + B strings are routed diversly throughout. Coordinating this with the outgoing cables from the LV switchrooms will also be required.

During the electrical KSAR workshop on 01 August 2022 NHS Lanarkshire advised that the entire basement containment system had been modelled to ensure sufficient space was available. This was not provided by NHS Lanarkshire as part of the KSAR response, therefore there is no documented assurance that this is suitably co-ordinated.

During the electrical KSAR workshop, NHS Lanarkshire also confirmed that stage 2 rules of thumb had been applied to load assessments, space planning and spare capacity. NHS Lanarkshire advised that these design assumptions would be developed further into the detailed design stage of the project.

NHS SA highlighted the risks around the design assumptions and advised that these are tracked through the next stages of design and construction from a project governance perspective to ensure that adequate space provision is provided for the installation, access and maintenance of the services and that the spare capacity provision is maintained.

Documents referenced are:

Combined Services Layouts MRP-TUV-ZA-00-DR-Z-50001, 50002, 50003
Combined Services Layouts MRP-TUV-ZA-01-DR-Z-50001, 50002, 50003
Combined Services Layouts MRP-TUV-ZA-02-DR-Z-50001, 50002
Combined Services Layouts MRP-TUV-ZC-00-DR-Z-50002
Combined Services Layouts MRP-TUV-ZC-01-DR-Z-50002
Combined Services Layouts MRP-TUV-ZC-02-DR-Z-50002
Combined Services Layouts MRP-TUV-ZC-03-DR-Z-50002
Combined Services Layouts MRP-TUV-ZC-B1-DR-Z-50002
Overview of Plant Capacity and Spatial Provisions report (MRP-TUV-XX-XX-RP-CS-60003)

Workbook Ref No.	Areas to probe	Evidence expected
4.3	How does the health board assure itself that all variations / derogations, which may be required to electrical systems, are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation has a detailed technical analysis, has been referred to the Board, and agreed with their electrical safety group, clinical, Estates, infection prevention and control and FM teams.

NHS Scotland Assure Observations:

Whilst the information submitted for review provides assurance that there is a formal derogations process in place NHS Lanarkshire have confirmed during the KSAR review that their final governance reviews for the OBC submission is still being finalised.

There are currently ten derogations listed within the derogations schedule relating to electrical systems. The “Rationale, Mitigation, Residual Risk and Outcome” sections of the schedule have not been completed for any of the electrical system derogations.

NHS Scotland Assure note that at the time of the KSAR, there were aspects of the design where NHS Lanarkshire did not provide assurance to demonstrate compliance with *BS7671 18th Wiring Regulations Edition including Amendment 2*. These specifically relate to:

- The use of Arc Flash Detection Devices (AFDD’s) in accordance with *BS7671 18th Edition Wiring Regulations Amendment 2*.
- Routing of services within protected escape route corridors in accordance with *Regulation 422.2 of BS 7671 18th Edition Wiring Regulations Amendment 2*.

NHS Lanarkshire advised that AFDD’s would not be provided to Clinical Risk Group 1 & 2 areas and that they would take a risk assessed approach to their use elsewhere in the hospital as per the requirements of *BS 7671 18th Edition Amendment 2 Wiring Regulations Regulation 710.421.1.201*.

NHS Lanarkshire also advised that in their opinion they were compliant with *Amendment 2 of BS 7671 18th Edition* in terms of routing services within escape corridors, however acknowledged that this would have to be discussed further with Building Control.

NHS SA recommend that this is also discussed and agreed with the local fire officer, electrical AE and NHS Lanarkshire Estates team. Further evidence will be required at the next stage of design to demonstrate compliance and NHS Lanarkshire approval.

Whilst the information submitted for review provides assurance that there is a formal derogations process in place there is no information provided to confirm that derogations relevant to the electrical systems have been signed off in accordance with the Health Board’s derogations process.

Documents referenced are:

MRP Derogation Schedule – v3.0 May 22.xls
Derogations Process Document - Final
MRP Team Minute 25th August 2021 v1 Approved.doc
MRP Derogations Rev 1 23.06.2022

Workbook Ref No.	Areas to probe	Evidence expected
4.4	Has the Health Board assured itself of availability of adequate supply from the local utility infrastructure?	Confirmation from the Regional Electricity Company as to how the supply will be provided from their network and if single or dual supplies are being made available.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided a *Utility Report* in support of this question. The report contains options discussed with Scottish Power Energy Networks (SPEN) on the diversion of the existing overhead lines on site and the selection of the preferred option. The report also identifies the estimated load for the site and the incoming supply arrangements discussed an agreed with SPEN. The report does not include the final offer or quotation agreed with SPEN for the size of the incoming primary substation, the load available for the site and any future spare capacity which could be made available.

SPEN have advised that it would not be possible to provide 2 separate DNO supplies from different parts of the grid for the full load of the hospital. This was due to the large load requirements, availability of supply and the location of the site in relation to major Grid Supply Points with sufficient capacity.

SPEN have confirmed that they will establish a new Primary substation on the site and will feed this with 2 supply cables from different sides of the Grid Supply point at Newarthill. The final location of the primary substation has still to be agreed between NHS Lanarkshire and SPEN.

NHS LA advised that the likelihood of losing both sides of the grid supply point or the primary substation would be extremely small, and this would need to be factored into any decision on obtaining a second supply to the site. There is no evidence to support this statement in terms of assessment of SPEN supply reliability as recommended in *SHTM 06-01 Part A 8.12* "*An approach to the Distribution Network Operator should be made to establish an indicative reliability factor for the Primary Electrical Supply.*"

The Maximum Demand for the site has been estimated by the designers at 17.2MVA including 30% spare capacity. NHS Lanarkshire have advised that the Primary substation will be a 21MVA unit and have advised this will be dedicated to the hospital only. NHS Lanarkshire are discussing this with SPEN to have this written into the supply agreement and to ensure that any further potential increase in load beyond the 30% spare capacity allowance would be available to them if required.

The 17.2MVA includes approx. 9MVA of electric heating load (via the heat pumps). In the event of a power failure from the grid the heating system electrical load would be "shed" from the electrical infrastructure and the heating system would instead be backed up by oil fired boilers. The remaining electrical load (circa 8.2MVA) would be backed up by a system of HV generators on site.

The initial *HV schematic MRP-TUV-XX-XX-SC-E-61001 Rev P02* issued for the KSAR review raised some concerns around the incoming supply arrangements resulting in a single point of failure at the main point of connection. Both incoming supply cables terminated onto the same HV switchboard within the same room creating the single point of failure.

This was discussed at the electrical KSAR workshop on 11 July 2022. NHS Lanarkshire confirmed that further discussions had taken place with SPEN, and the incoming supply arrangements had been updated to include a bus-coupler arrangement on the SPEN 11kV switchboard.

NHS SA note that the two supply cables still enter into the same room which would still potentially be a single point of failure.

NHS Lanarkshire agreed to discuss further with SPEN to separate the SPEN HV switchboard into two separate rooms to remove the potential for the single point of failure.

NHS SA understand this has been agreed with SPEN which a good step forward for the project. The updated schematics and supply arrangements have not been issued for the KSAR review.

Documents referenced are:

Utility report (MRP-TUV-XX-XX-RP-CS-60001)
Overview of Plant Capacity and Spatial Provisions report (MRP-TUV-XX-XX-RP-CS-60003)
Building services strategy report (MRP-TUV-XX-XX-RP-CS-60010)

Workbook Ref No.	Areas to probe	Evidence expected
4.5	Evidence of provisions for emergency supplies during loss of the utility incoming supply.	Floor plans with standby generator locations highlighted plus simple schematic. Capacity of generators. UPS provision.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided assurance that they have made provisions for emergency supplies during loss of power from the main incoming HV utility supply.

They have provided a series of reports, layout drawings and schematics in support of this question. The *building services strategy report*, *the utility report* and *the resilience report* all make reference to the provision of emergency supplies in the event of a loss of the utility incoming supply. These reports detail the load assessment for the building and the number and size of the proposed generators and Uninterruptible Power Supply (UPS) units. NHS Lanarkshire have also provided

layout drawings showing proposed locations of equipment and schematic drawings showing how the generators and UPS's are integrated into the system in response to this question.

NHS Lanarkshire have stated in the reports that they will be providing an 11kV dual unified network around the site and this is shown on the schematic and layout drawings. NHS Scotland Assure note the definition of a dual unified distribution network as per *SHTM 06-01 Part A* is as follows "*Dual-unified distribution: separate primary and secondary circuits collectively forming the electrical distribution of the healthcare facility. The secondary supply is equal to the primary supply; that is, both primary and secondary circuits are fully rated and provide a resilient distribution.*". NHS SA note that due to the configuration of the generator network and load shedding arrangement, it could be interpreted that the secondary circuits emanating from the generator infrastructure are not fully equal to that of the primary DNO supply. NHS SA recommend care is taken with respect to terminology to ensure no ambiguity over strategy.

