Department of Health

Tasmania

Royal Hobart Hospital (RHH) Intensive Care Unit (ICU) Expansion

SUBMISSION TO THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

August 2021

EXECUTIVE SUMMARY

The purpose of this document is to inform the Parliamentary Standing Committee on Public Works of the need for the proposed project and how the design of the works will address this need.

On the 19 March 2019 the then Premier announced the commitment to fund and commence Stage 2 of the Royal Hobart Hospital (RHH) Stage 2 Redevelopment, which included the expansion of the Intensive Care Unit (ICU) in its current location, to provide space for a further 10 beds (now 12 beds) on the same floor by 2024, whilst retaining close physical linkage to the RHH Medical Imaging services.

The RHH Masterplan 2020-2050 includes ICU to be located in L-Block in Stage 4 of the City Campus redevelopment, with the additional 12 patient beds to address ongoing ICU requirements until the L-Block construction.

The needs of a rapidly growing and ageing population as well as the impact of chronic disease and pockets of socio-economic disadvantaged, will drive demand for critical care medicine for the Tasmanian population over the next 15 years, with increasing demand for ICU services.

The proposed RHH ICU expansion will be undertaken on Level 1 H-Block, which is located on the Argyle Street side of the Hospital Campus. The area to be used for the ICU expansion is currently vacant ward space, located directly adjacent to the existing ICU, and accessible from the H-Block lift lobby. The expansion area also has a direct pathway to Medical Imaging, located on Lower Ground H-Block.

Through the extensive design process incorporating feedback from stakeholders the proposed design will provide

- 12 Additional Patient Beds including 2 N Class negative pressure isolation rooms
- Additional Family / visitors spaces
- Additional Storage, charging and clinical support areas
- Integration with the existing Intensive Care Unit to incorporate workflow and clinical staffing efficiency
- A new balcony overlooking the Hospital forecourt on the Liverpool Street side to provide an outdoor and therapeutic treatment space.
- Consideration of mass isolation capability to allow the unit to be mechanically and physically separated from the rest of the Hospital in the event of a pandemic situation.
- Individual temperature control for all rooms to cater to individual clinical needs (ie. burns patients)
- Access to natural light in all bed spaces.
- Upgraded plant and equipment to service the Unit.

This project is strategically important to the RHH in addressing the intermediate requirement of the intensive care unit until the construction of L-Block, as well as providing increased critical care capacity for the Tasmanian community.

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DOCUMENT PURPOSE

The purpose of this document is to inform the Parliamentary Standing Committee on Public Works (PSCPW) of the need for this project and to explain the processes undertaken during the design phase to maximise the delivery of the desired outcomes.

- The document includes the following:
- Confirmation that the proposed investment in infrastructure is the most appropriate means to support improved health services delivery.
- Confirmation that the project is consistent with the Department of Health and Human Services (DHHS) Strategic Asset Management Plan.
- Evaluation of the suitability of the proposed Design.
- Discussion of 'value for money issues' relating to the design and construction of this project.

Approval by the Parliamentary Standing Committee - Public Works (PSCPW) is required prior to selection of a contractor and is now a critical path issue for the project to enable construction.

PROJECT DEFINITION

Background

The Royal Hobart Hospital (RHH) is the tertiary referral centre for Cardiothoracic and Neurosurgical services in Tasmania. ICU provides high level acute, clinical support for the various specialist and subspecialist medical and surgical services operating within a health service or hospital. In this sense, ICU provides a safety net for those patients undergoing major surgery, procedures and treatments, and for managing complications of these.

ICU also supports those patients who present to the Emergency Department with severe acute reversible illness or injury. ICU care may also include end of life care and support for potential organ donation. Additionally, ICU medical and nursing staff provide a wide variety of outreach services to support patients on acute hospital medical and surgical wards.

The service provision for intensive care patients include Medical and surgical patients requiring specialised High Dependency and Intensive Care. The ICU model currently has two patient geographical areas over two buildings with interconnecting corridors.

Primary referral for admission into the ICU is from the Emergency Department, Elective Surgical admissions, in-hospital medical emergencies, and interhospital transfers (Both public and private). ICU had over 1460 average admissions over the last 3 years with an average length of stay of 6.0 days.

