Project: Tallawong Station – Precinct South
Project No: 191294
Client: Deicorp Projects (Tallawong Station) Pty Ltd
Architect: Turner

Hydraulic & Wet Fire Services
Design Brief

TALLAWONG STATION – PRECINCT SOUTH

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Date: 16th April 2020

Project Number: 191294

Revision: 2

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Document Control:

Prepared by	Approved by	Date	Revision	Issued for:
AM	IS	15/04/2020	1	Draft
AM	IS	16/04/2020	2	Final
AM	IS	30/04/2020	3	Final

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EXECUTIVE SUMMARY

The proposed Tallawong Station – Precinct South Development consist of two sites with a total area of 43,270sqm (Site one 16,240sqm and Site two 27,030sqm), 987 residential apartments and 9000m^2 commercial and retails spaces.

- Site 1: 2-12 Conferta Ave, Rouse Hill Legally known as Lot 294 / DP1213279 consist of residential buildings and 9000m^2 of retail /commercial spaces. All buildings are located above one common basement.

- Site 2: 1 - 15 Conferta Ave, Rouse Hill Legally known as Lot 293 / DP1213279 consist of residential buildings located over three separate basements.

The purpose of this report is to provide an overview of the hydraulic and wet fire services requirement for the proposed development.

The report shall not be relied upon as providing any warranty or guarantee of the building, its services or equipment.

This document describes the design criteria and philosophies that have been adopted in relation to the proposed building services design. The intent has been to develop design philosophies that enable a cost effective, energy efficient and code compliant design outcome for this stage of the works.

This document in conjunction with the draft concept design provided for each service will help to achieve the spatial requirement for the hydraulic and fire services at this stage.

1 HYDRAULICS AND WET FIRE SERVICES

1.1 AUTHORITIES

The hydraulic and fire services installations shall comply with the regulations and by-laws of all Federal, State, and Local Authorities holding jurisdiction over the works and in particular those listed below:

- The National Construction Code-2019
- Standards Australia
- Blactown City Council
- Sydney Water Utilities
- Gas Authority – Jemena
- Fire and Rescue NSW

1.2 DESCRIPTION OF WORK

The work described in this section includes the following hydraulic services systems:

- Sanitary Plumbing and Drainage
- Trade Waste Drainage
- Stormwater Drainage
- Cold Water
- Hot Water
- Rainwater Re-use
- Natural Gas
- Fire Hydrant
- Fire Hose Reel
- Fire Sprinkler
- Wall Wetting Sprinkler
- Fire Extinguishers

1.3 DESIGN STANDARDS

The Hydraulic Services shall comply with all current statutory requirements including, but not limited to, the National Construction Code, relevant Australian Standards, and the requirements of local council, water authority, gas authority and fire brigade.

In Particular, Hydraulic Services will comply with the following Australian Standards:

AS|NZS2118.1 – 2017	General Fire Sprinkler Systems
AS2118.2 - 2010	Drencher Systems
AS2118.6 - 2012	sprinkler systems - Combined sprinkler and hydrant systems in multi-storey buildings
AS2419.1 –2005	Fire Hydrant Installations
AS2441 - 2005	Installation of Fire Hose Reels
AS2444 - 2001	Portable Fire Extinguishers and Fire Blankets
AS2941 - 2013	Fire Protection Pumpset Systems
AS3500.1 - 2018	Water Services
AS3500.2 - 2018	Sanitary Plumbing and Drainage
AS3500.3 - 2018	Stormwater Drainage
AS3500.4 - 2018	Heated Water Services
AS5601 - 2013	Gas Installations
NCC 2019	Hydraulic & Fire Services

1.4 EXISTING UTILITY INFRASTRUCTURE

Contractor to liaise with authority in regard to the existing site conditions and additional loading from the proposed building onto the existing utility infrastructure available for connection to the site.

1.5 STORMWATER DRAINAGE

The stormwater shall be designed to AS3500.3-2018, Blacktown City Council requirements.

A water servicing coordinator shall be required to be engaged to make applications and to confirm specific connection requirements.

The stormwater drainage system shall collect rainwater from roof areas, including hard and soft landscaping, balconies, and runoff from carparks and discharge to the inground stormwater system *(by Civil)* at various points of connection.

