



Operations & Maintenance Manuals

TMS73

Standard Technical Specification



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REVISION CONTROL

Revision Number	Date	Revision Details	Responsible Officer
1	June 2015	Issued for use	Sylvester Hennessy
2	February 2018	Issued for TEG review	Sylvester Hennessy

DRAFT

DOCUMENT CONSULTATION

Revision Number	Date Sent	Name	Comments	
			Received	Incorporated
2	February 2018	Steve Bourke	Y	Y
2	February 2018			

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1 SCOPE

1.1 GENERAL

This Specification covers the preparation and supply of Operations and Maintenance Manuals to Queensland Urban Utilities.

The Contractor shall provide two (2) printed and bound copies and three (3) electronic copies on CD-ROM of an Operations and Maintenance Manual (the Manual). The Manual shall be divided into five (5) Volumes to identify and separate information that comprises:

Volume 1	Introduction, System Overview, Functional Specification, Design
Volume 2	Proprietary Equipment Manuals, Maintenance, Service, Data Sheets
Volume 3	Drawings, Drawing Register, Underground Cable routing Details
Volume 4	Installation, Pre-Commissioning, System Testing, Training, Method Statements, Q.A.
Volume 5	Design Reports, Appropriate Records & Appendices

The contents of the Manual shall comprise the sections, and in the same sequence, as listed in this Specification. The acceptance criteria for the information to be supplied in accordance with this Specification. The Contractor is required to liaise with QUU to ensure that appropriate information is provided in the required timeframe specified for the project.

1.2 DEFINITIONS

In this document, the following definitions apply:

Project Documentation	Governing technical documents for the specific item(s) for the specific works included or referenced in the Contract
Contractor	The entity bound (including sub-contractors appointed by the contractor) to execute the work having responsibility for design, manufacture and supply, delivery, documentation and other functions as further defined in the documents related to the work.
Contract	The agreement between QUU and the Contractor to which this specification pertains.

1.3 ACRONYMS AND ABBREVIATIONS

OMM	Operations and Maintenance Manual
QUU	Queensland Urban Utilities
SDRL	Supplier Data Requirements List
WRP	Water Reclamation Plants

1.4 REFERENCE DOCUMENTS

Document Number	Title
PRO307	Procedure Drafting Guidelines – Contract Requirements
PRO395	SEQ Water Supply and Sewerage- D&C Code Asset Information QUU Addendum
	SEQ Water Supply and Sewerage Design & Construction Code (SEQ WS&S D&C Code)
PRO396	Control System Change Management Procedure
BMS 01606	Electricity Connection and Metering Manual

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2 PRINTED MANUAL PREPARATION AND CONTENT

2.1 WORD PROCESSING

The OMM shall be written in English using Microsoft Word as the Word Processing package and Microsoft Excel for the spread sheet application. Both Word and Excel are required to be compatible with Word 2010 and Excel 2010, or later version.

2.2 PRINTING

The OMM shall be printed on size A4 pages on bond white paper of 70 to 106 g/m² weight. Font shall be Arial size 11 for all text. The use of *italics*, **bold** or underlines shall not be used in the text. The exception for the use of **bold**, underlines, and size 11 font shall be for headings, sub-headings, tables and figures.

2.3 PAGE LAYOUT

Each page shall have right and left margins of 2cm. Headers and footers shall have margins of 1.5cm. Each section, sub-section and paragraph shall be numbered. The format for numbering shall be consistent throughout the entire OMM. Numerical numbering shall be used for sections, sub-sections and paragraphs. Alphabetical numbering shall be used for sub-paragraphs. Dot points shall only be used for breakdown of the document structure after the sub-paragraph stage.

2.4 HEADERS

Each Page shall contain a Header where the field in the template of the header is populated from the information in the document summary as follows:

Left: Queensland Urban Utilities
Specific Plant Site/Project Name

Right: QUU Contract No.
Subsystem Description.

2.5 FOOTERS

Each page shall contain a Footer Field that is populated from the document summary that provides, from left to right, the following information:

- word processor filename,
- Issue and revision status no.: eg. 'Draft: A', B, etc. or 'Issue: 1' when approved. Revision numbering shall be used for page replacement purposes rather than amending the whole document or section,
- date: in the format: '11 OCT 06',

- volume, page number: eg. 'Volume 3, Page 5 of 21' (Page 5 indicates fifth page out of the 21 pages that make up Volume 3).

2.6 STANDARD TERMINOLOGY

The Contractor shall use the standard key words and terminology normally used by, or acceptable to QUU. Terminology shall be consistent both throughout the OMM and with other Project Documentation.

Units of measurement shall be in metric using standard terminology, abbreviations and acronyms.