There is competing and increased bed demand for high acuity patients that require ICU level of care, which has a flow on effect on scheduled elective surgery, with the risk of surgery cancellations if ICU beds are not available.

Primary Objective

On the 19 March 2019 the then Premier announced the commitment to fund and commence Stage 2 of the RHH Redevelopment, which included the expansion of the ICU in its current location, to provide space for a further 10 beds (now 12 beds) on the same floor by 2024, whilst retaining close physical linkage to the RHH Medical Imaging services.

the RHH Master 2020-2050 includes a new L-Block building which includes an ICU ward. The ICU expansion is required to meet the ongoing demand of ICU bed space at the RHH until a new ICU is constructed.

It is anticipated that the completion of a new 12 bed Critical Care area will improve service delivery and workflow, and by addressing environmental factors will enrich the patient journey through the ICU. This will be achieved by;

- new bed spaces meeting current Australian Health Care Facilities Guidelines for sizing and access to natural light
- Improved physical ward environment, incorporating multidisciplinary office space, family waiting room, separate non-sterile and sterile stock rooms, dedicated bariatric and negative pressure rooms
- All service areas (pharmacy, Pan Room etc.) to be easily accessible from all bed spaces,
- Centralised clinical parameter monitoring.
- Medical gases and power requirements will be located on ceiling mounted head and foot pendants to accommodate mechanical ventilators and monitors.
- Medical gases will be supplied to all bathrooms, and walled Oxygen and Air will be provided in the equipment room to test ventilators.
- Infrastructure to support haemodialysis and/or continual renal replacement therapy will be provided at each bed space.
- iGlass doors at the entry to each enclosed room and windows or sliding doors between adjacent rooms will optimise observation of patients and patient safety in emergencies.
- Continuity of care through improved workflow will improve the patient experience and reduce length of stay.
- Communication strategy, involving safety huddles with medical teams, allied health, ward clerk and hospital aides, as currently occurs, will be improved with the use of a journey board.
- An undercover deck will be provided to allow ICU patients to be taken outside in their beds. This will have medical gases and monitoring capabilities. This has been proven to have a positive impact on the ICU patient journey, including helping to reduce delirium.

Location

The new ICU ward will be located directly adjacent from the Level 1 H-Block ICU ward, and include a link corridor as part of the proposed construction works.

It is imperative that ICU remain in close location to Medical Imaging and the Emergency Department, and this location links into those existing connections via pathways and dedicated lifts.

General Scope

The project incorporates the construction of the new ICU within the existing RHH Footprint to allow the continued State-wide centralised service, within close location of Medical Imaging Services, the Emergency Department, Elective Surgical admissions, in-hospital medical emergencies and interhospital transfers.

Program

This project will have a target date for completion of July 2022. This completion date is subject to finalisation of the ICU tender process, which has been run in parallel with the PSCPW.

A detailed construction program will also be provided by the builder once the works have been tendered.

DESIGN APPROACH

The planning approach that has been adopted is based on meeting current and predicted service requirements.

The new 12 bed ward will be based on the guidelines contained in the Australasian Health Facility Guidelines, and this has formed part of the architect's design brief.

NEED FOR THE PROJECT

The needs of a rapidly growing and ageing population as well as the impact of chronic disease and pockets of socio-economic disadvantaged, will drive demand for critical care medicine for the Tasmanian population over the next 15 years.

The following statistical data indicates provides information on growth and health statistics that require an increased bed capacity within the ICU to meet the ongoing needs of the Tasmanian population.

Estimated resident population of Tasmania, at the end June 2020 is 524,170. The calculation is based on the average growth rate of 0.29% over the last nine years since 2011(ABS 2020).

Highest projected growth rate between 2012 - 2037 is expected at 20.1% with the greatest increase of 24.9% expected in Hobart and the South-East.

