PENRITH REGIONAL GALLERY
88 RIVER ROAD, EMU PLAINS
PROPOSED NEW BUILDING WORKS
HYDRAULIC SERVICES TECHNICAL SPECIFICATION AND PROJECT REQUIREMENTS

CIVIL
HYDRAULIC
FIRE
ENVIRONMENT

Document Status			
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1 PROJECT REQUIREMENTS & GENERAL COMPLIANCE

Read the Supplementary Conditions & Preliminaries to the head contract & comply with the clauses that apply to this trade.

1.1 DEFINITIONS & INTERPRETATION

- 'Approved', 'directed', 'required', 'rejected', and similar expressions, shall mean approved, directed, required, rejected, and the like, by the Superintendent.
- 'Give notice', 'submit', 'furnish', and all other similar expressions, shall mean give notice, submit, furnish, and the like, to the Superintendent.
- 'The Contractor', has the same meaning as 'the Builder and includes the hydraulic services sub-contractor',
- 'The Hydraulic Services Sub Contractor', has the same meaning as 'the plumber. drainer or gasfitter,
- 'Drawings' means the drawings referred to in the Contract and any modification of such drawings notified to the Builder by the Superintendent and includes such other drawings as may from time to time be supplied to the Builder by the Superintendent, for the purposes of the Contract;
- 'The Principal' has the same meaning as 'the Proprietor' or 'the client',
- 'The Superintendent' has the same meaning as 'the Architect';

1.2 EXTENT OF WORK

The scope of works is inclusive of the obtaining all approvals, supply, installation, testing, commissioning, maintenance and defects liability, materials labour and equipment for the complete hydraulic services installation as outlined in the hydraulic services documents.
The work shall also include all necessary minor and incidental work and items, valves, fixtures and fittings required to implement the hydraulic services works as indicated necessary to meet the relevant Australian Standard applicable to that service.

The hydraulic services drawings and specification set out the project requirements to be met over and above the minimum standards as set out by the relevant Australian standard applicable to that service. The contractor shall make due allowance in their tender, and shall be deemed to have made due allowance for ALL requirements, including all piping, excavation, valves, fittings, fixtures, ancillary materials and any other item necessary for the execution of the works in accordance with the minimum standard as set out by the relevant Australian standard applicable to that service, the relevant local authority requirements and for those requirements as set out in the hydraulic services drawings and the accompanying specification.

Should the contractor consider that discrepancies and omissions in the documents, such shall be notified in writing to the Architect prior to close of tender for direction. The contractor shall not be entitled to any allowance thereafter and shall be deemed to have allowed for such items in their tender where such discrepancies are not notified in writing.

Where the contractor disagrees with the interpretations set out in the hydraulic services documents of the relevant Australian standard, the contractors shall notify such in writing to the Architect prior to close of tender for direction. The contractor shall not be entitled to any allowance thereafter and shall be deemed to have allowed for such items in their tender where such discrepancies are not notified in writing.

Where the contractor considers that additional works are required to complete the project not indicated within the documents at the time of tender the contractors shall be notify such in writing to the architect / project manager prior to close of tender for direction. The contractor shall not be entitled to any allowance thereafter and shall be deemed to have allowed for any and all such items in their tender where such additional works are not notified in writing.

Whether or not the words “supply and install” appear in this Specification, unless clearly excluded, all items of equipment for the complete installation are required and shall he supplied and installed.

The scope of works is generally inclusive of the following

- General Compliance
- Excavation and Backfilling
- Sewer Drainage

  all sewer and waste drainage work including also, trade waste and the connection of all sanitary fixtures, waste, soil stacks and vents to the Sydney Water sewer, to comply with Sydney Water regulations and AS 3500.
- Hot & Cold Water Services

  all hot and cold water services including supplying and fixing of all pipework reticulation, tapware. control valves, temperature control devices, backflow prevention devices, hot water heaters and any pumps to comply to Sydney Water regulations and AS 3500
- Sanitary Plumbing

  all sanitary plumbing including all Stackwork, vents and traps. supply and fix all sanitary ware items to be installed to Sydney Water regulations and AS 3500.
- Storm water System

  All stormwater plumbing and drainage overflows, trench grates, flashings and capping to local council requirements and AS3500.
- Natural Gas Service

  Supply & installation of all pipework, meters, connection to main & fixtures to comply with AS5601 & AG601
- Testing and Commissioning

  Testing and commissioning of all works in accordance with the relevant Australian Standard

and the Regulatory Authorities requirements. Provision of all temporary water supply arrangements to complete progressive testing procedures.

- Operating and Maintenance Manuals

  Provide Operating and Maintenance Manuals.

  Provide training to client selected personnel (if required).

- As-Built Drawings

  Provision of as constructed documentation as per the specification

- Maintenance

  Provide comprehensive inspection and maintenance during the Defects Liability Period.

- Certification

  Provide all certificates required by the Building Code of Australia, Australian Standards and local authorities.

- Co-ordination

  Co-ordination of the Hydraulic Services with all other building services incorporating all required return visits.

- Materials Handling

  Loading/unloading materials and handling to final position.

- Core Holes & Penetrations

  allow to form up core hole penetrations as required following approval by the Structural Engineer. allow for all cut-outs, penetrations, sleeves and fire stop collars/sealants in conformance with the building Code of Australia.

- Drain Downs and Re-charging

  allow for drain down and re-charge of the system during the construction period as required to complete the installation.

- Sealing of Penetrations

  sealing of all penetrations to the superintendents approval.

- Trade Waste Removal

  removal of all excess pipe, general trade waste generated by the plumbing grade, following the works, but prior to practical completion.

- Cleaning on Completion

  final cleaning of the complete installation to the required standard before handover to the Contractor.

- Safe Work Statements

  provision of a safe work method statements relevant to the works for approval 7 days before the commencement of the works.

- Access Provisions

  provision of all necessary access and scaffolding to complete the works.

- Electrical Safety Checks

  provision for monthly electrical safety checks and tagging of all power tools and leads.

- Safety Representative

  provision of a Safety Representative on the site OHS & R Committee, if required and payment of all costs associated with the provision of same.

- Safety Equipment

  provision of all necessary personal safety equipment required to carry out the complete works.

- Protection of the Works

  provision of all necessary protection to the works and removal of that protection at completion.

- Site Meetings

  The contractor shall attend site meetings, when called by the Builder. The contractor may be required to attend other meetings and shall attend such meetings as directed by the Builder.

The contractor shall attend meetings, inspections and testing with authorities and/or the Engineers when required.

- Patching Masonry

  The contractor shall allow for all patching to block/brick walls (where required).

- Essential Services Certifications

  essential services certificates shall be supplied prior to Practical Completion or as required by the relevant statutory authorities, whichever is the earlier.

- Variations

  No variations to the Contract Sum shall be accepted by the principal, except when variation works are expressly directed in writing by the Client.

THE PRINCIPAL EXPRESSLY RESERVES THE RIGHT TO DEDUCT & RETAIN THE VALUE OF ANY WORKS NOT PERFORMED OR ANY THING, FIXTURE, FITTING, ITEM OR SERVICE TO BE PROVIDED NOT SUPPLIED AS SET OUT IN THE HYDRAULIC SERVICES CONTRACT DOCUMENTS FROM THE CONTRACT SUM.

