SCENTRE GROUP

GENERAL SPECIFICATION

HYDRAULIC SERVICES

Owner and Operator of Westfield in Australia and New Zealand

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DOCUMENT INFORMATION

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PREFACE

This General Specification is intended as supplementary information to be read in conjunction with the Project Specification issued in the Contract Documents.

The Scope of Works relevant to the Contract is contained within the Project Specification(s) and this specification provides additional information as to requirements pertaining to that scope.

Items may be referenced within that are not within the Scope of Works.

CONTENTS

1 GENERAL REQUIREMENTS

1.1 GENERAL

This General Specification covers the general requirements of materials, workmanship, testing, maintenance and documentation for fire protection installations. Unless specified otherwise in other project specific document, these requirements are applicable when they are relevant to the project.

If a service is not detailed in the project specification this general specification is to be used when adding services to the project as the minimum standard for that service and as a basis for costing by the contractor.

1.2 STANDARDS

General:

a) Comply with the relevant Australian Standards including but not limiting to those referenced in this document.

b) If the Australian Standard referenced in this document is superseded or withdrawn, the superseding standard or other relevant standards shall apply.

c) Refer to the latest issue of the Australian Standard unless a particular issue is referenced in the BCA.

1.3 DESIGN

Services and equipment: Locate and arrange all services and equipment so that:

a) Failure of plant and equipment (including leaks) does not create a hazard for the building occupants.

b) Failure of plant and equipment (including leaks) causes minimum or no damage to the building, its finishes and contents.

c) Hot water unit, pipework, valves or other potential leak sources are not located over rooms containing water sensitive equipment or finishes.

d) Inspection and maintenance operations can be carried out with minimum inconvenience and disruption to building occupants or damage to the building structure or finishes.

e) Safe tray and an overflow pipe are provided to each tank, hot water heater and storage vessel.

f) Services and equipment are readily accessible for inspection and maintenance and arranged so that inspection and maintenance can be carried out in a safe and efficient manner.

g) Conform to the relevant requirements of AS 1470, AS 1657, AS/NZS 1892.1 AS/NZS 2865 and AS/NZS 3666.1.

h) If parts of the plant (including high level tanks) require regular inspection and maintenance either locate plant so it is safely and readily accessible from floor level or provide permanent access platforms and ladders.

i) Locate items of equipment that require inspection and maintenance above removable ceiling where possible. If this is not possible (for example above set plaster or other inaccessible ceilings) provide access panels. Arrange services and plant locations to reduce the number of access panels. Coordinate with other trades to use common access panels where feasible.

j) Modify manufacturer's standard equipment when necessary to provide the plant access.

k) Submission to authorities: If required, submit design and documentation to statutory authorities for approval. Provide evidence showing approval of the authorities.

1.4 MATERIALS AND WORKMANSHIP

a) Materials: Provide new and high quality materials and components.

b) Certification: All products shall be certified in accordance with AS 5200 where applicable.

c) Workmanship: The standard of workmanship for all works shall conform to the industry best practice and shall be in accordance with the relevant standards, codes of practice.

d) Consistency: For the whole quantity of each material or product, use the same manufacturer or source and provide consistent type, size, quality and appearance.

e) Factory finish: To manufacturer's standard for factory fabricated equipment. All ferrous metallic work which is exposed to elements shall be hot dip galvanised. Any damage to the factory finish shall be repaired at completion..

f) Locking system: Provide 'Lockwood Twin System' (including 003 for Fire Brigade Access) for all locking applications.

g) Manufacturer: Select equipment from the following manufacturer:

Equipment	Manufacturer
Sanitary fixtures and tapware in amenities	As specified
Urinal flushing device	As specified (Zip, Caroma)
Tapware	As specified (Zip, Raymor, Caroma, Enware)
Thermostatic mixing valves	Enware, Rada, Hansa, Horne
Submersible pumps	Flygt, Mono
Surface pumps	Mono, Grundfos, Ajax, Kelly & Lewis, Nossiter
Grinder	Mono Muncher TR range, JWC Environmental Muffin Monster
Water meter	RMC, Elster, Enware, (NMI pattern approved)
Gas meter	Email, Roots, (NMI pattern approved)
Electric hot water units	Rheem, Dux, Edwards
Pipe insulation	Thermotec 4-Zero, Armaflex
Boiling water unit	Zip
Filtered and chilled water unit	Zip Chilltap, Aqua Cooler
Access covers and roof outlets	Gatic, S.P.S, A.W.E., Norcast, Galvin
Stormwater pollution arrestor	Pollutec, Kwikflo, Humeceptor, Littergard
Grease arrestors	As specified and approved by the local authority
Grease arrestor access platform	Weldlok Industries
Dissolved Air Filtration DAF Units	Ovivo, Sepa
Fire water storage tank	Australian Panel Tanks, Southern Cross, Tank Services
Water level alarm control	MultiTrode
Boiling and chilled water unit	Zip Hydro Tap, Clearwater Billi

h) Alternatives: If alternative manufactures are proposed, submit proposed alternatives and include samples and available technical information for approval prior to installation.

i) Samples: Submit samples for review as required.

1.5 INSTALLATION

a) General: Install equipment and services plumb, fix securely and organise reticulation neatly. Provide for movement in both structure and services.

b) Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements. Under suspended ground floors, keep services at least 150 mm clear above ground surface, additional to insulation, and ensure access is not impeded.

c) Minimum clear head height in Car Park 2300mm, Disabled car space (directly over) 2500mm.

d) Embedded pipes: Do not embed pipes that operate under pressure in concrete or surfacing material.

e) Lifting: Provide permanent fixtures attached to the equipment, for lifting heavy items of equipment, as recommended by the manufacturer.

f) System integration: Interconnect system elements so that the installation performs their designed functions.

g) Fixing:

   I. General: If equipment or services are not suitable for fixing to non-structural building elements, fix directly to structure and trim around holes or penetrations in non-structural building elements.

   II. Fasteners: Use proprietary fasteners capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly.

   III. Explosive-powered tools: Do not use explosive-powered tools.

h) Mounting: (caution heavy items will require structural engineers approval prior to installation)

   I. Wall/ceiling mount: Provide galvanised steel support from building structure.

   II. Roof mount:

      i. Roof mount - Metal: Unless equipment platform is provided by the Builder, provide galvanised steel support from roof structure.

      ii. Concrete roof: Fix equipment on concrete plinth.

i) Services connections:

   I. Statutory Authorities requirements: If the authorities elect to perform or supply part of the works, make the necessary arrangements. Install equipment supplied, but not installed, by the authorities.

   II. Connections: Connect to statutory authorities services or service points. Excavate to locate and expose connection points. On completion reinstate the surfaces and facilities which have been disturbed.

j) Concrete plinth: Provide concrete plinth for floor mounted equipment. Contractor to confirm size and location of all plinths on a builders work drawing, for review and coordination.

k) Construction:

   I. General: Provide galvanised steel surround at least 75 mm high and 1.6 mm thick, fixed to floor with masonry anchors, fill with concrete.

   II. Reinforcement: Single layer of F62 fabric.

   III. Concrete: Grade N20.

   IV. Finish: Steel float finish with the surround.

l) External application: Equipment and installation located outdoor shall be suitable for external application and shall be protected from the elements.

m) Cleaning: At Completion, clean all pipework and equipment (internal and external); remove all redundant material and rubbish from site.

1.6 BUILDING PENETRATIONS

a) General: Provide all necessary building penetrations other than those formed in situ in concrete and block work structures. Seal all penetrations after installation of services.

b) Piping sleeves

I. General: Provide metal sleeves formed from pipe sections for piping penetrations through building elements.

II. Sleeve diameter: Sufficient to provide an annular space around the pipe or pipe insulation of at least 12 mm.

III. Minimum sleeve thickness:

i. Metal: 1 mm.

ii. PVC: 3 mm.

IV. Sleeve terminations:

i. If cover plates are fitted: Flush with the building surface.

ii. If floor draining to floor waste: 50 mm above finished floor.

iii. In fire-rated and acoustic-rated building elements: 50 mm beyond finished building surface.

iv. Elsewhere: 5 mm beyond finished building surface.

V. Finish: Prime paint ferrous surfaces.

c) Cable sleeves: Provide UPVC sleeves formed from pipe sections, for penetration through ground floor slab and beams and external walls by cables not enclosed in conduit. Provide sleeves for MIMS cables penetrating through masonry.

d) Penetrations

I. Fire Resistance Level: Seal penetrations using a system to AS 4072.1 to retain the design FRL of the building element.

II. Non-fire rated building elements: Seal penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is acoustic rated, maintain the rating.

III. Roof penetration: Provide leak-proof seal for roof penetration with under-flashing and over-flashing.

IV. Limitations: Do not penetrate or fix to the following without approval:

i. Structural building elements including external walls, fire walls, floor slabs and beams.

ii. Membrane elements including damp-proof course, waterproofing membranes and roof coverings.

V. Membranes: If approval is given to penetrate membranes, provide waterproof seal between the membrane and the penetrating component.

1.7 VIBRATION SUPPRESSION

a) General: Minimise the transmission of vibration and noise from rotating or reciprocating equipment to other building elements.

b) Equipment requiring vibration isolation mountings: Except for external equipment that is not connected to the structure of any building, support rotating or reciprocating equipment on mountings as follows:

I. For static deflections < 15 mm: Single or double deflection neoprene in-shear mountings incorporating steel top and base plates and a tapped hole for bolting to equipment.

II. For static deflections ≥ 15 mm: Spring mountings.

c) Selection of vibration isolation mountings: Select mountings to achieve 95% isolation efficiency at the normal operating speeds of the equipment.

d) Spring mountings: Use freestanding laterally stable springs with at least 12 mm clearance between springs and other members such as bolts and housing. Provide the following:

   I. Ratio of mean coil diameter to compressed length at the designated minimum static deflection: > 0.8:1

   II. Minimum travel to solid of at lease 150% of the designated minimum static defection.

   III. Levelling bolts and lock nuts.

   IV. 5 mm neoprene acoustic isolation pads between base plate and support.

   V. Vertical resilient limit stops: To prevent spring extension when unloaded, to serve as blocking during erection, and which remain out of contact during normal operation.

   VI. Snubbing: Snub the springs to prevent bounce at start-up.

e) Installation: Set and adjust vibration isolation mounting supports to give adequate clearance for free movement of the supports.

f) Inertia bases:

   I. General: Use inertia bases with mass at least that of the equipment supported.

   II. Construction: Steel-framed reinforced concrete.

1.8 NOISE CONTROL

a) General: Control noise levels at site boundaries and in occupied spaces by proper system design, equipment selection, and acoustic treatment to plant rooms and noise sources.

b) Environmental noise:

   I. General: Comply with the noise limit requirements of the authorities.

   II. Background noise: If there is no specific authorities' noise limit requirements, classify the site as noise area category R3 in accordance with AS 1055.

   III. Noise level at boundary: If there is no specific authorities' noise limit requirements, ensure that when equipment operates under normal conditions it will not raise the ambient noise level at the

   IV. Nearest boundary of the site by more than 5 dB when measured on the unweighted 'A' scale, and will be free of any disturbing tone or harmonic sound, at any time of day and night, 7 days a week.

   V. Building interior noise: Ensure that the sound levels of different areas of the building interior will not exceed the recommended 'satisfactory' levels in accordance with AS 2107, when all equipment are operating under normal conditions.

1.9 SEISMIC RESTRAINT

a) General: Arrange all components, other than service items exempted in AS 1170.4, to resist seismic loads determined in accordance with AS 1170.4. Securely fix all plant and equipment to the building structure. Do not rely on gravity and/or friction to resist seismic forces.

b) Anti-vibration mounts: Use horizontally restrained type.

c) Components: Do not use components that will be damaged by earthquake conditions. Protect systems against the adverse effects of components such as mercury switches that, although not damaged by earthquake, may malfunction.

1.10 METAL WORK

a) General: Use metalwork capable of transmitting the loads imposed, and sufficient to ensure the rigidity of the assembly without causing deflection or distortion of finished surfaces. Construct to prevent rattle and resonance.

b) Fabrication: Keep clean, neat and free from burrs and indentation. Remove sharp edges.