NHS Lanarkshire state that they will be providing A&B distribution strings to the hospital and will provide generator back-up to both A&B distribution strings. This is shown on the schematic drawings. It should be noted that the generators do not back up the entire electrical load of the hospital. The electric heating and hot water system loads will be shed in the event of an HV mains failure, and the generators will back up the remainder of the hospital demand. The heating system will utilise a back-up boiler system in the event of a mains failure.

HV generators are sized at 2.25MVA and have each been provided with 200 hours of fuel as noted in *SHTM 06-01*. This includes 30% spare capacity allowance on A & B strings. Fuel polishing has also been specified. Whilst we note that this solution is in accordance with *SHTM 06-01*, it is unclear whether NHS LA have fully considered the maintenance regime associated with such a large volume of fuel storage, potential for fuel wastage, nor whether the noted fuel polishing will adequately preserve the quality of the fuel stored.

Floor plans have been provided showing substations, switchrooms, UPS rooms, generators and fuel store arrangements. Electrical schematic drawings have been produced detailing distribution strategy and the generator and UPS back-up strategy.

2 Main UPS rooms will be provided housing 2 x 500kVA UPS units per room giving a total of 1MVA of UPS power in an N + N arrangement. The UPS system will supply localised Medical IT panels around the hospital.

NHS Lanarkshire have confirmed Clinical Risk Category 5 areas will have dual unified Medical IT/UPS distribution.

The provision of UPS/tertiary power supplies to Category 4 locations is still under review by NHS Lanarkshire and their designers. The health board have indicated that as part of the OBC process to date, they have reviewed this at a high level but acknowledge that further detailed risk assessments will be required during the RIBA Stage 3 design to finalise requirements.

NHS SA note that there are contradictions between the *Building Services Strategy Report (MRP-TUV-XX-XX-RP-CS-60010)* Section 1.3 which indicates tertiary supplies will be provided to Category 4 areas and Section 5.6 which indicates this may not be the case. The *Resilience report (MRP-TUV-XX-XX-RP-CS-60011)* contains a similar contradiction. NHS Scotland Assure recommend that the risk assessment process be reviewed and ensure that the process considers both the clinical function of the room and the types of equipment used within the space. The risk assessment should also cover a review of the provision of A&B supplies to Category 4 areas as part of the overall resilience review.

Generator and UPS sizes are estimated at the moment based on early-stage load assessments and NHS Lanarkshire noted these will checked as the detailed design develops.

The room locations are generally agreed however as stated in section 4.2 above there are some concerns around the cabling into the main switchrooms which need to be addressed as the design moves forward.

Documents referenced are:

Building services strategy report (MRP-TUV-XX-XX-RP-CS-60010)
Resilience report (MRP-TUV-XX-XX-RP-CS-60011)
HV Schematic (MRP-TUV-XX-XX-SC-E-61001) Rev P02
LV schematics for each substation (MRP-TUV-XX-XX-SC-E-61010 to 61013)
Main Clinical UPS/IPS schematic (MRP-TUV-XX-XX-SC-E-60001) Rev P02
Main UPS (ICT) schematic (MRP-TUV-XX-XX-SC-E-60002) Rev P01

Workbook Ref No.	Areas to probe	Evidence expected
4.6	Is there a strategy for locating substations?	Floor plans with substation locations highlighted plus simple schematic.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided a series of reports, layout drawings and schematics in support of this question. The *building services strategy report*, *the utility report* and *the resilience report* all make reference to the provision of substations to provide the electrical supply requirements to the site. NHS Lanarkshire have also provided layout drawings showing proposed locations of substations and typical layout drawings showing equipment layouts and space for access and maintenance. Schematic drawings showing the distribution strategy and size of transformers have also been provided in response to this question.

The utility report states that SPEN will establish a new 33kV/11kV Primary Substation on the hospital site. The final location of this is still to be agreed with SPEN.

The primary substation will feed the hospital site at 11kV. Supplies are shown to be taken from the primary substation to two separate 11kV intake rooms which will house the 11kV switchgear serving the Hospital site 11kV/400V substations.

The drawings and reports show the hospital site will be supplied via sixteen (eight twin) electrical substations located around the site. 4 twin substations will be located within the energy centre to feed the energy centre load including the electric system for heating and hot water. 4 twin substations will feed the remainder of the hospital. These will be located within self-contained buildings external to the main hospital building.

NHS Lanarkshire have provided a basic block diagram plan showing the substation locations and substation layout drawings have been produced to show equipment layouts and maintenance and access zones.

Detailed HV and LV schematic drawings have also been produced to show the full distribution strategy for the hospital.

The evidence provided demonstrates that NHS Lanarkshire have established a strategy for locating substations.

The room locations are generally agreed however as stated in section 4.2 above there are some concerns around the cabling from the substation locations into the main LV switchrooms which need to be addressed as the design moves forward.

Documents referenced are:

Building services strategy report (MRP-TUV-XX-XX-RP-CS-60010)
Resilience report (MRP-TUV-XX-XX-RP-CS-60011)
HV Schematic (MRP-TUV-XX-XX-SC-E-61001) Rev P02
LV schematics for each substation (MRP-TUV-XX-XX-SC-E-61010 to 61013)
Proposed MEP Utility layout (MRP-TUV-XX-XX-DR-CS-96002)
Electrical Plant, Switchrooms, Generator and UPS report (MRP-TUV-XX-XX-RP-CS-60005)
Typical Substation Layouts and Locations (MRP-TUV-XX-XX-DR-E-60002)
Energy Centre Layout (MRP-TUV-XX-XX-DR-CS-96003)Rev P02

Workbook Ref No.	Areas to probe	Evidence expected
4.7	Is there a strategy for locating switch rooms?	Floor plans with switchroom locations highlighted plus simple schematic.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided a series of reports, layout drawings and schematics in support of this question. The *building services strategy report*, *the utility report* and *the resilience report* all make reference to the provision of switchrooms which will be used to provide the LV distribution to the energy centre and main hospital building.

NHS Lanarkshire have also provided layout drawings showing proposed locations of switchrooms and typical layout drawings showing equipment layouts and space for access and maintenance. Schematic drawings showing the distribution strategy and size of switchboards have also been provided in response to this question.

The layout and schematic drawings provided show the hospital site will be supplied via sixteen (eight twin A+B) LV switchrooms located around the site. 4 twin LV switchrooms will be located within the energy centre to feed the energy centre load including the electric system for heating and hot water. 4 twin LV switchrooms will feed the remainder of the hospital located within basement level B1.

The layout drawings show the location of the LV switchrooms at basement level and typical layout drawings have been produced to show equipment layouts and maintenance and access zones.

Detailed LV schematic drawings have also been produced to show the full distribution strategy for the hospital. These have been used to size the main switchboards and LV switchrooms.

The LV switchrooms for A&B strings are shown located side by side in separate rooms with each room having a 4-hour fire rating. Each LV switchroom is also provided with a Gas Suppression system.

The A&B string LV switchboards are shown connected via a Fire rated busbar system.

The evidence provided demonstrates that NHS Lanarkshire have established a strategy for locating switchrooms.

The room locations are generally agreed however as stated in section 4.2 above there are some concerns around the cabling from the substation locations into the main LV switchrooms and from the main LV switchrooms out into the main service routes which need to be addressed as the design moves forward.

Documents referenced are:

Building services strategy report (MRP-TUV-XX-XX-RP-CS-60010)
Resilience report (MRP-TUV-XX-XX-RP-CS-60011)
HV Schematic (MRP-TUV-XX-XX-SC-E-61001) Rev P02
LV schematics for each substation (MRP-TUV-XX-XX-SC-E-61010 to 61013)

Workbook Ref No.	Areas to probe	Evidence expected
4.8	Is there a strategy for locating Medical IT distribution equipment?	Floor plans with Medical IT board locations highlighted plus simple schematic. Compliance with BS7671 section 710. Compliance with SHTM 06-01.

NHS Scotland Assure Observations:

The building services strategy report states that a comprehensive UPS/Medical IT system will be installed within the facility to serve rooms identified as being Clinical Risk Category 5 areas only.

Medical IT strategy layout drawings have been produced to show the areas served and locations of Medical IT panels. Medical IT panels are located within 30m of the areas they are serving to comply with *SHTM 06-01* requirements, and this is evidenced on the layout drawings provided.