1.3 APPLICATION

The provisions of the hydraulic services drawings, specification and documents shall apply jointly and severally to the building contractor, head contractor (where applicable), and to the hydraulic services contractor.

1.4 CONTRACT DOCUMENTS

The Contract documents for hydraulics services component of this project comprise of the following:

1. Contract Document
2. Hydraulics Services Technical Specification and Project Requirements
3. Hydraulic Services Drawings

1.5 LIMIT OF HYDRAULIC SERVICES DRAWINGS & DOCUMENTS

The hydraulic services drawings indicate a possible general pipework arrangement (subject to final co-ordination with mechanical, electrical, structural and architectural details on site by the hydraulic services subcontractor) and service sizing only. They do not show, nor is it intended to show, each and every valve, clearout, fitting or other such item necessary for compliance with the relevant Australian standard or other authority requirement as may be required. The contractor shall make due allowance for all valves, clearouts, fixtures and fittings and other such items as necessary to complete the works in accordance with the relevant Australian Standard applicable to that service and Plumbing Code of Australia, whether or not such is indicated on the hydraulic services documents.

Should the contractor consider that discrepancies and omissions in the documents, such shall be notified in writing to the Architect prior to close of tender for direction. The contractor shall not be entitled to any allowance thereafter and shall be deemed to have allowed for such items in their tender where such discrepancies are not notified in writing.

Where the contractor disagrees with the interpretations set out in the hydraulic services documents of the relevant Australian standard, the contractors shall be notified such in writing to

the Architect prior to close of tender for direction. The contractor shall not be entitled to any allowance thereafter and shall be deemed to have allowed for such items in their tender where such discrepancies are not notified in writing.

Allow for any necessary diversions and adjustments of pipework and equipment as may be necessary to carry out and complete the works. Refer to architectural/structural drawings or request architectural/structural information for details of location of equipment and detail of finishes, and co-ordinate with other services where applicable.

No extra payment will be considered due to inaccuracy of the Tender Documents with regard to quantities and Authorities requirements. Any variation necessary shall be expressly noted and included in the tender price.

The contractor shall provide working drawings where a change is to be made from the contract drawings. Such works carried out shall not constitute a variation to the contract, unless said changes are a result of relevant Authorities or department's requirements made known prior to the commencement of any works.

1.6 SERVICE COORDINATION

Co-ordinate Hydraulic Services work with other trades and the existing site services and existing structure and the job progress schedule and follow-up other trades as the works proceed. Allow for necessary pipework offsets to co-ordinate with the structures, mechanical services ductwork, electrical lighting, electrical cable trays, electrical underground wiring and other services. Refer to architectural and other documents for details of work.

Prepare detailed drawings of the proposed positioning of plant and equipment as may be required to ensure work is co-coordinated in the general construction of the building and to attend any meetings to facilitate co-ordination.

Minimum coordination requirements:

1. Adjust the location of ceiling mounted items to coordinate with the ceiling grid and other ceiling mounted services.

2. Adjust the location of wall mounted items to coordinate with door swings, furniture, curtains and other wall mounted services.
3. Adjust above ceiling services to coordinate with other above ceiling services, structure ceiling suspension etc.
4. Adjust the items in risers to coordinate with other services, structure, etc.
5. Adjust the location underground services to coordinate with other services, structure etc.
6. Show adjusted positions on the shop and record drawings. Provide details of all loadings imposed on the structure.

1.7 REQUESTS FOR INFORMATION

The head contractor/builder and hydraulic services subcontractor shall review the documents during the tender period and raise all requests for information relating to the documents requiring further explanation or additional information prior to the close of the tender period.

The contractor shall not be entitled to any further variation or allowance thereafter and warrants that it has fully understood the project documentation and its requirements and made due allowance for all project requirements in their tender and has requested any and all such information in writing prior to the close of the tender period.

Failure by either the building contractor or hydraulic services sub-contractor to do all or any of the things they are obliged to do under this clause will not relieve the relevant party of their liability to perform all obligations under the contract.

The contractor shall be responsible for and bear any and all costs for requests for information relating to the documentation upon commencement of construction.

All requests for information shall be made in the written from.

1.8 SEVERABILITY

If any provision of this specification is prohibited by operation of law or judged by a court of competent jurisdiction to be unlawful, void or unenforceable, the provision shall, to the extent

required, be severed from this agreement and rendered ineffective as far as possible without modifying the remaining provisions of this agreement and shall not in any way affect any other circumstances of or the validity or enforcement of this specification.

The Laws of NSW shall apply to and govern the works.

1.9 SITE INSPECTION

The contractor is required to visit and inspect the existing site structures services and conditions prior to tendering.

Claims due to ignorance of site conditions will not be considered nor allowed.

1.10 HEAD CONTRACTOR / HYDRAULIC SERVICES CONTRACTOR TO INFORM SELF

The building contractor / hydraulic services sub-contractor shall, and shall be deemed to have:

- Examined all the information made available to him by the Principal for the purpose of tendering including the Drawings and Specification.
- Examined all information relevant to the risks, contingencies and other circumstances which could affect his tender, and which is obtainable by the making of reasonable inquiries; and
- Made all reasonable enquiries requiring further information or explanation with respect to the scope of works as set out in the hydraulic services drawings, specification and documents prior to the close of tender; and
- Examined the site and its surroundings; and
- Informed himself as far as practicable of all relevant physical conditions upon and below the surface of the site and the climatic conditions at or near the site: and
- Informed himself as far as practicable of the nature of the work and materials necessary for the Execution of the work under the Contract, the means of access to and facilities at the site, and transport facilities for deliveries to the site; and
- Satisfied himself as to the correctness and sufficiency of his tender for the work under the Contract, and that
- The rates and prices stated therein cover the cost of performing all his obligations under the Contract.

No extra payment will be considered due to inaccuracy of the Tender Documents with regard to quantities and Authorities requirements. Any variation necessary shall be expressly noted and included in the tender price.

Failure by either the building contractor or hydraulic services sub-contractor to do all or any of the things they are obliged to do under this clause will not relieve the relevant party of their liability to perform all obligations under the contract.

1.11 TENDER PRICE.

The tender price for the works shall include for all necessary excavation, grading to falls, forming handholes, supporting sides of excavations, keeping excavations free from water, backfilling and consolidation and for disposal of surplus spoil.

The head contractor/builder and hydraulic services subcontractor shall make due allowance in their tender, and warrant that they have made due allowance for ALL labour, materials, valves, fittings, pipework, payments to statutory authorities and approvals, and any other such items necessary for the execution of the works in accordance with the minimum standards as set out by the relevant Australian standard applicable to that service, the relevant local authority requirements and for those requirements as set out in the hydraulic services drawings and the accompanying specification.

No extra payment will be considered due to inaccuracy of the Tender Documents with regard to quantities and Authorities requirements. Any variation necessary shall be expressly noted and included in the tender price.

