

University of Wollongong

Documentation Standards
Version 6 – 23 April 2013

VERSION CONTROL SYSTEM

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1 OVERVIEW

Documentation includes all drawings, manuals, specification and reports prepared for the University of Wollongong (UOW). UOW require documentation to be prepared to be consistent and in an electronic format for the University's general use and archiving. This documentation standard applies to major or minor works and master planning activities.

Compliance with this documentation standard ensures that electronic information received by UOW is consistent and compatible with UOW's existing documentation.

2 RESPONSIBILITY

The lead design consultant is responsible for the compliance with this standard. They shall coordinate all design consultants to ensure all documentation, reflects the requirements of this standard. This document has been provided in pdf and word document to allow consultants to remove extracts and include in design and tender specifications as required.

Where work is undertaken directly to UOW, the responsibility resides with the relevant building contractor under direction from the UOW Project officer or representative.

3 DOCUMENT SUBMISSION PROCESS

Documentation required is outlined but not restricted to Table 1, 2 and 3. Figure 1 shoes the normal documentation submission process. It is important that the lead consultant understand and adhere to this process for capital works projects. In some instances for minor works projects the submission process may be reduced.

Contract documentation must comply with the following submission requirements:

3.1 Design Documentation

- Design Drawings - A soft copy of all progressive design drawings must be submitted at key stages, notionally:
 - Brief/Return Brief.
 - Concept/Schematic Design (notionally 40%).
 - Development Application.
 - Design Development (notionally 70%).
 - Pre Tender (notionally 95%).
- Design Reports - A complete revised soft copy of all relevant design reports must be submitted at Pre-Tender stage. Any amended design reports need to be resubmitted promptly.

| Design Stage - Project Documentation Checklist | | | |
|--|----------------------------------|-----------------------|-----------------------|
| Design Documentation | Report/Return Brief (pdf) | Drawings (pdf) | Drawings (dwg) |
| Architectural | X | X | |
| Design Risk Register | X | | |
| Structural | X | X | |
| Civil | X | X | |
| Mechanical | X | X | |
| Electrical | X | X | |
| Hydraulic | X | X | |
| Lift | X | X | |
| Communications | X | X | |
| Security | X | X | |
| Fire - Dry | X | X | |
| Fire - Wet | X | X | |
| Landscape | X | X | |
| Level 3 High Voltage | X | X | |
| BCA | X | | |
| Section J | X | | |
| Access | X | | |
| Cost Planning | X | | |
| BCA | X | | |
| Acoustic | X | | |
| Geotech | X | | |
| Surveyor | X | X | X |
| Traffic/Transportation | X | | |
| Bushfire | X | | |
| Heritage | X | | |
| Arborist | X | | |
| Stormwater | X | | |
| High Voltage | X | X | |
| Sydney Water | X | | |
| Gas | X | | |
| Telstra/Optus | X | | |
| Development Application | X | | |
| Construction Certificate | X | | |
| Other (as applicable) | | | |
| X - Denotes to be forwarded to relevant UOW project officer | | | |

Table 1 – Project Documentation requirements during the design stage

3.2 Tender Documentation

A complete soft copy of “Tender” documentation must be submitted. Drawings and specifications shall be submitted in pdf format.

3.3 Construction Documentation

A complete soft copy of “Construction” documentation must be submitted. Drawings shall be submitted in pdf and dwg format. Refer to Table 2.

| Construction Stage - Project Documentation Checklist | | | |
|--|---------------------|-----------------------|-----------------------|
| Construction Documentation | Report (pdf) | Drawings (pdf) | Drawings (dwg) |
| Specification-All disciplines | X | | |
| Drawings – All disciplines | | X | X |
| Schedules – Including FF&E, Finishes, Colour | X | | |
| Reports - Including Engineering, ESD etc | X | | |
| X - Denotes to be forwarded to relevant UOW project officer | | | |

Table 2 - Project Documentation requirements during the Construction stage

3.4 “As Installed” Documentation

- Progressive mark-up of “As Installed” drawings, including in-ground service drawings, must be progressively marked up and reviewed at site meetings on a monthly basis during the construction stage. Progress prints must be submitted to the lead consultant at 25%, 50% and 75% complete stages.
- As Installed documentation at Practical Completion - One draft hardcopy and onesoft copy of 90% complete documentation (which includes manual and drawings) must be submitted for approval at application for Practical Completion. Refer to Section 12.4 & 12.5 for details of document submission requirements
- As Installed and Operation and Maintenance Documentation - Final- One complete soft copy of final documentation must be submitted 4 weeks after Practical Completion.
- Retention will not be returned until final approved as-built drawings and operation & maintenance manuals have been issued.