The referenced assessments and derogations supporting the provision of Medical IT infrastructure refer solely to *SHTM 06-01* Clinical Risk Categories and do not make it clear as to how the requirements of *BS7671 18th Edition Amendment 2 Section 710* have been satisfied.

Medical IT schematic drawings have been provided to show the UPS/Medical IT distribution strategy for the hospital.

Medical IT units have been sized as floor standing 8kVA units with 12 outgoing ways and the cupboards have been sized to accommodate both A&B string units.

Documents referenced are:

Building services strategy report (MRP-TUV-XX-XX-RP-CS-60010)
Resilience report (MRP-TUV-XX-XX-RP-CS-60011)
Main Clinical UPS/IPS schematic (MRP-TUV-XX-XX-SC-E-60001) Rev P02
Main UPS (ICT) schematic (MRP-TUV-XX-XX-SC-E-60002) Rev P01
IPS Strategy Layout Drawings MRP-TUV-ZB-00-DR-E-60001, 60003 & 60004, MRP-TUV-ZB-01-DR-E-60002, 60003 & 60004.

Workbook Ref No.	Areas to probe	Evidence expected
4.9	Is there a strategy for distribution?	Floor plans with containment distribution routing (horizontal and vertical).

NHS Scotland Assure Observations:

NHS Lanarkshire have produced detailed HV and LV schematic drawings which show the main electrical distribution strategy for the building.

NHS Lanarkshire have also produced 2-D combined services drawing which highlight main distribution zones and include sections through ceiling voids showing electrical containment and riser drawings showing vertical distribution strategy.

Floor plans with containment system layouts have not been provided for review.

The current strategy routes all the main services through the main corridors of the building. This includes ventilation ductwork, water services pipework, main sprinkler pipes and electrical cabling and containment systems.

The latest Amendment No 2 to the Wiring Regulations *BS7671* introduces new requirements for electrical systems within escape routes. It states *"Cables or other electrical equipment shall not be installed in protected escape routes unless part of:*

(i) an essential fire safety or related safety system

(ii) general needs lighting

(iii) socket-outlets provided for cleaning or maintenance."

The current distribution strategy routes all main electrical services through the main corridors NHS SA raised this with NHS Lanarkshire in the electrical KSAR workshop of 01 August 2022 as this could have a significant risk to the routing of services and spatial coordination of services throughout the building.

As noted in 4.3 above NHS Lanarkshire advised that in their opinion, they were compliant with *Amendment 2 of BS 7671* in terms of routing services within escape corridors, however acknowledged that this would have to be discussed with Building Control and other relevant stakeholders such as the local fire officer and fire engineer to be agreed.

The electrical distribution strategy proposed for the building is very resilient. A+B substations will feed A+B LV switchrooms and A+B LV strings will be distributed around the building. NHS Lanarkshire have confirmed that diverse routing of A+B LV cables will be provided where possible, however they have advised that where the main LV cables leave the A+B switchrooms at basement level the A+B cables will be routed within the same corridor and fire compartment for a length of time before going off on different routes.

NHS Lanarkshire have confirmed that both sets of cables will be fire rated and routed down different sides of the corridor.

NHS SA have concerns that if there was to be a serious incident of fire within the corridor space and cables were damaged and had to be replaced this could affect a major area within the hospital. NHS SA would recommend these cables be diversely routed throughout their length as far as reasonably practicable. Given this is a new build facility, any constraints on achieving this should be reviewed and a documented decision-making process put in place should they not be removed through the design development.

Documents referenced are:

Combined Services Layouts MRP-TUV-ZA-00-DR-Z-50001, 50002, 50003
Combined Services Layouts MRP-TUV-ZA-01-DR-Z-50001, 50002, 50003
Combined Services Layouts MRP-TUV-ZA-02-DR-Z-50001, 50002
Combined Services Layouts MRP-TUV-ZC-00-DR-Z-50002
Combined Services Layouts MRP-TUV-ZC-01-DR-Z-50002

Combined Services Layouts MRP-TUV-ZC-02-DR-Z-50002 *Combined Services Layouts MRP-TUV-ZC-03-DR-Z-50002* *Combined Services Layouts MRP-TUV-ZC-B1-DR-Z-50002* *Overview of Plant Capacity and Spatial Provisions report (MRP-TUV-XX-XX-RP-CS-60003)* *MRP-TUV-XX-XX-CS-60013 - Plant Access & maintenance Strategy Report* *Building services strategy report (MRP-TUV-XX-XX-RP-CS-60010)* *HV Schematic (MRP-TUV-XX-XX-SC-E-61001) Rev P02* *LV schematics for each substation (MRP-TUV-XX-XX-SC-E-61010 to 61013)*

Workbook Ref No.	Areas to probe	Evidence expected
4.10	Is there evidence of the Health Board developing electrical commissioning proposals?	Evaluation of the suitability of the proposed plans in the context of the OBC, are these sufficient do the meet the requirements of the project, guidance and the design of the system?

NHS Scotland Assure Observations:

MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy Report describes the requirement for testing and commissioning, including a separate commissioning manager and an independent commissioning engineer however this will require further development into a dedicated commissioning brief document.

Elements of the commissioning brief should be able to be progressed and documented including key design criteria and design conditions. This document should be progressed at the earliest opportunity and should be a standalone document that is not embedded within other documents such as RIBA Stage reports and specifications.

Documents referenced are:

Building Services Strategy Report MRP-TUV-XX-XX-RP-CS-60010

Workbook Ref No.	Areas to probe	Evidence expected
4.11	Has the Health Board starting on its early thinking for the electrical governance arrangements for the operational phase?	Is the Health Board considering how it will ensure appropriate numbers of trained staff (AP(HV), AP(LV), CP(HV), CP(LV), AE(HV) and AE(LV) for the project, inclusive of third-party providers? Evidence that the Health Boards AE(E) have been involved with and reviewed the design proposals to date.

NHS Scotland Assure Observations:

Refer to observations in 2.5. These observations also apply to the evidence submitted with respect to the development of the Health Board's electrical governance arrangements. The Health Board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as APs and CPs, are in place.

Early discussions have taken place with AP/AE's and preliminary safe systems of work have been discussed. No formal documented safe systems of work have been put in place at this stage. Further assurance should be documented by NHS Lanarkshire on this matter as the project progresses.

Documents referenced are:

MEP Electrical Plant Approvals
MEP Electrical Services Strategy Approval
MEP Energy Centre Strategy Approval
MEP FM Electrical Design Workshop 211203
MEP FM Electrical Design Workshop 211217

3.4.2 Electrical: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.4.2.1	**Overhead Lines & Pylon Diversion Works** The utility report outlines that a number of options were considered for the diversion of the overhead lines currently running through the site. These included underground options and re-routing of overhead lines on Pylons. SPEN have advised NHS Lanarkshire that the existing 275kV overhead line system will have to undergo an upgrade to a 400kV system at some time in the future. This upgrade would not be carried out as part of the diversion works as it is programmed to happen in the future. Because of the future potential upgrade of the cables SPEN have effectively ruled out an underground option for the diversion works as this would be cost prohibitive and more disruptive in the future. It's not clear at the moment how these potential future upgrade works could affect the hospital as access would be needed to replace the re-routed overhead cable lines. NHS SA would recommend that NHS Lanarkshire request SPEN submit proposals as to how they would carry out the upgrade works

	and what access requirements they would need which might impact on the hospital. NHS SA recommend that NHS Lanarkshire track the potential upgrade of the overhead line in the future to ensure that the timing of it is known and any potential disruption to the site is understood including any EMC considerations and issues with emergency services access. NHS Lanarkshire should also consider any legal obligations to maintain access to the site to SPEN as part of any contractual arrangements, including wayleaves. ***Documents referenced are:*** *Utility report (MRP-TUV-XX-XX-RP-CS-60001)* *Proposed MEP Utility layout (MRP-TUV-XX-XX-DR-CS-96002)*
3.4.2.2	**Earthing Design** The main earthing system design for the hospital is stated as a Contractor Design Portion and has not been fully considered at this stage of the design. The earthing design strategy for the hospital will be very complex. There will be high fault levels on site with the Primary substation and large transformers in close proximity to the LV distribution. There are HV generators on site and UPS systems on the LV distribution so the use of Neutral/Earth contactors will need to be considered within the distribution system. Therefore, it will be important to understand the earthing strategy to ensure the safe operation of equipment and safety of the staff and patients within the hospital. The electrical design cannot be finalised until this is resolved. Soil resistivity testing or ground condition surveys have not been carried out to date to understand any impact on the earthing system design and locations of earth mats have not been identified on drawings. NHS Scotland Assure have concerns that this may have consequential impacts on other elements of the electrical services design. ***Documents referenced are:*** *Main Earthing Schematic MRP-TUV-XX-XX-SC-E-60003 Rev P02* *HV Schematic (MRP-TUV-XX-XX-SC-E-61001) Rev P02* *LV schematics for each substation (MRP-TUV-XX-XX-SC-E-61010 to 61013*)

3.5 Medical Gases

3.5.1 Medical Gases: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
5.1	Has the Health Board completed competency checks on the medical gases consultant designers?	Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards. Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the consultant designers? Recorded evidence that input from the Health Boards Authorising Engineer for Medical Gases (AE(MG)) has been requested.