Stormwater pump stations will be used to collect stormwater flows not able to be drained to the inground system via gravity. This is subject to confirmation at the detail design stage as the building is above ground and that conventional stormwater systems shall be utilised to drain the roof and hard stand areas. However syphonic roof drainage can be utilised, provided it is designed and installed by accredited a syphonic designer/contractor.

Fire sprinkler and fire hydrant test water drainage shall be sized for appropriate flow and discharge to the rainwater harvesting tank for reuse where possible/ stormwater system. (Rain water tank sizing and reuse water system to sustainability engineer and section J requirements)

Rainwater from roof shall discharge via gravity to rainwater harvesting tank.

The rainwater harvesting tank/tanks overflow, as well as the rainwater runoff collected on the hard stand areas shall discharge to the street drainage system in accordance with Blacktown City Council conditions and requirements.

Appropriate storm water treatment devices shall be incorporated and sized to meet Blacktown City Council requirements to reduce contaminants, prior discharge.

1.5.1 System Performance Requirements

- Eaves Gutter Design ARI - 1:20 year 5-minute event.
- Box Gutter and Surface Drainage Design ARI - 1:100 year 5-minute event.
- Maximum Horizontal Pipe Velocity: 2.0m/sec
- Eaves Gutter Gradient: 1:500
- Box Gutter Gradient: 1:200
- Overflow Provision Capacity: 100% of system design flow.

1.6 SANITARY PLUMBING AND DRAINAGE

The sanitary plumbing systems for the proposed development shall be a fully vented modified sanitary plumbing system using relief vents.

This type of system comprises of a stack riser extending vertically from the sanitary drainage system with a stack relief vent running parallel to the stack riser. A group vented branch shall extend from the stack riser at each level, with each fixture connecting to the group vented branch.

A vent pipe (group vent) shall extend from the group vented branch between the two last fixtures connecting to the group vented branch. The group vent shall rise into the ceiling space of the floor the group vented drain is servicing where it shall terminate to AS3500.2 requirements. Air admittance valves may be required/used depending on the number of fixtures to AS3500.2 requirements.

At the top, most floors, the relief vent shall connect to the stack riser above the overflow level of the highest fixture and the stack shall then extent to above roof level.

A gravity pipework system shall connect all stacks and sanitary fixtures within the building, making connection to Sydney Water sewer infrastructure.

Sewer pump stations in multiple locations will be required to collect waste flows not able to be drained to the inground system via gravity (e.g.) basements levels. A vent pipe shall extend from the sewer pump station through the building to discharge above roof level.

(The requirement for a sewer pump station/ numbers required is subject to confirmation at detail design stage as the building above ground and the design intended that conventional sewer drainage systems shall be utilised to drain to sewer main).

The sanitary drainage system shall collect discharge from the sanitary fixtures, floor wastes, mechanical condensate and convey the discharge via gravity to sanitary drainage system.

All sanitary vent shall terminate to atmosphere to AS3500.2 and in approved location by the Architect.

In Lot 294, for each retail and food tenancy provide a provisional sewer stack and relief vent. Trade waste stack and trade waste vent shall be provided in the proposed risers and strategically located. Each provisional riser shall consist of sewer stack and relief vent and to include:

- At each commercial level, a sewer capped 100mm diameter graded pipe provided within the ceiling space for connection by future tenants above.
- At each level, a capped 100mm branch sewer vent pipe provided within the ceiling space for connection by future tenants above.
- Drainage and vent points shall be located at the rear corners of the retail tenancies in locations that it would be reasonably expected for the tenant to locate their wet facilities.
- Provide tundishes to accept AC condensation as required and to be coordinated with the mechanical contractor.
- Floor drains and connection to sewer points within the tenancy, including fire stop collars where necessary.

- Each food and beverage tenancy to be provided with a minimum of 1 x 100mm sewer /110mm grease waste drainage point that is capable to extend the drainage to 100% of the retail space. Retail tenancies that are greater than 200 m^2 or has a length greater than 18m shall be provided with (2 x 100mm / 2 x 110mm) drainage points. Drainage points shall be located at the rear corners of the retail tenancies in locations that it would be reasonably expected for the tenant to locate their wet facilities. The final number of the capped serves required will be pending on the final number and areas of retail tenancies.
- Each retail tenancy to be provided by sanitary capped services and generally shall be as follows.