1.11 WELDING AND BRAZING

a) Hot work permit: Apply hot work permit procedures for all welding, brazing, grinding or other operations including open flames or producing heat and or sparks.

b) Welding:

I. Steel: To AS 1554.1.

II. Aluminium: To AS 1665.

III. Stainless steel: Follow the recommendations of WTIA Technical Note 16.

c) Brazing: Ensure brazed joints have sufficient lap to provide a mechanically sound joint.

d) Filler metal:

I. General: To AS 1167.1.

II. Copper-to-copper, copper-to-brass, brass to brass: Minimum 1.8% silver content and maximum 0.05% cadmium.

III. Application: Ensure the brazing alloy wets all surfaces and fills the clearance between the overlapping parts.

1.12 SERVICE TRENCHES

1.12.1 GENERAL

Provide trenches and reinstatement for all below ground installations

1.12.2 EXCAVATION

a) General: Excavation of trenches shall be in accordance with the relevant Australian Standard.

b) Existing surfaces: Before excavating trenches, saw-cut existing concrete and bituminous surfaces on each side of the trench to provide a straight even joint. Lift and store unit paving for later reinstatement.

c) Excavation:

I. General: If practicable, make trenches straight between pits, personnel access ways, junctions and changes in pipe route, with vertical sides and uniform grades.

II. Spoil: If excavated material cannot be used for filling or backfilling, remove it from the site.

d) Trench widths: Keep trench widths to the minimum consistent with the laying and bedding of services, and the construction of personnel access ways and pits.

e) Trench depths: If excavation is necessary below the level of adjacent footings, seek approval, and provide necessary support for the footings. If trench excavation exceeds the correct depth, reinstate to the correct depth and bearing value using compacted bedding material or grade N20 concrete.

f) Obstructions: Clear trenches of sharp projections. Cut back roots to at least 600 mm clear of services. Remove other obstructions including stones and boulders, which interfere with services or bedding. If rock is encountered, give notice.

g) Dewatering: Keep trenches free of water. Place bedding material, services and backfilling on firm ground free of surface water.

1.12.3 BACKFILLING

a) General: Bedding and backfill shall be in accordance with the relevant Australian Standard.

b) Backfilling: Backfill trenches as soon as possible after approval of laid and bedded service.

c) Boring: If required by statutory authorities, provide under road boring, carried out by a suitably qualified person, in lieu of trenches. Ensure a tight fit to the service pipes. If voids are encountered, fill by pressure grouting.

d) Reinstatement

I. Lawn areas: Provide 150 mm of loam and resew the lawn over the trench and other disturbed areas.

II. Paving and roads: Reinstate to match adjacent work, paved surfaces and assets disturbed or removed during excavation of trenching.

III. Concrete surfaces: Reinstate concrete surfaces to the original level. Provide steel reinforcement keyed to the adjacent concrete and lay to prevent the reinstalled concrete from subsiding and cracking.

e) Bituminous surfaces:

I. General: Provide crushed rock base and sub base to match the existing pavement. Prime coat the edges of the existing surfacing with bitumen. Lay and compact hot-mix asphalt so that the edges are flush and the centre is cambered 10 mm above the existing pavement. If hot pre-mix is not available, cold pre-mix may be accepted.

II. Minimum asphalt thickness: 50 mm or the adjacent pavement thickness, whichever is thicker.

f) Unit paving: Provide sand bedding and, if necessary, compacted crushed rock base. Reinstate the paving units

1.13 SITE PAINTING

a) General: Paint new surfaces and equipment including in plant rooms, except chromium, anodised aluminium, UPVC, stainless steel, non-metallic flexible materials and normally lubricated machine surfaces.

I. Exposed to view: 1 prime coat and 2 full gloss enamel finish coats.

II. Uninsulated ferrous pipes in concealed space: 1 prime coat.

III. Factory painted items: Repair damaged paint.

b) Low VOC emitting paints: Provide the following low odor/low environmental impact paint types with the following VOC limits:

I. Primers and undercoats: < 5 g/litre.

II. Low gloss white or light coloured latex paints: < 5 g/litre.

III. Coloured low gloss latex paints: < 16 g/litre.

IV. Gloss latex paints: < 90 g/litre.

c) Paint application: Apply first coat immediately after substrate preparation and before contamination of the substrate can occur. Ensure each coat of paint or clear finish is uniform in colour, gloss, thickness and texture, and free of runs, sags, blisters or other discontinuities.

d) Repair galvanising: If galvanised surfaces have been cut or welded after galvanising, prime the affected area using zinc rich organic binder.

e) Colour schedule: Follow the colour schedule below unless otherwise documented.

Service	Conforming AS 2700 Colour
Potable cold water	Jade green, G21
Hot water	Jade green, G21

Service	Conforming AS 2700 Colour
Sanitary and tradewaste drainage	Black
Fire fighting	Signal red, R13.
Electrical	Orange, X15

1.14 MARKING

1.14.1 GENERAL

a) General: Mark services and equipment to provide a ready means of identification.

b) Piping: Identify throughout its length, including in concealed space.

c) Consistency: Label and mark equipment using a consistent scheme across all services elements of the project.

d) Text: Provide marking and labelling text identical to the text and terminology used in operating and maintenance manuals.

1.14.2 LABELS

a) Type: Select from the following:

   I. For indoor application: Engraved two-colour laminated plastic.

   II. For outdoor application: Engraved two-colour laminated plastic, UV and fade resistant" and "to be screw fixed".

b) Colours: Generally black lettering on white background except as follows:

   I. Danger, warning labels: White lettering on red background.

   II. Main switch and caution labels: Red lettering on white background.

c) Minimum lettering heights: Unless specified in the Australian Standard:

   I. Equipment nameplates: 40 mm.

   II. Warning notices: 7 mm.

   III. Automatic controls and electrical equipment: 5 mm.

   IV. Isolating switches: 5 mm.

   V. Inside electrical enclosures: 3.5 mm.

   VI. Other: 3 mm.

   VII. Location signage for doors: 50mm.

d) Location: Locate labels so that they are easily seen and are either attached to, below or next to the item being marked.

e) Fixing:

   I. General: Use mechanical fixing.

   II. Valves and pumps: Attach by key ring to valve hand wheels.

f) Pressure vessels: Mount manufacturer's compliance certificate in glazed frames on wall next to the vessel

1.15 SUBMISSION BY CONTRACTOR

1.15.1 TECHNICAL DATA

a) General: Carry out system design. Submit system design details and technical data for all items of plant and equipment selected before ordering equipment.

b) Data to be submitted: Include at least the following:

I. System design:

i. Assumptions and design parameters.

ii. Engineering Calculations - The calculations should be via relevant software (such as HYENA calculations accompanied by drawings illustrating node points or manual hydraulic calculation sheets accompanied by drawings.

II. Schedules of equipment selected with the following information::

i. Model name, designation and number.

ii. Capacity of all system elements.

iii. Country of origin and manufacture.

iv. Materials used in the construction.

v. Size, including required clearances for installation.

III. Manufacturers' technical literature, type test report.

1.15.2 SHOP DRAWINGS

a) General: Prepare and submit shop drawings of fabrication and installation of services and equipment. Shop drawings shall be dimensioned, with reference to building structure and other services. Shop drawing shall contain all necessary information for coordination and construction on site, including symbols and legends, details, sections, and equipment schedules.

b) Shop drawings: Prepare and submit the following shop drawings:

I. Drawings of work to be provided by the Builder including:

i. Equipment rooms and platforms.

ii. Shafts and risers.

iii. Access doors and panels.

iv. Loads to be imposed on the structure during installation and operation.

v. In situ penetrations and openings.

vi. Structural support for equipment.

vii. Fire resistance of building structures.

viii. Other Builder's works documented.

II. Drawings of work by other contractors.

III. Hydraulic Services drawings including:

i. Layouts of pipework and equipment (valve locations, sanitary hardware and others).

ii. Riser layouts and sections.

iii. Pump room, valve room layouts.

iv. Seismic restraint details.

v. Piping schematic drawings.

vi. Relevant performance data for each item of equipment including make, model, speed, capacity etc., as appropriate.

vii. Pipework schematic drawings

1.15.3 WORK-AS-EXECUTED DRAWINGS

a) General: Submit work-as-executed drawings. Prepare work-as-executed drawings based on the shop drawings and include changes made during the construction and commissioning periods.

b) Submit for review: Submit draft work-as-executed drawings for review.

c) Final submission:

I. Timing: Submit work-as-executed drawings prior to Completion.

II. Format: Submit work-as-executed drawing in:

i. Revit format; and

ii. Adobe .pdf files

1.15.4 DATA FORMAT

a) General: Shop drawings and work-as-executed drawings must be prepared using Revit format. Data in other compatible formats may be considered, but will only be accepted with prior agreement by the Project Manager

b) General modelling guidelines:

I. Scentre Group will provide relevant Revit standards upon request for the Contractor to follow. If the Contractor elects to use other standards, the data shall be consistent, systematic and well organised. This applies to Revit worksets and object categories/sub-categories in particular.

II. The services drawing model shall share the same origin and coordinate system as the architectural model.

III. The services model must follow the same general data structure as the architectural model; typically the building is split into ‘zone models. The Project Manager may be accepted a single model for a discipline or trade subject to agreement prior to commencement of documentation.

IV. Elements shall be modelled using correct element types and with minimal use of ‘generic’ models/in place families. For example, ducts are created as ducts, beams as beams and so on.

V. Shop drawing Revit phasing shall follow the architectural model, new construction, stage 2 etc.

VI. CAD file format for shop drawing submission:

i. File format: Autodesk Revit is preferred. Other Autodesk Revit compatible Building Information Model 9MIM) file formats will be considered.

ii. File naming: Files are named in accordance with project number / project initials / portion of the project / service discipline. The following is an example for submitted file name:

10509_SC_100M_Mech.RVT

iii. Working units and location: BIM origin and scale is to match Scentre Group supplied base BIM file.

1.15.5 OPERATION AND MAINTENANCE MANUAL

a) Format: A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled. Identify each binder with printed title ‘Operation and Maintenance Manual’ to spine and on the cover. Identify title of project, volume number and date of issue on the cover.

b) Contents: Include the following:

I. Table of contents.

II. Directory: Names, addresses, and telephone and fax numbers of consultants, contractors, and names of responsible parties.

III. General description of installations.

IV. System description: Technical description of the systems installed. Identifying function, normal operating characteristics, and limiting conditions.

V. Design:

   i. Design parameter, assumptions and standards referred to.

   ii. Print out of full hydraulic calculations.

   iii. The control program based on the protocol.

VI. Equipment description:

   i. Names, addresses, telephone and fax numbers of manufacturers and suppliers of items of equipment installed.

   ii. Schedule (system by system) of equipment, stating locations, duties, performance figures. Use unique item number cross-referenced to the work-as-executed drawings.

   iii. Manufacturer's technical literature for equipment installed.

VII. Operating Procedures:

   i. Manufacturer's literature as appropriate.

   ii. Safe starting up, running-in, operating and shutting-down procedures for systems installed. Include logical step-by-step sequence of instructions for each procedure.

   iii. Control sequences and flow diagrams for systems installed.

   iv. Schedule of fixed and variable equipment settings established during commissioning.

VIII. Maintenance Procedures:

   i. Maintenance procedures.

   ii. Detailed recommendations for preventive maintenance frequency and procedures.

   iii. Safe trouble-shooting, disassembly, repair and reassemble, cleaning, alignment and adjustment, balancing, and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.

   iv. Schedule of spares recommended to be held on site.

   v. Instructions of use of tools and testing equipment.

   vi. Emergency procedures including telephone numbers for emergency services and procedures for fault finding.

IX. Certificates:

   i. Copies of manufacturer's warranties.

   ii. Certificates from authorities and certifiers.

   iii. Product certification.

   iv. Test and balancing reports.

X. Drawings:

   i. Work-as-executed drawings contained in plastic envelopes.

   ii. Equipment schedules.

XI. Timing:

   i. Draft: Submit draft manual 8 weeks before Completion.

   ii. Final copy: Submit final copy prior to Completion.

XII. Quantity: Submit 3 hard copies, and 1 copy of .pdf files on CD ROM.

1.16 LOG BOOKS

a) General: Provide a log book for each of the following systems:
   I. Fire Hydrant system to AS 2419.1
b) Volume: Provide sufficient pages to receive entries for a period of not less than 24 months.
c) Provide sufficient pages to receive entries for a period of not less than 24 months.

2 PIPEWORK

2.1 GENERAL

a) Cleaning: Before installations, remove loose scale, burrs, fins and obstructions.

b) Protection: During construction, prevent the entry of foreign matter into the piping system by temporarily sealing the open ends of pipes and valves using purpose-made covers of pressed steel or rigid plastic.