Documentation required is outlined but not restricted to Table 3.

If, during Defects Liability Period, any subsequent information is to be included in the manuals, it shall be provided as a soft copy and in a complete section for ease of integration into the O&M Manual. Any modification to drawing shall be submitted in pdf and dwg formats.

| As-Installed Documentation | Report (pdf) | Drawings (pdf) | Drawings (dwg) |
|--|---------------------|-----------------------|-----------------------|
| Specification- All disciplines | X | | |
| Drawings – All disciplines | | X | X |
| Operation and Maintenance Manuals | X | | |
| Survey | | X | X |
| Schedules – Including FF&E, Finishes, Colour | X | | |



| | | | |
|--|---|--|--|
| Reports - Including Engineering, ESD etc | X | | |
| | | | |
| X - Denotes to be forwarded to relevant UOW project officer | | | |

Table 3 As-installed documentation requirements

4 DRAWINGS

4.1 General

All design drawings prepared for UOW shall comply with the following standards:

- a. A1 sheets shall be used for all plans, construction layouts, and single line diagrams. Drawings shall be clearly legible when printed out at A3.
- b. A3 sheets shall be used for detail drawings and rendered illustrations.
- c. Drawing size shall be clearly noted in the title block.
- d. All drawings shall include a title block with version, issue, date, drawn by, project title, softcopy filename and the UOW logo.
- e. All plan drawings shall clearly show the north point.
- f. All drawings shall be clearly identified as “Design (relevant stage)”, “Tender”, “Construction” or “As Installed”.
- g. All drawings shall have a scale bar.
- h. Soft copies of drawings shall be provided in both AutoCAD (dwg) and Adobe Acrobat (pdf) formats.
- i. All AutoCAD cross reference drawings shall be bound into original drawing.
- j. Unused objects, line types and entities shall be purged to keep drawing file size to a minimum.
- k. All soft copy drawings submitted shall be able to be viewed and edited in the two latest versions of AutoCAD.
- l. Arial Narrow or Arial shall be used as the standard font for all text included on drawings.
- m. All drawings shall use the ‘Bylayer’ method, which ensures only one line type and colour per layer;
- n. Only AutoCAD standard line types (as defined in acad.lin) shall be used.
- o. Alternate line types and fonts may only be used with the permission of the project manager. A copy of the fonts and line types must be included with drawing file when issued.
- p. UOW's standard colours are identified in Table 1 following. If non-standard colours are used, the plot style table (ctb file) must be included with the drawing file.



| Screen Colour | Plot Colour | Plot Width |
|--------------------|-------------|------------|
| Red – Colour 1 | Black | 0.45mm |
| Yellow – Colour 2 | Black | 0.3 mm |
| Green – Colour 3 | Black | 0.9 mm |
| Cyan – Colour 4 | Black | 0.65 mm |
| Blue – Colour 5 | Black | 0.2 mm |
| Magenta – Colour 6 | Black | 0.2 mm |
| White – Colour 7 | Black | 0.2 mm |
| Grey – Colour 8 | Black | 0.1 mm |
| Grey – Colour 9 | Black | 0.1 mm |
| Colour 31 | Red | 0.1 mm |
| Colour 32 | Red | 0.6 mm |
| Colour 33 | Red | 0.3 mm |
| Colour 51 | Yellow | 0.1 mm |
| Colour 52 | Yellow | 0.6 mm |
| Colour 53 | Yellow | 0.3 mm |
| Colour 71 | Green | 0.1 mm |
| Colour 72 | Green | 0.6 mm |
| Colour 73 | Green | 0.3 mm |
| Colour 131 | Cyan | 0.1 mm |
| Colour 132 | Cyan | 0.6 mm |
| Colour 133 | Cyan | 0.3 mm |
| Colour 151 | Blue | 0.1 mm |
| Colour 152 | Blue | 0.6 mm |
| Colour 153 | Blue | 0.3 mm |
| Colour 201 | Magenta | 0.1 mm |
| Colour 202 | Magenta | 0.6 mm |
| Colour 203 | Magenta | 0.3 mm |
| Colour 250 | Black | 0.05 mm |
| Colour 251 | Grey | 0.1 mm |
| Colour 252 | Grey | 0.6 mm |
| Colour 253 | Grey | 0.3 mm |