The contractor may provide a schedule of rates for the purpose of assessing any variations that may arise during the project. Where a schedule of rates is not supplied, any variations to the contract sum will be assessed as against the current edition of the **Australian Plumbing Cost Guide.**

The Australian Plumbing Cost Guide is available from
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Narellan NSW 2567

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W - www.plumbingcosts.com.au

1.12 CONTRACTORS WORKSHOP AND DESIGN DRAWINGS

The hydraulic services contractor shall submit workshop drawings for approval prior to the installation showing details of the fabrication and installation of all hydraulic services and equipment, including relationship to building structure and services, service type and size, and marking details. Co-ordinate works shown diagrammatically in the contract documents and submit dimensioned set out drawings.

Where the hydraulic services contractor elects to install the works in a manner inconsistent with the tender documents and to the builder/head contractor and/or hydraulic sub-contractors own design and design criteria, the contractor shall submit co-ordinated design drawings and design certification for approval to the principal prior to commencement of ANY of the proposed installation works.

Where penetrations are required through the structure; such drawings shall be dimensioned and shall be submitted and approved by the architect and structural engineer prior to the penetrations being made either by cast in forms or drilling.

Drawings submitted by the Hydraulic subcontractor shall have a minimum scale of as those of the tender documentation and shall be of the same documentation standard, scale and format as the other trade workshop drawings for co-ordination purposes.

Submit workshop drawings for approval 7 days prior to required approval. No work shall commence on the proposed changes until the working drawings are approved. Approval of workshop drawings will not relieve the Hydraulic subcontractor of his responsibilities for errors and incorrect setting out. Approval of drawings is not intended to serve as a compliance check and does not relieve the contractor from furnishing materials and performing work as required by the contract drawings and specification.

WHERE WORKSHOP DRAWINGS ARE NOT SUPPLIED BY THE CONTRACTOR, THE PRINCIPAL RESERVES THE RIGHT TO DEDUCT AND RETAIN THE VALUE OF PREPARING WORKSHOP DRAWINGS FROM THE CONTRACT SUM.

1.13 CERTIFICATION OF HYDRAULIC SERVICES WORKS

At the completion of the works and prior to the submission for final payment the Hydraulic subcontractor shall make all necessary applications, pay all fees, obtain and issue to the superintendent all relevant certificates certifying that the **installation of the works** has been carried out in accordance with the relevant Australian standard applicable to that service and in accordance with the design documents.

Wherever applicable the relevant Authority shall issue the Certificate. Where this is not standard practice the Hydraulic subcontractor shall provide a Certificate or Letter of Certification that will guarantee that the works comply with the relevant Authorities regulations, requirements and conditions.

No application for final payment will be approved prior to the issue of all relevant certificates indicating that the installation of the works complies with the current regulations and requirements of the relevant Authority.

1.14 CERTIFICATE OF ESSENTIAL SERVICES

At the completion of the works and prior to the submission for final payment the Hydraulic subcontractor shall make all necessary applications, pay all fees, obtain and issue to the superintendent ALL relevant essential services certificates certifying that the **installation of the essential services works** has been carried out in accordance with the relevant Australian standard applicable to that service and in accordance with the design documents.

Wherever applicable the relevant Authority shall issue the Certificate. Where this is not standard practice the Hydraulic subcontractor shall provide a Certificate or Letter of Certification that will guarantee that the works comply with the relevant Authorities regulations, requirements and conditions.

No application for final payment will be approved prior to the issue of all relevant certificates indicating that the works comply with the current regulations and requirements of the relevant Authority.

1.15 CERTIFICATION OF HYDRAULIC SERVICES DESIGN

Where the contractor installs hydraulic services to the project in a manner inconsistent with the hydraulic services design documents and specification as issued, and to the contractors own design, design criteria and own interpretation of relevant standards and codes, the hydraulic services contractor shall issue, or if unable, cause to be issued, a certificate stating that such design is in compliance with all relevant Australian Standards, Building Code of Australia requirements, and the requirements of any authority having jurisdiction over the works, to the satisfaction of the Principal Certifying Authority, at the completion of the works and prior to the submission for final payment.

No application for payment will be approved prior to the issue of all relevant certificates indicating that the design of the amended works complies with the current regulations and requirements of the relevant Authority.

1.16 APPLICATIONS, FEES AND CHARGES

The Plumbing Contractor shall be responsible for making relevant applications to authority and service providers.

The contractor shall be responsible for the following fees and charges rendered by the respective Authorities in reference to the project, which shall include the following:

- Plumbing and Drainage inspection Fees

The principal shall be responsible for the following fees and charges rendered by the respective Authorities in reference to the project, which shall include the following:

- Commencement of Work Fees

1.17 MAINTENANCE MANUALS

- Supply three (3) copies of a hydraulic services systems operational & maintenance manual prior to practical completion. No application for final payment will be approved prior to the issue of all such manuals as described below. The following information as a minimum is to be included within the manual.

1. Location & Operational description of all equipment.
2. Complete listing of all maintenance requirements including work to be carried out and time intervals.
3. Manufacturers' brochures of all equipment.
4. Work as executed drawings.

Operation & maintenance manuals shall be equal in all respects to Ezy-Manual – Hydraulic & Fire Services Edition.
Available from
PLUMBASSIST
PO Box 130,
Narellan NSW 2567
T – 4648-1010 F – 9796 2272 M – 0403 390 810
E – estimating@plumbassist.com.au

WHERE OPERATION AND MAINTENANCE MANUALS ARE NOT SUPPLIED BY THE CONTRACTOR, THE PRINCIPAL RESERVES THE RIGHT TO DEDUCT & RETAIN THE VALUE OF PREPARING OPERATION AND MAINTENANCE MANUALS FROM THE CONTRACT SUM.

1.18 MAINTENANCE

The Plumbing Contractor shall allow to maintain the whole of the works for a period of 12 Months from the date of practical completion.

During the maintenance period, carry out periodic inspections and maintenance work as recommended by manufacturers of supplied equipment, and promptly rectify faults. Attend emergency calls promptly. Carry out recommended annual maintenance procedures at end of maintenance period.

Maintenance program

Submit details of maintenance procedures and program, relating to installed plant and equipment, 6 weeks before the date for practical completion. Indicate dates of service visits. State contact telephone numbers of service operators and describe arrangements for emergency calls.

Site control

Contractors shall report to the principal's designated representative on arriving at and before leaving the site.

Maintenance records

Submit, in binders that match the manuals, loose leaf log book pages designed for recording completion activities including operational and maintenance procedures, materials used, test results, comments for future maintenance actions and notes covering the condition of the installation.

Include completed log book pages recording the operational and maintenance activities performed up to the time of practical completion. Include test and approval certificates.

Record comments on the functioning of the systems, work carried out, items requiring corrective action, adjustments made and name of service operator for all service visits. Obtain the signature of the principal's designated representative.

1.19 DIMENSIONS AND LEVELS

All invert & other levels on the drawings are **approximate only** and **must** be checked on site **prior to commencement** of excavation or installation of pipework to ensure connection to supply services and correct cover and fall. Advise the Superintendent of any apparent discrepancies **before the commencement of any work.**

Note: Ascertain the depth, position and suitability of the sewer & stormwater connection point prior to the commencement of any work (pipelaying, sawcutting & excavation) and ensure that the sewer & stormwater can gravitate to the connection point. The superintendent shall be advised immediately should any adjustment be required to execute the work.