2.2 INSTALLATION

a) General: Install piping in straight lines at uniform grades with no sags. Arrange to prevent air locks. Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

b) Arrangement: Arrange and support piping so that it remains free from vibrations whilst permitting necessary movements. Minimise the number of joints.

c) Spacing: Provide at least 25 mm clear between pipes and between pipes and building elements, additional to insulation.

d) Changes of direction: Provide long radius elbows or bends where practicable, and swept branch connections. Provide elbows or short radius bends where pipes are led up or along walls and then through to fixtures. Do not provide mitred fittings.

e) Dissimilar metals: Join dissimilar metals using fittings of electrolytically compatible material.

f) Accessibility: Provide access and clearance at fittings, which require maintenance or servicing, including control valves and joints intended to permit pipe removal. Arrange piping so that it does not interfere with the removal or servicing of associated equipment or valves or block access or ventilation openings. If possible, locate valves in groups and in easily accessible locations.

g) Embedded piping: Do not embed pipes that operate under pressure in concrete or surfacing material.

h) Expansion and contraction: Sheath or sleeve metal piping chased into masonry or encased in concrete so that expansion or contraction can take place without damage to the pipe or to the material or surface finish of the surrounding element. Provide expansion loops as necessary to allow for expansion and contraction of the pipework systems.

i) Cover plates: If piping emerges from exposed building surfaces, provide cover plates of non-ferrous metal, finished to match the pipe, or of stainless steel, close fitting and firmly fixed in place.

Cover plates sizes table:

Nominal Pipe Size (mm)	Cover Plate Diameter
< 20	65 mm
$\geq$ 20, < 50	100 mm
$\geq$ 50	50 mm larger than pipe

j) Support system:

I. General: Provide proprietary support systems of galvanised or zinc-coated construction.

II. Vertical pipes: Provide anchors and guides to maintain long pipes in position, and supports to balance the mass of the pipe and its contents.

III. Balance the mass of the pipe and its contents.

IV. Saddles: Do not provide saddle type supports for pipes ≥ DN 25.

V. Uninsulated pipes: Clamp piping supports directly to pipes.

VI. Insulated pipes:

i. Spacers: Provide spacers at least as thick as the insulation between piping supports and pipes. Extend either side of the support by at least 20 mm.

ii. Spacer material: Rigid insulation material of sufficient strength to support the piping and suitable for the temperature application.

VII. Support spacing

i. Cold and heated water pipes: To AS/NZS 3500.1.

ii. Sanitary plumbing: To AS/NZS 3500.2.

iii. Fuel gas: To AS 5601.

iv. Other pipes: To AS/NZS 3500.1.

2.3 BELOW GROUND INSTALLATION

a) Depth of cover: Comply with the relevant Australian Standard.

b) Corrosion protection: Provide corrosion protection for:

I. Underground ferrous piping.

II. Underground non-ferrous metal piping in corrosive areas.

c) Protection methods: Select from the following:

I. Impermeable flexible plastic coating.

II. Sealed polyethylene sleeve.

III. Continuous wrapping using proprietary petroleum taping material.

d) Pit: Provide precast or in situ concrete pits to accommodate fittings of below ground installation:

I. Concrete: Grade N20, 100 mm thick, reinforced with F82 fabric.

II. Internal dimension: Provide 300 mm clear space all around the fittings in the pit.

III. Grade: Grade floor to a point on one side and provide drain for water.

IV. Finish to exposed surfaces: Provide a smooth seamless finish, cove or splay internal corners.

e) Pit cover:

I. Standard: Class D to AS 3996.

II. Installation: Cast in the pit cover frame, flush with the finished surface, or 20 mm above the ground level in landscaped area.

2.4 CONDENSATION INSULATION

a) General: Insulate pipework

I. carrying wastes below ambient temperature from plant rooms and refrigeration equipment until married into sanitary plumbing or drainage lines.

II. carrying water or wastes below ambient in supply or return air plenums where located above plasterboard ceilings.

b) Insulation materials:

I. Type: Elastomeric foam or polyethylene foam with aluminium foil facing.

II. Thickness: In compliance with Section J of BCA.

c) Joints: Seal aluminium foil laminate overlap at joints using aluminium foil tape to complete the vapour barrier.

d) Valves and fittings: Cut insulation and form to fit around valves and fittings. Use loose mineral wool or glass wool to fill air gaps and voids. Provide a continuous vapour barrier.

e) Provide support formed to fit around the insulation.

f) For pipes ≥ DN 25:

   I. Protect the insulation at the support point with metal sheathing; or

   II. Replace the insulation at the support point with a shaped wooden spacer block. But the insulation up to the wooden block and seal with silicon compound.

3 SANITARY PLUMBING AND DRAINAGE SYSTEMS

3.1 GENERAL

General standards: Comply with AS 3500.2 Sanitary plumbing and drainage

3.2 PIPEWORK

a) Sanitary pipes and fittings: Select from the following:

I. Above ground installation:

i. Unplasticised polyvinyl chloride (PVC-U) pipe and fittings to AS/NZS 1260 with solvent weld joints (waste temperature less than 50°C).

ii. High density polyethylene (HDPE) pipe and fitting to AS/NZS 4401.

iii. Cast grey iron pipe and fittings to AS 1631 with rubber ring mechanical joints.

iv. Copper pipe AS 1432 or AS 3501 with silver brazing alloy joints.

v. Copper alloy pipes to AS 3795 with silver brazing alloy joints.

vi. Copper and copper alloy fittings to AS 3688, AS 1589 and AS 3517.

vii. Polypropylene (PP) pipe to AS/NZS 5065 with rubber ring joints.

II. Below ground installation:

i. Unplasticised polyvinyl chloride (PVC-U) pipe and fittings to AS/NZS 1260 with solvent weld joints (waste temperature less than 50°C).

ii. High density polyethylene (HDPE) pipe and fitting to AS/NZS 4401.

iii. Cast grey iron pipe and fittings to AS 1631 with rubber ring mechanical joints.

iv. Polypropylene (PP) pipe to AS/NZS 5065 with rubber ring joints.

b) Trade waste pipes and fittings:

I. Select from the following:

i. High density polyethylene (HDPE) pipe and fitting to AS/NZS 4401.

ii. Stainless steel pipe and fitting Grade 304 to ASTM A270, with rubber ring joints.

iii. Polypropylene (PP) pipe to AS/NZS 5065 with rubber ring joints.

iv. Cast grey iron pipe and fittings to AS 1631 with rubber ring mechanical joints.

c) Finishes: Finish exposed piping, including fittings and supports, as follows:

I. In internal locations such as toilet and kitchen areas: Chrome plated copper piping to AS 1192 service condition 2, bright.

II. Externally, and steel piping and iron fittings internally: Paint.

III. In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking. Prime steel piping and iron fittings.

IV. Valves: Finish valves to match connected piping.

d) Bucket trap: Provide bucket trap with a stainless steel strainer, or sediment bucket fitted with stainless steel cable fixed to body of trap, grate and secondary strainer.

e) Plant rooms:

I. General: Provide a floor waste gully in plant room for collection of trade waste from mechanical equipment.

II. AHU room: Provide a minimum of 80 mm water seal in the floor waste gully.

III. Cooling tower compound: Provide a sump with upstand bund to collect cooling tower discharge.

3.3 TRADE WASTE ARRESTOR

f) Construction:

I. General: Comply with Authority's requirements and approved products

II. Material: Select from the following:

i. Reinforced precast concrete.

ii. Glass reinforced concrete with epoxy coated internal finish.

iii. Glass reinforced plastic.

iv. Polyethylene/polypropylene.

v. Stainless Steel

III. Cover:

i. Arrestor located in a mechanically ventilated room: Provide easy lift sectional fully serrated, galvanised mild steel grate covers.

ii. Arrestor located outdoor: Provide gas tight lid, Class D to AS 3996.

IV. Platform and stair: For arrestor greater than 1000 mm above finished floor level, provide fully serrated, hot dip galvanised mild steel grated access platform complete with safety rails, and stair with non-slip nosing. Access platform is to be 900 mm below top of arrestor.

g) Installation: To manufacturer's recommendation or specification.

3.4 PUMPED SYSTEM

3.4.1 GENERAL

If required, provide a pumped system comprising:

a) A wet well to which sanitary drainage or trade waste drainage discharge is gravitated and from which it is removed by automatically operated pumps. Provide an agitation circuit if required by the Authority.

b) An effluent treatment system (grinder).

c) Transfer pumps.

d) Pipework.

e) Control system.

f) Configuration:

I. Submersible pumps: With an in-line grinder and by-pass valve in the inlet drain to the wet well, and submersible transfer pumps.

II. Surface-mounted pump: With an in-line grinder, by-pass valve and surface mounted end-suction transfer pumps in the outlet from the wet well.

3.4.2 WET WELL

a) Wet well: Housed in a room provided with mechanical ventilation, and shall be:

I. Of reinforced fibreglass, precast reinforced concrete;

II. Complete with stainless steel 600 mm x 600 mm x 600 mm (W x L x D) basket with 75 mm Ø perforation for the inlet;

III. Provided with access cover and lifting mechanism for removal of basket and access to the well; and

IV. Provided with ball float operated micro switch for level control. Protect level control devices from the objects in the well.

b) Rising main:

I. Standard: To AS 3500.2.

II. Material: Same as system pipework.

III. Check valves: Provide non-clog ball-check valve to all submersible pump rising mains. Ball-check valve to operate in horizontal, vertical or inverted position.

IV. Check valves and isolation valves too be located in separate pit adjacent the wet well and include suction diversion connection where required by the local authority.

3.4.3 EFFLUENT TREATMENT

a) Provide a heavy-duty grinder of 150 mm ∅ inlet minimum, complete with isolation valves and automatic by-pass.

b) The grinder shall be electronically controlled to prevent large solids from jamming the machine. The unit shall sense an overload condition and momentarily reverses the cutlets to clear the condition and return to normal operation. After 3 tries of reverse rotation, if the grinder is still jammed, generate system failure alarm for remote monitoring by the BMS.

3.4.4 TRANSFER PUMPS

a) General: Provide the following electric driven pumps, complete with non-return valve and isolation valves:

I. One duty pump; and

II. One standby pump.

b) Control: Provide a microprocessor based control system for the following control functions:

I. Submersible pumps:

i. The grinder shall be timer controlled for out of hour shutdown.

ii. When the grinder is in system failure alarm, the by-pass valve shall open automatically.

iii. When the duty transfer pump fails, stop the duty pump and start the standby transfer pump, and generate system failure alarm.

iv. When the high level is reached, start the standby pump and generate alarm.

v. When the flooding level is reached, generate flooding alarm.

vi. When level control calls for pump to stop, stop the pump.

II. Surface-mounted pump configuration:

i. When level control calls for duty pump to start, start the associated grinder first, then start the duty transfer pump after 5s time-delay.

ii. If the grinder is jammed, automatically reverse the rotation of the grinder.

iii. When the duty transfer pump fails, stop the duty pump and start the standby transfer pump, and generate system failure alarm.

iv. When the high level is reached, start the standby pump and generate high level alarm.

v. When the flooding level is reached, generate flooding alarm.

vi. When level control calls for pump to stop, stop the pump and the associated grinder.

vii. Alternate the duty pump and the standby pump after each pumping cycle.

c) Provide a control panel complete with select switch/button, audible and visual indication.

d) Interface with BMS: Provide high level interface with BMS at the control panel for remote status and alarm indication. Ensure all items are nominated and detailed in the BMS Point Schedules.

e) Power supply: Provide a control panel for all electrical equipment and all local wiring from the control panel. Power supply to the control panel will be provided by the electrical services contractor.

3.5 SANITARY FIXTURE

a) Water efficiency: All fittings and fixtures shall be water efficient as specified and documented in the architects schedules with appropriate maximum WELS ratings.

b) Finish: White unless otherwise specified.

c) Installation:

I. Standard: To AS 3500.2.

II. Silicone sealant: Provide approved non-shrink white silicone sealant to all fixtures where they abut walls and bench tops.

4 STORMWATER PLUMBING AND DRAINAGE SYSTEM

4.1 GENERAL

General standards: Comply with AS/NZS 3500.3: Stormwater Drainage

4.2 PIPEWORK AND FITTINGS

4.2.1 GRAVITY SYSTEM

a) Stormwater pipes and fittings- Non-pressure: Select from the following:

   I. Fibre reinforced cement (FRC) pipes and fitting to AS 4139 bitumen coated with rubber ring joints.

   II. Glass-filament-reinforced thermosetting plastics (GRP) to AS 3571 pipes and fittings with rubber ring joints, of class to suite imposed load, and adequate resistance to UV where exposed to direct sunlight.