NHS Scotland Assure Observations:

The observations noted in response to question 2.1 apply to this question with respect to medical gases consultant designers.

NHS Lanarkshire's building services consultant confirmed at the KSAR Medical Gas Technical Workshop on 14 July 2022 that they would deliver fully designed proposals for the medical gas systems to RIBA Stage 4. Typical industry practice is for the medical gas systems to be a Contractor Design Package (CDP) with the medical gases consultant engineer producing the performance requirements for a specialist to develop the detail design.

A CV has been submitted for the lead medical gases consultant designer however no further detail is provided on the resource allocated by the medical gases consultant designer to deliver the full design including details of other engineers supporting the lead designer and their respective qualifications, competency and experience in medical gas design.

Whilst the information submitted provides the Health Board a level of assurance on the competency of the project building services consultant, there is limited evidence provided to confirm how the competencies of the medical gases design consultants have been assessed by NHS Lanarkshire as part of the lead advisor procurement process.

NHS SA recommend that NHS Lanarkshire undertake appropriate due diligence to ensure that the proposed design team can demonstrate the appropriate levels of competence, qualifications**,** and experience to be able to produce a detailed medical gas design during subsequent design stages.

During the KSAR Medical Gas Technical Workshop, it was confirmed by the Health Board's current Authorising Engineer (AE) for medical gas services that they would be involved in a scoping exercise at RIBA Stage 3 and 4 to assist NHS Lanarkshire's design team in determining specific requirements such as flow rate provisions to each department. NHS SA would note that this is not typical practice and that NHS Lanarkshire should ensure all roles and responsibilities for the development of the medical gases design are clearly defined.

Documents referenced are:

5.1 OBC KSAR Review WIP.doc
SBAR MRP Governance and Assurance SHTM 00.doc
MRP MEP Workshop Attendees.xls
MRP MEP Workshops Programme 2021-2022.xls
8. WW Healthcare CVs_1 per page Rev 01.pdf
10. MRP Team Structure.pptx
Competence Questionnaire SKE&R_Designer_Mech & Elec Eng_Wallace Whittle_Review.pdf
Competence Questionnaire SKE&R_Designer_Landscape Architect_Review.pdf

Workbook Ref No.	Areas to probe	Evidence expected
5.2	How does the Health Board assure itself that all variations / derogations' which may be required to medical gas systems are being investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation has a detailed technical analysis and has been referred to the Board and agreed with their medical gases management group, clinical, Estates, infection control and FM teams.

NHS Scotland Assure Observations:

The observations noted in response to question 2.3 apply to this question with respect to medical gases variations and derogations.

There is currently one derogation listed within the derogations schedule relating to medical gases. There are elements of the medical gas design proposals that may not be compliant with relevant guidance, with no recorded derogations or evidence of review by NHS Lanarkshire. These are as follows:

- There is no evidence that medical air termination outlets have been allowed to the inpatient rooms, this is a derogation from *SHTM 2-01-part A, table 11: Provision of terminal units, AVSUs and area alarms*.

Whilst the information submitted for review provides assurance that there is a formal derogations process in place NHS Lanarkshire have confirmed during the KSAR review that their final governance reviews for the OBC submission is still being finalised. As such the derogations relevant to the medical gas systems have still to

be fully signed off in accordance with the Health Board's derogations process for the OBC milestone.

Documents referenced are:

MRP Derogation Schedule – v3.0 May 22.xls
Derogations Process Document - Final
1.1 MRP Team Minute 25th August 2021 v1 Approved.doc
MRP Derogations Rev 1 23.06.2022

Workbook Ref No.	Areas to probe	Evidence expected
5.3	How does the Health Board ensure that medical gas services are designed in a fashion, which will provide ease of access for future maintenance and which will retain space for minor additions and modifications to services in the future?	Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board. Evidence that the designer has presented each of the main service runs to the Board's FM team.

NHS Scotland Assure Observations:

The observations noted in response to question 2.2 in relation to the 2D combined services drawings, Plant Capacity and Spatial Provisions report and the Plant Access & Maintenance report apply to this question and should be read in conjunction with the following observations.

The medical gas strategies for the new hospital are clearly documented, however there is some contradiction between the documents. NHS Lanarkshire's medical gases design consultant confirmed the correct strategy for each gas during the Medical Gas Workshop held on Thursday 14 July 2022.

The Health Board have provided a number of documents to outline the medical gas services strategy. The documentation provided has been presented to the wider stakeholder groups at focussed technical workshops. The minutes of these workshops confirmed there was representation from the Health Board's FM team.

Stage 2 drawings and schematics are included, however there are some contradictions in different revisions, but again these were clarified by design consultant in the KSAR Medical Gas Workshop held on Thursday 14 July 2022.

Additional capacity for future expansion and its feasibility was not clearly indicated within the document *Overview of Plant Capacity and Spatial Provisions (MRP-TUV-XX-XX-RP-CS-60003)* however the considered figures have been confirmed for

each gas during the KSAR Medical Gas Technical workshop held on Thursday 14 July 2022.

There is no BIM model reviewed or coordination drawings documented to ensure that all medical gas plantrooms are fully accessible and maintainable. During the workshop held on Thursday 14 July 2022, the masterplan site layout was presented that indicated provisional space and routes for regular access and future replacement have been allocated. However, this should be clearly documented for OBC stage and further development will be required in the next design stage.

Documents referenced are:

MEP Medical Gas Provision Strategy Approval
MRP-TUV-XX-XX-RP-CS-60006 Medical Gas Strategy Considerations
Medical Gases Concept Schematics
MRP MEP FM Medical Gases Workshop

Workbook Ref No.	Areas to probe	Evidence expected
5.4	Is there evidence of the Health Board developing medical gases commissioning proposals?	Evaluation of the suitability of the proposed plans in the context of the OBC are these sufficient do the meet the requirements of the project, guidance, and the design of the system?

NHS Scotland Assure Observations:

The *Building Services Strategy Report (MRP-TUV-XX-XX-RP-CS-60010)* details the initial high-level requirements for MEP testing and commissioning. The information provided at this stage is generic and not specific to the medical gas systems. This will require further development into a dedicated and detailed medical gas commissioning briefing document, as per chapter *SHTM 02-01 clause 15.2*.

From the documentation provided it is unclear how the commissioning roles identified will interface with a Contractor, who would appoint these individuals and the contractual relationship of these key roles. A particular focus is required on the designers commissioning brief. Limited information is provided at this stage and requires commissioning documentation to be developed for the medical gas strategies within a healthcare environment as opposed to generic commissioning specifications.

Documents referenced are:

MEP Medical Gas Provision Strategy Approval
MRP-TUV-XX-XX-RP-CS-60006 Medical Gas Strategy Considerations
Medical Gases Concept Schematics

Workbook Ref No.	Areas to probe	Evidence expected
5.5	Has the Health Board started developing its medical gases governance arrangements for the operational phase?	Is the Health Board considering how it will ensure appropriate numbers of trained staff (AP and CP) and AE(V) for the project? And is it clear how this project will interface with the Board existing arrangements for management of the medical gases installations?

NHS Scotland Assure Observations:

Refer to observations in section 2.5. These observations also apply to the evidence submitted with respect to the development of the Health Board's medical gases governance arrangements. The Health Board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as APs and CPs, are in place.

Whilst the AE's identified for each discipline have been provided with their contact details and training log, this does not demonstrate how the Health Board will ensure that they have appropriate resources, skills, and trained staff. The appointed AE (MGPS) for the MRP project, as the technical professional adviser to the Health Board, should have specialist knowledge of MGPS design and specification. This should include validation of MGPS design and systems, procurement procedures, statutory and legislative requirements, and be conversant with the relevant codes of practice as clearly specified in the AE Appointment letter (*NP813-17 Appendix 3 - Lot 3 AE MGPS Specification V1*). NHS Lanarkshire should ensure this is clearly defined, developed, and documented with the appropriate governance in place.