NO CLAIMS FOR REDUNDANT WORK WILL BE ENTERED INTO DUE TO FAILURE TO COMPLY WITH THIS REQUIREMENT.

No pipelaying or excavation shall be undertaken until this has been undertaken.

1.20 PLUMBING CODE OF AUSTRALIA AND AS 3500

Australian Standard AS3500 (All Parts), and the Plumbing Code of Australia are adopted by reference and form an integral part of the hydraulic services specification and shall be read in conjunction with the hydraulic services drawings and specification. Tender, installation and workmanship shall as a minimum conform to but not be limited by these standards as a minimum requirement for the works to be carried out. Notwithstanding the hydraulic services documents, the contractor shall make due allowance in their tender, and warrants that they have made due allowance for ALL labour, materials, valves, fittings, pipework, payments to statutory authorities and approvals, and any other such items necessary to undertake all works in accordance with the current editions of the Plumbing Code of Australia and the relevant sections of AS 3500 (All Parts).

1.21 AUTHORITIES AND STANDARDS

The whole of the work shall be carried out by, or under the full supervision of a fully licensed Plumber, Gasfitter and Drainer, who shall be on site at all times whilst the work is being

performed and such works shall be completed in accordance with the hydraulic services drawings and specification, to the Australian Standard and regulations of the authorities having jurisdiction over the works.

Tenders, installation and workmanship shall as a minimum conform to but not be limited by the following standards as set out below as a minimum requirement. In the case of a conflict between the Codes and the specification the more stringent provisions shall apply.

Tenderers shall allow for complete compliance with the requirements of all authorities and shall be deemed to have done so unless expressly stated otherwise within their tender submission.

These standards are adopted by reference and form an integral part of the hydraulic services specification and shall be read in conjunction with the hydraulic services drawings and specification. Tender, installation and workmanship shall as a minimum conform to but not be limited by these standards as the minimum requirement for the tender & execution of works to be carried out.

- National Construction Code (Previously The Building Code of Australia) (current amendment)
- Local Council Stormwater Drainage Design Guidelines
- Plumbing Code of Australia
- AS 3500.1 Water Supply
- AS 3500.2 Sanitary Plumbing & Drainage
- AS 3500.3 Stormwater Drainage
- AS 3500.4 Hot Water Supply
- AG 5601 Gas Installation Code
- Work Cover Authority of N.S.W.
- AS3000 Wiring Rules
- Telstra Australia
- Department of Mines

- AS 3500
- Agility / Jemena Gas Authority
- Roads & Traffic Authority
- Any other authorities that may be applicable

A copy of these standards shall be kept on site for use by the contractor at all times during the course of the works.

1.22 MANUFACTURERS INSTALLATION REQUIREMENTS

The Contractor shall familiarise themselves with the manufacturers installation requirements for the specified plant, fixtures, fittings, valves, tapware and associated materials required by the relevant standards, and is required to make due allowance and will be deemed to have made all due allowances for the necessary plant, fixtures, valves, fittings, piping and associated plumbing requirements for the installation of such plant, fixtures, fittings, tapware, valving and the like to the standard required by the manufacturer of the relevant items.

1.23 SCHEDULE OF RATES

The Hydraulic services contractor may supply with their tender a detailed Schedule of Rates for the purpose of assessing progress claims and variations.

The Schedule of Rates is to be agreed upon by both the hydraulic contractor and the superintendent.
Where a schedule of rates is not supplied, any approved variations and progress claims will be assessed as required as against the current edition of the Australian Plumbing Cost Guide.

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1.24 SET OUT.

The set out of pipe work to all groups of fixtures shall be arranged in conjunction with the Builder and the other trades concerned. All pipe work shall be made and positioned in a neat competent manner and a first class finish obtained.

Set out pipe work before brickwork is commenced. No walls or ducts shall be built before set out has been approved. Where pipe work extends through walls, scheduled to have tile finish, set out in conjunction with the architectural details showing centre lines of fixtures and outlets.

1.25 SUPPORTING & FIXING OF PIPES.

All pipes shall be adequately supported and secured by hangers, brackets, ring clips, saddles, etc., and shall be insulated by two thicknesses of an approved PVC stripping where supports are of a dissimilar material.

Materials for brackets and clips shall be of galvanised steel for cast iron pipes when utilised and galvanised steel or copper for copper pipes.

Supports shall be attached in a manner as to allow complete flexibility of the pipe work in a controlled manner so that movement of the piping due to temperature differences will not cause undue strain to any fixture, fitting, pipe work, pipe joint or to the structure to which it is attached.

Nails or gun fixings shall not be used for the fixing of pipe supports.

The distance between pipe supports shall as a minimum be in accordance with the relevant Australian Standard.

Where vertical pipes are exposed in rooms, they shall be secured at floor and ceiling and pipes up to 25mm diameter shall have at least two intermediate supports.
Where subject to vibration of where chafing may occur copper pipes greater than 25mm shall be separate from the supports or building structure by a 1.8mm soft copper liner held in position by flanged edges.

During construction, the open ends of pipes shall be sealed in such a manner as to prevent the entry of foreign matter into the lines.

1.26 OBVIOUS, MINOR & INCIDENTAL WORK.

Where a construction or items of work is usual, first class practice in the type of work specified, it shall be included whether or not it is mentioned in the specification or shown on the drawings.

Where neither the specification nor the drawings contain any particulars of minor parts, valves or fittings, which are nevertheless clearly to be inferred and which are necessary for the completion of the work and required by the relevant Australian Standard or manufacturers requirements, all such parts shall be supplied and executed by the contractor without extra charge.

It is the intent of the specification and drawings to broadly outline the scope of the works required to be carried out only. It is to be fully understood and agreed by the head contactor/builder and the hydraulic services contractor, that by entering into the contract, and/or commencing work on site, that both parties have agreed to furnish everything necessary for the completion of the hydraulic services to the project, and warrant that they have made due allowance for ALL labour, materials, valves, fittings, pipework, liaison with and payments to statutory authorities, the obtaining of relevant approvals, and any other such items necessary for the execution of the works in accordance with the minimum standards as set out by the relevant Australian standard applicable to that service, the relevant local authority requirements and for those requirements as set out in the hydraulic services drawings and the accompanying specification.

1.27 COOPERATION.

Allow to maintain close cooperation with all trades at all times during the project such that a first class finish is obtained.

1.28 PROGRAMMING OF WORK

Allow to comply with the program of the main contract.

1.29 STAGING OF WORK IN ACCORDANCE WITH BUILDERS PROGRAM

Staging of work shall be carried out in accordance with the builder's / head contractors' construction program.

1.30 PENETRATIONS THROUGH BUILDING ELEMENTS AND SERVICE SLEEVES.

Generally all core holes shall be Slabseal plastic waterstop assemblies accurately located, provided for all services penetrating floors and complete with approved fire stop collars equal to 'Hilti" manufacture where penetrating through floors and fire rated building elements.
Allow to core existing slabs & building elements where required for passage of services.
Waterstop flanges are to be provided to all plant room sumps, floor wastes, shower outlets, roof outlets and to piping wherever water leakage may occur.