Tasmania experienced the largest increase in median age over the last 20 years, increasing by 6 years from 36 years in 1999 to 42 years in 2019 (ABS 2019 Census data)

Tasmanian adults have a higher prevalence of lifestyle risk factors compared to the national average, including;

- 36% are overweight, 34.8% are obese (National Av. 67%, 31.3%)
- 27.2% have high blood pressure (National Av. 22.8%)
- 16.4% daily smokers (National Av. 13.8%)
- 45.4% who exceeded the single occasion risk guideline (National Av. 42.1%)
- 6.1% % have high cholesterol nationally across all regions of Australia.
- Two thirds of Tasmanians have inadequate levels of activity
- (ABS – National Health Survey: first results 2017-18).

Tasmania has a higher proportion of its population living in areas of lower socio-economic disadvantage than any other State or Territory. In Tasmania 57.1% of the population are living in the two lowest socio-economic quintiles of disadvantage (Improving the Hearts of Tasmanians; State-wide State Service Plan 2017-2022, Heart Foundation 2016).

ICU Model of Care was reviewed, and updated to inform the design for the ICU ward expansion.

CONSULTATION AND GOVERNANCE CONSULTATION

Consultation

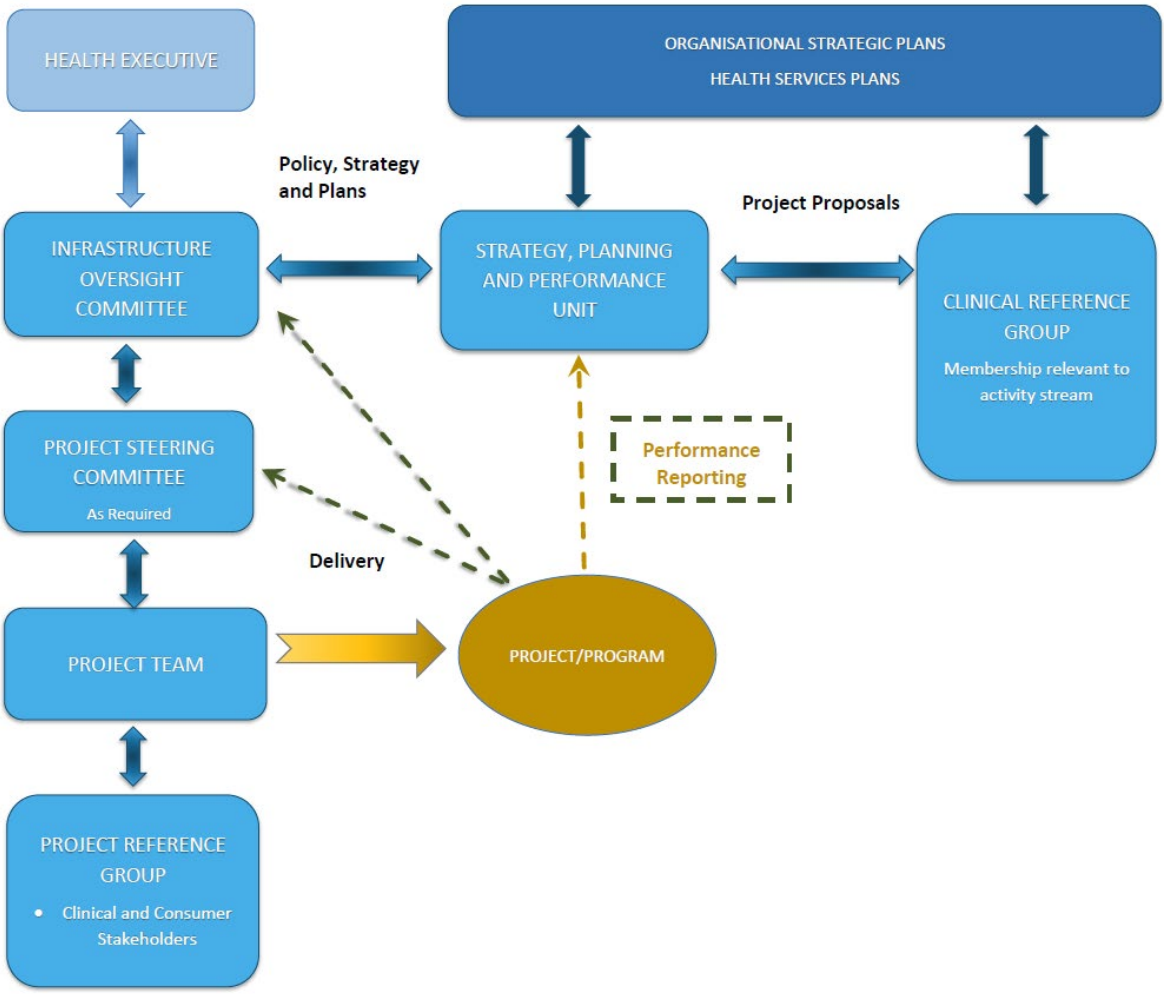
As part of the design phase, input has been sought from both clinical, non-clinical staff, infection control, and internal service providers into the design. As plans have been developed, they have also been displayed within the Intensive Care Unit to provide an opportunity for comment.