   III. High density polyethylene (HDPE) pipe and fitting to AS/NZS 4401.

   IV. Precast concrete pipe (steel reinforced) pipes and fittings to AS 4058/NZS 3107 with rubber ring joints, of class to suit imposed load.

b) Stormwater pipes and fittings- Pressure: Select from the following:

   I. Polypropylene (PE) pipes and fittings to AS/NZS 4130 and AS/NZS 4129 with fusion weld joints.

   II. Glass-filament-reinforced thermosetting plastics (GRP) to AS 3571 pipes and fittings with rubber ring joints, and adequate resistance to UV where exposed to direct sunlight.

c) Downpipe: Select from the following:

   I. Encased in column: High density polyethylene (HDPE) pipe and fitting to AS/NZS 4401; Maximum size 150 mm ∅. Wrap tightly in plastic. Tie to structural steel every 1m. Fill with water before concrete pour. Drain water when formwork is stripped.

   II. Exposed :

      i. Type D copper pipes to AS 13795and fittings to AS3517 with silver brazing alloy joints.

      ii. Cast iron pipe and fittings with rubber ring mechanical joints to AS 1631.

      iii. Fibre reinforced cement (FRC) pipe and fitting to AS 4139 bitumen coated with rubber ring joints, supported in accordance with Unistrut pipe support and bracing methods for FRC.

   III. Connection to box gutter: Vertically to the base of sump.

d) Planter drain pipe: Select from the following:

   I. Type D copper pipes to AS 1432 and fittings to AS 3517 with silver brazing alloy joints.

e) Normal outlets and overflow outlet:

   I. On concrete slab: Cast iron roof outlets with rubber ring, mechanical or push fit joints to suit and fitted with heavy duty flat grate.

   II. Fire stairs: Parapet outlets with rubber ring or push fit joints to suit with overflow duct/channel through parapet wall.

   III. Colonnades: Cast iron body with rubber ring mechanical or push fit joints to suit and fitted with square heavy duty flat nickel-bronze adjustable grate.

   IV. Main entries: Stainless steel trough with heel-guard wedge wire grate and frame of duty suitable for expected traffic loadings.

4.2.2 SIPHONIC SYSTEM

a) Pipe and fittings: High density polyethylene (HDPE) pipe and fitting to AS/NZS 4401.

b) Pipe support: Support system shall be capable of handling the thrusting force and preventing pipe movement. Typical support system comprises steel rail and bracket supported by steel rods.

c) Normal outlet and overflow outlet:

I. Box gutter:

i. Construction: Constructed with stainless steel body and baffle. Provide stainless steel removable debris guard/upstand shroud.

ii. Fixing: Pop riveted to box gutter with a continuous silicon bead between surfaces.

iii. Connection to drain pipe: With HDPE threaded connector.

II. On concrete slab:

i. Construction: Constructed with stainless steel body and baffle. Provide stainless steel removable grate.

ii. Fixing: Fix to concrete slab with stainless steel lugs tied off to concrete reo.

iii. Membrane: maintain the integrity of membrane.

4.2.3 SUBSOIL DRAINAGE

a) Trench width: Minimum 450 mm.

b) Geotextile filter: To AS 3500.3.

c) Pipe: Minimum 100mm perforated plastic pipes to AS 2439.1

d) Fill: Material excavated.

e) Embedment: Gravel.

f) Pipe depth: Provide the following minimum clear depths, measured to the crown of the pipe:

I. 100 mm below formation level of the pavement, kerb or channel.

II. 100 mm below the average gradient of the bottom of footings.

III. 450 mm below the finished surface of unpaved ground.

4.2.4 STORMWATER INGROUND PIPE

a) Material: Precast concrete.

b) Construction: To AS 3500.3. Provide bolt down cover or grate to pits which may be damaged by surge.

4.3 STORMWATER ARRESTOR

a) General: Provide stormwater arrestor to remove contamination, generally silt, oil, or both from stormwater prior to discharge to the stormwater drainage network.

b) Material: Precast concrete.

c) Construction: To AS 3500.3.

4.4 PUMPED SYSTEM

a) General: Provide a pumped stormwater drainage system consisting of a wet well to which stormwater or subsoil drainage discharge is gravitated, and from which it is removed by automatically operated pumps. Provide necessary piping, valves, rising main, electric wiring, alarms and control panel.

b) Wet well:

I. Standard: To AS 3500.3

II. Construction: precast reinforced concrete or in situ reinforced concrete

III. Wet well size: the capacity of the wet well shall be sized:

i. In accordance with AS 3500.3.

ii. Adequate to house and operate pumps and associated equipment.

iii. Adequate for 1 day storage for subsoil drainage.

IV. Pumps: Provide submersible pump in duplicate.

c) Control:

I. Control panel: Provide a control panel complete with selector switch, indicating lights of pump status, audible and visual alarm indication (high-level and low-level) in accordance with AS 3500.3.

II. Interface with BMS: Provide high level interface with BMS at the control panel for remote status and alarm indication. Ensure all items are nominated and detailed in the BMS Point Schedules.

4.5 STORMWATER HARVESTING

a) General: Provide a stormwater harvesting system consisting storage tank, filtration and treatment, delivery pump and mains water top up/change over supply. Provide all piping, valves, controls, electrical connections etc for a complete and working system

b) Reference: Australian Guidelines for Water Recycling: Stormwater Harvesting and Reuse by National Environmental Protection Council (NEPC).

c) Storage tanks:

I. General: Comply with ATS 5200.026 (Technical specification for Plumbing and Drainage Product – Cold Water Storage Tanks).

II. Above ground tank:

i. Polyethylene tank to AS/NZS 4766.

ii. Precast concrete or galvanised steel tank to ATS 5200.026 (Technical specification for Plumbing and Drainage Product – Cold Water Storage Tanks).

III. Underground tank: Precast or in-situ concrete tank with gas tight covers. Underground tanks shall be bedded and backfilled to manufacturer's specification.

IV. Accessories: Provide all inlets, outlets, drains, overflows, valves, access covers, access ladders etc.

d) Filtration and treatment: Provide the following:

I. First flush device: Provide a first flush device appropriately sized to match rainwater catchment area to capture initial run off containing debris and silt. Use storage tank manufacturers recommended device where applicable.

II. A biofilter to reduce phosphorous and iron concentration if necessary.

III. A filter before the UV disinfection unit to reduce turbidity.

IV. An ultraviolet (UV) disinfection unit: Comply with the requirements of NSF/ANSI 55-2004. The selected unit shall have automatic lamp cleaning mechanism, and UV lamps shall be removable without contact with liquid of the system.

e) Automatic control: Provide a microprocessor based automatic control system, which shall perform the following functions:

I. Water level switches for:

i. High and low water level indicators.

ii. Automatic control of the delivery pump(s).

iii. Automatic mains change over.

II. Control and monitoring of delivery pumps:

i. When water level in the storage tank reaches the low level limit, stop the delivery pump.

ii. Generate alarm upon pump failure. Use magnetic flow sensor to provide positive indication of pump running.

III. Mains change over: Change over from the recycled water to town main supply with control valves when:

i. Water level in the storage tank reaches the low limit.

ii. When the delivery pump fails.

IV. UV disinfection unit monitoring: Monitor the photo intensity of the unit, and generate alarm when the UV intensity drops below the designed level.

V. Control panel: Provide a control panel complete with selector switch, indicating lights of equipment status, audible and visual alarm indication in accordance with AS 3500.3.

VI. Interface with BMS: Provide high level interface with BMS at the control panel for remote status and alarm indication. Ensure all items are nominated and detailed in the BMS Point Schedules.

f) Commissioning: To prove the system is operating as designed, carry out commissioning, validation and verification in accordance with the Australian Guidelines for Water Recycling: Stormwater Harvesting and Reuse by National Environmental Protection Council (NEPC).

5 WATER SYSTEMS

5.1 GENERAL

a) General standards: Comply with the following:

I. AS/NZS 3500.1: Water Services.

II. AS/NZS 3500.4: Heated water services.

III. AS/NZS 2845.1: Water supply – Backflow prevention devices.

b) Certification and registration: Provide certification and registration of all air gaps and backflow prevention devices to Authorities as required.

5.2 COLD WATER SERVICES

5.2.1 MAINS CONNECTION

a) General: Connect cold water system to the Authority's main through a stop valve and authority's meter, including backflow prevention device where required by the authority.

b) Valve box:

I. Provide cast iron valve box with removable covers for access to underground control valve. Cover to be marked C.W.

II. Set beneath each box a shaft formed of 100 mm Ø UPVC pipe to give clear access to the valve wheel or spindle. Set top flush with finished surface, or 25 mm above landscaped surface, and encast in formed concrete box of 150 mm thick, with top surface trowelled smooth.

5.2.2 PIPES

a) Cold water pipe and fittings: Select from the following:

I. Copper pipes and fittings Type B to AS 1432 with silver brazing alloy joints.

II. Copper alloy pipes and fittings to AS 3795 and fitting to AS 3688.

III. Ductile iron pipes and fittings to AS/NZS 2280 with rubber ring joints.

IV. Polypropylene (PE) pipes and fittings to AS/NZS 4130 and AS/NZS 4129 with fusion weld joints.

5.2.3 FITTINGS AND ACCESSORIES

a) General: Provide fittings necessary for the proper functioning of the water supply system, including taps, valves, backflow prevention devices, pressure and temperature control devices, strainers, gauges, tenancy water meters and automatic controls and alarms.

b) Pressure control valves:

I. General: Provide reduction valves, pressure limiting valves, or ratio valves, which produce the necessary reduction in pressure.

II. Standard: To ATS 5200.052.

c) Line strainers:

I. Type: Low resistance, Y-form bronze body type, with screen of dezincification resistant brass or corrosion-resistant stainless steel.

II. Screen perforations: 0.8 mm maximum.

d) Pressure gauges:

I. Provide gauges with full-scale reading in kPa, a minimum diameter of 65 mm and capable of reading pressures at least 25% higher than the maximum static pressure of the system.

II. Locate at inlet and outlet sides of cold water pumps. Isolate from pump vibration and complete with gauge cock on inlet.

e) Provision for irrigation system: Provide hose cocks and or control valves as required including back flow prevention devices for connection by irrigation contractor.

f) Urinal flushing system

I. General: Provide electronic urinal flushing systems for staff and public toilets with “smart flush” on-demand and delay automatic sensors, complete with control valve and filter.

5.2.4 PRESSURE BOOSTER SYSTEM:

a) General: Provide a system consisting of pumps and motor sets, and pressure vessels, operated by an interconnected automatic control mechanism. Assemble the units in factory on steel frames mounted on steel base plates.

b) Flexible pipe connection: Connect suction and discharge pipes with flexible pipe of pressure rating $\geq$ 2x the system design pressure.

c) Pressure vessels: Diaphragm pressure tanks of fabricated steel construction; epoxy coated on metal surfaces in contact with water; pre-charged with air.

d) Pumps: Provide in-line or end-suction centrifugal.

e) Control panel: Provide a control panel complete with selector switch, indicating lights of equipment status, audible and visual alarm indication

f) Interface with BMS: Provide high level interface with BMS at the control panel for remote status and alarm indication. Ensure all items are nominated and detailed in the BMS Point Schedules.

g) Irrigation system: Provide hose cocks and or control valves as required including backflow prevention devices for connection by the irrigation system contractor.

5.2.5 FINISH

a) Piping: Finish exposed piping, valves, fittings and supports as follows:

I. Exposed piping in amenities such as toilet, parent’s room and kitchen areas: Bright chrome plate copper piping to AS 1192 service condition 2.

II. In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking.

b) Valves: Finish valves to match connected piping.

5.3 HEATED WATER SERVICES

5.3.1 PIPES AND FITTINGS

a) Pipes: Copper pipes and fittings copper pipes and fittings Type B to AS 1432 with silver brazing alloy joints.

b) Fittings and accessories: Provide fittings necessary for the proper functioning of the water supply system, including taps, valves, backflow prevention devices, pressure and temperature control devices, strainers, gauges, tenancy water meters and automatic controls and alarms.

c) Finish: Finish exposed piping, including fittings and supports as follows:

I. Exposed piping in amenities such as toilet, parent’s room and kitchen areas: Bright chrome plate copper piping to AS 1192 service condition 2.

II. In concealed but accessible spaces (including cupboards and non-habitable enclosed spaces): Leave copper and plastic unpainted except for identification marking.

