Warren Smith & Partners

‘PROJECT ARCHIMEDES’ WENONA SCHOOL

Hydraulic & Fire Services Development Application Report

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1. INTRODUCTION

The "Project Archimedes" development involves the construction of a six (6) storey building which will house a 25m main swimming pool, Learn to Swim Pool, Change Rooms, Gym & Sports area, Science Hub, Senior Ecosystem and Staff area.

The site address is 255-265 Miller Street North Sydney.

Warren Smith & Partners has been engaged to provide the Hydraulic, Fire and Civil Services design for the development

2. **AUTHORITIES & CODE REQUIREMENTS**

The design of the Hydraulic Services will conform with the following Authorities and Code Requirements:-

- North Sydney Council
- National Construction Code (NCC)
- Environmental Planning and Assessment Act
- Environmental Planning and Assessment Regulations
- Insurance Council of Australia
- Environmental Protection Authority
- Sydney Water
- Fire & Rescue New South Wales
- Jemena Limited
- Australian Competition and Consumer Commission
- NSW Department of Energy
- Energy Australia, Integral Energy
- Telstra, Austel, Optus
- Roads and Traffic Authority
- All relevant Australian Standards and Referenced International Standards
- Occupational Health and Safety Act

3. HYDRAULIC SERVICES SYSTEMS

The internal and external Hydraulic Services Systems will comprise:-

- Sewer Drainage
- Stormwater and Subsoil Drainage internal to the building
- Sanitary Plumbing & Venting
- Roof Drainage and Downpipes
- Potable Cold & Hot Water Service
- Natural Gas Service

4. HYDRAULIC SERVICES REQUIREMENTS

4.1 SEWER DRAINAGE

4.1.1 General

Sewer Drainage will gravitate and connect to the existing Sydney Water 225mm sewer main located in Elliott Street.

The sewer drainage system will extend via gravity from fixtures and sanitary plumbing stacks above the Lower Ground 2 Mezzanine Floor.

The Lower Ground 2 and Lower Ground 3 floors are below the Elliott Street sewer main invert level and will need to drain to a sewer pump out pit. This pit will also take required discharges from the swimming pool plant.

Dual submersible grinder pumps will pump the waste from the pit to the boundary trap prior to the connection to the sewer main.

All in ground drainage will be provided with accessible clear-outs and/or manholes for maintenance and general cleaning provisions.

4.1.2 Materials

Sewer Drainage pipework will consist of UPVC pipes and fittings for suspended and underground pipework.

4.1.3 Sizing / Diversity

The sewer system will be sized in accordance with the requirements of AS 3500 based on fixture loading units incorporating diversity factor.

4.1.4 Design Standards

The Sewer Drainage Systems will be designed and constructed in accordance with:-

- AS 3500.2, National Plumbing and Drainage Code Part 2 Sanitary Plumbing and Sanitary Drainage
- New South Wales Code of Practice
- Sydney Water

4.2 **STORMWATER DRAINAGE**

4.2.1 Proposed Stormwater System

Stormwater drainage will gravitate from the base of all downpipes and rainwater outlets to the Councils stormwater infrastructure via an on site detention tank being designed under the Civil package.

4.2.2 Materials

Stormwater drainage pipework will consist of UPVC pipes and fittings for suspended and underground pipework.

4.2.3 Sizing / Diversity

The stormwater drainage system will be sized in accordance with the requirements of North Sydney Council's requirements.

4.2.4 Design Standards

The Stormwater Drainage Systems will be designed and constructed in accordance with:-

- North Sydney Council
- AS 3500.3, National Plumbing and Drainage Code, Part 3: Stormwater Drainage
- New South Wales Code of Practice

4.3 SANITARY PLUMBING & VENTING

4.3.1 General

A system of sanitary plumbing, relief vents and back vents is proposed to convey soil and waste water from sanitary fixtures to the sewer drainage system.

Sanitary Plumbing, soil waste and vent pipes will be located in close proximity to wet area facilities ensuring that horizontal pipe work length is kept to a minimum. Soil stacks will be provided with 100mm diameter inspection access fittings close to drainage connection and at each floor connection.

4.3.2 Materials

The sanitary plumbing system will consist of UPVC pipes and fittings for all soil waste and vent pipe work.

4.3.3 Sizing / Diversity

The sanitary plumbing system will be sized in accordance with the requirements of AS 3500 based on fixture loading units incorporating diversity factor.