Table 4

4.2 Room Numbers

Final room numbers will be provided by FMD once architectural layouts are frozen. The final room numbers must be shown on tender drawings and documentation for labelling of all spaces using the FMD numbering and sequencing process. Schedules and Specifications must reflect the UOW room numbers. Final room numbers must also be shown on services drawing for the purpose of labelling field equipment.

4.3 Survey Drawings

Survey drawings shall comply with the following format:

- a. All survey drawings shall be based on the 'Map Grid of Australia'.
- b. All contour lines shall be minimum 0.5 metre.
- c. Survey to include corners of buildings within survey vicinity.
- d. State Control Points for Main Campus are located in Northfields Avenue:
 - i. PM 4442 – RL 47.531 – E 1019.68 – N 933.45
 - ii. PM 16948 – RL 24.114 – E 1696.78 – N 970.80

Internal control point locations and coordinates may be obtained from Facilities Management Division (FMD) by contacting Ph 42213085 or 42214248.

- e. Control Points for Innovation Campus are located in Squires Way:
 - i. PM 5591
 - ii. PM 5588

Refer UOW Drawing No. 99-10-091.

- f. Dwg file to include (in model space) two relevant control points.
- g. Certified survey of Ground Floor Slab to be submitted to the following tolerances
Slab edge (on plan) +/- 25mm
- h. Slab Level +/- 10mm.
- i. The date shall be clearly indicated.
- j. North point shall be clearly indicated.

5 OPERATION AND MAINTENANCE MANUALS

5.1 General

Operation and maintenance manuals shall be submitted for all services installations and building elements with specific maintenance requirements. The operation and maintenance manuals shall contain separate sections on correct operating procedures, specific maintenance tasks and detailed technical information.

Operation and maintenance manuals shall be formatted as follows:

Soft Copy

- a. Each manual shall be provided on a separate disk.
- b. Each disk shall be labelled with the typed or printed title 'OPERATION AND MAINTENANCE

MANUAL' in capital lettering on the disk and the cover.

- c. Each manual shall be one file only in contents order.
- d. Where possible, manual to be provided as pdf and word format. Drawings in manual to be provided as pdf and dwg files.
- e. Wherever possible the pdf file is to be created from an original electronic document.
- f. Each disk shall be version controlled and identified with the title of the project, volume number, volume subject matter, revision and date of issue.
- g. A table of contents shall be provided for each volume.
- h. The pages shall be consecutively numbered where possible.

All operation and maintenance manuals shall contain:

- a. A general description of the installed system.
- b. A directory listing of names, addresses and telephone and facsimile numbers of the designer, sub-consultants, contractors, sub-contractors and names of responsible parties.
- c. A directory listing the name, address, telephone and facsimile numbers and web links of the manufacturer and supplier of items of equipment installed, together with catalogue list numbers.
- d. An approved listing of Agreed Departures from the current UOW Design Standards at the time (note version of current UOW Design Standards).
- e. Photographic identification of in-ground services to clarify relevant location.

5.2 Table of Contents

Operation and maintenance manual's Table of Contents shall be organised but not restricted to, the following:

CONTENTS

1. VOLUME 01: BUILDING WORKS

- 1.1 Introduction.
- 1.2 Emergency Contacts.
- 1.3 Consultant Directory.
- 1.4 Subcontractor Directory.
- 1.5 Project Reports.
- 1.6 Consultant and Service Trade Certification.
- 1.7 Trade Work Certification – Architectural and Structural Works.
- 1.8 Warranties.
- 1.9 Statutory Approvals and Permits.
- 1.10 Finishes Schedules.
- 1.11 Defects Procedure.
- 1.12 Defects at Handover.
- 1.13 Occupation Certificate/BCA Certification.
- 1.14 Independent Fire Certification.