Documents referenced are:

PSSD Org Chart July 18
AE Contact List v1.0
2022.01.19 Statutory Compliance
MEP Medical Gas Provision Strategy Approval
NP813-17 Appendix 3 - Lot 3 AE MGPS Specification V1

Workbook Ref No.	Areas to probe	Evidence expected
5.6	Is there recorded evidence of a strategy for bulk gas and bottle gas storage?	Floor plans with cylinder locations highlighted Site plan with VIE location(s). Simple schematic.

		Confirmation that the medical gas strategy is adequate. Floor plans with pipework distribution routing and manifold locations.

NHS Scotland Assure Observations:

The Health Board have explained the oxygen supply strategy in the KSAR Medical Gas Workshop held on Thursday 14 July, identifying the three sources of supply, VIE locations, system schematic, sizing, including provision for 20% spare capacity within the vaporisers. Many of the strategies discussed, including how the spare capacity figure has been derived, how this will impact on pipework sizing and flow rates is not currently documented.

However, the level of detail provided for review at this stage does not fully demonstrate the actual VIE setup, installation details, safety measures and general arrangement layout. It is also not clear how the VIE capacity and future spare capacity has been estimated which will be required further development in the next design stage.

At this stage there are no floor plans or site masterplan documented at this stage that documents the ring main pipe details, VIE size and safety measures in accordance with the SHTM and British Compressed Gases Association BGCA requirements. NHS SA would also note that the VIE locations are in close proximity to the emergency manifold room. *SHTM 02-01* recommends locating the VIE separately from the emergency manifold room. The Health Board should carry out a detailed risk assessment to evaluate the required separation safety distances and mitigate any risk of losing the primary and emergency supply in case of any catastrophic failure occurred to the energy centre. This should be assessed in more detail at the next stage.

Documents referenced are:

MRP-TUV-XX-XX-RP-CS-60006 Medical Gas Strategy Considerations
Medical Gases Agenda 2 02 00924
MRRP Design Development Review
MRP MEP FM Medical Gases Workshop
Medical Gases Concept Schematics
MEP Medical Gas Provision Strategy Approval

Workbook Ref No.	Areas to probe	Evidence expected
5.7	Is there recorded evidence of a strategy for medical gas plant?	Description of medical; gas requirements signed off by clinical colleagues. Floor plans with pipework distribution (horizontal and vertical) routing.

		Details of all medical gas plant areas ensuring safe and adequate access.

NHS Scotland Assure Observations:

NHS Lanarkshire have provided a series of reports, layout drawings and schematics in support of this question. The *building services strategy report*, *medical gas strategy report* and *the resilience report* all make reference to the provision of medical gas services requirements to the hospital. NHS Lanarkshire have also provided single line schematics showing the distribution strategy and location of each plantroom.

There is evidence that the design team have collaborated with the existing AE and Estates team to develop the proposals. Workshop minutes provide evidence that this engagement has taken place, however there is no clear evidence that the final strategy has been fully signed off by the Clinical team. NHS Lanarkshire have however confirmed the final governance processes are still to be completed prior to the conclusion of the OBC milestone.

The minutes received note that plant locations will meet the requirements set out in *SHTM 02-01 Part A, Section 2*. The Medical Gas Strategy document details the medical gas plant areas and notes that all plant areas will be accommodated within suitably designed buildings, rooms and enclosures with good access, natural ventilation, and satisfactory noise emissions control.

Further development around the layout and detail of these spaces will be required at RIBA Stage 3. NHS SA shared lessons learnt in relation to VIE setups and arrangements from other project during the KSAR Medical Gas Technical Workshop with specific reference to avoidance of single points of failure and ensuring the proposed oxygen ring is hydraulically balanced. The current arrangement is to provide two duplex VIE's connected onto a ring main which will allow for a lead lag situation which would be automatic based on pressure differential. No detail was provided as to allowances for ultrasonic metering or future interconnectivity to the digital estate.

Documents referenced are:

20211203-Medical Gas Provision Report
MRP MEP FM Medical Gases Workshop
MRRP Design Development Review
MEP Medical Gas Provision Strategy Approval
MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy

3.5.2 Medical Gases: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.5.2.1	**Designers Commissioning Brief** A designer's commissioning brief has not been fully developed at this stage in accordance with *SHTM 02-01*. Commissioning documentation should begin to be developed in the next design stage for the medical gas services. The commissioning documentation and brief should be specific to a healthcare environment as opposed to generic commissioning specifications. Lessons learned from the pandemic regarding oxygen supply security and provision to Theatres, ICU, NICU, PICU, etc should be taken into account.
3.5.2.2	**VIE Risk Assessment** To confirm the final Oxygen capacity, resilience and VIE compound locations, a risk assessment should be undertaken to consider all issues concerning the safety and continuity of the medical oxygen supply. It is suggested that identified risk factors and criteria need to be evaluated using both qualitative and quantitative measures, and that all results be recorded in a logical manner that will support the decisions being made. The record of the risk assessment will also need to act as a reference document when the system is reviewed.
3.5.2.3	**Use of Nitrous Oxide** NHS Scotland Assure note that there was no evidence of a nitrous oxide mitigation plan in accordance with Scottish Government policy as outlined in *DL(2021)41*. The initial KSAR response included a nitrous oxide schematic, however further clarification was provided by NHS Lanarkshire that they are looking to only utilise bottled nitrous oxide as opposed to a piped distribution system. NHS Lanarkshire should ensure that the strategy is clearly documented, including how they will satisfy the requirements of *DL(2021)41*.

3.6 Fire Safety

3.6.1 Fire: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
6.1	Has the Health Board completed competency checks on the Fire Engineering consultant designers?	Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards. Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers? Recorded evidence that input from the Health Boards Fire Advisors has been requested.

NHS Scotland Assure Observations:

Whilst the information submitted provides a level of assurance on the competency of the project fire engineering consultant NHS SA would highlight that there is limited evidence provided to confirm how the competencies of the fire engineering design consultants have been assessed by NHS Lanarkshire as part of the lead advisor procurement process. The documentation provided for review also does not confirm that the Health Board's Fire Advisors have been involved in assisting the Health Board in assessing the competency of the fire engineering consultant designers.

The Lead Advisor has provided a *Design Competence Questionnaire pro-forma* completed by the fire engineering design consultant which relates to the skills, knowledge, and experience of Lead Advisor's design team members. A completed version of this document by the fire engineering design consultant has not been provided for review.

The CV provided for the Principal Fire Engineer on the project confirms they have 6.5 years' experience in fire engineering and have worked on a number of healthcare projects in England. As Scottish healthcare guidance does differ to English healthcare guidance; it has not been confirmed what experience the fire engineering consultants have with respect to Scottish healthcare guidance, to ensure the requirements of NHS Lanarkshire and the *Non-Domestic Technical Handbook* can be met.

Documents referenced are:

SBAR MRP Governance and Assurance SHTM 00.doc
MRP MEP Workshop Attendees.xls
MRP MEP Workshops Programme 2021-2022.xls
220512 <Fire Engineer> CV - Healthcare.pdf
10. MRP Team Structure.pptx

Workbook Ref No.	Areas to probe	Evidence expected
6.2	Has a written fire strategy been completed, and does it provide evidence, where there is a variance from statutory and mandatory guidance, that an equivalent level of safety has been achieved by alternative means?	Is there documented evidence that fire suppression systems have been considered for life safety and property protection? Is progressive horizontal evacuation available for all patient areas that continuously moves away from the fire area? Does the design considerations of the fire and detection system, for in-patient facilities, provide L1 coverage including voids? Does the design provide for a compliant emergency lighting system? Are free swing arm self-closers fitted to all leaf's of doors serving sleeping accommodation? Have escape lifts been considered for the evacuation of patients and others with mobility issues? Are multi sensor fire detectors installed to reduce the occurrence of unwanted fire alarm signals? Are there adequate storage facilities to ensure escape routes are not used for this purpose? Are measures in place to provide safe charging of electrical and personal electronic equipment? Have fire hazard rooms been designated based on fire load? Where there is a mechanical ventilation system - have all compartments, sub-compartments and corridors serving sleeping accommodation been designed to be fitted with fire and smoke dampers?

NHS Scotland Assure Observations:

A written fire strategy document has been provided for review. The fire strategy identifies some areas where there are potential departures from guidance, without supporting justification. NHS Scotland Assure note that the justifications for these must be fully developed and documented during subsequent design stages.

NHS SA noted that not all relevant standards are referenced within the fire strategy, for example *SHTM 82, SHTM 83, SHTM 87* and SFPNs are not listed. NHS Lanarkshire fire safety policy is also not referenced in the fire strategy document.