The proposed development was advertised in the Mercury newspaper on Saturday 21 August 2021, informing the public of the project and calling for submissions to the Parliamentary Standing Committee hearing.

Feedback from ICU patient family's was conducted in 2019 and incorporated into the design process.

Governance

The following diagram illustrates the Infrastructure Oversight Committee (IOC) Project Team and Project Reference Group relationships.



Design Approval Process

The design process included:

- Initial stakeholder meetings to gain further understanding on clinical, infection control, health service planning and facilities and engineering requirements.
- Ongoing meetings where completed where concept designs were presented to the project reference group, and the agreed concept design developed further to schematic design.
- Infrastructure Oversight Committee at its April 2021 meeting endorsed the RHH Redevelopment Phase 2 Scope Definition and subsequently approved the schematic design for new ICU Expansion.
- Further meetings were undertaken with specific groups to complete room layout sheets and design choices, with the final documentation signed off by the working group, Susan Gannon, Chief Executive Hospitals South and reported through to the IOC.
- During the project lifecycle monthly Project Status Reports on the ICU Expansion Project for the IOC were provided.

As noted elsewhere, the design of each functional space is based on AustHFG.

ADDRESSING THE NEED

The Site

The proposed expansion of the Intensive Care Unit at the Royal Hobart Hospital will be undertaken on Level 1, H-Block which is located on the Argyle Street side of the Hospital Campus. The area to be used by the expanded unit is a currently vacant ward space and was previously occupied by a medical unit that has now transferred to K Block. The location is directly adjacent to the existing Intensive Care Unit and is accessible directly from the H-Block lift lobby.

Design Philosophy

The proposed development of the Level 1 H-Block provides a dedicated 12 bed intensive care ward providing contemporary health care services to patients requiring critical care.

The design philosophy for the new ward is to best design practice to enable optimum clinical services including:

- Patient and Staff Focussed;
- Innovative planning that provides efficient and effective workflow;
- High quality work and patient environment;
- Responsive to the new models of care for nursing management
- In accordance with the Australasian Health Facility Guidelines (AHFG);
- To optimise energy efficiency and maximise environmental benefits of natural light, views and indoor air quality;
- Incorporates best practice Environmentally Sustainable Fit out Design.

Architecture & Interiors

The new 12 bed ICU will supplement the existing ICU located within H-Block and provide additional treatment for patients requiring critical care as the existing unit is operating at its current capacity. The new unit consists of:

- 12 Additional Patient Beds including 2 N Class negative pressure isolation rooms
- Additional Family / visitors spaces
- Additional Storage, charging and clinical support areas

- Integration with the existing Intensive Care Unit to incorporate workflow and clinical staffing efficiency
- A new balcony overlooking the Hospital forecourt on the Liverpool Street side to provide an outdoor and therapeutic treatment space.
- Consideration of mass isolation capability to allow the unit to be mechanically and physically separated from the rest of the Hospital in the event of a pandemic situation.
- Individual temperature control for all rooms to cater to individual clinical needs (ie. burns patients)
- Access to natural light in all bed spaces.
- Upgraded plant and equipment to service the Unit.

Attention has been focused on the new patient treatment spaces to create interior design aesthetics that have a holistic and considered approach for the well-being of users and staff offering direct relationships with nature. Natural elements have been referenced through the use of timber look and colours extracted from nearby natural views. Materials selections have been carefully considered for the use of the space. The design approach addresses the aesthetic while balancing the considerations of the Staff requirements, Infection control, way-finding, statutory requirements, ergonomics, DDA requirements, maintenance and quality of stay. Interior colour and material selections are proposed as a basic neutral palette with a few colour highlights.