III. Valves: Finish valves to match connected piping.

5.3.2 HOT WATER CIRCULATION

a) General: Where specified, provide a hot water circuiting system comprising hot water pump, thermostatic mixing valves, and thermal insulation.

b) Hot water pump: In-line centrifugal.

c) Hot water circuit: Flow and return.

5.3.3 THERMOSTATIC MIXING VALVES

a) Standard: To AS 4032.

b) Type: Water temperature regulated by a single hand control, and capable of delivering water at the temperature of either of the supply systems and at any temperature in between, and suitable for controlling single or multiple outlets, as appropriate.

c) Controls: Incorporate the following:

   I. A temperature sensitive automatic control, which maintains temperature at the pre-selected setting and rapidly shuts down the flow if either supply system fails, or if the normal discharge water temperature is exceeded.

   II. Lockable temperature control.

d) Thermal insulation systems:

Material	Facing	Fixing
Foamed nitrile rubber		Glue adhesive
Closed cell polyethylene foam	Aluminium foil laminate	Self adhesive strip

e) Fire resistance: Insulation must have BCA compliant Spread of Flame and Smoke Development indices.

f) Pipe support:

   I. Provide support formed to fit around the insulation.

   II. For pipes ≥ DN 25: Replace the insulation at the support point with a shaped wooden spacer block. Butt the insulation up to the wooden block and seal with silicon compound.

5.4 SOLAR HOT WATER SYSTEM

a) General: Provide a centralised hot water plant consisting of a solar hot water system with gas boosting to provide hot water to the food court specialty shops and restaurants.

b) System:

   I. Type: Forced circulation system.

   II. Components: The solar hot water system shall comprise:

      i. Solar collectors complete with supports and installation kit.

      ii. Solar hot water storage tanks (with pipework manifolds).

      iii. Solar flow and return pipework including circulating pumps.

      iv. Solar controller for operation of pumps and thermostats.

      v. Booster water heater.

c) Solar collector:

   I. Standard: To AS 2535.

   II. Type: Glazed liquid heating collector.

d) Solar hot water storage tank:
   I. Jacket: Colorbond steel.
   II. Cylinder: Stainless steel.
   III. Thermal insulation: CFC free polyurethane insulation.

e) Booster water heater:
   I. Standard: To AS 4552.
   II. Burner: Gas burner.
   III. Jacket: Colorbond steel.
   IV. Cylinder: Stainless steel.
   V. Thermal insulation: CFC free polyurethane insulation.

f) Accessories: Provide all necessary fittings for the complete and proper functioning of the system including valves, manifolds, temperature sensor, pressure relief valves, insulation and control devices.

5.5 WATER SUBMETER

a) General: Provide water submeters for real-time local and remote reading of water supply.

b) Standard: To AS 3565.1.

c) Accuracy: Minimum Class 3. Meters to have National Measurement Institute (NMI) pattern approval.

d) Interface with BMS: Provide low level interface with BMS for remote reading.

5.6 BOILING & CHILLED WATER UNIT

a) General: The unit shall consist an under sink assembly of water filtration, a water boiling tank and a chilled water tank; a water tap with operating levers. The unit shall be capable of instant supply of boiling and chilled water.

b) Specification:
   I. Water supply pressure: Mains pressure.
   II. Case material: Stainless steel 430.
   III. Water tank: Stainless steel.
   IV. Filtration: 5 micron minimum.
   V. Boiling water temperature: min. 98 ^{o}C.
   VI. Boiling water delivery rate: 3 l/min.
   VII. Chilling system: Fan-cooled condenser type.
   VIII. Chilled water delivery rate: 4 l/min.
   IX. Operation: by levers integrated with the tap.

c) Installation: To manufacturer's recommendation.

5.7 TAPWARE

a) Tapware:
   I. In amenities such as toilet, parent's room and kitchen areas: Provide tapware as documented.
   II. Other areas: Provide brass, bright chrome plated and vandal proof tapware complete with ceramic discs

b) Vandal proof or valve with anti-tampering devices: Provide in areas subject to vandalism, such as outdoor, cleaner room, loading dock, plant room etc.

c) Tap positions: Locate hot tap to the left of, or above the cold tap.

d) Valve spindles: If practicable, install in a vertical position.

6 FIRE HYDRANT AND HOSE REEL SYSTEMS

6.1 GENERAL

a) General standards: Comply with the following:
   I. AS 3500.1: Water Services.
   II. AS 2419: Fire hydrant installations.
   III. AS 2441: Installation of fire hose reels.
   IV. AS 2941: Fixed fire protection installations – Pumpset systems.
   V. AS 4118.1.4: Fire sprinkler systems – Components – Valve monitors.
   VI. A/NZS 2845.1: Water supply – Backflow prevention devices.

b) Certification and registration: Provide certification and registration of all air gaps and backflow prevention devices to Authorities as required.

6.2 MATERIALS

6.2.1 FIRE HYDRANT PIPES

a) General: To AS 2419.1.

b) For above-ground installation select from the following:
   I. Medium grade galvanised steel pipes and fittings with roll groove rubber ring joints. Light wall steel pipe shall not be used.
   II. Copper tubes and fittings.

c) For below-ground installation select from the following:
   I. Plastic pipes and fittings, not less than PN16.
   II. Ductile iron pipes and fittings with rubber ring joints.
   III. Copper pipes and fittings with silver brazing alloy joints.

6.2.2 FIRE HOSE REEL PIPES

Fire hose reels installation: copper pipes and fittings Type B to AS 1432 with silver brazing alloy joints

6.2.3 FIRE HYDRANT VALVES

a) General: To AS 2419.2.

b) Material:
   I. Exposed to weather: Copper alloy.
   II. Elsewhere: Grey cast iron.

c) Coupling: Provide suitable brass couplings fitted to fire hydrant valve by the manufacturer for connection to local Fire Brigade's fire hose.

d) Blank caps: Metal of compatible material.

6.2.4 FIRE HYDRANT ISOLATION VALVES

a) General: To be either continuously monitored or strapped and locked in the normal operating position to authority requirements.

b) Type:
   I. Below-ground installation: Cast iron key operated sluice valve to AS 2638 with value box over.

II. Above-ground: Cast iron gate valve to AS 3579 or approved butterfly valve.

III. Monitored isolation valve: Provide isolation valves fitted with internal supervisory switches each having SPDT contacts. The electrical ratings for the switch contacts are 10 A at 240 V a.c. and 1.5 A at 0-30 V d.c.

6.2.5 FIRE HOSE REEL ISOLATION VALVES

a) General: To be strapped and locked in the normal operating position and labelled with an engraved non-ferrous metal tag with 8 mm upper case wording:

I. FIRE SERVICES VALVE - CLOSE ONLY TO SERVICE FIRE HOSE REELS

b) Type: Copper alloy gate valves to AS 1628 or approved ball valves.

6.3 WATER STORAGE TANK AND BREAK TANK – METAL

c) Construction:

I. General: Modular bolted steel construction, fabricated heavy gauge steel plate panels, reinforced with stays and struts for maximum strength complete with vermin proof cover.

II. Material: All panels, stays, struts and cover shall be hot dip galvanised.

III. Bolts and nuts: Stainless steel bolts nuts and washers.

IV. Minimum base metal thickness:

i. Wall and top panels: 2.4 mm.

ii. Floor plate: 3 mm.

V. Internal lining: Not required.

VI. Seam: External.

VII. Baffling: As required.

d) Fixing: Elevated by concrete plinth and fully supported by galvanised steel beams to provide adequate access to the base of the tank in accordance with confined space requirements of AS/NZS 2865. Support beams shall be anchored both to the base of the tank and the plinth.

e) Hydraulic components: Provide the following (to each tank and or tank compartment):

I. Manual quick-fill.

II. Make up water.

III. Automatic inflow if required.

IV. Pump suction lines.

V. Fire Brigade connection if required.

VI. Overflow.

VII. Tank drain and sludge valve.

VIII. Pump testing inlet.

f) Maintenance facilities:

I. Provide access manholes and ladders.

II. Water level alarm control:

III. Provide stainless steel liquid level sensing probe with PVC casing.

IV. Provide a control panel with audible and visual alarm indications (high water level and low water level).

V. Interface with BMS: Provide low level interface with BMS at the control panel for remote alarm indication.

6.4 FIRE PUMPS

6.4.1 FIRE HYDRANT PUMPSET

a) General: Provide the following pumps:
   I. A pumpset comprising:
      i. An electric driven pump; and
      ii. A diesel driven pump.
      iii. Type of pump: Electric centrifugal end-suction pump.

b) Jockey pump: An automatic jockey pump to maintain the system pressure without starting the pumpset as a result of minor pressure drop in the fire main.

c) Standard: To AS 2941.

6.4.2 FIRE HOSE REEL PUMP

a) Fire hose reel pump: To AS 2941

b) Type: Electric driven centrifugal pump.

6.5 BLOCK PLANS & OPERATING INSTRUCTION

a) General: Provide block plans showing the following:
   I. Fire Hydrant Layout.

b) Material: Legibly print or engrave block plans and emergency instructions on durable material resistant to defacement, at least 3 mm thick or mounted on board at least 3 mm thick.

c) Operating Instruction: Provide simple, concise, step-by-step operating instructions with graphical illustrations mounted in a glass frame and fixed next to the MECP, SMS and other equipment.

7 GAS SYSTEMS

7.1 GENERAL

Standards: Comply with AS 5601: Gas installations.

7.2 CONSUMER PIPING

a) Above ground installation: Select from the following:

   I. Copper tube type B to AS 1432 with plastic coating, and copper alloy fitting to AS 3688 with silver brazing alloy joints.

b) Below ground: Select from the following:

   I. Copper tube type B to AS 1432 with plastic coating, and copper alloy fitting to AS 3688 with silver brazing alloy joints.

   II. Polyethylene (PE) pipe and fittings AS 4130 with butt-fusion or electro-fusion joints.

   III. Polyamide (Nylon 11 and 12) pipe and fittings Class 300 and 400 to AS 2944.1 with adhesive joints.

c) Finishes: Finish exposed piping, including fittings and supports, as follows:

   I. In internal locations such as kitchen areas: Bright chrome plated copper piping to AS 1192 service condition 2.

d) Installation:

   I. Concealment: If practicable, install piping so that it is concealed within service ducts or non-habitable enclosed spaces and does not appear on external walls.

   II. Below ground installation: During backfilling lay plastic warning tape 150 mm above buried piping, for the full length of the piping. Warning tape shall be of minimum 100 mm width, with '**GAS PIPE UNDER**' marked continuously.

7.3 CONSUMER PIPING GAS PRESSURE REGULATOR

a) General: Provide gas regulators with over pressure protection, to maintain downstream operating pressures.

b) Installations:

   I. General: Complete gas regulator with upstream filter/strainer to pipeline size.

   II. Nipples: Provide 6mm capped nipples to each side of gas regulator and filter/strainer for pressure test.

   III. Vent: where required, provide vent off regulator vent to terminate outside building. Protect vent terminal against any forms of blockage.

c) Pressure switch: Provide a gas pressure switch for each regulator, located down stream of the regulator, with adjustable switching pressure and voltage free contacts for connection to the building management system.

7.4 GAS SUB-METERS

a) General: Provide gas submeters for real-time local and remote reading of water supply.

b) Standard: To AS 5601.

c) Accuracy: Minimum Class 3. Meters to have National Measurement Institute (NMI) pattern approval.

d) Interface with BMS: Provide low level interface with BMS for remote reading.

8 PUMPS AND ASSOCIATED EQUIPMENT

8.1 GENERAL

General standards: Comply with the following:

a) AS 2417: Rotodynamic pumps.

b) AS 2941: Fixed fire protection installation – Pumpset systems.

