



Northern Beaches Health Service Redevelopment
A new wave in healthcare

Northern Beaches Hospital

Stage 1: Concept Design, Site Clearance & Preparatory Works

Appendix J

Infrastructure Management Plan



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Northern Beaches Hospital Infrastructure Management Plan

 STEENSENVARMING

Warren Smith & Partners Pty Ltd

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1 Introduction

This report has been prepared by Steensen Varming and Warren Smith & Partners on behalf of Johnstaff for Health Infrastructure in respect of the proposed new Northern Beaches Hospital.

The report outlines the proposed Infrastructure Management Plan for the new hospital with respect to electrical, telecommunications, hydraulics and fire services.

While preliminary details have been discussed with the relevant authorities, further liaison will be required with the authorities and the Hospital Operator to determine the extent of the augmentation required with regard to provision of electrical, telecommunications, and hydraulics services to the site.

2 Electrical

2.1 Existing

There are several existing 415 V, 11 kV and 33 kV cables adjacent to the proposed hospital site. However, none are adequate to support the anticipated maximum demand load of the proposed hospital.

2.2 Augmentation

A 415 V supply is not considered adequate due to the amount of load required. Thus new high voltage feeders to the hospital are required.

The option exists to supply the site via 33 kV transmission lines or 11 kV lines.

While the 33 kV option is possible, it would incur additional costs and require infrastructure such as a zone substation or new 33 kV / 415 V transformers without any technical advantage.

Based on discussions with the supply authority, a Maximum Demand of 10 MVA or more is tipping point for the requiring a 33 kV supply arrangement. Thus to avoid a large zone substation and 33 kV feeders, a maximum demand of less than 10 MVA is required. The maximum demand for the site at this stage is considered to be less than 10 MVA.

The recommendation is to feed the site via 11 kV HV lines.

It is proposed that two diverse high voltage feeders from the one zone substation (Beacon Hill, about 1-2 kilometres away) utilising the redundancy available at that zone substation be provided. Thus two feeders fed from different sections of the zone substation switchboard and following a slightly diverse cable routes to the site. For budget reasons these could be installed in the same trench but at different levels with separate entry and exit points.

The existing Beacon Hill Zone Substation does not presently have the capacity to supply the proposed development. However, Ausgrid is planning to install a third zone transformer in 2013–14 to increase the zone substation's capacity.

Steensen Varming has undertaken initial consultation with Ausgrid to confirm the solution to support the new hospital.

Ausgrid contact:

The main contact for the project is:

Michael Rourke
 Engineering Officer, Contestability Sydney North & Central Coast |
 Building 3a, 51-59 Bridge Road Hornsby NSW 2077 AUSTRALIA
 02 8569 6729 (Ext 66729) or 02 9477 8341 (Ext 38341)
mrourke@ausgrid.com.au

While preliminary details have been discussed with the relevant authorities further liaison is required with the Authorities and the Hospital Operator to determine the extent of the augmentation required to provide electrical power services to the site.

3 Natural Gas

3.1 Jemena Infrastructure

Jemena has advised that the existing 160 mm diameter 210 kPa high pressure natural gas main situated on the northern side of Warringah Road, to be diverted into an easement on the southern boundary of the site, is available for connection to supply natural gas to the hospital at a metering pressure of 35 kPa.

Jemena has advised that the existing 200 mm diameter 1050 kPa natural gas main in Frenchs Forest Road West, Bantry Bay Road (natural gas main to be relocated) is at full capacity and is not available for connection.

Jemena has advised that the existing 200 mm diameter 1050 kPa natural gas main in Bantry Bay Road (closed) would need to be removed and diverted to extend west along Frenchs Forest Road West and be installed at a minimum depth of 1.2 m in a 3 m wide easement on the western boundary of the proposed hospital site and extend east along Warringah Road to reconnect to the existing 200 mm diameter high pressure natural gas main adjacent Bantry Bay Road (closed) and Warringah Road.

3.2 Hospital Building

The natural gas service for the hospital would connect to the Jemena 160 mm diameter 210 kPa high pressure natural gas main situated on the northern side of Warringah Road and extend to a master natural gas meter assembly and regulator.