Tenancy area (m^2)	Sanitary drainage Provision (mm)	Vent Provision (mm)
All	100	100

The sanitary drainage system shall collect discharge from the sanitary plumbing system and convey the discharge via gravity to the Authority sewer main.

All permanent formwork, pipes, to be either Best Practice PVC and/or non-PVC alternatives.

For each building, overflow relief gullies and reflex valves shall be provided where required to protect the site from surcharging sewage.

A boundary trap is required to be installed, prior connection to authority main.

1.6.1 System Performance Requirements

The sanitary plumbing and drainage system must be designed in such a manner as to:

- Convey sewage or sullage to a sanitary drainage system or an approved disposal system and in a manner, that does not create undue noise;
- Avoid the likelihood of blockage and leakage;
- Provide ventilation to avoid the likelihood of foul air and gases accumulating in the sanitary drainage and sewerage systems;
- Avoid the likelihood of the ingress of inappropriate water, sewage, sullage, foul air and gases from the system into the building;
- Provide adequate access for maintenance of mechanical components, operational controls, and for clearing blockages;
- Avoid the likelihood of damage from superimposed loads, ground movement or root penetration;
- Avoid the likelihood of ingress of surface water, subsurface water or stormwater into the system;
- Avoid the likelihood of uncontrolled discharge;

- Avoid the likelihood of damage to existing buildings or site works;
- Provide for the effective and efficient use of water;
- Provide adequate ventilation to avoid hydraulic load imbalance.

1.7 TRADE WASTE PLUMBING AND DRAINAGE

A trade waste system shall be provided for all hot food tenancies to treat waste discharge that comprises of solids, oils and grease, or is of a high temperature. This is provided to prevent;

- Pipe blockages;
- Damage to Sydney infrastructure (pipework, pumps etc.);
- Accelerated pipe corrosion.

A detailed assessment of trade waste treatment requirements will be undertaken in due course, however, Australian Consulting Engineers anticipates the following trade waste treatment to be required:

1.7.1 Lot 294 – Stage 1 Trade Waste Treatments

- Grease traps to provide provision and serve retail and F+B at stage 1. The proposed grease trap sizes as per the table included in clause 1.8.3.
- Final size subject to the equipment / appliances and to Local Authority Approval.
- 1 x 2,000L petrol/oil separator to serve loading dock, final size (T.B.C.).
- 1 x 1,000L petrol/oil separator to serve each car wash bay, final size (T.B.C.).

1.7.2 Super Lot 293 Stage 2- Trade Waste Treatments

- 1 x 1,000L petrol/oil separator to serve each car wash bay, final size (T.B.C.).

1.7.3 General Trade Waste Treatments/Requirements

Grease arrestor access covers shall be located within a sealed room to prevent odours from dissipating into the building during regular maintenance and cleaning of the arrestor. Above ground grease arrestors to be provided with adequate clearance and platform for maintenance purposes and to authority approval. The room shall be mechanically ventilated.

Heat trace shall be provided to trade waste pipework (main run) in excess of 40 meters from the arrestor.

A trade waste suction pump out pipe shall be installed from the grease arrestor room and shall terminate in a location accessible by the grease waste service truck (e.g.) loading dock. The suction line shall have stainless steel camlock couplings and caps at both ends.

The outlet from the treatment devices shall discharge to the sanitary drainage system. Vent pipes extending from the trade waste drainage system shall extend separately from the sanitary drainage system through the building to discharge above roof level.

In Lot 294, for each retail and food tenancy provide a provisional sewer stack and relief vent. Trade waste stack and trade waste vent shall be provided in the proposed risers and strategically located. Each provisional riser shall consist of sewer stack and relief vent and to include:

- Each food and beverage retail tenancy will be provided with minimum Grease Trade waste capped 1x110mm diameter graded pipe provided within the ceiling space for connection by future tenants above.
- At each level, a capped 100mm branch sewer vent pipe provided within the ceiling space for connection by future tenants above.
- Each food and beverage retail tenancy greater than 200m2 will be provided with minimum Grease Trade waste capped 2x110mm diameter graded pipe provided within the ceiling space for connection by future tenants above.
- For each tenancy provide floor drains and connection to greasy waste within the tenancy, including fire stop collars where necessary.
- Each tenancy to be provided with a minimum of 1 x 100mm sewer /110 grease waste drainage point that is capable to extend the drainage to 100% of the retail space. Retail tenancies that are greater than 200 m^2 or has a length greater than 18m shall be provided with (2 x 100mm / 2 x 110mm) drainage points. Drainage points shall be located at the rear corners of the retail tenancies in locations that it would be reasonably expected for the tenant to locate their wet facilities.
- At each level, a capped 110mm branch trade waste vent pipe provided within the ceiling space for connection by future tenants above.
- Each F+B tenancy to be provided with sanitary and trade waste capped services and generally shall be as follows.

Tenancy area (m^2)	Sanitary Drainage Provision (mm)	Vent Provision (mm)	Trade Waste Drainage Provision (mm)	Trade Waste Vent Provision (mm)
100 - 200	100	100	110	100
> 200	100	100	2x110	2x100

The sanitary drainage system shall collect discharge from the sanitary plumbing system and convey the discharge via gravity to the Authority sewer main

1.7.4 System Performance Requirements

The trade waste plumbing and drainage system must be designed, constructed, and installed in such a manner as to:

- Convey trade waste water to an approved treatment system prior to making connection to the sanitary drainage system or an approved disposal system and in a manner, that does not create undue noise;
- Avoid the likelihood of blockage and leakage;
- Provide ventilation to avoid the likelihood of foul air and gases accumulating in the sanitary drainage and sewerage systems;
- Avoid the likelihood of the ingress of inappropriate water, sewage, sullage, foul air and gases from the system into the building;
- Provide adequate access for maintenance of mechanical components, operational controls, and for clearing blockages;
- Avoid the likelihood of damage from superimposed loads, ground movement or root penetration;
- Avoid the likelihood of ingress of surface water, subsurface water or stormwater into the system;
- Avoid the likelihood of uncontrolled discharge;
- Avoid the likelihood of damage to existing buildings or site works;
- Provide for the effective and efficient use of water;
- Provide adequate ventilation to avoid hydraulic load imbalance.

1.8 COLD WATER SERVICE

The cold-water service will be designed in accordance with the BCA, AS3500.1, and Sydney Water requirements.

Water meters for each building shall be located within a room located on the site boundary at street level in accordance with the requirements of Sydney Water

Private sub-water meters shall be installed to monitor all major water usage, complete with voltage free Modbus output and interface with BMCS. this shall include but not limited to:

- Sub-metering for each building tower residential and commercial tenancies.
- Sub-metering for each hot water plant
- Sub-metering for mechanical plant

Sub-metering for non-potable top-up supplies

Backflow prevention shall be provided in accordance with AS3500.1 and Sydney Water requirements.

The cold-water service for each lot shall make connection to the existing authority main to Sydney Water requirements and reticulate to a water meters assembly located at the boundary.

The water service shall reticulate through a backflow prevention device for containment protection and extend to the cold-water pump room to be boosted by a triplex variable speed pump sets to maintain adequate cold-water pressure throughout all levels of the buildings. Pumps shall be sized as a duty / standby /standby arrangement whereby each pump has the capacity to provide 100% of the required duty, therefore providing redundancy to the system in the event of a single pump failure.

The cold-water service shall extend through the services risers to the potable water sub meters located within the lobby service cupboard. All meters shall be wired back to a central data logger for billing purposes. A branch line shall extend to the central hot water plant located at roof level.

Cold water pump room to accommodate the triplex pump set is required for each building minimum size 3.0mx3.0m.

Retail Tenancies:

The reticulation within the retail stratum shall extend to those tenancies nominated as requiring a cold-water supply.

Isolation valves shall be provided within the ceiling space of each tenancy accessible via a 300mm x 300mm access panel. The tenant shall be responsible for arranging the installation of the water meter from the water authority, the location of which shall be within the lobby service cupboard.

- Each retail tenancy to be provided by capped services. Water supply to retail tenancies shall generally be as follows.