1.31 CONCEALING PIPES

Except where otherwise noted on the drawings, or where projecting from a floor, wall or ceiling to connect a fitting, piping of all kinds and descriptions shall be concealed within walls.
Chases for pipes in brick walls shall be cut with a masonry saw. Chases to be accurately set out and carefully cut to the minimum dimensions required to house pipes and fittings. Chases in reinforced concrete walls shall be formed with timber blockouts prior to concrete pour.
Underground or enclosed work shall not be covered up or concealed from view until it has been duly tested, inspected and passed by the authorities.

1.32 PAINTING & IDENTIFICATION

With the exception of any exposed flues, stacks, vents, **ALL** exposed piping in toilets, kitchens, etc. shall be heavily nickel-plated and then chromium plated and finished with chromium-plated wall flanges fitted at the wall face.

All other exposed piping, fittings & brackets are to be cleaned, primed & painted to colour coding in accordance with AS1345-1995.

Supply and fix 3M Safetyman pipe identification labels at 3m. centres to all services.

1.33 FIXING

All pipes above ground level shall be securely fixed in position with M.S. Clips and/or hangers fixed to walls or concrete slabs with approved metallic anchors. Fixing brackets, clips, etc. shall be similar and equal in all respects to 'Unistrut' and the Contractor shall provide and install M.S. channel inserts in positions to receive pipe hangers prior to concrete slabs being poured. Care shall be taken to insulate copper pipe from mild steel clips by lagging that portion of the pipe with PVC tape.
All work shall be carried out in a neat competent manner.

1.34 COVER PLATES

Where exposed pipes pass through a floor, wall or ceiling, the joint shall be finished with an approved spun metal cover plate.

1.35 PLACING OF ORDERS.

The Contractor shall ensure that orders for materials, sanitary fixtures, brassware, appliances, etc. shall be placed with the manufacturers and/or suppliers as soon as possible to ensure delivery of items specified and to obviate any delay or change of specified articles.

1.36 ACCESS TO PIPES.

All services shall be free of each other and easily replaceable for their full length. Pipe work shall be so arranged with inspection openings, valves, etc. so placed as to be accessible through inspection panels provided in walls or ceiling.

1.37 PROVISION OF MATERIALS.

The Contractor shall provide all piping, fittings tools, plant and all other incidental materials necessary for the satisfactory installation, testing and completion of work all to the satisfaction of the local Authority. All materials shall be new and the best of their respective kinds and shall conform to the requirements of the current relevant specification of the Standards Australia. All materials delivered to the site shall be protected and stored in a suitable manner.

1.38 PROTECTION OF POLISHED SURFACES.

All polished stainless steel, chromium plated; vitreous enamel etc. surfaces shall be protected during installation by application in strict accordance with the Manufacturer's instructions of a strippable coating.
The coating shall be applied as soon as practicable and shall not be removed until completion of the job. On removal of the coating, the previously protected surfaces shall be cleaned with Methylated Spirits and polished with a soft dry cloth.
Scratched or damaged finished surfaces will not be accepted.

1.39 CLEANING OUT OF PIPING SYSTEM.

All piping shall be thoroughly cleaned of loose scale or dirt before erection and following erection and sealing of joints shall be thoroughly cleaned out by flushing through with clean water at the highest practicable velocity until all foreign matter is removed.
Allowance is to be made for cleaning out of all piping and disposal of water used for flushing.

1.40 RESTORATION OF SURFACES

The Contractor shall be responsible for the restoration of any road paving, bitumen surfacing or other surfaces removed or damaged because of the works. Any roads, pavings etc. so affected shall be restored with materials of the same nature and of equal quality as those removed or damaged and to the same standards of construction and depth so as to produce at the end of the maintenance period a finished surface at least equal in all respects to that existing before the commencement of the works.

Should the Contractor fail to restore properly and maintain surfaces affected by his operations, the Builder shall have full power to have the necessary work done and the cost of such work shall be deducted from any sums that may be due or become due to the Contractor under this contract.

1.41 EXPANSION & CONTRACTION

Steel and/or copper piping shall be arranged with bends and offsets to absorb the whole of its own expansion and contraction without developing excessive stress in the piping or joints.

Approved type expansion bends or loops may be used where offsets are impractical. Gland packed expansion units shall not be used.

1.42 EXISTING SERVICES

Prior to commencement of construction works, allow to fully investigate, electronically locate, mark and identify the location and reticulation of all existing on site water, gas, sewer and stormwater drainage services affected by the works and carry out any necessary works or diversions required to maintain those service supplies to the site.

Contractor is to allow to locate and disconnect obsolete gas, water, and sewer and stormwater drainage services at street mains to authority requirements. Allow for and undertake all necessary liaison & co-ordination with relevant authorities and service providers.

Ensure that all authority services that are to remain operational within the site boundaries are located and protected from damage.

1.43 EXISTING DISUSED SERVICES

All redundant existing services shall be investigated and disconnected at their point of connection to the authorities' service. Disconnections shall be to the approval of the relevant Authority.

This shall include but not be limited to Stormwater, Sewer, Gas and Water Services.

1.44 CONNECTIONS TO EXISTING SERVICES

It is the responsibility of the Plumbing Contractor to ensure that when connecting to or diverting existing services they have clearly located & ascertained that the services are in fact the services in question.

Dye tests shall be undertaken on all sewer and stormwater pipework connection / diversion points.

1.45 AUTHORITIES SERVICES SEARCH - DIAL BEFORE YOU DIG

The Plumbing Contractor shall allow to undertake an Authorities services search and obtain all available information on Authorities services within the street and site area.
Contact
Dial Before You Dig PH: 1100
www.dialbeforeyoudig.com.au

1.46 EXCAVATION NEAR AUTHORITIES SERVICES

The Plumbing Contractor shall allow to hand dig when excavating Authorities services. The Authorities shall be given 48 Hours' notice prior to any excavation taking place where required or requested.

1.47 MATERIALS

Materials for each service shall be new, first quality, approved and comply with the appropriate Australian Standard.

All plumbing and drainage products used throughout the project shall be approved in accordance with MP52 Manual of authorization procedures for plumbing and drainage products and shall bear **watermark approval**.

Pipe sizing has been undertaken using copper tubing and pipe sizes indicated in the documents are Nominal OD. Where the contractor utilizes a material other than Copper Tubing, the contractor shall ensure that the internal pipe diameters and flow rates match those of the equivalent nominated copper tubing size.

1.48 SERVICE MATERIAL SCHEDULE

Service	Material	Jointing
1. Cold Water Supply	Copper Tube	Silver Soldered
2. Stormwater Drainage	PVC/Concrete	Solvent Cement/ Rubber Ring
3. Trade Waste Drainage	HDPE	Fusion welded
4. Sanitary Plumbing	PVC/Copper Tube	Solvent Cement/ Silver Soldered

5. Hot Water Supply	Copper Tube	Silver Soldered
6. Natural Gas Service	Copper Tube	Silver Soldered

Note: Polypropylene (PPR) piping of any kind shall not be used on the project. Where found to have been used in any service, any polypropylene piping used shall be removed and replaced at the contractor's costs, including such costs as necessary for consequential damage.