Jemena has advised that the metering pressure for the natural gas service would be 35 kPa and the natural gas service would extend to supply the following:

- Domestic hot water heating plant
- Commercial kitchens
- Mechanical boilers
- Tri-generation plant (if required).

Individual natural gas meters wired to the hospital BMCS system would be provided to meter the natural gas consumption to the above plant and equipment.

The 200 mm diameter 1050 kPa high pressure natural gas pipeline deviation works would need to be designed by Jemena, and installed by Jemena or an accredited Jemena contractor who has accreditation to work on the Jemena natural network infrastructure mains.

4 Water and Sewer

4.1 Scope

The hydraulic services for the Northern Beaches Hospital development would include:

- Sub-soil drainage (internal to the building)
- Stormwater drainage (internal to the building)
- Roof water drainage
- Rainwater downpipes including 'syphonic' downpipe system
- Sewer drainage
- Sanitary plumbing and drainage
- Grease waste plumbing and drainage
- Grease waste pre-treatment
- Trade waste plumbing and drainage
- Trade waste pre-treatment
- Domestic cold water service
- Domestic hot water services
- Warm water service using thermostatic mixing valves (TMVs)
- Non-potable cold water via localised potable water reduced pressure zone devices (RPZD)
- Non-potable hot water via localised potable water reduced pressure zone devices (RPZD)
- Laboratory quality water
- Natural gas service
- Sanitaryware fittings and fixtures
- Taps and water outlets
- Metering for Green Star (based on Green Star Health Pilot).

4.2 Standards

The hydraulic services would be designed to a minimum of the following Standards:

- National Construction Code (NCC)

- AS 3500 – Plumbing and Drainage Code
- NSW Code of Practice, Plumbing and Drainage
- AS 5601 – Gas Installation Code
- EPA – Rules and Guidelines
- Sydney Water trade waste requirements
- Warringah Council stormwater requirements
- TS 11 NSW Health Engineering Services and Sustainable Development Guidelines – 2007
- NSW Health Department Circulars.

4.3 Existing

4.3.1 Sewer Drainage

Sydney Water infrastructure

Sydney Water has advised that the main sewer drainage connection point for the hospital would be to the existing Sydney Water sewer access chamber situated adjacent to the southern side of the site at Warringah Road and Bantry Bay Road.

Hospital building

The sewer drainage system from the hospital would gravitate and connect to the existing 300 mm diameter Sydney Water sewer main and access chamber on the northern side of Warringah Road adjacent Bantry Bay Road (closed).

4.3.2 Water Services

Sydney Water infrastructure

Sydney Water has advised that the existing 250 mm diameter Sydney Water water main situated on the southern side of Frenchs Forest Road West is available for connection of domestic cold water supply and fire services for the hospital.

Sydney Water has advised that the 450 mm diameter Sydney Water water main situated on the southern side of Frenchs Forest Road West is available for connection of domestic cold water supply and fire services for the hospital.

Both the 250 mm and 450 mm diameter Sydney Water water mains are part of the same pressure zone and given the larger 450 mm water main, a far greater flow rate for the hospital would be available.

Sydney Water has advised that the existing 100 mm diameter Sydney Water water main in Bantry Bay Road (closed) between Frenchs Forest Road and Warringah Road can be disused and disconnected.

4.4 Augmentation

4.4.1 Sewer Drainage

Sydney Water infrastructure

Sydney Water has advised that a 300 mm diameter sewer extension would be required to extend from the existing 300 mm diameter sewer in Bantry Bay Road that passes under Warringah Road that reduces to 200mm in diameter, be disconnected and a 300 mm diameter Sydney Water sewer extension be installed to gravitate south along Bantry Bay Road and extend along Aquatic Drive to connect to the existing 300 mm diameter Sydney Water sewer in the parkland south of the Warringah Aquatic Centre.

The 300 mm diameter Sydney Water sewer accepts sewage and trade waste drainage from the adjacent industrial area.

Sydney Water has advised that the existing 150 mm diameter Sydney Water sewer adjacent to the north eastern corner of the site in Frenchs Forest Road West is not available for connection.

The sections of redundant Sydney Water sewer drainage pipelines and access chambers in Bantry Bay Road and in the north eastern corner of the site would need to be removed and capped off.

