

CARDINAL FREEMAN VILLAGE

Supporting Documentation

Appendix A1

Mechanical Services Report

Prepared by **Engineering Partners**

Cardinal Freeman Village Village Green Precinct

Independent Living Units & Community Facilities

Mechanical Services

DA Report

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Issue A

1.0 SUMMARY OF PROPOSED MECHANICAL SERVICES

The following mechanical services are proposed to be incorporated into the development.

1.1 Basement

- a) The carpark will be provided with a mechanical exhaust and supply air system, comprising sheetmetal ducting, exhaust and supply fans mounted in the basement plantrooms and discharge ducting rising to above the roof.

These systems will be designed in accordance with AS1668.2 to ensure contaminant levels within the carpark and loading dock due to vehicle movements are maintained within acceptable limits.

- b) Miscellaneous Ventilation: Exhaust or supply ventilation systems to miscellaneous areas in accordance with AS1668.2, including Electrical/comms room etc.

1.2 Independent Living Unit (ILU) Buildings Q1, Q2 and Q3

- a) Air Conditioning - ILU's: Provision will be made to install air conditioning to each self contained ILU. The final installation of the air conditioning to individual units may occur either during construction or some time after completion of construction on an as needed basis.

The air conditioning to each unit will typically comprise an air cooled reverse cycle split type system with fan/coils located in the unit served, connected via refrigerant pipework to roof mounted condensers.

- b) Air Conditioning – Café, Offices and Community Facilities: Each of these areas will be provided with independent air conditioning typically comprising an air cooled reverse cycle split type system with fan/coils located in the area served, connected via refrigerant pipework to roof mounted condensers.

- c) Mechanical Ventilation: All internal bathrooms, laundries, toilets and garbage rooms will be mechanically ventilated in accordance with AS1668.2.

Each ILU will be provided with an individual ventilation system comprising ventilation fan(s), ducting and grilles. These will discharge horizontally through the building fascade.

Garbage rooms and ground level toilets serving community facilities will be provided with ventilation systems comprising ventilation fan(s), ducting and grilles. These will discharge above roof level.

Bathrooms, toilets and laundries which have openable windows complying with the natural ventilation requirements of the BCA may also be provided with mechanical ventilation subject to the clients preference. Such systems would typically comprise ceiling or wall mounted ventilation fans discharging horizontally through the building fascade.

- d) The café will be provided with a commercial kitchen exhaust system in accordance with AS1668.2 comprising hood(s), sheetmetal ducting and fan. This system will discharge above roof level.

1.3 Swimming Pool and Gym

- a) The swimming pool will be provided with an air conditioning system to provide cooling, reverse cycle heating and condensation control. The system will comprise a 100% outside air system incorporating a high efficiency heat recovery heat exchanger to recover heat from the exhaust air stream.
- b) The gym will be provided with an air cooled reverse cycle type air conditioning system comprising a room mounted fan/coil unit and remote air cooled condenser.
- c) Change rooms and toilets will be provided with a mechanical exhaust ventilation system in accordance with AS1668.2.

1.4 Chapel Undercroft

- a) Dining, AV room and kitchenette: Each of these areas will be provided with an air cooled reverse cycle air conditioning system. This will be a VRV type system comprising an individual fan/coil unit(s) for each area, connected to a common air cooled condenser located in the rear courtyard.
- b) The food preparation kitchen will be provided with an individual air cooled reverse cycle air conditioning system comprising an indoor fan/coil unit and remote air cooled condenser located in the rear courtyard area.
- c) Toilets will be provided with a mechanical exhaust ventilation system in accordance with AS1668.2.
- d) The workshop will be provided with a mechanical supply ventilation system in accordance with AS1668.2.

1.5 General

All mechanical services will be designed in accordance with the requirements of the BCA, the ventilation codes AS1668.1 and AS1668.2 and related codes and standards. In addition, mechanical services to the ILU buildings will comply with the BASIX commitments.

2.0 PROPOSED ENERGY EFFICIENCY MEASURES

The mechanical services design will be carried out based on energy saving concepts including the following:

2.1 Air Conditioning – ILU buildings Q1, Q2, Q3 and Miscellaneous Community Facilities

The air conditioning will comprise air cooled systems incorporating:

- Reverse cycle type condensers providing both cooling and heating functions ie. no electric heating.
- Each individual unit will be served by individual fan/coil units. This allows the air conditioning to be independently controlled by the residents.
- Air conditioning will be operated via electronic controllers to provide comfort conditions without over cooling or heating.

- Air conditioning ductwork and pipework will be insulated to reduce heat loss/gain.

2.2 Air Conditioning – Chapel Undercroft Dining, AV Room and Kitchenette

The air conditioning will comprise air cooled VRV type systems incorporating:

- Reverse cycle type condensers providing both cooling and heating functions ie. no electric heating.
- Compressors are electronically inverter speed controlled to accurately match the system capacity to the cooling or heating load. This provides significant energy savings.
- Each individual area will be served by individual fan/coil units. This allows the air conditioning to be switched off in rooms and areas not in use.
- Air conditioning will be operated via electronic controllers to provide comfort conditions without over cooling or heating.
- Air conditioning ductwork and pipework will be insulated to reduce heat loss/gain.

2.3 Air Conditioning – Pool

The air conditioning will comprise a 100% outside air system to provide a high level of condensation control as required for indoor heated pools. The system will incorporate a high efficiency heat exchanger to recover heat from the exhaust air stream to provide pre-cooling/heating of the incoming air stream. In addition the exhaust air stream is passed over the condenser coil thereby increasing refrigeration efficiency compared to conventional air cooled systems which rely on variable ambient air temperatures.

2.4 Carpark Ventilation

- The carpark ventilation fans and motors will be selected based on high energy efficiency.
- The systems will be controlled by a CO monitoring system in accordance with BCA Section J requirements. This system will monitor the CO concentration in the carpark and vary the fan speeds accordingly.

2.5 Passive Measures

- All windows will be provided with internal blinds or drapes. This will significantly reduce the direct solar load into the building in summer and reduce the loss of heat through windows in winter, thereby minimising the air conditioning load.
- All exposed roof areas and walls will be insulated in accordance with BCA Section J requirements.
- Windows will be sized and treated as required in accordance with BCA Section J requirements.

2.6 General

- All mechanical services systems to the community facilities will be designed in accordance with the requirements of BCA Section J.

- All mechanical services to the ILU's will be designed in accordance with the requirements of BCA Section J and the BASIX commitments.