2.7 CONDITION OF SUB-CONTRACTOR MATERIALS

Only original printed Sub-Contractor materials, such as equipment brochures with the highlighted relevant materials, shall be allowed as inserts. Where these are not practically available, good photocopies or emails will be acceptable. Copies of faxes shall not be acceptable under any circumstances

2.8 WARNINGS AND NOTES

Throughout Volume 2, the Contractor shall draw attention to relevant safety and environmental requirements and other critical information. This shall be carried out by ensuring appropriate resources are identified at the front of each relevant procedure and by appropriate headings throughout the procedure. Headings shall use the terms: "Danger", "Caution", or "Note" as applicable. These terms shall be used in a consistent and easily recognised manner and be prominently positioned prior to the text to which it applies. Warnings and Notes shall be used as follows:

Danger: Shall call attention to mandatory instructions (those which must be followed) to ensure personal safety and/or prevent environmental damage.

Caution: Shall call attention to mandatory instructions (those which must be followed) to avoid damage to plant and equipment only.

Note: Shall be used for identifying supplementary information.

2.9 DRAWINGS AND DIAGRAMS

Prints of engineering drawings that are part of the contract deliverables and may be required for maintenance purposes shall be issued in separate A3 folders by discipline and/or process area (for WRP's). Refer to Clause 5.5 where the requirements for Volume 3.2 'As Constructed Drawings' are detailed

Illustrations, diagrams, tables, schedules and other non-text pages shall be numbered to fit into the section and page sequence in which they are located.

Note: Refer to document 'PRO307: Drafting Guidelines – Contract Requirements for full details regarding the drawings.

3 ELECTRONIC MANUAL

3.1 MANUAL CONTENTS

The contents of the electronic CD-ROM version of the Operation and Maintenance Manual shall be identical to the printed version.

The electronic CD-ROM version shall be divided into five individual folders, one for each Volume 1-5 as specified for the printed version of the Manual.

All information and individual documents supplied in the printed Manual shall be saved as individual files within the relevant Folder for the Volume.

The electronic CD-ROM version is required to be navigable via an index page which shall contain a hyperlink to each individual document within the Operation and Maintenance Manual, enabling the entire contents of the CD-ROM to be accessed via the Index Page.

The CD-ROM root directory shall look as follows:

Index	(Document, with individual hyperlinks to each file on the CD-ROM)
Volume 1	(Folder, containing all documents relating to Volume 1)
Volume 2	(Folder, containing all documents relating to Volume 2)
Volume 3	(Folder, containing all documents relating to Volume 3)
Volume 4	(Folder, containing all documents relating to Volume 4)
Volume 5	(Folder, containing all documents relating to Volume 5)

Note: Operations in general have different requirements, where files are split by Plant-Process-Function. Binders/volumes are to be split by process areas for WRP's.

3.2 FILE TYPES

All original documents created in Word or Excel shall be supplied in the Word (.doc) or Excel (.xls) format and as a PDF (.pdf) file.

OMM supplied by the manufacturer are to be supplied as a PDF file. Scanned documents must be text searchable.

Handwritten documents such as Inspection Checklists etc. shall be supplied as a high quality scan of 300dpi minimum.

3.3 SCANNED DOCUMENTS

Where a document has to be scanned it shall be scanned as a PDF at a minimum resolution of 300dpi. Where required documents are to be scanned in colour to maintain the detailed information as contained in the original document.

4 COMPILATION AND SUBMISSION OF MANUALS

4.1 INITIAL TEMPLATE AND SECTION DIVISION

The template for the OMM shall consist of a detailed contents page of volumes and sections which shall be submitted under Contract in accordance with the SDRL.

4.2 DRAFT ISSUE

One draft issue of the OMM in electronic formats shall be submitted to QUU for review. Within the printed version each Section shall be separated by thumb tabbed dividers with the Section No. and Title printed on each tab. The electronic version shall be formatted as detailed later in this document.

4.3 FINAL ISSUE

When the information contained in the OMM is accepted by QUU, the Contractor shall issue the OMM to the QUU as final version.

- Two (2) complete printed copies of the OMM,
- Three (3) complete electronic versions of the OMM on CD-ROM

4.4 SUPPLY OF REVISED MANUALS AND CD-ROMS

During the period of the Contract, (up to the Final Completion Certificate) the Contractor shall be responsible for making any further revisions to the OMM as required

The Contractor shall provide the replacement pages for both copies of the printed version and three (3) replacement CD-ROMs.

5 ARRANGEMENT AND EXPLANATION OF SECTIONS

5.1 TITLE PAGE

The Contractor shall provide a Title Page and matching cover insert formatted as shown in the Attachment and containing the following information:

QUEENSLAND URBAN UTILITIES
 Location and title of the plant
 Title of the system or sub-system
 Title of Manual
 Contractor's name
 Contract No.