Hospital building

Adequate grease arrestors would be provided to treat all kitchen trade waste drainage in accordance with the requirements of Sydney Water.

Sanitary fixtures that cannot gravitate to the hospital house service sewer drainage system would gravitate to a sewage pump out pit complete with dual submersible grinder sewage pumps situated at the lowest basement car park level.

All sewage pumps would be separately wired to emergency power so the sewage pumps could operate in the event of power failure. The pumps would also be connected to the building BMCS system.

4.4.2 Sanitary Plumbing and Venting

A system of sanitary plumbing stacks, relief vents and back vents would be provided to convey soil and waste water from sanitary fixtures and appliance outlets to the sewer drainage system.

Sanitary plumbing soil waste and vent pipes would be located in close proximity to wet area facilities ensuring that horizontal pipework length is kept to a minimum.

4.4.3 Roof and Stormwater Drainage

Hospital building

The internal rainwater drainage system would collect water from metal and concrete roofs and gravitate by downpipes to connect to the external stormwater drainage system provided by the civil engineering consultant.

The rainwater drainage system would be sized for a 1:100 year storm event.

Overflows to building roofs would be designed to cater for a 1:100 year storm event and overflows would be provided to cater for a 1:200 year storm event.

The basement car park levels would be provided with a subsoil drainage system to gravitate and connect to subsoil drainage pump-out pits, complete with dual submersible pumps. Stormwater drainage from grated drains from car park driveways that cannot connect to a gravity stormwater drainage system would also connect to the subsoil drainage pump-out pits.

All subsoil drainage pumps would be separately wired to emergency power so as the subsoil drainage pumps could operate in the event of power failure.

The pumps would also be connected to the building BMCS system.

4.4.4 Water Services

Domestic cold water

The incoming domestic cold water service would need to extend to separate reduced pressure zone devices (RPZDs) before extending to a suitably sized Sydney Water water meter assembly.

An adequately sized combined fire hydrant and fire sprinkler service tee and valve connection would need to also separately connect to the 250 mm or 450 mm diameter Sydney Water water mains.

For connections to the 250 mm diameter Sydney Water water main on the southern side of Warringah Road, the two separate incoming water and fire services connections would need to be bored under Warringah Road and installed in suitably sized conduits.

A Triplex variable speed pressure unit pump set would be provided to provide adequate water pressures throughout the hospital building. The Triplex variable speed pressure unit pump set would be separately wired to emergency power so as the pumps could operate in the event of power failure.

The pumps would also be connected to the building BMCS system.

The domestic cold water system would be designed so that the velocity would not exceed 1.5 m/sec and would deliver a minimum pressure of 300 kPa at the most disadvantaged fixture outlet point.

Pressure limiting valves would be installed to all domestic cold water branch lines immediately downstream of branch line control valves to ensure that the water pressures do not exceed 350 kPa.

Domestic cold water supply to laboratory areas, garbage rooms, plant rooms and other hazardous areas would be provided with reduced pressure zone devices (RPZDs).

The Sydney Water Statement of Available Pressure and Flow from the 250 mm diameter Sydney Water water main in Warringah Road is as follows:

- Ground Level – 154 mAHD
- Maximum Pressure – 87 m head
- Minimum Pressure – 40 m head
- Maximum Possible Flow – 120 L/sec @ 14 m head.

The maximum possible flow from the 250 mm diameter Sydney Water water main in Warringah Road being 120 L/sec at 14 m head, would be an adequate flow rate for both domestic cold water and fire services to the hospital.

Domestic hot and warm water

The domestic hot water system would consist of a pressurised central domestic hot water plant situated in the roof plant room of the hospital building and would circulate via a flow and return system via domestic hot water circulating pumps.

The domestic hot water system would be designed so that the velocity did not exceed 1.5 m/sec and deliver a minimum pressure of 300 kPa at the most disadvantaged fixture outlet point.

Pressure limiting valves would be installed to all domestic hot water branch lines immediately downstream of branch line control valves to ensure that the water pressures do not exceed 350 kPa.

Domestic hot water supply to laboratory areas, garbage rooms, plant rooms and other hazardous areas would be provided with RPZDs.