4.3.4 Design Standards

The Sanitary Plumbing Systems will be designed and constructed in accordance with:-

- AS 3500.2, National Plumbing and Drainage Code Part 2 Sanitary Plumbing and Sanitary Drainage
- New South Wales Code of Practice
- Sydney Water

4.4 ROOF DRAINAGE & DOWNPIPES

4.4.1 General

All roofs will incorporate emergency overflow provision designed for a 1:100 Year intensity.

4.4.2 Materials

All rainwater downpipe will consist of UPVC pipes and fittings with electro fusion joints.

4.4.3 Sizing

The rainwater downpipe system including gutters will be sized for 1 in 100 year rainfall intensity. An emergency overflow system from all roof areas and balconies will also be sized for a for a rainfall intensity of 1 in 100 year event in the event of failure to the roof drainage system.

4.4.4 Design Standards

The Roof Drainage and Downpipes will be designed and constructed in accordance with:-

- North Sydney Council
- AS 3500.3, National Plumbing and Drainage Code Part 3 Stormwater Drainage
- New South Wales Code of Practice

4.5 **DOMESTIC HOT & COLD WATER SERVICE**

4.5.1 General

A domestic cold water system will extend from the existing 200mm diameter Sydney Water watermain in Miller Street. A reduced pressure zone device will be provided and located on the outlet side of the new property water meter.

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

The potable hot water system will also be supplied from the domestic cold water system. The potable hot water plant will consist of natural gas instantaneous hot water units installed on Level 2. From the hot water units, the hot water system will reticulate throughout the building via a flow and return piped system. 65°C hot water will be provided to sinks and cleaner sinks.

Warm water will be supplied via Thermostatic Mixing Valves to all hand basins and showers in amenities areas (50°C) and all accessible hand basins (43°C).

Flow regulated tapware will be provided to all fixtures and tapware to reduce cold water consumption.

4.5.2 Materials

Potable cold and hot water will be reticulated throughout the building using type B copper tube and fittings. All risers and individual zones will have isolation valves.

The potable hot water pipework will be insulated to prevent heat losses within the overall potable hot water system.

All branch lines will be fitted with pressure limiting valves to ensure that equal pressures are maintained.

4.5.3 Sizing / Diversity

A pressurised supply to all fixtures and appliances. Pipe work will be sized to achieve flows with a maximum velocity of 1.5m/s in accordance with the Australian Standard utilising fixture loading units including diversity factors.

4.5.4 Design Standards

The Potable Hot & Cold Water Service will be designed and constructed in accordance with:-

- AS 3500.1, National Plumbing and Drainage Part 1: Water Supply
- New South Wales Code of Practice,
- Sydney Water.

4.6 **NATURAL GAS SERVICE**

4.6.1 General

There is an existing natural gas service on the site with the gas meter set currently located in the garden area of the existing school off Miller Street

The Natural Gas Service will extend from the existing natural gas reticulation service to the new gas appliances.

All natural gas appliances are to be flued in accordance with the requirements of Jemena and the Manufacturers' Specification.

4.6.2 Materials

The natural gas service pipe work will consist of Type B copper tube and fittings.

4.6.3 Sizing / Diversity

The natural gas service will be sized in accordance with the requirements of AS/NZS 5601.1 – 2010 – Gas Installation, Part 1; General Installation, incorporating a diversity factor.

4.6.4 Design Standards

The Natural Gas Services will be designed and constructed in accordance with of AS/NZS 5601.1 – 2010 – Gas Installation, Part 1; General Installation.

4.7 SANITARY FIXTURES & TAPWARE

4.7.1 General

Generally, the Sanitaryware and Tapware will be selected by the Architect with approval and liaison with Users.

4.7.2 Materials

All tapware consists of solid brass tapware chromium plated.

5. FIRE SERVICES REQUIREMENTS

5.1 FIRE HYDRANT SERVICE

5.1.1 General

The "Project Archimedes" development shall be provided with a dedicated Fire Hydrant Service to satisfy the requirements of the NCC and AS 2419.

Site Hydrant Services
The Fire Hydrant System will be supplied from the 200mm diameter Sydney Water water main in Miller Street.

A 100mm diameter hydrant service water supply will be provided with a testable double check valve assembly and Fire Sprinkler Booster Assembly located adjacent to the Sprinkler Booster Assembly off Miller Street.

A Diesel Fire Hydrant Pump will be provided in the Combined Fire Pump and Sprinkler Alarm Valve Room which required BCA compliance access or as otherwise negotiated with Fire & Rescue NSW as part of the Fire Engineered Solution.

