RGW:

SY110367

5th June 2012

St George Hospital Emergency Department

Design Development Report - Hydraulic and Fire Services

1.1 Sanitary Drainage and Sanitary Plumbing

Sanitary drainage and plumbing shall consist of PVC-U pipe and fittings to convey sewer and waste from site fixtures and fittings. The system shall comprise of a series of gravity pipelines and inspection pits/clear-outs that allow direct rodding access. The sanitary drainage system shall discharge and connect to the existing on site 225mm vitrified clay sanitary drainage system.

Tundishes shall be located throughout the building for mechanical condensate drains.

The emergency shower shall not be connected to sewer it shall be provided with a pit with a removable access clear-out for tanker removal.

1.2 Fixtures and Fittings

The sanitary fixtures and tapware will comprise the supply and installation of all fixtures and associated tapware and fittings throughout as selected and scheduled by the Architect.

Fixtures will be supplied to meet the requirements of all wet areas within the facility. All fixtures will be rated as water efficient type (WELS) in order to minimise energy and water costs.

1.3 Stormwater Drainage

Rainwater sumps, gutters and downpipes will be capable of collecting and disposing of water flows of greater than 1% AEP (1:100 year) rainfall event for a time of concentration of 5 minutes.

A portion of the rainwater downpipes shall terminate at the rainwater tank with overflow connection to the stormwater drainage system.

1.4 Rainwater Harvesting and Non-Potable Water

Provision will be made in the form of a concrete base slab under the ground floor void space to enable the installation of a rainwater storage tank during the proposed vertical expansion stage of the project.

1.5 Cold Water Supply

Potable water supply shall be fed from the existing metered 100mm cold water service coming off Sydney Water 150mm water main in Gray Street.

The potable supply has existing water filtering to ensure an acceptable high quality of water is maintained to the facility.

Materials for water pipe and fittings shall be copper tube for main lines and polypropylene and cross linked Polyethylene (PEX) for dead leg branch piping.

Potable water will be reticulated to all fixtures, fittings and hose reels. Piping layout shall incorporate ring mains where required to ensure continuity of supply.

Isolation valves shall be located on the service lines to individual fixtures or group of fixtures in accessible locations at ground level.

1.6 Potable Hot/Warm Water

The proposed hot water plant shall comprise of natural gas supplied instantaneous hot water heaters with storage tanks located in the Mechanical Plant room. A flow and return system shall be located to provide a logical distribution throughout the building to maintain thermal efficiencies within the hot water system.

The hot water plant will generate 65ºC hot water and shall incorporate a ring main flow and return system to reticulate around the building supplying hot water to fixtures as required. RPZD's shall be fitted for zone protection where required by AS3500.

Warm water to all patient and staff ablution fixtures will be provided by thermostatic mixing valves located in the wall in a lockable stainless steel box equal to Enware.

Branch pipework groups of outlets shall be minimised and dead-legs shall not exceed three metres for 15mm diameter pipe. Each branch shall be equipped with an isolation valve for maintenance purposes located adjacent to the cold water supply branch isolation valve serving the same outlets. Main isolation valves located in the ceiling space shall be kept to a minimum.

Materials for water pipe and fittings shall be copper tube for main lines and polypropylene and cross linked Polyethylene (PEX) for dead leg branch piping.

1.7 Automatic Fire Sprinkler System

An automatic fire sprinkler system consisting of distribution, range piping and sprinkler heads shall be provided to protect the entire building to comply with BCA and AS2118.1.

The system shall be extended from the existing system in the main Tower Ward building via the ceiling voids.

1.8 Fire Hydrant System

An internal fire hydrant system consisting of piping and landing valves generally located in fire exit stairs and elsewhere due to fire compartmentation is being extended from the existing service in the Tower Ward Block to provide coverage to all parts of the building.

Note: fire compartment floor areas in the building must not exceed 1,000 m^2, otherwise an on-site water storage tank and diesel hydrant pump must be provided with sufficient capacity to allow hydrant operation for a period of 4 hours.