Insulation would be provided to all domestic hot water pipelines in accordance with AS 3500.

Warm water to all patient care and staff area fixtures would be limited using thermostatic mixing valves. Temperature limitation to outlets would be applied as follows:

- Staff – 50°C
- Public – 50°C
- Disabled public – 43°C
- Patient care – 43°C.

5 Telecommunications

While there are several existing telecommunications services within the area it has been established that none of these are adequate to support the new proposed hospital.

Telstra is currently the incumbent supplier for the Local Area Health. The actual lead in services will be coordinated with the future “Health WAN” master plan. Links to Telstra’s exchange would be included consisting of relevant optical fibre, multi-core copper PSTN lines and ISDN services from the Frenchs Forest Exchange.

Additional private microwave links to Royal North Shore Hospital (RNSH) and other health facilities are also being considered.

Telstra has been contacted as the communications services required for the new development would be derived from the existing hospital infrastructure.

Telstra contact

The main contact for the project is:

Damian Bonser
Project Specialist
Network Integrity
L9, 18 Smith St, Parramatta 2150 NSW Australia
Locked Bag 5035, Parramatta NSW 2124
Phone Number 02 8842 5182

While preliminary details have been discussed with the relevant authorities further liaison is required with the Authorities and the Hospital to determine the extent of the augmentation required to provide telecommunications services to the site.

6 Fire Services

6.1 Scope

The Fire Services that shall be provided for the Northern Beaches Hospital, Frenchs Forest, and Development shall include:-

- Combined Fire Hydrant and Fire Sprinkler System;
- Fire Hose Reel System;
- AS 1670 Fire Detection and Alarm System;
- Sound System and Intercom System for Emergency Purposes;
- Fire Extinguishers.

6.2 Standards

The fire services would be designed to a minimum of the following Standards:

- AS 2118.1 – Automatic Fire Sprinkler Systems – Standard
- AS 2118.2 - Automatic Fire Sprinkler Systems – Wall Wetting Sprinklers (Drenchers)
- AS 2118.6 Automatic Fire Sprinkler Systems – Combined Sprinkler and Hydrant
- AS 2941 – Fixed Fire Protection Installations – Pump Set Systems
- AS 1668.1 – The use of mechanical ventilation and air-conditioning in buildings – Fire and Smoke Control
- AS 1670.1 – Fire Detection, Warning, Control and Intercom Systems – System design, installation and commissioning
- AS 1670.4 – Fire Detection, Warning, Control and Intercom Systems – System design, installation and Commissioning – Part 4: Sound Systems and Intercom Systems for Emergency Purposes

- AS 2419.1 – Fire Hydrant Installations – System design, installation and commissioning
- AS 1221 – Fire Hose Reels
- AS 2441 – Installation of Fire Hose Reels
- AS 2304 – Water Storage Tanks for Fire Protection Systems
- AS 2444 – Portable Fire Extinguishers – Selection and Location
- AS 1851 – Maintenance of Fire Protection Systems and Equipment

6.3 Augmentation

6.3.1 Combined Fire Hydrant and Fire Sprinkler System

A fire hydrant service would be provided to the building as part of a combined fire sprinkler / fire hydrant service. The water supply and pumps configuration would be as follows:

- Adequately sized combined water supplies from the 450 mm diameter Sydney Water town main in Frenchs Forest Road West
- New Fire and Rescue NSW booster arrangement,
- On-site Water Storage Tank,
- Diesel and Electric driven main pumps, and
- Automatic Jacking Pumps.

All pumps would be connected to the building BMCS System.

The above described water supply would comply with a Grade 1 Water Supply as required by Table E1.5 of the NCC.

Fire hydrant services would be sized with adequate capacity to supply a minimum of 5 L/s to each internal fire hydrant location and allowing for two hydrants to operate simultaneously.

A combination of ring mains and main supply risers would be used to achieve the most economical fire hydrant service installation, in conjunction with a system design that provides for flexibility and redundancy in supply.

The combined sprinkler / hydrant infrastructure reticulation would be constructed from medium weight galvanised mild steel pipework and fittings for above ground locations.

A fire sprinkler service would be provided to the building as part of the combined fire hydrant / fire sprinkler service.