1.49 PROTECTION OF PIPELINES BY ENCASEMENT IN POLYETHYLENE

Where installed underground all new metallic pipelines, pipe fittings, valves and areas of existing branch pipelines of any material joining new pipelines for the distance specified, shall be provided with a protective encasement of polyethylene tubing.
Such tubing shall be provided additional to, but not as a substitute for, any corrosion protection that may be specified elsewhere.

1.50 ACOUSTIC PIPE SUPPORTS

Isolate all waste, stormwater and water services pipework from the building structure using supports as mentioned in Fixing and Supporting of Pipes. Pipework shall be separated from brackets using Dammgulast Pipe Fixture Insulators 4.5mm thick.
Rubber grommets shall be used where pipework passes through metal studs.

1.51 CONCRETE

All concrete used in conjunction with this work shall have a minimum strength of 20 mPa at twenty-eight days when tested in accordance with AS 1012 Part 8 - Method for Making and Curing Concrete Compression, Indirect Tensile and Flexure Test Specimens in the Laboratory or in the Field.

1.52 ALTERNATIVES TO SPECIFIED MATERIALS AND PLANT

Tenders shall be based on materials, plant and equipment mentioned in this specification unless alternatives are detailed and costed to indicate such savings at time of tender.

NO CORRESPONDENCE WILL BE ENTERED INTO FOR SUBSTITUTION OF SPECIFIED MATERIALS AFTER THE TENDER PERIOD.

WHERE SPECIFIED MATERIALS, FIXTURES AND FITTINGS ARE NOT SUPPLIED BY THE CONTRACTOR, THE PRINCIPAL RESERVES THE RIGHT TO DEDUCT & RETAIN THE DIFFERENCE IN VALUE OF THE INSTALLED MATERIALS AS AGAINST THE COST OF THE SPECIFIED MATERIALS FROM THE CONTRACT SUM.

1.53 TESTING

Allow for the cost of carrying out all tests set out on the drawings or in the specification or as required by the respective authorities. Supply all plugs, apparatus, and other materials necessary for the tests. Underground or enclosed work shall not be covered or concealed from view until it has been inspected, tested and sighted by the Superintendent and approved by the Authority concerned.

On completion of the works included under this part of the specification the Plumbing Contractor shall carry out any procedure required to prove that the respective systems are operational under normal working conditions, as requested by the Superintendent and authorities.

Provide a minimum of two (2) working days' notice to the Superintendent before the commencement of testing.

Maintain a separate set of drawings on site to record progress of testing. The Superintendent shall initial the drawings of each section of work that has passed a satisfactory test. Remedy any defects in the piping found during testing and re-test as specified under each section of work.

1.54 SEWERAGE SERVICE DIAGRAM

The Contractor must provide a Sewerage Service Diagram to the Project Manager prior to practical completion.

The Sewerage Service Diagram must comply with the requirements of **Sydney Water**

The Sewerage Service Diagram must be supplied to **Sydney Water**

1.55 WORK AS EXECUTED DRAWINGS

Unless over-ridden by the General Conditions of Contract, one month prior to practical completion of the works provide a complete and accurate set of CAD drawings showing the installed position of all services, equipment, valves and sundry pipework included in this specification. Drawings shall be prepared by a competent drafter on approved reproducible material. The minimum size scale shall be at least equivalent to those used on the contract document. The invert depths and location of all pipes and valves shall be accurately plotted and indicated by measurements. Provide the following:

- Three sets of drawings on plain paper.
- Three CD Copies of all drawings in DWG format.
- Three CD Copies of all drawings in PDF format.

All changes in between practical completion and the tender drawings are to be allowed by the Hydraulic subcontractor.

The minimum size scale shall be at least equivalent to those used on the contract documents.

WHERE AS CONSTRUCTED DRAWINGS ARE NOT SUPPLIED BY THE CONTRACTOR, THE PRINCIPAL RESERVES THE RIGHT TO DEDUCT & RETAIN THE VALUE OF PREPARING AS CONSTRUCTED DRAWINGS FROM THE CONTRACT SUM.

1.56 MP52 AUTHORIZATION

All plumbing and drainage products shall be approved in accordance with MP52 Manual of authorization procedures for plumbing and drainage products and shall be watermarked.

1.57 WELS AUTHORIZATION

All tapware used throughout the project shall be approved in accordance with WELS Ratings system of authorization procedures and shall be marked accordingly. All WELS documentation shall be provided to the principal at the end of the project.

1.58 DEFECTS

RECTIFICATION OF DEFECTS

1. The builder is to be responsible for ensuring that the subcontractor(s) satisfactorily attends to all defect items issued during inspections by the consulting engineer, prior to the final inspection.

2. Failure to attend to these defects resulting in repeat inspections by the consulting engineer shall make the builder liable for the engineer's fees for the inspections.

2 WORKS BY OTHER TRADES

2.1 BUILDING CONTRACTOR

The following works by others shall be undertaken by the building contractor:

2.1.1 Prior to works commencing on-site

- Erosion & Sediment Control in accordance with Councils requirements and Department of Conservation and Land Management — Urban Erosion & Sediment Control Handbook • (Including Sediment Control Fences, wash bays, straw bale's, etc)
- Dewatering of Site.
- Stamping of plans — The Builder shall take to Sydney Water Quick Check Agent
- - The original approved DA architectural drawings stamped by council for stamping
- - A copy of the structural drawings
- - A copy of the hydraulic drawings

2.1.2 General

- Duct access panels and inspection panels. (Plumbing Contractor to coordinate locations with builder)
- Inspection panels for all plumbing traps & required access point in ceiling areas.
- The construction of the plumbing ducts in accordance with part F5.6 of the Building Code of Australia.
- Replacement of bitumen roadways removed for plumbing installation.
- Sink top and hole penetration

2.1.3 Waterproofing

- Waterproofing of all wet areas.

2.1.4 Overflows

- Overflows from the Roof box gutters
- Sealing between all pipework that pass through the building facade including box gutter overflows and downpipes

3 EXCAVATION AND BACKFILLING

3.1 GENERAL

Before excavating in public areas obtain the approval of all the relevant authorities and comply with their requirements regarding fees, traffic, excavation, backfilling and reinstatement of roads, footpaths and grassed areas.

3.2 TRENCHES

Trenches shall be excavated at uniform grades, in straight lines and shall provide safe working conditions with timbering being provided where required.
Common trenches shall be constructed with benches for each service at the required invert levels. Piping laid vertically above another service will not be permitted.
Trenches shall be excavated material 'as found' with contractor allowing for excavation of all materials as provided for in the geotechnical report supplied by the superintendent.

3.3 EXCESS EXCAVATION

If the required area of excavation is exceeded, allow to make good and fill the extra excavation with concrete.

3.4 BARRIERS

Allow to provide warning signs, lights, barriers and trafficable temporary covers over open trenches where necessary.

3.5 SURPLUS SPOIL

Surplus spoil is to be removed from the site prior to practical completion.

3.6 SAWCUTTING

Concrete and bitumen surfaces shall be saw cut to a minimum depth of 100mm.

3.7 BACKFILLING

Where a length of trench has been approved, the backfilling material shall be placed and compacted to approval. Piping under vehicle access areas and all other areas outside the site boundaries shall be backfilled with sand to finished ground level. Piping in other areas to be backfilled as specified below. Sand backfill to be consolidated by flooding.