2. VOLUME 02: ARCHITECTURAL WORKS

- 2.1 Curtain Wall.

- 2.2 Waterproofing.
- 2.3 Carpet and Vinyl.
- 2.4 Dry Walls, Ceilings and Glazed Partitions.
- 2.5 Joinery.
- 2.6 Glass Balustrades.
- 2.7 Safe Access System & Cleaning Procedures.
- 2.8 External Cladding.
- 2.9 Painting.
- 2.10 Tiling.
- 2.11 Roofing.
- 2.12 Cement Render.
- 2.13 Metalwork.
- 2.14 Toilet Partitions.
- 2.15 Fire Doors and Frames.
- 2.16 Landscaping.
- 2.17 Bathroom Accessories.
- 2.18 Louvres.
- 2.19 Roller Shutters.
- 2.20 Signage.
- 2.21 Agreed Schedule of Departures from the current UOW Design Standards.

3. VOLUME 03: STRUCTURAL WORKS

- 3.1 Piling.
- 3.2 Concrete.
- 3.3 Structural Steel.
- 3.4 Masonry.
- 3.5 Post Tension.
- 3.6 Agreed Schedule of Departures from the current UOW Design Standards.

4. VOLUME 04: MECHANICAL SERVICES WORKS

- 4.1 Introduction.
- 4.2 Assets and Equipment Information (including BMS).
- 4.3 Installation, Maintenance & Operating Instructions.
- 4.4 Authority Tests and Approvals.
- 4.5 Commissioning tests.
- 4.6 Warranties.
- 4.7 Spare parts list.
- 4.8 Agreed Schedule of Departures from the current UOW Design Standards.

5. VOLUME 05: ELECTRICAL/SECURITY/COMMUNICATION SERVICES WORKS

- 5.1 Introduction.
- 5.2 Assets and Equipment Information.
- 5.3 Installation, Maintenance & Operating Instructions.
- 5.4 Authority Tests and Approvals.
- 5.5 Commissioning tests.
- 5.6 Warranties & Certificates.
- 5.7 Spare parts list.
- 5.8 Agreed Schedule of Departures from the current UOW Design Standards.



6. VOLUME 06: HYDRAULIC SERVICES WORKS

- 6.1 Introduction.
- 6.2 Assets and Equipment Information including:
 - Sewer Drainage.
 - Water Services.
 - Potable.
 - Non Potable.
 - Fire Services.
 - Gas Services.
 - Gas Suppression Systems.
 - Recycled Water System.
- 6.3 Installation, Maintenance & Operating Instructions.
- 6.4 Authority Tests and Approvals.
- 6.5 Commissioning tests.
- 6.6 Warranties & Certificates.
- 6.7 Spare parts list.
- 6.8 Agreed Schedule of Departures from the current UOW Design Standards.

7. VOLUME 07: FIRE SERVICES WORKS

- 7.1 Introduction.
- 7.2 Assets and Equipment Information (Sprinkler, Fire Alarm & BOWS Systems):
 - Sprinkler.
 - Fire Alarm.
 - BOWS.
- 7.3 Installation, Maintenance & Operating Instructions.
- 7.4 Hydraulic Calculations for the Installation.
- 7.5 Authority Tests and Approvals.
- 7.6 Commissioning tests.
- 7.7 Warranties & Certificates.
- 7.8 Spare parts list.
- 7.9 Block Plan.
- 7.10 Agreed Schedule of Departures from the current UOW Design Standards.

8. VOLUME 08: VERTICAL TRANSPORT WORKS

- 8.1 Introduction.
- 8.2 Declaration of Conformity, Technical Description, Logbook.
- 8.3 Installation, Maintenance & Operating Instructions.
- 8.4 Authority Tests and Approvals.
- 8.5 Commissioning tests.
- 8.6 List of Safety Components, Warranties & Certificates.
- 8.7 Spare parts list.
- 8.8 Safety Instructions & Rescue of Passengers.
- 8.9 Agreed Schedule of Departures from the current UOW Design Standards.