8.2 END-SUCTION CENTRIFUGAL PUMP

a) Standard:

   I. General: To ISO 2858 or DIN EN 733.

   II. Fire pump: To AS 2941.

b) Type: Close-coupled, single-stage, radially split, end suction, back pull out pumps.

c) Pump characteristics: Provide pumps with constant falling head v. quantity curves for stable operation with duty nearest to the best efficiency point for the impeller diameter. Select a pump with design flow rate not to exceed 80% of the maximum rating of impeller size.

d) Parallel operation:

   I. General: No instability when operating either singly or in parallel at the same shaft speed.

   II. Maximum difference between the individual shut-off heads: 10% of that of the pump with the lowest shut-off head.

e) Materials:

   I. Casings: Cast iron to AS 1830, Grade T220.

   II. Shafts: Stainless steel Grade 416.

   III. Impellers: Grade 836B bronze.

f) Impellers:

   I. Maximum diameter: 90% of maximum impeller size for the casing.

   II. Statically and dynamically balance.

g) Coupling: General: Direct couple pumps and motors using flexible spacer couplings which are enclosed in coupling guards.

h) Shaft seals: Provide mechanical seals compatible with carbon elements rotating against a ceramic stationary face.

i) Installation:

   I. Bases: Mount pumps and motors on a mild steel base sufficiently rigid to prevent distortion.

   II. Inertia bases: Fix the pump assembly on an inertia base.

   III. Mounting: Mount the inertia base on a concrete plinth with anti-vibration spring mounts.

   IV. Positive head: Provide positive head at pump suction.

j) For diesel pump only:

   I. Duplicate batteries: One set for automatic starting and one set for manual starting.

   II. Engine cooling: Manual by-pass provided.

   III. Circulation relief valve: Provide 19 mm circulation relief valve unless the diesel drive takes cooling water from the pump discharge.

   IV. Battery charger: Individual charger for each battery set. Provide alternator/generator for battery charging.

V. Speed governor: Capable of keeping engine within ± 10% of rated speed and tamper resistant.

VI. Fuel supply: 5.1 litres/kW + 10%. Fuel gauge to be provided.

VII. Instrument panel: Complete with oil gauge, temperature gauge, tachometer, hour meter, and ammeter.

VIII. Over speed shutdown: Provide.

IX. Jacket water heater, oil heater and power fail relay: Provide.

X. Local visible and audible alarm: High temperature, over speed shutdown, low oil pressure, fail to start, battery charger failure.

XI. Attempt to start cycle: The attempt to start cycle shall be fixed and consist of six crank periods of approximately 12-second duration separated by five rest periods of approximately 15-second duration. In the event that the engine does not start after the completion of the "attempt to start" cycle, the controller should stop all further cranking and generate local and remote alarm.

k) Piping:

I. Disconnectable connections: Provide flanges or screwed connections with unions, for removal of pump casings without disturbing piping.

II. Suction connections: Provide demountable pipe sections between pumps and system isolating valves, for removal of impellers.

III. Drip tray: Drain to the nearest waste using DN 25 copper pipe.

8.3 IN-LINE CIRCULATING PUMPS

General: Canned rotor type, comply with the requirements Clause 7.2 - END-SUCTION CENTRIFUGAL PUMP except in the following:

a) Mounting: Suitable for mounting with the shaft vertical or horizontal.

b) Coupling: Close-coupled.

c) Radial bearings: Ceramic sleeve or ball bearing.

d) Axial bearings: Carbon/ceramic sleeve or ball bearing.

e) Casing arrangement: Back pullout.

f) Sealing: Seal motors and electrical connections to protect against ingress of condensation.

8.4 SUBMERSIBLE PUMPS

a) Type: Vertical, fully flooded submersible, close coupled, single stage, centrifugal.

b) Construction:

I. Casing: Cast iron to AS 1830/T-220, minimum.

II. Impellers: Cast iron or stainless steel Grade 416.

III. Shafts: Stainless steel to ASTM A240/240M.

IV. Nuts and bolts: Stainless steel.

V. Suction screens: Stainless steel.

VI. Float switches: Integral.

c) Motors:

I. Type: 3-phase, with windings protected by thermistors and moisture sensor.

II. Degree of protection: Water tight enclosure, IP68.

d) Mounting: Provide duckfoot pedestal bases with guide rails or guide wire system.

e) Connections:

   I. Piping: Provide flanged discharge connections.

   II. Electrical: Provide resin filled cable glands.

f) Flush valves: Provide flush valve to the volute of one submersible sanitary drainage pump for flushing wet well to reduce sludge build-up.

8.5 ACCESSORIES

8.5.1 CONTROL PANEL

a) General: Provide control panel of the same make as the manufacturer or supplier of the pumps.

b) Construction: Galvanised sheet metal construction with lockable door, weatherproof if external. Finish off with approved metallic paint. Contain starters, control equipment, visual indicators, audible alarm and other accessories.

c) Control of duty/standby pumps: Provide equipment as required to automatically:

   I. Alternate pumps after each cycle of operation;

   II. Activate standby pump in event of breakdown;

   III. Prevent simultaneous starting of pumps; and

   IV. Activate pump failure alarm.

d) Visual indicators: Provide LED indicators for the following:

   I. Power on – green.

   II. Pump running – green.

   III. Pump failure (for each pump) – red.

e) Audible alarm: Provide audible alarm with mute button.

f) Remote monitoring: Provide suitable Communications connection for high-level interface with the Building Management System for remote monitoring of the following:

   I. Status of power supply.

   II. Pump running.

   III. Common fault.

   IV. Level Alarms (where nominated).

g) Diagrams: Provide wiring diagrams in control panel in plastic sleeve. Clearly set out special operating procedures recommended by manufacturer on a panel and located in suitable position.

8.5.2 FLOAT SWITCHES

a) General: Provide one level switch for each liquid level to be detected.

b) Type: Micro switch.

c) Construction: Double encapsulated hermetic construction designed for long life submerged. Provide a clamp to permit accurate adjustment of levels.

d) Cable: Low moisture absorption type.

8.5.3 PRESSURE GAUGES

General: Provide a pressure gauge to indicate the pressure at the inlet and outlet of the system.

8.5.4 MARKING

a) Direction of rotation: Provide permanent indication on the principal component of the casing, indicating the direction of rotation.

b) Name plates: Attach to the casing permanent labels indicating the following:

I. Make.

II. Mode.

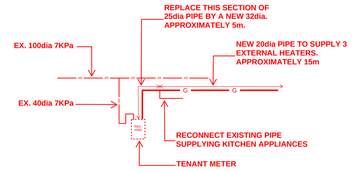
III. Serial number.

IV. Casing material.

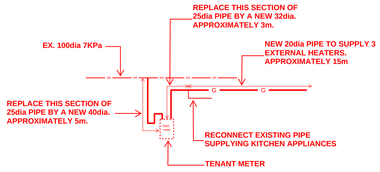
V. Impeller material.

VI. Shaft material.

VII. Impeller diameter (if reduced).



GAS DIAGRAM, SHOP 64A



GAS DIAGRAM SHOP 60

XU XT XS XR1 XQ1 XP1 XP XO XN XM XL XK

8400 8400 8400 8400 8400 800 8400 8400 8400 8400

Y47 Y48 Y49

8400 8400

EXISTING SHOP NO. 66

EXISTING SHOP NO. 65

EXISTING SHOP NO. 61

EXISTING SHOPS NO. 51A/52

EXISTING SHOPS NO. 51

EXISTING SHOP NO. 53

EXISTING SHOP NO. 64A

EXISTING SHOP NO. 60

EXISTING SHOP NO. 60A

EXISTING MALL

OUTDOOR SEATING AREA

GREY DASHED LINE INDICATES EXISTING ROOF OVER

EXISTING AWNING OVER

EXISTING DP

2600 2400 2500 2400

F12A F11A

NEW STREET PLANTING SUBJECT TO COUNCIL'S APPROVAL. REFER TO LANDSCAPE CONSULTANT & STRUCTURAL ENGINEER'S DETAILS.

Note:
To provide gas to proposed 3 heaters, the existing tenant pipe work will need to be modified. Refer to diagram 64A

Note:
To provide gas to proposed 3 heaters, the existing tenant pipe work will need to be modified. Refer to diagram 60

100mm DP & 100mm O/F

100mm DP & 100mm O/F

IRRIGATION BY OTHERS. REUSE EXISTING WATER POINT. EXISTING IRRIGATION SYSTEM IS NOT WORKING. NEW SYSTEM TO BE INSTALLED ACCORDING TO LANDSCAPE CONSULTANT'S DETAILS.

APPROXIMATE LOCATION OF 375mm COUNCIL STORWATER DRAINAGE.

NEW CONCEALED DOWNPIPE & OVERFLOW TO HYD. ENG'S DETAILS. CLADDING TO MATCH EXISTING. ALLOW TO RELOCATE TENANT'S EXISTING LIGHTING WHERE AFFECTED

NEW INSET COVER TO EXISTING STORMWATER PITS.

NEW LINE MARKING

EXISTING TRAFFIC LIGHT POLE TO REMAIN

EXISTING BICYCLE RACKS

NEW KERB RAMP TO AS1428.1. REFER TO CIVIL ENG'S DETAILS.

RELOCATED POST BOXES TO AUS. POST'S REQUIREMENTS/LOCATION. ALLOW FOR DYNA BOLT FIXINGS TO MATCH EXISTING.

100mm DP

100mm O/F

NEW DOWNPIPE & OVERFLOW TO HYD. ENG'S DETAILS. CLADDING TO PAINTED **[P01]**

DASHED LINE INDICATES NEW METAL & GLAZED AWNING OVER

1500 6300 7800

RELOCATED POSTAL PICKUP & EMERGENCY SERVICES

RELOCATED ACCESSIBLE PARK

100mm DP DISCHARGES TO ROAD GUTTER

100mm OF DISCHARGES TO ROAD GUTTER

EXISTING BOOTH

DASHED LINE INDICATES OVERPASS MALL OVER

EXISTING BOLLAROS & TACTILE INDICATORS TO REMAIN

EXISTING PEDESTRIAN CROSSING

EXISTING TRAFFIC SIGNAL BOX TO REMAIN

REFER TO 13 SERIES FOR REQUIRED TACTILE INDICATORS.

TREE IN GROUND IN GROUND PLANTER

TREE IN GROUND IN GROUND PLANTER

NEW BIN

300 300

CONNECT 100mm DP & O/F TO EXISTING SW GRATE PIT

EXISTING TRAFFIC LIGHT POLE TO REMAIN

100mm O/F DISCHARGES TO ROAD GUTTER

NEW STREET FURNITURE & SEATING. REFER TO 71 SERIES

100mm O/F DISCHARGES TO ROAD GUTTER

NEW STORMWATER PIT TO CIVIL ENG'S DETAILS

CONNECT 100mm DP TO EXISTING SW GRATE PIT

RECONFIGURED PAVEMENT, KERB AND STORMWATER PITS TO CIVIL ENG'S DETAILS. NEW PAVERS TO MATCH EXISTING. RELAY AND MAKE GOOD AS REQUIRED.

RAISED PLANTER WITH RETAINING WALL

NEW LINE MARKING

PINK DASH INDICATES EXTENT OF CONCRETE TRENCH BELOW

GREY DASHED LINE INDICATES SHORING WALL BELOW

4400 600 5400 600 1800 600 3000 6000 600 1800 600 3000 6000

R I L E Y S T R E E T

H E N R Y S T R E E T

LANDSCAPING UPDATED F

EXISTING SHOP NO. 152

EXISTING SHOP NO. 154

EXISTING SHOP NO. 153

EXISTING MALL

EXISTING SHOP NO. 115

EXISTING SHOP NO. 118

8700 8700 8700 8700 8700 8700

GA GB G19 G18 G17 G16 G15 G14 G13

P ORKMSKOI EV REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER

O OOKMOKOI EV EV REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER

N NSKNOKOI EV EV ISSUED FOR TENDER

A NVKNNKOL EV EV ISSUED FOR COSTING

NVKNNKOI

NSKNOKOMP

1 FLOOR PLAN - SOUTH
1 : 100

COLOUR LEGEND

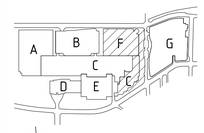
- EXISTING STRUCTURE/ELEMENT TO BE DEMOLISHED
- NEW STRUCTURE/ELEMENT
- EXISTING STRUCTURE/ELEMENT TO REMAIN

10.0001 [F]

THIS DRAWING TO BE PRINTED IN COLOUR

Rev	Date	By	Chk	Description
4	27.04.2017	EV	EV	ARCHITECTURAL LAYOUT REVISED - ISSUED FOR TENDER
3	25.04.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
2	22.04.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
1	16.12.2015	EV	EV	ISSUED FOR TENDER
A	19.11.2015	EV	EV	ISSUED FOR COSTING

Key Plan



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SCENTRE GROUP

Owner and Operator of Westfield in Australia and New Zealand

PENRITH

Scentre Design and Construction Pty Limited
85 Castlereagh Street Sydney NSW 2000
Phone (02) 9358 7000 Fax (02) 9028 8500
GPO Box 4004 Sydney NSW 2001
ACN 000 267 265