The fire strategy confirms that progressive horizontal evacuation is the evacuation strategy. However, NHS SA consider that elements of the current architectural layouts (zoning plans) do not fully demonstrate or confirm adherence to *SHTM 81 Fire Safety Precautions & Engineering and Non-Domestic Technical Handbook*. Particularly with respect to evidence that the non-compliant design meets the intent of the regulations by an alternative means, specifically, capacity of sub-compartments to accommodate numbers of patients in a developing fire situation, consideration of system failure i.e. suppression system or fire shutter, robust management procedures.

The fire strategy should be revised to take account of the above. This should be addressed at the earliest opportunity as there is a potential for a major impact on the design (and overall cost) of the hospital.

The documentation provided confirms that the fire alarm and detection coverage is category L1 and detection will be provided to voids except those considered as low risk (following a risk assessment) and less than 800mm as per *BS 5839-1 Fire detection and fire alarm systems for buildings*. This would be subject to a risk assessment and reviewed as the design progresses. Multi-sensor heads are recommended in fire strategy and building services strategy.

NHS Lanarkshire confirmed during the KSAR workshops that fire suppression will be installed in accordance with *SHTM 81* and additionally in other areas to provide added life safety resilience, however, this has not been confirmed in writing by NHS Lanarkshire.

The MEP Fire Design and Strategy Approval document provides a record of workshops and meetings held to define and develop the fire safety systems strategy and confirmation of the fire system proposals agreed as being carried forward.

Workshop notes confirm attendance by key project personnel, including NHS Lanarkshire's fire safety advisors, fire engineer, MEP engineers and project managers. However formal sign off sections 7 & 8 have not been completed by all relevant parties.

Documents referenced are:

MEP Fire Design and Strategy Approval.doc
MRP-WSP-SW-XX-RP-FI-1001.pdf
MRP-TUV-XX-XX-RP-CS-60010 Building Services Strategy.pdf

Workbook Ref No.	Areas to probe	Evidence expected
6.3	How does the Health Board assure itself that all variations / derogations, which may be required to fire systems, are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation and any fire engineering proposals are being referred to the Board and agreed with their fire safety group, clinical, engineering, infection prevention and control and FM teams.

NHS Scotland Assure Observations:

Whilst the information submitted for review provides assurance that there is a formal derogations process in place NHS Lanarkshire have confirmed during the KSAR review that their final governance reviews for the OBC submission is still being finalised.

There are currently three variations to standards listed within the derogations schedule relating to fire engineering. NHS SA consider that the fire engineering derogations currently noted do not clearly highlight the rationale behind the derogation, the mitigation measures, and any residual risks.

Whilst the information submitted for review provides assurance that there is a formal derogations process in place NHS Lanarkshire have confirmed during the KSAR review that their final governance reviews for the OBC submission is still being finalised. As such the derogations relevant to fire engineering have still to be fully signed off in accordance with the Health Board's derogations process for the OBC milestone.

Documents referenced are:

MRP Derogation Schedule – v3.0 May 22.xls
Derogations Process Document – Final.doc
1.1 MRP Team Minute 25th August 2021 v1 Approved.doc
MRP Derogations Rev 1 23.06.2022.pdf

Workbook Ref No.	Areas to probe	Evidence expected
6.4	How does the Health Board assure itself that all fire dampers and fire/smoke dampers are designed to allow for inspection, resetting and maintenance?	Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board. Evidence that the designers have presented each of the fire dampers and smoke / fire dampers to the Board's FM team.

		Safe and adequate access has been allocated on both sides of all fire dampers for maintenance.

NHS Scotland Assure Observations:

The fire strategy outlines at high level, where the fire dampers and motorised fire and smoke dampers are required. This should be developed and co-ordinated with the MEP consultant designers to ensure dampers are installed where they are required. The building services strategy and construction phasing should clearly identify the sequence of installation and the need for safe maintenance access on either side of the damper.

It is noted that the fire strategy suggests remotely resettable dampers. It should be made clear that the dampers will also be able to reset at the damper itself and safe access provided to access the damper.

Drawing MRP-TUV-XX-XX-SC-M-57006 provides a concept strategy detail for a combined fire and smoke damper. Whilst an access zone is noted in the middle portion of the corridor, the location of pipework and electrical containment does not appear to allow access to the damper actuator. Further review and development of these details is required and assurance will be required that there is sufficient space to allow safe access to the damper.

Regular workshops and co-ordination between the architect and MEP engineer will be required at an early stage to ensure the fire damper installations are co-ordinated with tested and certified manufacturers details (from damper manufacturers, partition manufacturers etc.) to ensure appropriately sized risers, ceiling voids and services distribution zones.

With regards to BIM, clash detection should be allowed for to maintain access zones within the BIM model and design. Further co-ordination will be required in RIBA Stage 3 between the building services consultant designer, fire engineer and architect to ensure ceilings are designed in a manner that will facilitate access to all dampers.

Documents referenced are:

MEP Fire Design and Strategy Approval.doc
MRP-TUV-XX-XX-RP-CS-60010
Initial Fire Strategy (MRP-WSP-SW-XX-RP-FI-1001.pdf)
Combined fire and smoke damper details (MRP-TUV-XX-XX-SC-M-57006.pdf)

Workbook Ref No.	Areas to probe	Evidence expected
6.5	How does the Health Board assure itself that any fire rated ductwork is correctly installed?	Evidence that the system is certificated and that the installation follows the installation details which were used for the certification. Written confirmation from the design consultant.

NHS Scotland Assure Observations:

The need for fire-resistant ductwork is not noted in the initial fire strategy however is referenced in the *Building Services Strategy*. This is typical for this stage of design, however the full requirements should be developed as the design progresses and communicated to the design team by the fire engineer. The BS EN standards for fire resistant ductwork should be utilised rather than *BS 476 Fire Tests* series as best practice.

As the design progresses, competency checks should be undertaken on the proposed manufacturer, product and installer. This should form part of a wider project quality plan. The Health Board should consider their quality process and how this is defined and developed for both their contracting partners and other parties fulfilling an inspection and sign off role.

Documents referenced are:
MEP Fire Design and Strategy Approval.doc
Building Services Strategy Report (MRP-TUV-XX-XX-RP-CS-60010.pdf)
Initial Fire Strategy (MRP-WSP-SW-XX-RP-FI-1001.pdf)
Combined fire and smoke damper details (MRP-TUV-XX-XX-SC-M-57006.pdf)
MRP-TUV-XX-XX-RP-CS-60007 Risk Assessment for MEP Services Installations.pdf

Workbook Ref No.	Areas to probe	Evidence expected
6.6	How does the Health Board assure itself that any smoke control and/or clearance systems are fit for purpose?	Evidence that the smoke system is being designed by an accredited Fire Engineer. Evidence that Building Control are being consulted. Confirmation from the Building Services Design Consultant that the operating sequence for the smoke system has been discussed regarding being integrated into the control of other building systems.

NHS Scotland Assure Observations:

The fire strategy identifies the need for smoke control systems within the public street and a requirement to validate the proposals using Computational Fluid Dynamics (CFD) modelling.

As the design progresses into RIBA Stage 3, there should be detail provided in the fire strategy to highlight the need for smoke control (which is currently the case). The *fire strategy report* should also set out the performance specification of the smoke control system.

A competent smoke control system designer should then develop the smoke control system to meet the performance specification and co-ordinate the proposals with the building services engineer, structural engineer and architect.

The Health Board should undertake competency checks on the smoke control system designer, the proposed manufacturer, product and installer. The Health Board should also consider their quality process and how this is defined and developed for both their contracting partners and other parties fulfilling an inspection and sign off role.

Documents referenced are:

MEP Fire Design and Strategy Approval.doc
Building Services Strategy Report (MRP-TUV-XX-XX-RP-CS-60010.pdf)
Initial Fire Strategy (MRP-WSP-SW-XX-RP-FI-1001.pdf)

Workbook Ref No.	Areas to probe	Evidence expected
6.7	Evidence that the Health Board is ensuring fire safety input into the design process together with early design decision-making.	Input from Fire lead(s) and HFS / SFRS on fire safety into site / option selection. Documents e.g., option appraisal report, fire strategy report, meeting minutes. Demonstrable and appropriate engagement and expertise of relevant Fire lead(s). Signed off documents, e.g., reports, role profiles, minutes. Evidence that the Health Boards Fire Advisor have been involved with and reviewed the design proposals to date.

NHS Scotland Assure Observations:

The documentation provided includes a *strategy approval document for Fire Engineering design*. This confirms that the information developed to date has included input from NHS Lanarkshire's Fire Safety advisors and their SCART manager. Section 2.7 of the initial fire strategy sets out the approach to stakeholder

engagement and the intent to continue this as the design progresses. The Health Board should continue to maintain this.