Where possible, the minimum standards recommended by the Australasian Health Facility Guidelines (AusFHG) have been achieved with regards to floor area. Consideration in the design was always to give patient treatment spaces as the priority for spatial importance.

The treatment spaces have been located around the perimeter of the building so that each room has direct access to natural light and affords the patient the ability to discern time of day through transition of daylight in the room. All the patient rooms have been provided with a glazed sliding door that allows for direct access into the room, which can then be closed if required to provide temperature control or acoustic privacy. Visual privacy for each patient is achieved through the use of electronic glass in the sliding doors, which is fully transparent when switched off and opaque when switched on.

Staff support areas have been located in the centre of the “racetrack” which is surrounded by the patient rooms on the perimeter of the building. This allows staff to have easy access to the patients and maintains high visibility of these areas.

The new expansion has also been provided with new clean and sterile storage areas within its footprint. This assists in the unit maintaining its independent operational needs, especially when operating in “pandemic” mode as an isolation ward.

The reception is located at the main entry in order to provide ease of orientation for family members of patients entering the facility for visiting them in either the existing ICU ward or the new ICU. Immediately adjacent to the new reception is an upgraded and extended Family Lounge. This is a private and secure area for family members to wait in, and also take a break in when visiting patients that are housed in the ICU. The Family Lounge is located centrally between the existing and new ICU wards, behind the new reception, and is provided with tea making facilities.

For the most part, related spaces are linked together to form a common service unit. It has not always been possible to do this with the objective of creating a highly efficient layout.

Special consideration has been given to after-hours access to the area, through the use of video/intercom and access control, which will allow for visitors to arrive after the main reception has closed. This will ensure a higher level for after-hours security within the ward.

Environmentally Sustainable Design

The environmentally sustainable development features include:

- Energy efficient light systems through type/wattage and sensors.
- Material selections (where suitable) for the project will be selected based upon the criteria of low off-gassing characteristic (low VOC), low embodied energy and suitability for recycling.

- New internal glazing has been installed inside the existing façade to provide an upgraded thermal barrier to the exterior whilst also resolving infection control issues created by the old façade.
- Local materials, where possible have been used, however, given the specialist nature of the finishes required, the majority of materials and finishes that have been selected are only available from mainland suppliers. All installation works will be undertaken by local suppliers and subcontractors.

Building Services

Heating, Ventilation and Air Conditioning (HVAC)

The Mechanical HVAC system is designed to Australian Standard (AS) 1668 and National Code Compliance (NCC) requirements, with particular focus on occupant comfort, energy efficiency, reliability, quiet operation, and ensuring all maintenance and servicing can be done with minimal interruption to the function of the Intensive Care Unit.

The HVAC system consists of:

- Dedicated heat recovery Variable Refrigerant Flow (VRF) ducted units located in the rooftop plantroom.
- Ductwork to individual patient bedrooms which are treated as separate zones.
- Individual patient bedroom temperature control, to assist with the treating of temperature sensitive patients.
- Separate mechanical plant for the N Class isolation rooms.
- Variable Outside Air intake based on CO2 concentration to ensure healthy indoor air quality.
- Fixed quantity Toilet/Cleaners Room Exhausts to AS1668 requirements.
- HEPA air filtration to the Sterile Store and Stock rooms.

The HVAC system has been designed so that it operates independent of the remainder of the plant within H-Block. This allows the air to be specifically treated and tailored to suit the patient cohort present in the ICU. It also has the benefit that the additional 12 beds can be operated as a discrete hospital ward and has been specifically set up so that it can be isolated and function as a pandemic ward during such an event. This pandemic ward function allows the entire mechanical system to operate in a negative pressure mode to create a 12 bed ICU that is isolated from the rest of the Hospital.

Medical Gases

Medical gases are provided to a connection point in the ceiling of all patient rooms that then connects into a ceiling mounted pendant over each bed location. Each room is provided with Oxygen, Suction and Medical Air outlets on the pendant. Gases are also provided to the ensuites to the N Class Isolation Rooms, the Patient Bathroom, and the Patient Balcony.