Title

RILEY ST UPGRADE FLOOR PLAN SOUTH

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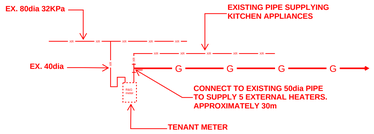
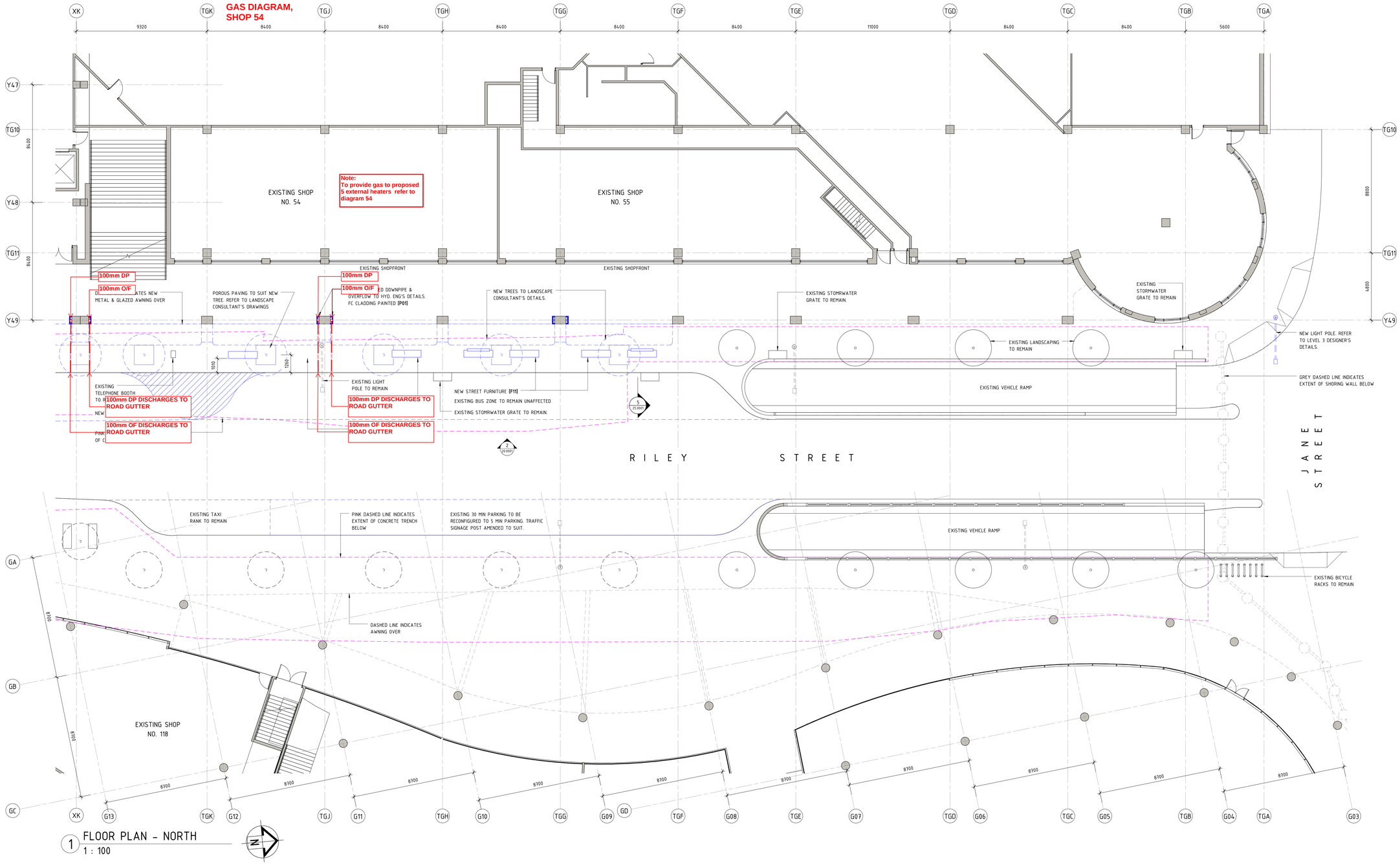
1:100 @ A0	0 10 20 30 40 50	
Drawn By: LSN	CAD Filename: T:\SCENTRE\+PROJECT\02 PROJECTS\02 DRAWINGS\02 BIM\02 SHEETS	Plot Date: 26/04/2017 11:44:00 AM
Project No.: C57490	Drawing No.: H10.0001	Revision: 4

FOR TENDER



GAS DIAGRAM, SHOP 54



1 FLOOR PLAN - NORTH
1 : 100

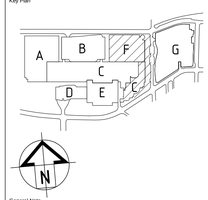
COLOUR LEGEND

- EXISTING STRUCTURE/ELEMENT TO BE DEMOLISHED
- NEW STRUCTURE/ELEMENT
- EXISTING STRUCTURE/ELEMENT TO REMAIN

10.0002 [C]

Rev	Date	By	Ck	Description
3	24.06.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
2	22.04.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
1	16.12.2015	EV	EV	ISSUED FOR TENDER
A	19.11.2015	EV	EV	ISSUED FOR COSTING

Key Plan



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GPO Box 4004 Sydney NSW 2001
ACN 002 267 265

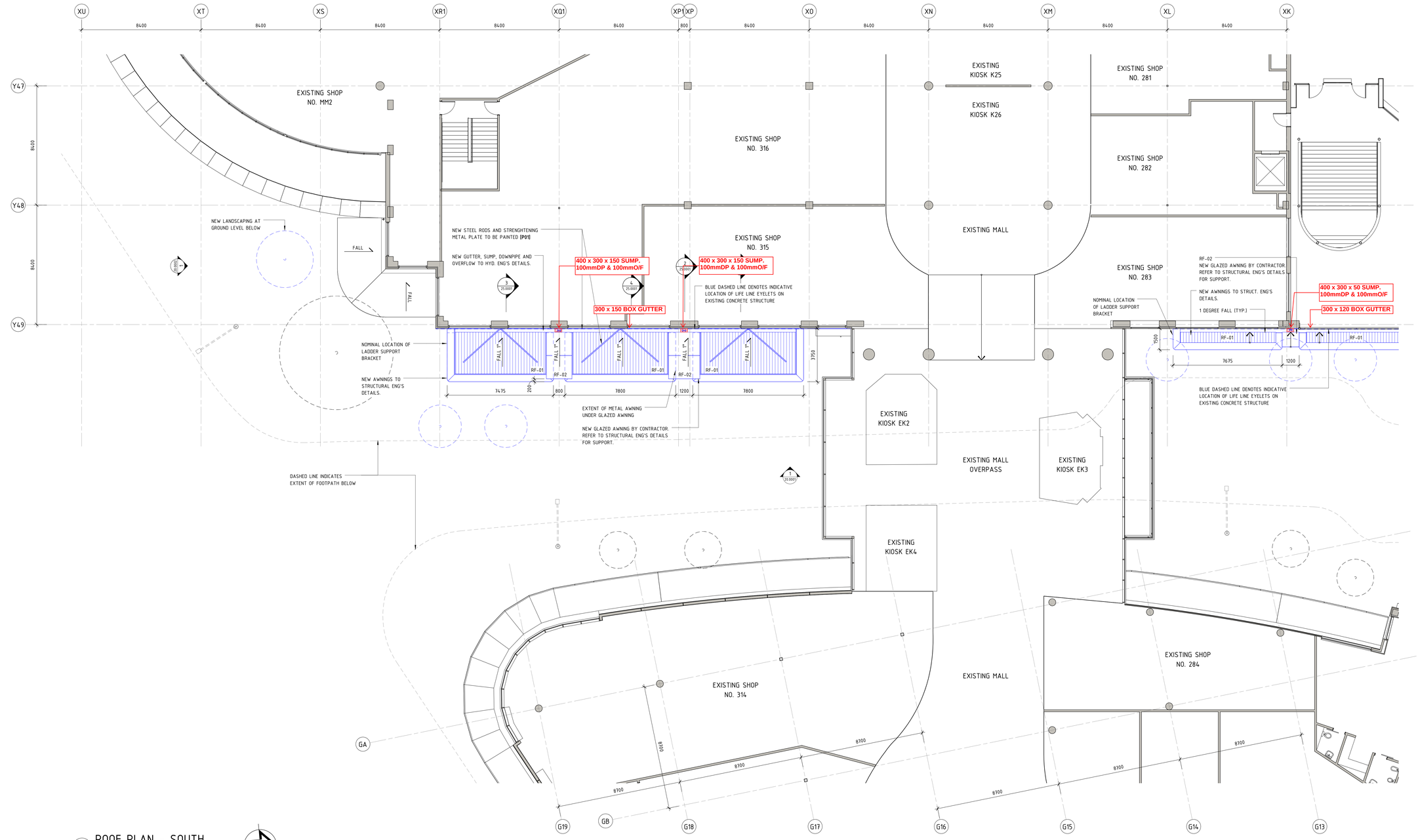
Title
RILEY ST UPGRADE FLOOR PLAN NORTH

FOR TENDER

Drawing Scale: 1:100 @ A0	Scale Bar 1:1: 0 10 20 30 40 50	
Drawn By: LSN	CAD Filename: T:\CENTRE\+PROJECT+02 PROJECTS\02 DRAWINGS\02 BIM\02 SHEETS	Plot Date: 20/06/2016 4:48:08 PM
Project No.: C57490	Drawing No.: H10.0002	Revision: 3

ROOF LEGEND

CODE	DESCRIPTION
RF-01	COLORBOND METAL AWNING AT 1 DEGREE PITCH
RF-02	NOMINAL 22mm THICK GRADE A LAMINATED SAFETY GLASS FRITTED GLAZED AWNING AT 1 DEGREE PITCH, CONCEALED FRAMING - **F4**



1 ROOF PLAN - SOUTH
1 : 100

COLOUR LEGEND

- EXISTING STRUCTURE/ELEMENT TO BE DEMOLISHED
- NEW STRUCTURE/ELEMENT
- EXISTING STRUCTURE/ELEMENT TO REMAIN

NOTES:

1. ALL ROOF ACCESS EQUIPMENT AND INSTALLATION TO COMPLY WITH AS 1657-2013.
2. LOCATION OF LADDER BRACKET AND LIFE LINE EYELETS INDICATIVE ONLY. FINAL SYSTEM AND LOCATION TO BE CONFIRMED WITH CENTRE MANAGEMENT.
3. GLAZED AWNING IS ASSUMED TO BE TRAFFICABLE. SIGNAGE TO BE PROVIDED NOMINATING LOAD LIMITATIONS. ACCESS TO GLAZED AWNING AND REQUIRED CLEANING REGIME TO BE CONFIRMED WITH CENTRE MANAGEMENT.
4. ALLOW FOR LEAF GUARD TO ALL NEW GUTTERS.