A meeting was held with Fire & Rescue NSW (FRNSW) – Messrs. Castelli and Parkins to discuss their requirements for the fire hydrant service where we are proposing to connect to the existing Ordinance 70 Specification 10 system in the Tower Ward Block they advised the following requirements:

- The existing diesel and electric hydrant pumps located in the roof plant room will both need to be changed to provide a duty of 20 l/s @ 700kPa at the most disadvantaged fire hydrant landing valve to bring the existing building up to the latest AS2419.1 requirements.
- No dispensation would be given if the new Emergency Department is fire separated from the existing building

- The existing tank type booster valve would need to be provided with a pair of suction hydrants adjacent connected to either an existing 100mm water main on site or new town mains connection.

1.9 Fire Hose Reel System

Fire hose reels will be supplied from the new fire hydrant service and will be arranged to serve any fire compartment with a floor area greater than 500m^2. They shall be located externally or internally within 4 metres of an exit. They shall be arranged so that the fire hose will not need to pass through fire or smoke doors.

The fire hose reels must be 36 metres in length.

1.10 Automatic Fire Detection System

The existing Building No. 1 contains a conventional non addressable Main Fire Indicator Panel (MFIP) and an Emergency Warning and Intercommunication System (EWIS) which are both located within the "fire control room" that also contains the sprinkler valves and is located at basement level. A MIMIC EWIS panel is located at the main entry to the building.

The Clinical Services Building (CSB) has a main FIP located at the "main entry" within an externally accessible cupboard to the building at ground floor.

The Service Centre Building (SCB) has a main FIP located at ground floor corridor on the western side of the building. The FIP is connected to the CSB FIP via a common alarm signal.

The CSB FIP and Building No. 1 MFIP are connected to the existing Fire MIMIC Panel located within the communications room at the Prince William Wing. These links will be maintained.

The Building No. 1, CSB and SCB dry fire systems are all at end of service life and there is a difficulty of sourcing replacement parts. The existing panel cannot be expanded to accommodate the new building (or future vertical expansion of building) utilising current industry standard devices.

It is proposed to salvage the SCB FIP and all detector heads & bases, speakers (Horn and recessed) and other ancillary equipment. Devices from the existing SCB FIP will be utilised to modify the MFIP within the Fire Control Room to accommodate the connection of the CSB and new ED SFIPs. Remaining devices and the FIP will be handed to the St George Hospital Maintenance staff for maintaining other similar systems within the hospital as per their verbal request.

A new fire detection system is proposed as an addressable system for the new ED building and refurbished adjacent areas. A Sub-FIP (SFIP) will be located to serve the new ED building and connected to the existing MFIP within the Fire Control Room.

The CSB FIP will be re-designated as an SFIP and connected to the existing Building 1 MFIP and be designated as an SFIP. The CSB FIP is proposed to remain in its present location. A fire engineering solution may be required to review proposal as the SFIP is not at the designated main entry to the CSB building.

To allow investigation of alarms, a delay of up to 3 minutes will be provided to the new SFIP in accordance with AS 4428.1 prior to alarm being raised to the external monitoring station and hence Fire & Rescue NSW.

A delay of up to 10 minutes in accordance with AS 1670.4 can be provided from alarm signal acknowledgement at the FIP until an audible alarm signal occurs within the building. The actual time delay will be as required within the building's emergency management plan.

The existing MIMIC panel located within the communications room at the Prince William Wing will be maintained and be modified to reflect the new works.

The new FIP and EWIS/BOWS for the new ED building will be in accordance with BCA specification E2.2a Clauses 4, 5 and 6 as applicable, E4.9 and AS 1670.1 and AS 1670.4.

The new ED SFIP and EWIS/BOWS panels are proposed to be located in a common cupboard located adjacent to the air lock and room RM 2005. The cupboard will be required to be minimum 1,600mm (W) x 2,100mm (H) and 400mm (D) internal clear dimensions with the width measured between the door frames and depth to back of door face to accommodate the panels. The cupboard doors are to be non lockable and be provided with contrasting label “FIRE PANEL” of letters 50mm minimum. No other signage shall be provided on the cupboard doors. The doors are to open greater than 120^{o}.

The following diagram provides clearance requirements in front of the cupboard.