Lighting

Lighting is designed to AS1680 and NCC, focusing on energy efficiency, long life and task-appropriate colour and temperature corrected lighting. Light levels to each area have been tailored to the types of work occurring, with local task lighting, switching, and occupancy sensing controls.

Emergency lighting utilises LED technology and is designed to AS2293.

Power

Power to the unit is provided by a new main local switchboard on the Level 1 floor, which is then connected back to the main H-Block switchboard and transformer. The new switchboard will provide both essential and non-essential power to the Unit based upon the requirements of the Australasian Health Facility Guidelines (AusFHG). The essential power is connected back to the H-Block generator via the main switchboard. This allows for the critical functions of the Unit to be maintained in the event of a power failure.

A new Uninterrupted Power Supply (UPS) system will be installed in the Main Switch room as part of the development.

General Power Outlets have been located as per AusFHG requirements, including Colour-coded outlet plates. Electrical body and cardiac protection have been designed in accordance with AS3003.

Security

Security systems will be provided including closed-circuit television, access control to strategic doors, duress and intruder detection including door read switches. Video/intercom points will be provided at the entry doors to the Unit, which will be connected back to the main Reception. Remote control and monitoring from the Hospital's Building Management System will be included.

Communications

Communications systems have been designed to meet the Department of Health requirements including:

- Provision of a structure Cat 6 cabling system to cater for voice and data
- Provision of telephony points where required
- IP TV where required
- Nurse call systems
- Wireless access points

An upgraded and expanded Communications Room has been provided which enables the consolidation of all equipment for both the existing ICU, and the new addition to be consolidated into the one location to create an efficient and effective strategy. This approach also allows for the removal of any existing equipment that is currently redundant and/or will become redundant during the development. The new Communications Room also provides an effective and safe work zone for IT services.

Hot Water & Cold Water Service

Hot and Cold Water is reticulated throughout the building in accordance with AS3500. The Hot water system is of a recirculating loop type and connects into the existing H-Block water ring main, however, in cases where hot water is required a significant distance from the main system a small under bench hot water boiling unit has been provided.

Sanitary Sewer

A conventional gravity sewer system will be used in this building in accordance with AS3500.2.

Fire Services

Fire hose reel coverage has been retained according to AS2441 and Extinguishers are located throughout the building in accordance with AS2444.

A combination of thermal and smoke detection systems have been designed including an addressable fire detection system. Switchboard and computer cabinet fire protection systems have been integrated with the fire detection and Emergency Warning and Intercommunication System (EWIS) has been provided throughout.

The extent of the redeveloped area will also have a new fire sprinkler system installed, to provide a greater level of protection to both the building and importantly the patients. This is a strategy that has been progressively implemented over the last 10 years across all the RHH refurbishment projects.

PROJECT SCHEDULE & BUDGET

Project Schedule

A Summary of the Project Timeline is as follows:

Description

Completion of design development	January 2021
Development Application	Not Applicable
Completion of Construction Tender Documentation	June 2021
Construction Tender (closing and assessment)	July 2021
Construction Start (subject to approval)	October 2021
Practical Completion of Construction	November 2022

Project Cost

Approved funding for the RHH Redevelopment Stage 2 program of works is $200M. The cost of the Paediatric Outpatient Clinics development is currently broken down as follows:

Description

Construction Costs	$11,560,000
Construction/Design Contingency	$ 685,000
Post Occupancy Allowance	$ 100,000
Professional Fees and associated costs	$ 792,510
Other Fees	$ 45,000
Information and Communication Technology Infrastructure	$ 456,000
Furniture and Equipment	$ 1,808,000
Other client costs	$ 489,000
Tasmanian Art Scheme	$ 80,000
PROJECT TOTAL	**$16,015,510**

The estimated construction costs have been provided by the project's Quantity Surveyor and are based on reasonable allowances for the project's location, current market conditions, and tender documentation issued to market.