9. VOLUME 09: DOCUMENT REGISTER

Specifications

- 9.1 Architectural – Specification.
- 9.2 Structural – Specification.
- 9.3 Mechanical Services – Specification.
- 9.4 Electrical/Security/Communication Services – Specification.
- 9.5 Hydraulic Services – Specification.
- 9.6 Fire Services – Specification.
- 9.7 Lift Services – Specification.

As-Built and Survey Drawings

- 9.8 Architectural – As-Built Drawings.
- 9.9 Mechanical Services – As-Built Drawings.
- 9.10 Electrical/Security/Communication Services – As-Built Drawing.
- 9.11 Hydraulic Services – As-Built Drawings.
- 9.12 Wet Fire Services – As-Built Drawings.
- 9.13 Dry Fire Services – As-Built Drawings.
- 9.14 Lift Services – As-Built Drawings.
- 9.15 Fitout – As-Built Drawings.
- 9.16 Curtain Wall – As-Built Drawings.
- 9.17 Structural Steel – As-Built Drawings.
- 9.18 Work-As-Executed Survey Drawings – Survey Drawings.

5.3 Asset & Equipment Information, Certification and Warranties

Detailed technical specifications shall be provided on each piece of equipment. The manufacturer or a suitably qualified consultant may provide technical information. Technical specifications should contain the following information:

- a. A technical description of the system installed, written to ensure that UOW staff fully understand the scope and facilities provided.
- b. The system's function, normal operating characteristics, and limiting conditions.
- c. A technical description of the mode of operation of the system(s) installed and final setup that meets design performance.
- d. Schedules (system by system) of equipment, stating locations, duties, performance figures and dates of manufacture.
- e. A unique code number for each item of equipment installed, cross-referenced to the diagrammatic drawings and schedules, including spare parts schedule.
- f. Manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Product data sheets shall clearly identify specific products and component parts used in the installation, and data applicable to the installation.
- g. Supplements to product data shall illustrate relations of component parts.

Certification shall be provided to ensure all systems and equipment complies with the relevant standards and regulations. The following certificates shall be provided as part of the operation and maintenance manuals for each system installed:

- a. Certificates and Registrations from authorities.
- b. Product certification.
- c. Copies of commissioning results for the installation and equipment used in the installation (Refer to the relevant UOW Commissioning Standard).
- d. Commissioning Test reports.
- e. Material Safety Data Sheets (MSDS).

Copies of manufacturers' warranties shall be provided as part of the operation and maintenance manuals for all systems.

5.4 Operation Manuals

The following information shall be provided to ensure correct operating procedures for each system installed and commissioned:

- a. Safe starting up, running-in, operating and shutting down procedures. Include logical step-by-step sequence of instructions for each procedure.
- b. Control sequence and flow diagrams.
- c. Legend for colour-coded services.
- d. Schedules of fixed and variable equipment settings established during commissioning and maintenance.
- e. Procedures for seasonal changes.
- f. Drawings and technical data as necessary for the efficient operation of the installed system.

5.5 Maintenance Manuals

The following information shall be provided to ensure that maintenance tasks are performed correctly and systems run efficiently:

- a. Detailed recommendations for preventative maintenance frequency and procedures.
- b. Safe trouble-shooting, disassembly, repair and reassembly, cleaning, alignment and adjustment, balancing and checking procedures. Provide logical step-by-step sequence of instructions for each procedure.
- c. Schedule of spare parts and recommendation of items to be held on site, being those items subject to wear or deterioration and which may involve extended delivery times when replacements are required. Include complete nomenclature and model numbers, and local sources of supply.
- d. Schedule of normal consumable items, local sources of supply, and expected replacement intervals up to a running time of 40,000 hours. Include lubricant and lubrication schedules for equipment.
- e. Instructions for use of specialised tools and testing equipment.
- f. Emergency procedures, including telephone numbers for emergency services, and procedures for fault finding.
- g. Risk assessment of plant & equipment with control measures detailed.

