APPENDIX I

Mechanical and Vertical Transportation Services Report

aurecon

St George Hospital Redevelopment

Mechanical and Vertical Transportation Services Schematic Design DA Report

Health Infrastructure

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1 Executive Summary

This report outlines the concept design proposals in relation to the mechanical services, medical gasses and vertical transport needs of the proposed stage 2 development at St George Hospital.

The proposed new AST building will be provided with an all new air conditioning and ventilation systems to provide the occupants with a healthy environment for work and recovery. The systems will feature central Air Handling Units (AHUs) located within dedicated plantrooms on multiple floors, with ductwork reticulated to the floors.

The building will feature water cooled chillers and natural gas fired water heating to provide chilled and heating water to the AHUs.

The services will incorporate sustainable design principles to achieve environment quality and energy efficiency. Some of these features will include:

- All new systems will be designed to comply with deemed to satisfy section J requirements
- The design of the services will incorporate sustainable design principles to achieve a healthy indoor environment and minimise energy and other resource consumption.
- The building façade will be designed to achieve a high thermal efficiency to minimise heat load in the building. High performance glazing and highly insulated façade panels will be utilised
- High efficiency Water cooled chillers and associated plant to be utilised due to minimise energy consumption and maximise equipment life.
- High efficiency fans to be utilised across the project including within Air Handling Units distribution air around the building.
- Potential usage of heat recovery where beneficial and subject to the strict cross contamination requirements of the hospital
- High efficiency heating water boilers and associated plant to be utilised to minimise energy consumption. Water heaters will be natural gas fired to minimise carbon dioxide production
- High to premium efficiency pumps where appropriate
- Variable Speed Drives for pumps, fans, etc where appropriate
- Use of face and bypass within the air handling units in lieu of reheating to achieve humidity control
- The building will be provided with air handling plant zoned to match the expected heat loads within the building
- Control of the air handling plant will minimise the need to reheating and over conditioning of spaces
- Refrigerants utilised will feature zero Ozone Depletion Potential and low Global Warming potential

The design has the capability to meet the requirements of TS11

2 Mechanical Services & Medical Gas

1.1 Project Brief

The project comprises a new Acute Services Tower (AST) building to be constructed above the existing emergency department. The new building is currently planned at seven storeys plus a roof plantroom and helipad.

The project also comprises refurbishment to approximately 8,000 sqm of existing hospital.

1.2 Plant Configuration

The following overarching principles are proposed to be applied to the design for the mechanical services:

- Centralised air handling, for minimisation of components, optimum maintenance efficiency, minimal ceiling access and energy efficiency
- Air handling plant as close as practical to area served, whilst maintaining air intake distances from helipad
- Appropriate smoke control, utilising deemed to satisfy process together with fire engineering
- Centralised cooling and heating, giving consideration to interplay between minimising run lengths of incoming power mains and minimising chilled and condenser water piping distribution
- Recognizing that the existing emergency department must maintain function. As such plant options for the AST are affected
- The new building will require cooling plant to serve the air conditioning systems. A Chilled water system is proposed
- Water cooled plant is proposed in lieu of air-cooled due to energy efficiency, reliability, spatial footprint and consistency with the existing hospital
- New heating hot water plant is proposed to be located in a dedicated roof plantroom in the new AST building. Hot water will be reticulated to air handling units and fan coil units within the development.

1.3 Mechanical Ventilation

- Fresh air rates will comply with AS1668, TS-11 or any aspirational Greenstar targets if an as applicable, whichever is the most onerous.
- Toilet and ensuite exhausts will comply with AS1668 and/or TS-11, whichever is greater. Ensuite exhausts will comply with minimum requirements.
- Full fresh air economy cycles will be provided to all air handling systems over 1000 l/s in capacity, unless functional or operational needs prevent this
- The outdoor terrace areas will be naturally ventilated through glass operable louvres

1.4 Smoke Control

- The proposed stage 2 building is greater than 25 m in effective height and therefore requires a zone smoke control system, inclusive of stair pressurisation.

1.5 Medical Gas Infrastructure

- Medical Gasses will be reticulated through the building served from existing gas storage facilities in the site
- Liquid O2 will be reticulated throughout the building from the existing bulk storage facility on the site
- Medical air will be provided with new medical air plant
- Medical suction will be provided to the new building from the existing new plant located in the emergency department.

1.6 Pneumatic Tube

- A pneumatic tube system will be provided to interlink with the existing system in the ward block

1.7 Refurbishment Spaces

There are a number of spaces totalling approximately 8,000 square metres of refurbished space.

The specific scope of these spaces requirements in relation to refurbishment needs will be developed in due course. Overarching concept principles that will apply to the mechanical and medical gas systems are:

- Existing mechanical systems will be assessed for condition and reused where reasonable value life remains
- Existing Medical gas systems and reticulation will be retained and augmented where necessary
- Where capacity shortfalls exist due to increase in air conditioning load due to the refurbishment, supplemental air conditioning systems will be provided. These may be either chilled water, fed from existing system or standalone reverse cycle split or VRV systems.

3 Vertical Transport

1.8 Lifting Strategy

The lifts in the hospital are generally separated into four categories:

- Transportation of the public/visitors and is also suitable for staff
- Transportation of FM staff, goods, service trolleys, clean / dirty etc
- Transportation of beds
- “hot” lifts and bariatric beds.

The lifts are to be centrally located relative to their function and are readily accessible.

1.9 Design Requirements

1.9.1 Planning and Locations

The project should ensure the vertical transportation cores meet the following requirements:

- Lift systems must be located in groups of two or more to ensure lift service is retained in the event of a single lift failure
- Lifts are to be provided to serve all plant rooms, including roof plant rooms, to comply with the requirements of WHS and Safety in Design obligations, and to enable ease of maintenance and replacement of Plant.
- Separate transfer of clean and dirty utensils on trolleys to and from CSSU and CSSU sterile store (and operating rooms if CSSU and operating rooms are not on the same level).
- The secure transfer of Pharmacy materials between the loading dock and the Pharmacy need to be considered. Further advice will be required to confirm if any special features or additional lift services are required
- The lift control system shall be capable of operating on emergency power in the following manner:

4 ESD Principles

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