Further ongoing support from NHS SA's fire safety subject matter experts is also being provided out with the KSAR review process. NHS Lanarkshire have also confirmed through the KSAR process that the Fire Engineering Strategy approval will be formally signed off by the attendees at various Fire Engineering Workshops which includes the key stakeholders noted above and the various governance groups which include the Estates sub-group. Minutes of the Fire Engineering Workshops have also been provided for review recording the discussions and input from all parties to date.

The strategy documents are still required to be signed off as part of NHS Lanarkshire's final stages of governance prior to conclusion of the OBC milestone. This will include submission of the signed of strategy to NHS Lanarkshire's Fire Safety Group for final stage approval.

Whilst there has been no formal consultation with the fire service, it was advised by NHS Lanarkshire during the KSAR process that there have been informal discussions with the Scottish Fire and Rescue Service (SFRS). This is typical for this stage of design but during successive design stages the SFRS should be formally consulted. This consultation will be important in the early parts of RIBA Stage 3 to review and agree items such as fire tender access, fire tender parking and hydrant locations as these elements of the fire strategy may impact on any advanced site works particularly with respect the site layout and cut and fill associated with landscaping proposals.

Documents referenced are:

MEP Fire Design and Strategy Approval.doc
Initial Fire Strategy (MRP-WSP-SW-XX-RP-FI-1001.pdf)
MRP MEP Workshop Attendees.xls
KSAR Workbook 6.8 Word Doc.doc

Workbook Ref No.	Areas to probe	Evidence expected
6.8	Has the Health Board started the development of the fire system outline commissioning proposals?	Has the Health Board designed appropriate trained staff and appointed a fire officer for the project, is there an established firer management group that will ensure the fire management strategy is adhered to?

NHS Scotland Assure Observations:

Whilst there is evidence that the Health Board have commenced development of fire system outline commissioning proposals that is considered commensurate with this stage of the project, there are a number of areas that will require development during subsequent design stages.

The *Building Services Strategy* describes the high-level commissioning strategy for the project, which provides a level of detail that is commensurate with the OBC project stage. The commissioning strategy confirms that the contractor shall be responsible for the commissioning of all building services (including fire safety systems) and refers to relevant guidance and fire codes.

An independent Commissioning Engineer is noted as being required to take responsibility for managing the commissioning process and compiling the O&M Manual. NHS Lanarkshire should confirm who appoints the independent Commissioning Engineer (and how their independence will be maintained) and at what stage they will be appointed.

The Commissioning Engineer should be appointed at the earliest opportunity in the forthcoming FBC stage to ensure the effective preparation and management of the commissioning process, with a clear strategy and process in place prior to commissioning commencing.

The response noted to question 6.7 clarifies the early-stage input from the Health Board's fire safety advisors, NHS SA's fire safety subject matter experts and the wider interface with the Health Board's fire safety group. Ongoing resource required from these various stakeholders to support the project going forward will however require further review to ensure the development of fire system commissioning proposals and the successful delivery and implementation of the projects fire strategy objectives.

Documents referenced are:

KSAR Workbook 6.8 Word Doc.doc
MEP Fire Design and Strategy Approval.doc
Attendance MEP Workshops 2021-2022.xlsx
Initial Fire Strategy (MRP-WSP-SW-XX-RP-FI-1001.pdf)
Building Services Strategy Report (MRP-TUV-XX-XX-RP-CS-60010.pdf)

3.6.2 Fire: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.6.2.1	**Fire alarm signalling** *SHTM 82 Fire Safety – Alarm and Detection Systems* and the initial fire strategy note that the fire alarm should sound continuously in the fire zone and intermittently in adjacent zones (horizontal and vertical). This standard approach is different to that stated in the *Draft NHS Lanarkshire Board Construction Requirements (BCRs)*, which asks in 9.10.3 for all other zones to receive "awareness signalling". It is not clear what "awareness signalling" implies.

3.6.2.2	**Fire Engineer appointment beyond Stage 2** The information contained within the tender submission suggests that there will be no formal fire engineering involvement beyond RIBA Stage 2. This could lead to a lack of sufficient expertise/experience with regards to fire engineering as the project develops. The Health Board should seek assurance that competent fire engineering support will be provided past stage RIBA Stage 2 and as required by the project needs.
3.6.2.3	**Reference to standards in the BCRs** The *Draft NHS Lanarkshire BCRs V1.0 Clause 9.5.7m* references the *BS 476* series of fire test standards. These have been largely superseded by BS EN fire test standards which are more recent and comprehensive than the *BS 476* fire tests.
3.6.2.4	**"Applicable Guidance doc V5 20210803", which forms part of the ACRs, is not ratified** This document has not been ratified by the Health Board and therefore the context of this document is unclear with respect to the fire safety features and requirements that may need to be included and addressed as part of the fire safety design for the project.
3.6.2.5	**Fire Control Centre** From the discussions at the fire engineering technical workshop on 25 July 2022, it is understood that NHS Lanarkshire's current intention is to have the Fire Control Centre in the same location so all the services and control panels are together but needs to be discussed further. NHS Lanarkshire advised that the Command-and-Control Centre is not designed for daily influx of people and will consider the Fire control and Command control as separate entities. This requires further clarity and should be discussed and agreed as the design develops.
3.6.2.6	**Escape bed lift lobbies** A decision on whether there should be evacuation lifts within the building is required, as noted in the *Action Log*. This item is closed, but it is not clear what decision was taken. The initial *Fire Strategy Report* states that bed lifts are to be provided adjacent to the Critical Care Unit in Zone B only. Bed lifts are noted as being designed to *SFPN 3*, which (for example) requires ventilated lobbies. From the discussions at the fire engineering technical workshop on 25 July 2022, it is understood that design coordination with other disciplines in relation to ventilation and pressurization of the lobby is required.

	NHS Lanarkshire should ensure that evacuation lifts are being designed to *SFPN 3* in full or whether variations are being proposed. The requirements should be clearly documented and justified in the fire strategy report.
3.6.2.7	**Lead Advisor RACI Matrix** The *Lead Advisor RACI Matrix* makes no reference to the roles & responsibilities of the Fire Engineer. This should be updated to include this discipline.
3.6.2.8	**Future changes to SHTM/ Building Standards Technical Handbook Non-Domestic (THND)** A revised *SHTM 81* is under development, and revised *THND* is now published. Guidance in place at the time of the Building Warrant will be applicable to the design, therefore design should consider all foreseeable changes. The impact of any regulation changes will require a full appraisal to assess the impact on the project. NHS Scotland Assure recommend appropriate mitigation measures be reviewed and considered by NHS Lanarkshire in lieu of any changes, and a full appraisal undertaken at the earliest opportunity.
3.6.2.9	**Fire vehicle access routes and tracking** Detailed information will be required at the next design stage (RIBA Stage 3) confirming fire vehicle access routes around the site, including vehicle tracking where required. Vehicle tracking dimensions should be confirmed with SFRS to ensure access roads can accommodate all current and (reasonably) foreseeable fire vehicle sizes.
3.6.2.10	**Fire Strategy Drawings** No fire strategy drawings have been produced to date showing the full building layout and demonstrating compliance with travel distance requirements etc. These will require to be developed early in RIBA Stage 3 to ensure the concept fire strategy intent is being followed detailing compartmentation, travel distances, fire fighting facilities.
3.6.2.11	**Remote dry riser inlets** It is understood that dry riser inlets are proposed to be situated remote from the stairs they serve. NHS Lanarkshire should ensure that hydraulic calculations are provided in due course in the forthcoming design stage to confirm no drop in water pressure as a result.

3.6.2.12	**Development of 1m vertical strip at fire rated/ external wall junctions** There is currently no technical design detail confirming how 1m vertical strips at junctions of fire rated walls/external walls will be achieved.

3.7 Infection Prevention & Control Built Environment

3.7.1 Infection Prevention & Control Built Environment: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
7.1	How does the Health Board demonstrate that there is an effective infection prevention and control management structure in place? How does the Board demonstrate leadership and commitment to infection prevention and control to ensure a culture of continuous quality improvement throughout the organisation and that there is an effective IPC structure in place; inputting into the design process?	The Health Board provides evidence that there is an IPC Management Structure with the necessary expertise and leadership skills to support the design work. The Health Board provides evidence that there is an IPC Management Team with the necessary expertise and leadership skills to support the project. Executive board reports or minutes. Risk registers or equivalent, Minutes from operational and governance groups, (and action points). Structure of infection prevention and control team (IPCT) and qualifications held, previous experience supporting new build projects. Evidence IPC and clinical teams have been involved with any derogation through the design process and are satisfied this will not impact on patient safety. This can be meeting minutes, risk assessments, and risk registers. There is IPC evidence of escalation through the agreed NHS board governance process. Evidence the Executive board member assigned to lead on IPCT has been kept informed of IPC risks identified and associated with the project this can be demonstrated by the board. Evidence that fixtures fitting, and equipment have not been proposed for the project that would represent an IPC risk.