A fire sprinkler isolation valve set including flow switch and test assemblies would be provided at each floor level of the building within all nominated fire stairs.

The fire sprinkler system as part of the combined fire system would share all infrastructure with the fire hydrant system as described above.

Fire sprinkler service reticulation would be constructed from medium weight black mild steel pipework and fittings for above ground locations.

6.3.2 Fire Hose Reel Service

Fire hose reels would be provided throughout the building and generally located within 4 m of exits and to suit the fire compartmentation requirements. Additional fire hose reels would be located elsewhere within the buildings to provide additional coverage as required.

The fire hose reel service would form part of the domestic water supply system.

The fire hose reel service would be provided with water from the metered potable water supply and the pipework would be constructed from Type B copper tube.

Fire hose reel services would be sized with adequate capacity to convey water supply to all connected fire hose reels, allowing for a minimum supply of 0.33 L/sec at each fire hose reel and for two fire hose reels to operate simultaneously.

6.3.3 AS 1670 Fire Detection and Alarm Systems

An addressable fire detection and alarm system would be provided throughout the building. The main fire indicator panel and fire fan control panel would be located in the ground floor lobby of the main hospital building in a fire control centre.

A point smoke detection system would be installed throughout the building to BCA Part E2.2, AS 1670.1:2004 and AS/NZS 1668.1:1998 requirements. Manual call points would be located in corridors at 30 m intervals in all patient care areas.

A remote display unit mimic panel would be provided at each nurse's station complete with visual and audible alarm complete with mute switch.

The fire detection and alarm system would also monitor the combined fire sprinkler and fire hydrant system.

The fire fan control panel would connect to the essential services control system and provide indication and control.

6.3.4 Sound System and Intercom System for Emergency Purposes

A sound system and intercom system for emergency purposes (SSISEP) would be installed throughout the building. The system would incorporate a master emergency control panel (MECP) located in the fire control centre on ground floor.

6.3.5 Fire Extinguishers

Fire extinguishers would be provided throughout the Hospital in accordance with Table E1.6 of the NCC, including the nurses and supervisor stations. Selection and location of fire extinguishers would comply with AS 2444.

6.3.6 Alternative Fire Engineered Solution Recommendations

The following alternative solutions have been accepted by Health Infrastructure and would be incorporated as part of the fire engineering for presentation to Fire & Rescue NSW.

Minimising trauma via the SSISEP

Speakers and white T3 pattern strobe lights in the patient area egress corridors only and all back of house non-patient areas. No speakers or visual indicators in the 'Ward / Room' so trauma cannot be created.

Provision of mimic panels (remote display units) in nurses stations with a buzzer and mute switch, red manual break glass alarm, warden intercommunication phone (WIP) with evacuation plan strategy and evacuation training.

Smoke detectors in ceiling voids greater than 800mm in depth

The deletion of smoke detectors other than those required for return air paths for ceiling voids greater than 800 mm in depth which are sprinkler protected.

Light hazard NFPA 13 sprinkler protection instead of light hazard to Australian Standards

The provision of light hazard protection to NFPA 13 including patient care areas to provide a higher level of life safety and property protection.

7 ESD Inclusions

7.1 Wat-1: Occupant Amenity Water

The selection of sanitary fixtures and tapware to be used shall be selected to reduce water consumption against a 'best practice' benchmark.

The selection of sanitary fixtures and tapware shall be undertaken in consultation with Health Infrastructure, considering the required WELS ratings.

The 'Potable Water Calculator' shall be completed at an appropriate time in the project.

7.2 Wat-2: Water Meters

Pulse water meters shall be installed on all major users of water and wired to the BMCS for data collection. The meters shall be installed on such items as heating water heaters, hot water generation plant, etc.

7.3 Emi-6: Discharge to Sewer

The selection of sanitary fixtures and tapware to be used shall be selected to reduce water consumption against a 'best practice' benchmark.

The selection of sanitary fixtures and tapware shall be undertaken in consultation with Health Infrastructure, considering the required WELS ratings shall be reviewed.

The 'Sewerage Calculator' shall be completed at an appropriate time in the project.

7.4 Emi-9: Trade Waste Pollution

All trade waste discharges shall be via pre-treatment devices prior to discharge.