Tenancy area (m^2)	Water Provision (l/s/ m^2)	Gas Capped Provision Size (mm)
Below 100	0.8 -TBC	32-TBC
100 - 199	0.9-TBC	40-TBC
200 - 400	1.2-TBC	40-TBC

1.8.1 System Performance Requirements

- Pipe Velocity Inground: 2.4m/sec
- Pipe Velocity Above Ground: 1.6m/sec
- Maximum Pipe Velocity: 3m/sec
- Design Water Pressure at Fixtures or Outlets: 250kPa
- Minimum Water Pressure at Fixtures or Outlets: 50kPa

- Maximum Water Pressure at Fixtures or Outlets: 500kPa
  The cold-water service will be designed in such a manner as to:
- Avoid the likelihood of contamination of drinking water within both the water service and the Sydney Water requirements supply;
- Provide water to fixtures and appliances at flow rates and pressures which are adequate for the correct functioning of those fixtures and appliances under normal conditions and in a manner, that does not create undue noise;
- Avoid the likelihood of leakage or failure including uncontrolled discharges;
- Facilitate the efficient use of drinking water;
- Allow adequate access for maintenance of mechanical components and operational controls;
- Allow the system, appliances, and backflow prevention devices to be isolated for testing and maintenance, where required.

1.9 HOT WATER SERVICE

The buildings shall be served by gas fired hot water plants located at roof level, each retail tenancies and where indicated.

The hot water service shall extend from the plant, reticulated through the hydraulic service as required.

Temperature control valves shall be provided to reduce the draw off temperature to acceptable levels to all ablution fixtures.

The maximum dead leg from hot water flow loop piping to the thermostatic mixing valves shall be 10 meters.

The ‘Dead Leg’ system will be heat traced to maintain temperatures on excessively long lengths of pipework as required.

1.9.1 Hot Water Plants

Each building shall be served by a central gas fired hot water plants located at roof level.

The hot water service shall extend from the plant, reticulated through the hydraulic service risers to each floor level.

The hot water service shall be a flow and return system through the service risers and a ‘Dead Leg’ run out from services risers to the sub meters located within the lobby service cupboard. All meters shall be wired back to a central data logger for billing purposes.

Temperature control valves shall be provided to reduce the draw off temperature to acceptable levels to all ablution fixtures.

The maximum dead leg from hot water flow loop piping to the thermostatic mixing valves shall be 10 meters.

The ‘Dead Leg’ system will be heat traced maintain temperatures on excessively long lengths of pipework as required.

Hot water circulation pumps shall be provided to each central hot water plant to circulate the hot water throughout the building's piping loop. The pumps shall be rated at 100% of design capacity each shall operate on "duty stand by" principle, hot water return shall be sized to facilitate a 5-degree temperature drop over the entire system.

Thermostatic mixing valves (TMV) will temper the hot water to a maximum temperature of 50°C for the public amenities, basins, showers and a maximum 45°C for accessible amenities and parents' room basins. A stainless-steel cabinet will be mounted in the wall cavity local to these rooms to house the TMV and the isolation valves for the hot and cold water services. This enables a single point of access and maintenance for each room and service.

All hot water pipework will be insulated with 25mm thick closed cell thermal insulation to reduce heat loss within the pipework.

1.9.2 System Performance Requirements

- Maximum Pipe Velocity Copper Tube: 1.2m/sec
- Design Water Pressure at Fixtures or Outlets: 250kPa
- Minimum Water Pressure at Fixtures or Outlets: 50kPa
- Maximum Water Pressure at Fixtures or Outlets: 500kPa
- Minimum Hot Water Storage Temperature: 60°C
- Maximum Temperature at Ablution Fixtures or Outlets: 50°C
- Maximum Temperature at Ablution Fixtures or Outlets for the Aged, Sick, Children, or Disabled: 45°C.

The hot water service must be designed in such a manner as to:

- Avoid the likelihood of contamination of drinking water within both the on-site installation and the supply;
- Provide heated water to fixtures and appliances at flow rates and temperatures which are adequate for the correct functioning of those fixtures and appliances under normal conditions and in a manner, that does not create undue noise;
- Avoid the likelihood of leakage or failure, including uncontrolled discharges;
- Provision shall be made for expansion and contraction in the hot water system by means of suitable lagging, expansion bends, conduits or sleeves or any combination of such methods to the satisfaction of the local Authority and to allow for the free movement of pipes and fittings without undue stress.
- Provision shall be made for risers / pipes lagging as per acoustic report.
- Allow adequate access for maintenance of mechanical components and operational controls;
- Allow the system, appliances, and backflow prevention devices to be isolated for testing and maintenance, where required.