The fire hydrants will be installed within designated fire stairs and within four (4) metres to compartment exits as required under the NCC with supplementary hydrants in the path of egress to ensure coverage.

5.1.2 Materials

The fire hydrant service pipework shall consist of HDPE pressure pipes and fittings underground and galvanised pipework with "Victaulic" fittings above ground.

5.2 **FIRE HOSE REEL SERVICE**

5.2.1 General

Fire hose reels will be installed throughout the facility and shall comply to NCC Part E1.4 and AS 2441 - 2005 requirements. The system will incorporate the following:

- Fire hose reels located in cupboards within 4.0m of the building exits.
- Additional fire hose reels will be located elsewhere within the buildings to provide additional coverage as required.
- The fire hose reels will be provided with water from the metered potable water supply.

A Fire Hose Reel system shall extend from the metered potable cold water system.
Fire hose reels will be installed within four (4) metres of all fire compartment exits and adjacent to all Fire Hydrants outside of fire isolated zones.

5.2.2 Materials

The Fire Hose Reel Service pipework shall consist of copper pipe and fittings.

5.3 **FIRE SPRINKLER SYSTEM**

5.3.1 General

A Fire Sprinkler System complying with NCC Part E1.5 and AS 2118.1 - 1999 will be provided throughout the Building.

The Fire Sprinkler System will be supplied from the 200mm diameter Sydney Water water main in Miller Street.

A 100mm diameter sprinkler service water supply will be provided with a testable double check valve assembly and Fire Sprinkler Booster Assembly adjacent to the Hydrant Booster off Miller Street.

An Electric Fire Sprinkler pump will be provided in a combined Fire Pump and Sprinkler Alarm Valve Room which requires BCA compliant access or as otherwise negotiated with Fire & Rescue NSW as part of the Fire Engineered Solution.

5.3.2 Pipework & Fittings

Sprinkler service piping shall be in accordance with AS 1074 and AS 4118-2.1 suitable for screwed, roll grooved or welding jointing. Flexible fire sprinkler droppers will be acceptable. Pipework downstream of the Sprinkler Alarm Valve will be medium grade mild steel with stainless steel pipework in the Swimming Pool area. Pipework from the Sprinkler Booster to the Sprinkler Alarm Valve will be galvanised mild steel.

5.3.3 Sprinkler Heads

Sprinkler heads shall be of appropriate temperature rating for positions and of a pattern compliant with AS 2118 and all other Authorities concerned and shall be suitably arranged on the distributing pipework.

5.3.4 Hazard Classification under AS 2118.1 - 1999

Area Classification	Hazard Classification	Operational Requirements
Plantrooms	Ordinary Hazard 1	5mm/min over 72m^2
Sports area & Foyers	Ordinary Hazard 1	5mm/min over 72m^2
Swimming Pool access areas	Ordinary Hazard 1	5mm/min over 72m^2
Senior Eco Systems	Ordinary Hazard 1	5mm/min over 72m^2
Science Hub	Ordinary Hazard 2	5mm/min over 144m^2

5.4 **FIRE DETECTION & ALARM SYSTEM**

An addressable Fire Detection & Alarm System will be provided in accordance with AS 1670.1 – 2004, and E2.2a of the BCA. A non-proprietary system and open protocol system will be selected to enable a variety of Fire Alarm Contractors to work on and maintain the system.

An addressable analogue Main Fire Indication Panel (MFIP) shall be provided in the main Building Foyer adjacent to the MECP.

The FIP shall provide interface between the sprinkler and hydrant systems (including fire pumps and tanks), smoke detectors and shut-down of the mechanical ventilation systems.

Smoke detectors shall be installed throughout the building, except in areas such as Science Laboratories, Kitchens, Laundries and Bathrooms which may be subject to spurious alarms.

The MFIP will incorporate Alarm Signalling Equipment (ASE) and connect to an approved monitoring provider.

5.5 SOUND SYSTEM & INTERCOM SYSTEM FOR EMERGENCY PURPOSES (SSISEP)

A SSISEP (EWIS) will be provided in accordance with AS 1670.4 – 2004 and E4.9 of the BCA.

A Master Emergency Control Panel (MECP) shall be provided in the Ground Floor Front Foyer adjacent to the MFIP.

The SSISEP shall be activated by Emergency Initiating Devices, the automatic operation of an active fire system or manual operation from the Fire Indication Panel.

Automatic evacuation shall be configured to operate throughout the Building for simultaneous evacuation.

Warden Intercommunication Points shall be provided at every level according to the evacuation zone.

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