After a length of pipeline has been constructed, tested and approved and permission given to backfill, the trench shall be backfilled with sand up to 300mm. above the pipe collar. The remainder of the trench may be filled with sandy loam or other granular material free from any rocks or other objects that may damage the pipes. Each succeeding 300-mm. layer of backfill material shall be consolidated by mechanical tamping method.

4 STORMWATER DRAINAGE.

4.1 GENERALLY.

The work to be executed under this section comprises the complete supply, installation and testing of the stormwater drainage from the base of all downpipes to all outlets, inspection pits and sumps complete with gratings, all to levels and details shown on the drawings as specified herein.
All 100mm and 150mm diameter pipes and fittings shall be DWV uPVC with solvent cement joints. Piping over 300mm diameter shall be Class 2 reinforced concrete or fibre reinforced cement (FRC) of equivalent class suitable for rubber ring jointing.

4.2 BEDDING.

Allow to bed all piping on 75mm sand.

4.3 SERVICE IDENTIFICATION

Lay locatable warning tape over all underground stormwater drainage pipelines for full length of service. Tape to be continuous and marked STORMWATER DRAINAGE PIPE UNDER.

4.4 PITS.

Excavate for and install precast concrete inlet sumps as detailed on drawings. Cast iron covers shall be equal to that manufactured by C.I. &D. Fix light duty gratings and frames in pedestrian areas and heavy duty in vehicle access areas. Provide gas tight trafficable covers to pits located in internal areas and as required. Pit gratings to be heel proof with non slip finish.

4.5 TESTING

The whole of the pipelines shall be hydraulically tested to maximum choke level in lengths approved or as directed. Before testing, all pipe bedding shall be completed, and backfilling compacted to the level of the centre of the pipe.
On completion of testing and cleaning provide a full CC TV camera video of the entire drainage system

5 SEWER DRAINAGE

5.1 GENERALLY

This section of the work comprises the complete excavation supply and installation of the sewer drainage from the fixtures and vent pipes to the existing sewer drainage located on site.

5.2 SEWER PIPES.

The pipes to be used for trade waste drainage shall be HDPE. Pipes and fittings shall be laid firmly on the barrel and evenly graded from point to point.

Joints shall be fusion welded as approved by Sydney Water.

Inspection openings to be fitted at all changes of direction and before each fitting and at intervals not greater than 30m. Inspection openings shall be sealed by means of screwed cap.

Gullies to be 100mm diameter 'P' trap with required inlets set on a concrete base 150mm thick and with riser to finish 150mm above the finished ground or paving level with a 150 x 100mm taper made for the purpose neatly splayed concrete surround and fitted with a cast iron grating.

Floor wastes to be 100mm traps set on concrete base and with plain or inlet riser fitted with CP brass drainer grate.

Bends turned up to receive vents shall be set on a 150mm thick concrete base.

5.3 BEDDING.

All pipes shall be supported beneath barrels with 4:1 cement mortar or granular material.

5.4 SERVICE IDENTIFICATION

Lay locatable warning tape over all underground sewer drainage pipelines for full length of service. Tape to be continuous and marked SEWER DRAINAGE PIPE UNDER.

5.5 TESTING OF PIPELINES.

The whole of the pipelines shall be hydraulically tested to maximum choke level in lengths approved or as directed. Before testing, all pipe bedding shall be completed, and backfilling compacted to the level of the centre of the pipe.

On completion of testing and cleaning, provide a full CCTV camera video of the entire drainage system.

5.6 SEWER CONNECTION.

Ascertain the exact depth, position and suitability of the sewer connection prior to commencement of any trenching or other sewer drainage works and provide advice if any adjustments are required to execute the work as shown on the drawings.

5.7 CLEAROUTS

Supply and install clearouts to all sanitary drainage in accordance with AS 3500.2 - 2003 4.7.1.

Minimum Requirements for Location of Clearouts

(a) as close as practicable outside the building on each branch connecting one or more water closets or slop hoppers but not greater than 2.5 m;

(b) at each end of the straight section of a main drain and at intervals of not more than 30 m.

(c) at the connection to the regulating authority's sewer, if not provided by the authority;

(d) on the downstream end where any drain passes under a building except where waste fixtures only are connected;

(e) where any new section of drain is connected to an existing drain;

(f) immediately at or upstream of the upper bend of a jump-up;

(g) at every change in horizontal direction of greater than 45°; and

(h) at every change in gradient greater than 45°.

6 SANITARY PLUMBING.

6.1 GENERALLY.

The work to be executed under this part comprises the complete supply and installation of the soil, waste and vent piping from the sewer drainage to the vent terminals and includes for all bends, offsets, branches, brackets and sundry equipment necessary to complete the installation.

Except where otherwise specified soil waste and vent piping shall be carried out with U.P.V.C. piping and fittings.

6.2 EXPANSION JOINTS.

Supply and install approved expansion joints to all soil and waste stacks, all branch and vent piping in accordance with AS 3500.2 - 2003

6.3 INSPECTION OPENINGS & GATES.

Supply and install test and inspection openings to all sanitary plumbing in accordance with AS 3500.2 - 2003

Minimum Requirements for Location of Test and Inspection openings

Install inspection openings in pipes in that each section of pipework is accessible in at least one direction. Install bolted testing gates at the foot of each stack and at intervals not exceeding (3), three floors. Inspection openings shall be placed in accessible positions and to approval.

All pipes conveying discharge from soil fixtures shall be provided with inspection openings in the following locations:

(a) Wherever necessary for testing purposes.
(b) As close as practical to or at the first bend downstream from the outlet of every fixture trap.
(c) At minimum intervals of 30 m in any graded pipe.
(d) At the base of every stack.

(e) At junction fittings that connect any graded pipe or branch to a stack, or at the upstream section of such graded pipe or branch.

Install inspection openings in pipes in that each section of pipework is accessible in at least one direction. Install bolted testing gates at the foot of each stack and at intervals not exceeding (3), three floors. Inspection openings shall be placed in accessible positions and to approval.

6.4 VENT PIPES.

Terminate all vents through roof with approved cowl. Penetrations for vent piping through roof shall be carried out by the Roofing contractor.

6.5 FLOOR WASTES.

Supply and fix 100mm x 50/65 floor gullies of self-cleansing pattern with P.V.C. rise and CP brass grate.

6.6 TRAPS.

All traps to fixtures shall be of U.P.V.C. universal pattern where concealed and where exposed shall be CP copper.

6.7 TESTING.

The complete sanitary plumbing installation shall be water tested to maximum choke level to the approval of the relevant authorities.

6.8 SANITARY FIXTURES

Refer to the architectural fixtures schedule for type and location.

7 COLD WATER SUPPLY

7.1 GENERALLY.

The work to be executed under this part comprises the complete supply and installation of the cold water supply from the existing service to all connection points mentioned in the Specification and shown on the drawings. Allow for all piping, fittings, valves and brackets necessary to complete the installation.

Maximum operational pressures within the cold water system shall be limited to 500 kPa by use of suitably sized pressure limiting valves.

Allowance shall he made for the use of water hammer arrestors where necessary.

7.2 PIPEWORK.

All pipework shall be installed using materials as previously specified.