1.10 RAINWATER RE-USE WATER SERVICE

Rainwater collected from the roof areas shall be diverted to the rainwater tank via a three-way monitored diverter valve. The diverter valve will be interlinked with the float level sensor in the tank. The valve will allow inflow of the rainwater when the float sensor level is below the pre-determined intake level. In the event of the float sensor level being above the set level the valve will divert the rainwater to the nominated legal point of discharge without any flow into the rainwater tank.

The rainwater harvesting tank shall be provided with a first flush device and overflow pipe making connection to the external stormwater system by others.

The rainwater harvesting system with a booster pump assembly, filters, ultra violet disinfection system and all associated valves and pipework in accordance with all relevant authority codes and Australian Standards. The harvested water service shall be used for irrigation purposes.

Rainwater harvesting system shall be provided with an in-line pumping assembly located directly after the rainwater tank. The pump and associated equipment shall be capable of delivering non-potable water to the fixtures at the required pressures and on demand.

The rainwater harvesting system shall be provided with a potable cold-water make-up supply complete with a three-way valve, backflow prevention device and all other associated valves and equipment in accordance with all relevant authority codes and Australian Standards.

At the completion of the works, the tank should be filled with potable water, tested, commissioned and fully operational.

1.10.1 System Performance Requirements

- Pipe Velocity Inground: 2.4m/sec
- Pipe Velocity Above Ground: 1.6m/sec
- Maximum Pipe Velocity: 3m/sec
- Design Water Pressure at Fixtures or Outlets: 250kPa
- Minimum Water Pressure at Fixtures or Outlets: 50kPa
- Maximum Water Pressure at Fixtures or Outlets: 500kPa

The rainwater re-use water service must be designed in such a manner as to:

Avoid the likelihood of contamination of drinking water;

- Provide non-drinking water to fixtures and appliances at flow rates and pressures which are adequate for the correct functioning of those fixtures and appliances under normal conditions and in a manner, that does not create undue noise;
- Avoid the likelihood of leakage or failure including uncontrolled discharges;
- Allow adequate access for maintenance of mechanical components and operational controls;
- Allow the system, appliances, and backflow prevention devices to be isolated for testing and maintenance, where required.

1.11 NATURAL GAS SERVICE

The natural gas service shall make connection to the existing gas main located within the site and reticulate to a boundary pressure regulator assembly, located at the property boundary, dropping the pressure to 5.0 kPa.

The natural gas service shall extend through the services risers to the sub meters located within the lobby service cupboard. All meters shall be wired back to a central data logger for billing purposes. A main riser shall extend up to roof level to supply the central gas fired hot water plant.

Gas supply rates to retail shall generally be as follows:

Tenancy area (m^2)	Gas Provision (MJ/h)	Gas Capped Provision Size (mm)
Below 100	275 -TBC	32-TBC
100-200	400-TBC	40-TBC
201-400	1000-TBC	50-TBC
401-600	1500-TBC	65-TBC
601-800	2100-TBC	65-TBC

Gas isolation valves shall be provided within the ceiling space of each tenancy accessible via a 300mm x 300mm access panel. The tenant shall be responsible for arranging for the installation of the gas meter from the gas supplier, the location of which shall be within the lobby service cupboard.

1.11.1 System Performance Requirements

- Maximum Gas Pressure within Buildings: 5kPa
- Maximum Volume Boundary Metering Gas Pressure: 2.75kPa
- Minimum Natural Gas Pressure at Appliance Inlets: 1.38kPa
- Minimum LPG Gas Pressure at Appliance Inlets: 2.75kPa

The natural gas service must be designed in such a manner as to:

- Provide natural gas to appliances at flow rates and pressures which are adequate for the correct functioning of those fixtures and appliances under normal conditions;
- Avoid the likelihood of leakage or failure including uncontrolled discharges;
- Allow adequate access for maintenance of mechanical components and operational controls;
- Allow the system and appliances to be isolated for testing and maintenance, where required.

1.12 WATER CONSERVATION

- Rainwater re-use for landscape irrigation.;
- Specification of water efficient fixtures and tapware and equipment with aerators, flow regulators, and pressure limiting valves;
- Fire testing water recirculation system.