NHS Scotland Assure Observations:

The *IPCT Structure Overview* provides evidence of the IPC management structure that is in place. This also describes team roles and responsibilities. Necessary expertise and skills were discussed at the KSAR IPC workshop and NHS Lanarkshire described the skills available within the team and how the team would supplement these with expertise from out with the team where necessary. There is no formal documented process in place for this.

NHS Lanarkshire should ensure that there is a process in place whereby the Health Board assures itself that sufficient and consistent IPC, medical and nursing resource is allocated to the project and by which it assures itself that all staff engaged in the project are appropriately qualified and competent, specifically that they have the knowledge and expertise with respect to the healthcare built environment and new builds to fulfil their roles and responsibilities with respect to the project.

Operational governance of the project, and the integration of infection prevention and control into this process were evidenced by *minutes, an action log* and *an action tracker from the Infection Prevention and Control Committee (IPCC)*; and by the *terms of reference (ToR) of the MRP Leadership Group*.

Documentation provided to show the derogation process did not specify a need for IPC approval but did show IPC representation on the groups where derogations will be approved. In addition, the design approvals process requires sign off by IPC representatives. NHS Lanarkshire should ensure that there is adequate IPC medical and nursing resource allocated to the project to allow this to be done in a timely manner.

Documentation provided demonstrates that the MRP Leadership Group includes the Executive Lead for IPCT (Director of Nursing, Midwifery and AHPs) and that risks, including risks relating to IPC, are a standing agenda item for the group. This demonstrates that the Executive board member assigned to lead on IPCT has been kept informed of IPC risks identified and associated with the project.

Documentation provided shows that the Core Equipment Group responsible for equipping the project includes IPC representation and demonstrated the process through examples of key decisions made by the group.

Documents referenced are:

IPCT Structure overview
IPC workshop minutes
IPCC minutes, action log, action tracker
MRP Leadership Group Terms of Reference
Design Approvals Process
Core Equipment Group Terms of Reference

Workbook Ref No.	Areas to probe	Evidence expected
7.2	How does the Health Board demonstrate implementation of evidence-based infection prevention and control measures during the design process?	The Health Board evidences that: The Health Board can demonstrate the current version of the National Infection Prevention and Control Manual has been adopted by the organisation and all staff are aware of how and where to access this and it is being referred to during the design process. IPC work programme and planned IPC audit programme for new building taking cognisance of any actual or perceived risks identified.
NHS Scotland Assure Observations: NHS Lanarkshire's compliance with the *NIPCM* was evidenced by an extract from the *Health Board's audit system* showing compliance with specific elements of the *NIPCM* in different clinical areas within the Health Board. Incorporation of the *NIPCM* into the design process is via IPC representation on the Key Decisions Group. No evidence was seen of a formal process for ensuring referral to the *NIPCM* during the design process. NHS Lanarkshire should ensure that they have assurance that the *NIPCM* is taken into account by all stakeholders (including Lead Advisor, the Contractor and respective design consultants) during the design process. ***Documents referenced are:*** *Key decisions process* *Key Decisions Group Terms of Reference*		

Workbook Ref No.	Areas to probe	Evidence expected
7.3	How does the Health Board assure itself that the designers have a proper understanding of the infection prevention and control procedures required?	The Health Board evidences that: All relevant staff within the designers' organisation are provided with clear guidance on roles and responsibilities in relation to infection prevention and control. The contractors' organisation will provide evidence of education in relation to infection prevention in the built environment for all staff involved in the project.
NHS Scotland Assure Observations:		

NHS Lanarkshire provided a level of assurance with respect to the appointed Lead Advisors awareness with respect to infection prevention and control; for example, the *construction quality proposal* notes the need to complete and monitor HAI-SCRIBE. Little detail of specifics is provided is provided, although IPC engagement on previous projects is discussed in the project experience document. Similarly:

- The *manpower pro forma template* which lists qualifications and experience of the consultancy team has no mention of qualifications and experience relating to IPC.
- The *competence questionnaires* for engineer and architect do not mention IPC
- The *Lead Adviser RACI matrix* cites need to engage in HAI-SCRIBE but does not include a need for IPC training
- The environmental building services consultants' CVs provided do not mention experience relating to, or training in IPC.

In discussion at the IPC KSAR workshop NHS Lanarkshire responded '*that all the organizations NHS Lanarkshire are working with, they have worked with, over several projects, and they know that they've been tried and tested in industry. The lead advisors and partner agencies have been taken through several frameworks and there is a framework criteria that is required for that. [Contractors] would be able to provide more information on that which can be included in the KSARs and carried to FBC if acceptable*'

NHS Lanarkshire should ensure that they have a process in place to provide assurance that relevant staff within the designers' organisation have been provided with clear guidance on their roles and responsibilities in relation to infection prevention and control, that all contractors have provided evidence of education in infection prevention in the built environment for all staff involved in the project, and that the design team has, or has access to, knowledge and expertise with respect to the reduction of infection risks in the healthcare built environment and new builds.

Documents referenced are:

Curry & Brown quality proposal
ESPD Scored Question 4C.1.2 Projects / Work Experience Pro-Forma Template
Manpower pro forma
Competence questionnaires
Lead Adviser RACI Matrix
Wallace Whittle CVs
IPC Workshop Minutes

Workbook Ref No.	Areas to probe	Evidence expected
7.4	How does the Health Board assure itself that equipment being proposed	The IPC Team are involved and IPC advice followed in all procurement decisions for new equipment prior to purchase. IPCT are satisfied that all

	meets the required IPC standards?	equipment purchased can be decontaminated safely in line with National Guidance NIPCM and manufacturers' instructions.

NHS Scotland Assure Observations:

Documentation provided shows that the IPC representative is a key member of the Core Equipment Group. In addition, the Decontamination Environmental Monitoring Group, which reviews fixtures and fittings for cleaning purposes, is led by the IPCT.

The MRP Equipment Decisions Group provides assurance with respect to equipment procured for the project and includes IPC, Hotel Services, Procurement and product specialists. NHS Lanarkshire should ensure that there are no routes by which equipment can be procured without approval by the relevant group(s).

NHS Scotland Assure notes that an 'MRP Equipment Subgroup' appears in some documents. This appears to be another name for the MRP Equipment Decisions Group. NHS Lanarkshire should note the potential confusion that this may cause and ensure that there is consistency across all documents.

There was no evidence as to how IPC would be engaged in reviewing proposed engineering services accessories such as pipework, sinks, taps, showers and grilles.

Documents referenced are:

Core Equipment Group ToR
Decontamination Environment Monitoring Group Terms of Reference and Minutes
MRP Equipment subgroup ToR, minutes and action tracker

3.7.2 Infection Prevention & Control Built Environment: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the KSAR.

3.7.2.1	NHS Scotland Assure has been providing additional support to NHS Lanarkshire in respect of the high consequence infectious disease (HCID) suite. Further work is required on the design of, and patient flow model for, this unit, and for this reason it has not been considered as part of this KSAR. However, decisions made for this unit may have significant impacts on other parts of the building and aspects of the project. For example, the routing of ventilation ductwork, the need for a separate drainage stack, and the location of exhaust ventilation. NHS Lanarkshire should ensure that the design, engineering requirements and patient flow model of the HCID suite are not considered in isolation and that they are taken into consideration with respect to all potentially affected areas.

3.7.2.2	NHS Scotland Assure is seeking more details of the perioperative model to be used in the new hospital and further assurance that future service pressures have been considered and will not lead to increased perioperative infection risks. NHS Scotland Assure will continue to work with NHS Lanarkshire on this after completion of the KSAR.
3.7.2.3	As noted in Paragraph 1.12, evidence was not seen of IPC input into the forthcoming contractor selection process or of a robust process to ensure that ensure that potential contractors have appropriate expertise and competency relating to the reduction of infection risks from the healthcare-built environment. NHS Lanarkshire should ensure that there is IPC input to all aspects of procurement for the project, including for designers and contractors, and that there is a robust process in place for ensuring that designers and contractors have appropriate knowledge, skills and experience relating to the reduction of infection risks from the built environment.

4. Appendices

Appendix 1: Glossary

Please refer to NHS Scotland Assure – Assurance Service Master Glossary document available to download from NHS National Services Scotland website

[redacted]