Pipework shall be installed in a neat and competent manner, running parallel with walls and floor slabs and branches taken off at right angles. Where pipes are led up or along walls and then through to fixtures, the pipes are to be fitted with elbows to allow correct fitting of C.P. cover plates. Short pipe extension pieces from walls to fixtures shall be fitted with union connections to allow removal of fixtures.

7.3 SERVICE IDENTIFICATION

Lay locatable warning tape over all underground water / fire hosereel pipelines for full length of service. Tape to be continuous and marked WATER / FIRE HOSEREEL PIPE UNDER as applicable.

7.4 TESTING.

On completion, all piping shall be subject to a (2) hour pressure test of 2400 kPa. Provide a minimum of 24 Hrs notice to the superintendent to allow for arrangement of test witnessing. Any defects in the system shall be remedied and the test reapplied. Provide a certificate ndicating satisfactory application of test.

7.5 TAPS & FAUCETS.

Refer to the Architectural Fixtures schedule for type and location of taps and faucets.

Taps and faucets shall be equal to a bright chromium finish. All connections and cover plates shall be to the same finish as the taps.

Provide sufficient unions to allow removal of fixtures without alteration to pipework.

All tap handles to disabled toilets to be lever action & disabled standard approved and equal to Enware Expo lever or single lever mixer style.

7.6 CONNECTION TO MAIN

EXISTING ON SITE

7.7 WATER METERS.

Allow to supply and install with all necessary valves a new private sub-meter in location as indicated on the drawings.

7.8 VALVE BOXES.

Install cast iron path boxes with PVC riser over spindle and cover marked W to all underground valves.

8 HOT / WARM WATER SUPPLY.

8.1 GENERALLY.

The work under this part comprises the complete supply and installation of the hot water piping from the existing hot water heater to all fittings as indicated on the drawings. Allow for the supply and fixing of the piping, fittings, brackets and insulation required to complete the installation.

The entire hot water piping installation shall be installed to comply with the requirements of BCA 2007 Section J and AS3500.4 Section 8 – Energy Efficiency.

Maximum operational pressures within the hot water system shall be limited to 500 kPa by use of suitably sized pressure limiting valves.

Allowance shall he made for the use of water hammer arrestors where necessary.

8.2 PIPEWORK.

All pipework shall be installed using materials as previously specified.

Pipework shall be installed in a neat and competent manner, running parallel with walls and floor slabs and branches taken off at right angles. Where pipes are led up or along walls and then through to fixtures, the pipes are to be fitted with elbows to allow correct fitting of C.P. cover plates. Short pipe extension pieces from walls to fixtures shall be fitted with union connections to allow removal of fixtures. On completion, all piping shall be subject to a (2) hour pressure test of 2400 KPa. Any defects in the system shall be remedied and the test reapplied.

8.3 VALVES.

All valves installed in hot water lines are to be ball type valves. Ball valves are to be provided on each branch line from the main service lines of the water supply system to isolate all connected equipment.

8.4 TESTING.

On completion, all piping shall be subject to a (2) hour pressure test of 2400 KPa. Any defects in the system shall be remedied and the test reapplied.

8.5 HOT WATER CIRCULATING PUMP

NOT REQUIRED

8.6 BALANCING VALVE

NOT REQUIRED

8.7 INSULATION.

The entire hot water piping installation shall be insulated to comply with the requirements of BCA 2007 Section J and AS3500.4 Section 8 – *Energy Efficiency and as per the table extracted below*.

In addition to these minimum requirements, all piping chased in brickwork or concrete otherwise than as nominated below shall be insulated with factory applied Kemlag or equal. All piping concealed in ducts, conduits and false ceilings shall be insulated with 25mm. minimum wall thickness Thermotec / Armaflex type flexible insulation.

HEATED WATER PIPING				
MINIMUM THERMAL INSULATION				
System	Location of piping to be insulated	Minimum Total R-values required		
		Climate region A	Climate region B	Climate region C
Non–circulating heated water piping	All heated water piping within a conduit encased within a concrete floor slab	0.3	0.3	0.3
	All external piping from the water heater to the primary kitchen sink	0.3	0.6	1.0
Circulating heated water piping	All heated water piping within a conduit encased within a concrete floor slab (except for piping which is part of a floor heating system)	0.3	0.3	0.3

	All external flow and return piping including 500 mm along any branch from the flow and return piping	0.3	0.6	1.0
	All internal flow and return piping including 500mm along any branch from the flow and return	0.3	0.3	0.3

8.8 HOT WATER HEATERS.

EXISTING ON SITE

9 NATURAL GAS SUPPLY

9.1 GENERALLY.

The work to be executed under this part comprises the complete supply and installation of the natural gas supply from the boundary to the gas appliances as shown on the drawings. Allow for all piping, fittings and valves necessary to complete the installation.
Allow to make all applications for the connection of the proposed gas service with Jemena.

9.2 PIPEWORK & FITTINGS.

All pipe work and fittings shall be installed using copper tube with silver soldered joints as previously specified.

Pipework shall be installed in a neat and workmanlike manner, running parallel with walls and floor slabs and branches taken off at right angles. Where pipes are led up or along walls and then through to fixtures, the pipes are to be fitted with elbows to allow correct fitting of C.P. cover plates. Short pipe extension pieces from walls to fixtures shall be fitted with union connections to allow removal of fixtures.

9.3 TESTING.

On completion, all piping shall be subject to a 30 minute pressure test of 15 kPa. Any defects in the system shall be remedied and the test reapplied.

9.4 METER.

Supply & install a 9cu.m. capacity gas meter & regulator as indicated on drawings.

9.5 VALVES.

Service, control and appliance control valves shall be stainless steel ball valves with brass union connections.

Supply and install cast iron path boxes with PVC riser over spindle to all underground valves with cover marked GAS.

9.6 APPLIANCES

Refer to Architectural specification for type & manufacturers instructions.

9.7 IDENTIFICATION

Lay warning tape over all underground gas pipelines for full length of service. Tape to be continuous and marked GAS PIPE UNDER.

10 SANITARY FIXTURES

The work under this part comprises the complete supply and installation of all the sanitary fixtures and tapware mentioned in the specification and as shown on the drawings. Fixtures not nominated in the schedule, but shown on the drawings shall be equal in all respects to those fixtures as nominated in the fixtures schedule.

Allow for the supply and fixing of all fixtures, bolts, brackets, putty, cement and sundry materials necessary for the installation and connection of fixtures and tapware to Manufacturer's instructions.

For fixture details refer to Architectural Specification.

11 PLUMBING CONTRACTOR SCHEDULE OF REQUIRED SUBMISSIONS

The Following items are required to be supplied by the plumbing contractor to the Architect / Superintendent during the course of the project:

A. *Copy of receipts for payment of authorities application fees*
B. *Copy of all Authorities Applications for connection*
C. *Tender Break up / schedule of rates*
D. *Work as executed drawings*
E. *Operation and maintenance manuals*
F. *Survey of completed detention tank*
G. *Valve Schedule*
H. *Trade Waste Cleaning Reciept.*
I. *Written guarantee for sanitary fixtures, fittings and all equipment from the manufacturer for a period of two years. The guarantee shall cover all costs associated with replacement of a faulty article within the two-year period.*