1.13 ENERGY CONSERVATION

- Gas fired water heating plant;
- Thermal insulation to the flow and return pipework to reduce the heat loss;
- Material selection will be based on environmentally sustainable manufacturing practices.

2 FIRE PROTECTION SERVICES

2.1 GENERAL

The following fire services are required to the building in accordance with the latest NCC, proposed relevant Australian standards as follows:

- Combined hydrant and sprinkler system throughout the building.
- Fire Hose Reels
- Potable fire extinguishers

2.2 COMBINED FIRE HYDRANT / SPRINKLER SERVICE

The combined fire hydrant/sprinkler service shall make connection to the existing water main located within the site and reticulate to a brigade booster assembly located at the property boundary. This assembly shall incorporate a double check detector valve backflow prevention device with metered bypass.

The brigade booster assembly shall be located no more than eight (8) metres from a hardstand area, suitable for the parking of FRNSW pumping appliances and a minimum of ten (10) metres from any building served.

From the brigade booster assembly, the service shall extend to the fire pumproom, the pumproom shall be located so that it has direct access to a road or open space.

The fire service risers shall be located within each fire stair with hydrant valves and sprinkler control valves being provided at each level.

Due to the buildings having an effective height in excess of 25m the following additional provisions are anticipated:

- Sprinkler protection throughout each building exceeding 25m effective height;
- Construction of a fire control centre in accordance with the NCC Specification 1.8;
- On-site water storage tanks located underground.
- Reticulation of pipework in a ring main configuration;
- Continuous monitoring of all isolation valves connected to an alarm panel.

2.2.1 Combined Sprinkler and Hydrant System

The combined fire sprinkler and fire hydrant system shall be provided in accordance with the BCA 2019 and latest reference standard AS2118.1, AS2118.6, AS2419.1 and AS2441.

The fire system to include but not limited to the following:

- Connection for the combined fire system to the incoming town main;
- Electric and diesel pumps and all associated equipment.
- Combined sprinkler and fire brigade booster assemblies and all associated equipment.

- Fire water tanks and associated equipment.
- Fire brigade alarm.
- Pressure gauges
- Pressure switches.
- Pressure reduction valve.
- Remote test valves.
- Flow switches
- Sprinkler control assembles.
- Monitoring and control valves.
- Fast response sprinklers.
- Wall wetting sprinkler where required (internal and /or external).
- Sprinkler spare cabinet.
- Internal hydrants.
- All pipework and associated valves, equipment, fitting and fixing.
- Combined fire sprinkler and fire hydrant block plan.

2.2.2 System Performance Requirements

- Maximum Pipe Velocity: 4m/sec
- Maximum System Pipe Friction Losses: 150kPa
- Minimum Fire Hydrant Flow Rate: 10-15L/sec
- Minimum Unassisted Feed Fire Hydrant Residual Pressure: 150kPa
- Minimum Unassisted Attack Fire Hydrant Residual Pressure: 250kPa
- Maximum System Dynamic Pressure: 1200kPa
- Maximum System Static Pressure: 1300kPa

The combined fire hydrant/sprinkler service must be designed in such a manner as to:

- Avoid the likelihood of contamination of drinking water;
- Provide water to fire-fighting equipment at a flow rate and pressure that is adequate for the correct functioning of the equipment;
- Avoid the likelihood of leakage or failure including uncontrolled discharges;
- Allow adequate access for maintenance of mechanical components and operational controls;

- Allow the system and backflow prevention devices to be isolated for testing and maintenance.

The fire sprinkler component shall be designed in accordance with the requirements of the hazard class of occupancy. The hazard classification of occupancy is as follows:

Light Hazard (Office, Residential, Hospital, Concealed Space):

Number of Heads Operating	6 at 48L/min (4.8L/sec)
Standard Sprinkler Spacing	21 m² with 4.6m spacing, 2.3m from walls
Sidewall Sprinkler Spacing	17 m² with 4.6m spacing, 2.3m from walls
Discharge Pressure at Most Remote Sprinkler	70kPa

Ordinary Hazard 1 (Plant Room, Restaurants, and Cafés):