10.0011 [C]

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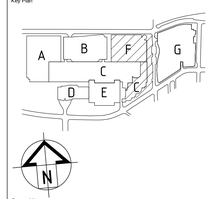
Rev	Date	By	Chk	Description
3	24.06.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
2	22.04.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
1	16.12.2015	EV	EV	ISSUED FOR TENDER
A	19.11.2015	EV	EV	ISSUED FOR COSTING

Key Plan



General Note

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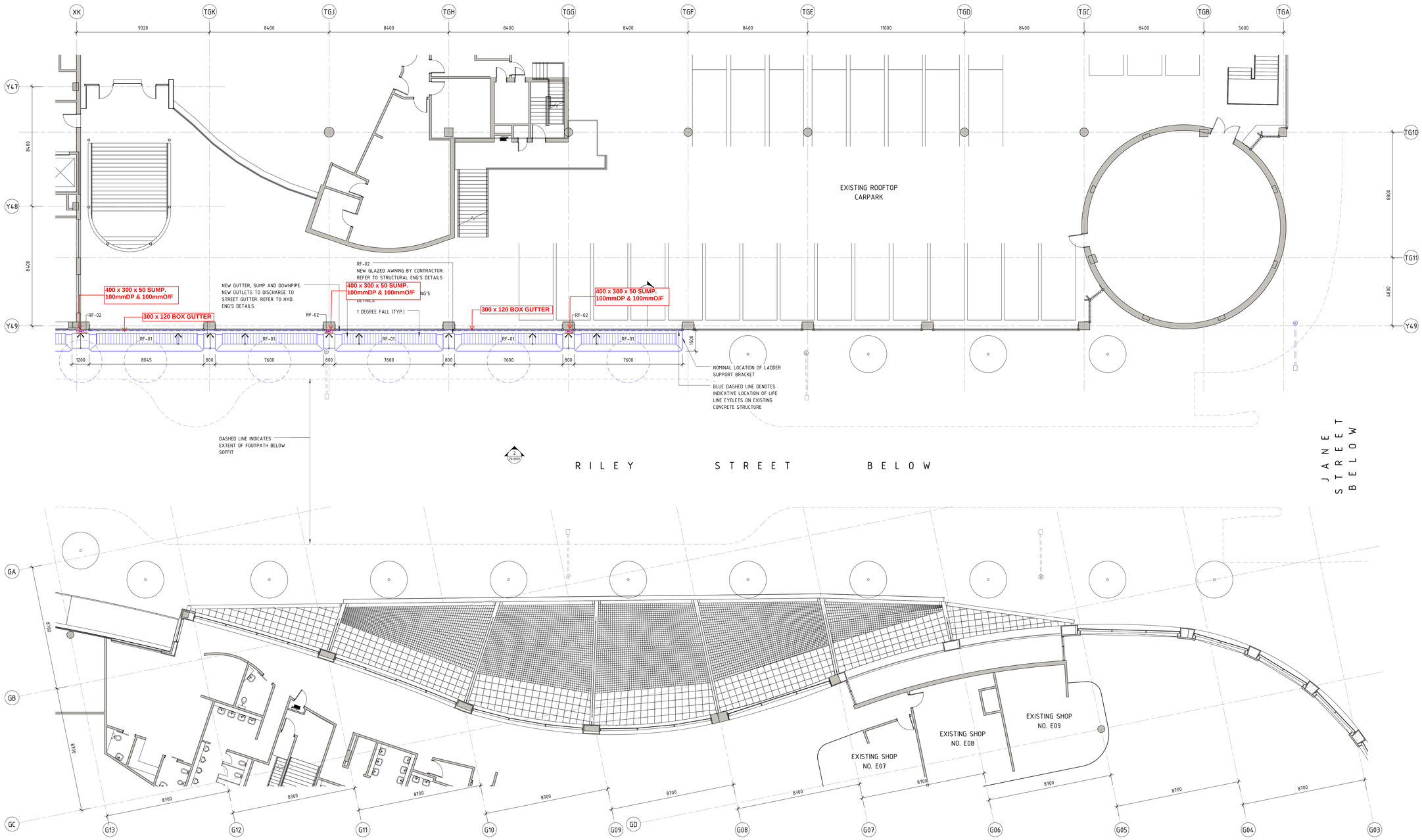
RILEY ST UPGRADE ROOF PLAN SOUTH

Drawing Scale	Scale Bar 1:1
1:100 @ A0	0 10 20 30 40 50
Drawn By: LSN	CAD Filename: T:\CENTRE\H\PROJECT\H02 PROJECT\S02 DRAWINGS\02 BIM\02 SHEETS
	Plot Date: 20/06/2016 4:48:28 PM
Project No.: C57490	Drawing No.: H10.0011
	Revison: 3

FOR TENDER

ROOF LEGEND

CODE	DESCRIPTION
RF-01	COLORBOND METAL AWNING AT 1 DEGREE PITCH
RF-02	NOMINAL 22mm THICK GRADE A LAMINATED SAFETY GLASS FRITTED GLAZED AWNING AT 1 DEGREE PITCH, CONCEALED FRAMING - F4



1 ROOF PLAN - NORTH
1 : 100

COLOUR LEGEND

- EXISTING STRUCTURE/ELEMENT TO BE DEMOLISHED
- NEW STRUCTURE/ELEMENT
- EXISTING STRUCTURE/ELEMENT TO REMAIN

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4. ALLOW FOR LEAF GUARD TO ALL NEW GUTTERS.

10.0012 [C]

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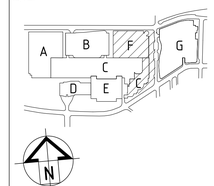
Rev	Date	By	Chk	Description
3	24.06.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
2	22.04.2016	EV	EV	REVISED TO SUIT NEW LAYOUT-ISSUED FOR TENDER
1	16.12.2015	EV	EV	ISSUED FOR TENDER
A	19.11.2015	EV	EV	ISSUED FOR COSTING

Key Plan



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Title

RILEY ST UPGRADE ROOF PLAN NORTH

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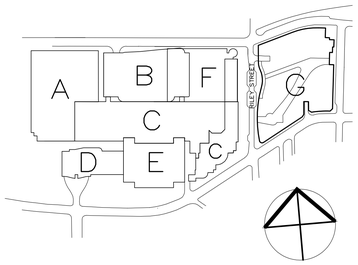
Drawn By: LSN	CAD Filename: T:\CENTRE\H\PROJECT\H02 PROJECTS\02 DRAWINGS\02 BIM\02 SHEETS	Plot Date: 20/06/2016 4:48:55 PM
Project No.: C57490	Drawing No.: H10.0012	Revision: 3

FOR TENDER

DRAWING SCHEDULE

Drawing No.	Rev.	Drawing Title	CAD file	Scale
H00.0000	3	HYDRAULIC SERVICES COVER SHEET, DRAWING SCHEDULE AND NOTES	SGD-H000000_CAD	N.T.S.
H10.0001	3	HYDRAULIC SERVICES RILEY STREET UPGRADE FLOOR PLAN SOUTH	SGD-H100001_CAD	N.T.S.
H10.0002	3	HYDRAULIC SERVICES RILEY STREET UPGRADE FLOOR PLAN NORTH	SGD-H100002_CAD	N.T.S.
H10.0011	3	HYDRAULIC SERVICES RILEY STREET UPGRADE ROOF PLAN SOUTH	SGD-H100011_CAD	N.T.S.
H10.0012	3	HYDRAULIC SERVICES RILEY STREET UPGRADE ROOF PLAN NORTH	SGD-H100012_CAD	N.T.S.



KEY PLAN N.T.S.

NOTES

SCOPE OF WORKS

1. TO COMPLY WITH WESTFIELD GENERAL SPECIFICATION GS-HS[7].
2. PROVIDE HYDRAULIC SERVICES ASSOCIATED WITH THE RILEY ST COLLONADE UPGRADE GENERALLY AS INDICATED ON PLANS .

NOTES

1. AUTHORITIES AND STANADRDS
   THE WHOLE OF THE PLUMBING SYSTEM, GENERALLY AS OUTLINED ON THE DRAWINGS, INCLUDING STORMWATER PLUMBING, COLD WATER SUPPLY, SHALL BE UNDERTAKEN BY A FULLY LICENSED PLUMBER IN ACCORDANCE WITH ALL APPLICABLE PLUMBING CODES & REGULATIONS, AUSTRALIAN STANDARDS AND LOCAL AUTHORITY REQUIREMENTS. THE INSTALLATION SHALL BE IN A TRADESMAN LIKE MANNER AND TO THE SATISFACTION OF SCENTRE DESIGN & CONSTRUCTION (SDC).
2. SITE VISIT AND FAMILIARISATION
   A SITE VISIT MUST BE UNDERTAKEN PRIOR TO TENDER TO ENSURE THAT THE CONTRACTOR UNDERSTANDS THE VISIBLE EXISTING CONDITION AND HAS ALLOWED FOR THE ENTIRE SCOPE OF WORK REQUIRED TO COMPLETE THE PROJECT. THE DRAWINGS INDICATE THE GENERAL LAYOUT OF THE PROPOSED WORKS.
3. EXISTING SERVICES
   EXISTING SERVICES SHOWN ON THESE DRAWINGS HAVE BEEN INDICATED FROM AVAILABLE DATA AND RECORDS BUT MAY NOT REPRESENT THE ACTUAL ON SITE AS-BUILT SITUATION. THE CONTRACTOR IS RESPONSIBLE TO LOCATE AND VERIFY ALL SERVICES PRIOR TO COMMENCING WORK AND NOTIFY MUST SDC A.S.A.P. SHOULD ANY MAJOR DISCREPANCIES EXIST. THAT EFFECT OTHER TRADES AND THE PROJECT PROGRAM.
4. CO-ORDINATION & SETOUT
   CO-ORDINATE NEW SERVICES WITH ALL OTHER TRADES AND EXISTING SERVICES. THE CONTRACTOR WILL BE RESPONSIBLE FOR SETTING OUT ALL PIPE RUNS, CORE HOLE PENETRATIONS AND SLEEVES AS NECESSARY TO COMPLETE THE WORKS. ALL PREFABRICATED PIPE SECTIONS MUST BE FIXED IN POSITION IN AMPLE TIME TO AVOID DELAY TO ANY OTHER TRADES.
5. EXCAVATION & BACKFILL
   PROVIDE ALL EXCAVATION AND BACKFILLING REQUIRED TO INSTALL THE SERVICES IN ACCORDANCE WITH RELEVANT STANDARDS.
6. PENETRATIONS
   FLOOR PENETRATIONS SHALL BE CORED IN A METHOD APPROVED BY THE STRUCTURAL ENGINEER & SDC. SEAL ALL PENETRATION WITH APPROVED FIRE RATED MATERIAL TO MATCH MINIMUM FIRE RATING WHERE REQUIRED AND SEAL WITH AN APPROVED EPOXY SEALANT.
7. MATERIALS
   MATERIALS USED SHALL BE NEW AND MANUFACTURED AND APPROVED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARD. WHERE REQUIRED ALL MATERIALS SHALL HAVE THE APPROPRIATE WATERMARK. MATERIAL SHALL MATCH EXISTING MATERIALS WHEREVER POSSIBLE AND GENERALLY BE AS FOLLOWS.
   SANITARY PLUMBING AND DRAINAGE SHALL BE UPVC DWV GRADE.
   STORMWATER DRAINAGE AND DOWNPIPES SHALL BE UPVC DWV GRADE
   COLD WATER AND GAS PIPEWORK SHALL BE COPPER TUBE TYPE B.
   FIRE HYDRANT AND FIRE HOSE REEL MEDIUM GRADE GALVANISED STEEL (WITH VICTAULIC COUPLINGS)
8. TESTING
   TEST ALL SERVICES DURING INSTALLATION AND PRIOR TO BACKFILLING OR CONCEALING IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND TO LOCAL AUTHORITY REQUIREMENTS. ANY LEAKS SHALL PER RECTIFIED AND RETESTED AS PER THE TEST REQUIREMENTS.
9. CERTIFICATION
   UPON COMPLETION THE CONTRACTOR SHALL CERTIFY THE INSTALLATION AND PROVIDE A COPY OF THE REQUIRED CERTIFICATES TO SDC.
10. AS BUILT DOCUMENTATION.
    THE CONTRACTOR SHALL KEEP ACCURATE MARKED UP RECORDS OF THE PLUMBING INSTALLATION DURING CONSTRUCTION AND SHALL SUBMIT UPON COMPLETION A SET OF AS BUILT DRAWINGS FOR APPROVAL TO SDC. APPROVED AS BUILT DRAWINGS SHALL BE PROVIDED TO SDC IN BOTH PDF AND AUTOCAD FORMAT.

TENDER

SCENTRE GROUP

Owner and Operator of Westfield in Australia and New Zealand

Scentre Group Design and Construction Pty. Ltd.

PENRITH -
C57490 RILEY STREET COLLONADE OUTDOOR SEATING
HYDRAULIC SERVICES

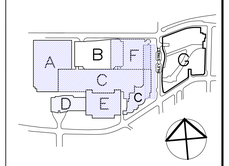
Revision No. : 3
Issued : 24.06.2016

TENDER

SGD-H00.0000[3]

Rev	Date	By	Chk	Description
3	24-06-2016	EV		RE-ISSUED FOR TENDER
2	22.04.2016	EV		RE-ISSUED FOR TENDER
1	17.12.2015	EV	EV	ISSUED FOR TENDER

Key Plan:



General Note
ALL DIMENSIONS TO BE CHECKED ON SITE. WRITTEN DIMENSIONS ONLY TO BE USED. REFER TO ALL DETAIL DRAWINGS, STRUCTURAL, MECHANICAL & SERVICES DRAWINGS BEFORE COMMENCING WORK. REFER ANY DISCREPANCIES TO SCENTRE DESIGN & CONSTRUCTION FOR CLARIFICATION.
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Title:
HYDRAULIC SERVICES COVER SHEET, DRAWING SCHEDULE AND NOTES

Drawn By	Design By	Checked By
S.L.	E.V.	E.V.

Drawing Scale	CAD File	Plot Date
N.T.S.	SGD-H000000_CAD.dwg	23/06/2016

Project No	Drawing No.	Revision
C57490	**H00.0000**	3

Drawing to scale at A0

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