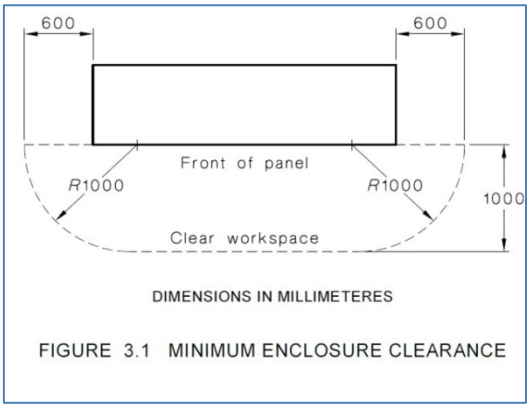

FIGURE 3.1 MINIMUM ENCLOSURE CLEARANCE

New block plans will be provided adjacent to the CSB SFIP and to the existing Building 1 MFIP locations and MIMIC panels.

New block plans will generally be A3 in size etched on stainless steel plate.

The new building Warden Intercom Points (WIP) will be connected to the existing EWIS panel within the Fire Control Room.

1.11 Portable Fire Extinguishers

Portable fire extinguishers shall be provided throughout the building in fire hosereel cupboards and plant rooms and must be selected, located and distributed in accordance with the BCA and AS 2444.

1.12 Gas Supply

Reticulated Natural gas supply shall be provided as fuel for hot water use for the facility.

The system shall be extended from the existing system in the main building located in the service tunnel.

1.13 Infrastructure Risk Assessment - Hydraulic and Fire Services

1.12.1 Engineering Systems

The following existing services will be connected to and extended to serve the new Emergency Department Building:

- Sanitary drainage in the existing building consists of PVC-U piping and fittings connecting to the existing 225mm vitrified clay sanitary drainage.
- The cold water system in the existing building consists of copper tubing and fittings connected to the Sydney Water watermain in Gray Street via a water meter and backflow prevention device to be relocated where indicated on the drawings. The existing water meter and backflow device interfere with the proposed works and it is proposed to relocate them clear of the works and provide for a new water connection in the ambulance bay fronting Gray Street. The existing cold water service is provided with a water meter, RPZD and automatic backwash filter.
- The new natural gas supply for the building shall be connected to the existing supply in the service tunnel and provided with a new meter and regulator to serve the new hot water plant which will be separate to the existing plant.
- The existing fire hydrant service consists of copper and galvanised mild steel piping and is provided with a diesel and electric booster pumps (which will be replaced) and a 25,000 water storage tank at main roof level. This service will be extended to serve the new building fire hydrants and hosereels.
- The existing fire hosereel system consists of galvanised mild steel pipes and fittings and is connected to the fire hydrant system.

1.12.2 Condition and Age

The existing infrastructure serving the Emergency Department Building is generally in good condition and some recent blockages in the existing sanitary drainage have been found. We recommend that the existing 225mm vitrified clay pipe proposed to take sewer discharge from the new Emergency Department be re-lined where it passes under the building.

1.12.3 Capacity Vs Demand

The existing hydraulic services infrastructure serving the Emergency Department building has sufficient capacity to supply the new building.

The existing sanitary drainage system has capacity to serve the future vertical expansion of the building and provisional plumbing stacks have been provided in the building where indicated on the drawings.

1.12.4 Likelihood of Failure

The risk of the existing and new hydraulic services failing is low and would usually only happen if the drainage pipes were blocked or there was a loss of water supply in the watermain due to a mains failure. In the majority of cases where this occurs the average time to repair the main would be in the order of 2-4 hours.

1.12.5 Consequences/Impacts of Failure

The impact of failure would result in water not being available for ablutions, water consumption and fire fighting in the building during the time taken to repair the watermain. If this was to occur arrangements could be made to for the patients to use amenities in another part of the hospital as the hospital has more than one connection to the Sydney Water reticulation network. Fire protection could also be provided from the external on site fire hydrant systems connected to other watermains.

1.12.6 Single Points of Failure

As there are no operating theatres proposed in the building dual connections to the Authorities' infrastructure is not considered to be warranted.

1.12.7 Back-up

The existing fire hydrant and sprinkler systems are both provided with electric and diesel driven motors and the hydrant pumps will be upgraded to comply with current code requirements.