6 AS-BUILT DOCUMENTATION

As-built documentation shall consist of the following parts as a minimum requirement:

- Operation Manual.
- Maintenance Manual.
- Authority approval drawings.
- Construction drawings.
- As-built drawings incorporating final room numbers.

As-built drawings shall include the following features:

- a. Dimensions, types and location of equipment, cables, piping and ductwork in relation to permanent site features and other underground services.
- b. As-installed locations of building elements, plant and equipment.
- c. Off-the-grid dimensions (where applicable).
- d. Relationship to building structure and other services, and changes made during commissioning and the maintenance period.
- e. Diagrammatic drawings of each system showing piping and wiring, and principal items of equipment.

In addition to the standard information described above, the following information shall be provided for each of the services listed.

6.1 Architectural

Each set of architectural documentation shall include the following information as a minimum for all projects:

- Soft copy of as-built architectural drawings.
- Locations of fire walls and fire doors.
- Final room numbers.

6.2 Mechanical Services

Each set of mechanical services documentation shall include the following information as a minimum for all projects:

- Duct sizes.
- Damper locations, size and type.
- Field equipment locations.
- Software algorithms for all control loops.
- Pipe routes and sizes.
- Air balancing results.
- Sound level tests.

- Commissioning results.
- Isolator locations.

6.3 Electrical Services

Each set of electrical services documentation shall include the following information as a minimum for all power and lighting projects:

- As-built drawings incorporating final room numbers.
- Field equipment locations such as pits, conduit locations and sizes.
- Electrical distribution board locations.
- Schematic of power and lighting reticulation.
- Distribution board schedules incorporating final room numbers.

Each set of electrical services documentation shall include the following information as a minimum for all emergency and exit sign projects:

- As-built drawings indicating equipment locations and numbers and final room numbers.
- Addressable commissioning results.
- Project specific schematic of reticulation.
- Location of main test point.

Electronic Monitoring and Access Control (EMAC)

Each set of EMAC documentation shall include the following information as a minimum for all projects:

- Field processing unit locations.
- Field device descriptions, types and locations.
- Hub and switch locations.
- Cable paths.
- Location of operator's terminal.
- Printout of points list.
- Commissioning test results.

6.4 Closed-Circuit Television (CCTV)

Each set of CCTV documentation shall include the following information as a minimum for all projects:

- Camera types, locations and field of view.
- Field processing unit locations.
- Hub and switch locations.
- Cable paths.
- Location of operator's terminal.
- Printout of points list.

- Commissioning test results.

6.5 Hydraulic Services

The following hydraulic services documentation shall be provided for all projects:

- Trade based specification.
- Sketch plans.

Each set of hydraulic services drawings shall include the following:

- Site plan and reticulation (scale not smaller than 1:1000).
- Major pipe runs indicating control valves, meters, access pits and connections to existing services.
- Reticulation indicating materials, pipe sizes, control valves, fixtures and taps.
- Diagrammatic presentation of hydraulic services in axonometric or two dimensional forms.
- Construction details of pits, inspection openings, valves, etc.
- Schedules of fixtures and fittings with brand names, models etc.

The following minimum information shall be provided on all hydraulic services drawings:

- Pipe inverts and associated ground levels, at junctions, pipe crossovers and at termination of runs.
- Pipe gradients.
- Pits, trade waste arresters and capacities.
- Fittings, fixtures and appliances.
- Connection to, and location of all authorities mains and existing internal services, including sizes, invert levels and associated ground levels.
- Symbolised fixtures, appliances and stacks at each building, including loadings on site plans.
- Dimensioned locations of all pits, tanks, etc.
- All contour levels.
- All downpipe locations.
- Dimensioned service locations (site plan).
- Boundaries and roads.

6.6 Fire Services

Each set of fire services documentation shall include the following information as a minimum for all projects:

- As-built drawings incorporating final room numbers.
- FIP location.
- Detector, breakglass alarm and other field device locations on floorplans incorporating item number.
- Programming matrix of FIP.

- Softcopy of FIP programme.
- Block plans showing zones and final room numbers.
- 100% addressable detector results.
- Commissioning test results of fire trips, e.g. air conditioning, gas, autodoor, access control, isolates.
- EWIS sound level test results.