RECOMMENDATIONS

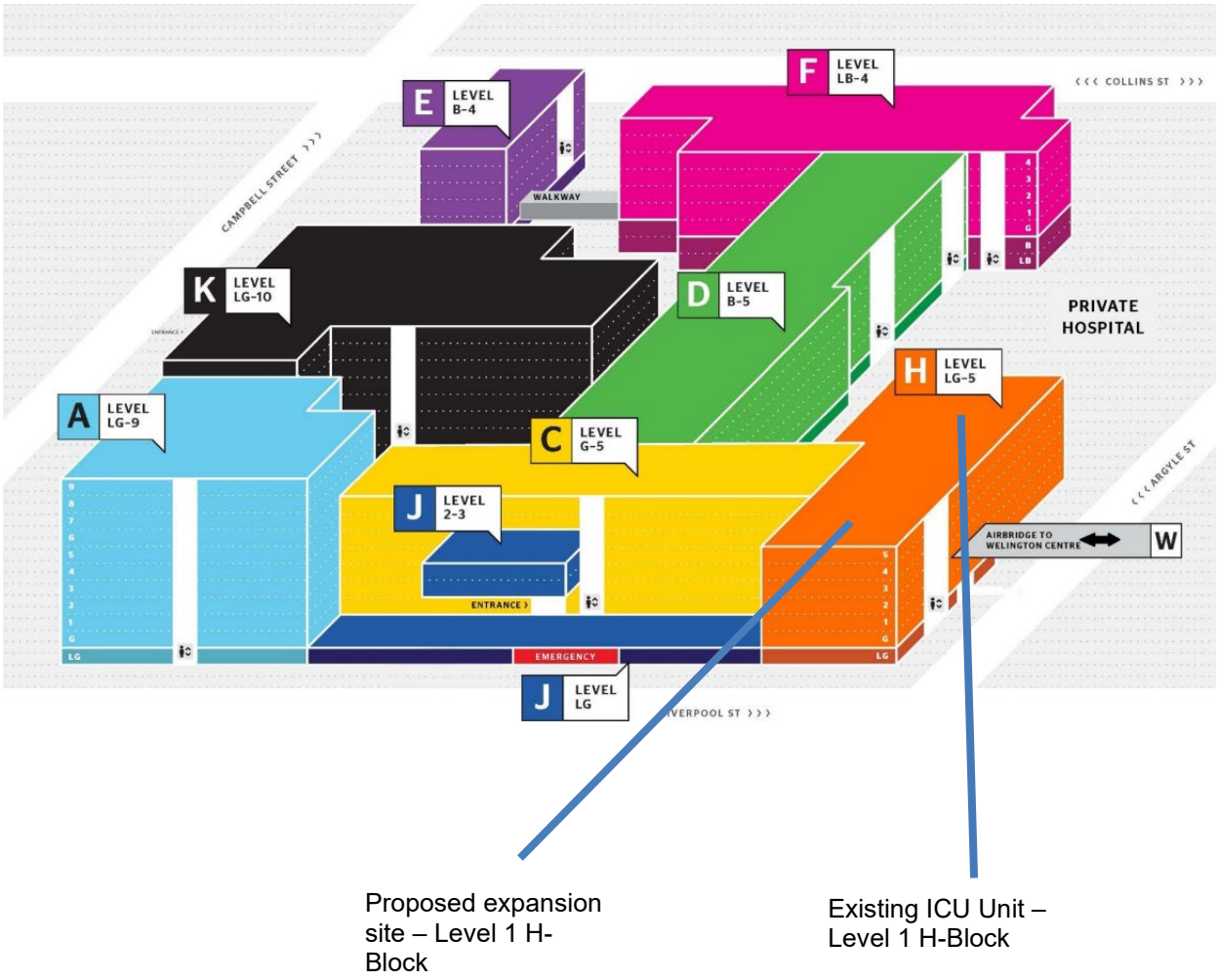
The Infrastructure Oversight Committee and Project Team have carefully assessed and explored the options and solutions available and have determined the designs submitted provides the required project outputs as determined in the project functional brief. In addition, the design is consistent with the strategic long-term direction of the Tasmanian Health Service.

It is recommended that this submission be viewed favorably given the benefits it will provide to Tasmanian community with the provision of an additional 12 ICU beds with pandemic capability.