Area of Operation	72m² at discharge density of 5mm/min
Number of Heads Operating	6 at 60L/min (6L/sec)
Standard Sprinkler Spacing	12m2 with 4.2m spacing, 2.1m from walls
Sidewall Sprinkler Spacing	9m2 with 4.2m spacing, 1.8m from walls
Discharge Pressure at Most Remote Sprinkler	70kPa

Ordinary Hazard 3 (Retail, Storage):

Area of Operation	216m² at discharge density of 5mm/min
Number of Heads Operating	18 at 60L/min (18L/sec)
Standard Sprinkler Spacing	12 m² with 4.2m spacing, 2.1m from walls
Sidewall Sprinkler Spacing	9 m² with 4.2m spacing, 1.8m from walls
Discharge Pressure at Most Remote Sprinkler	70kPa

Fire Hydrant System

No of hydrant to operate simultaneously	2 (TBC)
Minimum flow rate:	20L/s total at the two most hydraulically disadvantaged hydrants (10L/s each)
Minimum outlet pressure each hydrant outlet non-boosted:	700 kPa @ 10L/s for each hydrant
Minimum outlet pressure when boosted:	700 kPa

2.2.3 Combined Water Supply/ Fire Tank

The combined fire system for will be served by water supply main.

The water supply will serve the combined fire sprinkler and fire hydrant system and will consist of primary and secondary water supply,

Primary Water Supply to each lot shall be through direct connection from the town main complete with double check valve set by hydraulic contractor. The proposed connection will be from the existing authority water main in close proximity to the building site with 200mm provision off the tee connection. The fire contractor will connect from the back-flow prevention device and continue the supply and provide all associated equipment for the fire booster assembly.

Secondary water supply to each lot shall be on-site fire storage tank.

The fire service tank volume calculated based on simultaneous flow from fire hydrant, sprinkler, assuming the available flow in the main meet the requirement of the fire system (Stage 2 Stratum 4).

The tank effective volume will be reduced to 2/3rd capacity, in accordance with AS2118.6-2012, 2.8.5 (c). Proposed fire water tanks will be located adjacent to the fire pumps or level above fire pumps.

Provision for the tank supply shall be provided by the hydraulic contractor.

The fire services trade shall provide all other associated and required equipment.

2.2.4 Fire Main Reticulation

Piping to which sprinkler installations and fire hydrants are directly connected to shall be from a 150mm ring main with multiple pressure zones.

Vertical portions of the ring main pipes shall be located within separate fire isolated stairs within each building.

2.2.5 Drencher System (Lot 294 and lot 293)

The fire drencher system shall be designed depending on their intended purpose and detailed design of the protected building elements. Drenchers might be incorporated for any of the following purposes:

- Protection of openings in walls to NCC-2019 Part C3;
- Part of Fire Engineered Alternative Solution.

Water supply to drencher system must be considered additional to the hydrant and sprinkler protection for the building.

2.3 FIRE HOSE REEL SERVICE

The fire hose reel system shall make connection to the cold-water service via a double check valve backflow prevention device.

All fire hose reels are to be located in a readily accessible position within 4 metres of a required exit, and along the normal paths of travel to an exit where additional coverage is required.

Coverage will be provided via a 36 metres hose issuing a 4-metre hose spray. The hose shall extend to 1 metre within each room it is protecting.

2.3.1 System Performance Requirements

- Minimum Hose Reel Discharge Pressure: 220kPa
- Minimum Hose Reel Flow Rate (19mm Hose): 0.33L/sec
- Minimum Hose Reel Flow Rate (25mm Hose): 0.44L/sec

The fire hose service must be designed in such a manner as to:

- Avoid the likelihood of contamination of drinking water;
- Provide water to fire-fighting equipment at a flow rate and pressure that is adequate for the correct functioning of the equipment;
- Avoid the likelihood of leakage or failure including uncontrolled discharges;
- Allow adequate access for maintenance of mechanical components and operational controls;
- Allows the system and backflow prevention devices to be isolated for testing and maintenance.

2.4 FIRE SERVICE DESIGN ASSUMPTIONS

The following assumptions have been made in this report:

- The Authority proposed new water main at New Southern Road will provide adequate flow to meet the requirement of the combined flow (Fire Hydrant, Fire Sprinkler) to serve part of stage 2.

APPENDIX A

HYDRAULICS SERVICE DRAWINGS

FIRE SERVICE DRAWINGS