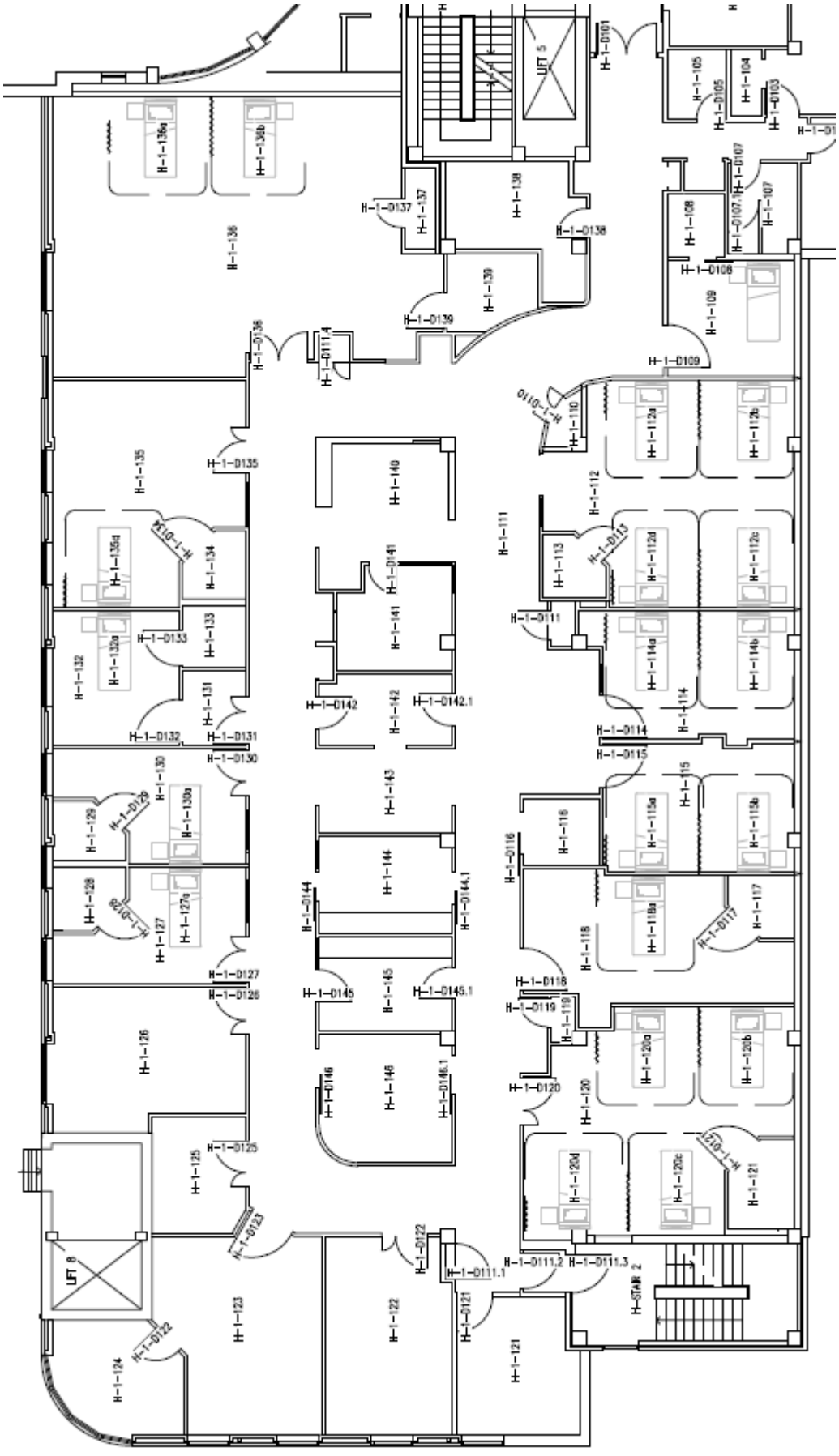
The project, once completed, will immediately commence addressing the need to deliver appropriate health services.

APPENDIX A – PROPOSED DESIGN

ROYAL HOBART HOSPITAL SITE DIRECTORY



PROPOSED CONSTRUCTION SITE – H-BLOCK LEVEL 1



PROPOSED NEW INTENSIVE CARE WARD FLOOR DESIGN