5.2 REVISIONS

This page (or pages) shall list each page revised after the OMM's initial approval. The Contractor shall list each page number that was revised, new revision status, revision date, approval signature and verification signature to indicate that the changes were implemented.

5.3 CONTENTS

Contents page shall list the Volume and Section Number, Titles and page number and shall follow the format, titles and sequence as identified in the following.

CONTENTS

Vol	Section	Description	Page
		Title Page	
		Revision Control	i
		Contents	ii

Volume 1 Introduction, System Overview, Functional Spec, Design

- 1.1 Introduction and System Overview
- 1.2 Location Details and Map
- 1.3 Description of Equipment and Process

1.4 Operational Modes

Volume 2 Proprietary Equipment Manuals, Maintenance, Service, Data Sheets

2.1 Proprietary Equipment Manuals

2.2 Operational Procedures

2.3 Fault Protection and Rectification

2.4 Start Up and Shut Down Procedures

2.5 Isolation and Restoration Procedures

2.6 Preventive Maintenance

2.7 Corrective Maintenance

2.8 List of Sub-Contractor and Proprietary Equipment

2.9 Recommended Spare Parts and Special Tools

2.10 Handling, Unpacking and Storage

2.11 List of Manufacturer and Supplier Details

Volume 3 Drawings, Drawing Register, Underground Cable Routing Details

3.1 Drawing Register

3.2 'As Constructed' Drawings

3.3 Underground Cable Routing Details

Volume 4 Installation, Pre-Commissioning, Commissioning, System Testing, Training, Method Statements, Q.A.

4.1 Training Program

4.2 Commissioning Report

4.3 Commissioning Procedure

4.4 Inspection, Test Plans and Test Sheets

4.5 Pre-commissioning and Test Procedures

4.6 Site Acceptance

4.7 Installation Procedure

- 4.8 Factory Acceptance
- 4.9 Manufacturers Test Data & Certificates
- 4.10 Required Services
- 4.11 Construction & Work Method Statements
- 4.12 Quality Assurance Records

Volume 5 Design Reports, Appropriate Records & Appendices

- 5.1 Design Details
- 5.2 Design Criteria
- 5.3 Process Design Description
- 5 Appendices

5.4 NON-APPLICABLE SECTIONS

In order to ensure consistency with other OMM, the above numbering and sequence of sections shall be complied with. Should any Section not be applicable to the particular Manual, it shall be reserved by the insertion of a page containing the words "Not Applicable".

5.5 EXPLANATION OF THE CONTENT OF REMAINING SECTIONS

The following provides criteria and guidance to the content of each Section of the Manual discussed previously above:

Volume 1	INTRODUCTION, SYSTEM OVERVIEW, FUNCTIONAL SPEC, DESIGN
1	<p>Introduction and System Overview</p> <p>The Contractor shall provide a general description of the purpose and scope of the plant, system or equipment supplied. It shall include a scope of works summary from the feasibility study or the project delivery document when multiple contracts for a project are arranged. This information will be partially made available by the QUU if required.</p>
2	<p>Location Details and Map</p> <p>The Contractor shall provide location details and map of the facility provided under the Contract.</p>
3	<p>Description of Equipment and Processes</p> <p>The Contractor shall list and provide a brief description of each major item of equipment supplied in the Contract.</p>

<p>4</p>	<p>Operational Modes What operational modes (ie. Remote-Auto, Remote-Manual or Local) are available and their use.</p>
<p>Volume 2</p>	<p>PROPRIETARY EQUIPMENT MANUALS, MAINTENANCE, SERVICE, DATA SHEETS</p>
<p>1</p>	<p>Proprietary Equipment Manuals The Contractor shall provide all the relevant Operation & Maintenance Manuals as supplied by the original equipment manufacturer. Where pumps are a part of the Contract the Contractor shall supply an Operation & Maintenance Manual specific to the actual model and size of pump supplied under the contract. A general Operation & Maintenance Manual covering multiple pumps will not be acceptable.</p>
<p>2</p>	<p>Operational Procedures These procedures shall be segmented into the various disciplines in order to provide readily available access for staff. For example, electrical, mechanical and information technology. A complete description of day-to-day operating procedures shall be provided by the Contractor and include:</p> <ul style="list-style-type: none"> • step-by-step start and stop procedures for each operational mode, • recommended target parameters and set points, • operating guidelines including any additional knowledge gained during commissioning, • describe which operator checks and records need to be made at regular intervals (e.g. Hourly, daily) and provide examples of any forms found useful by the Contractor in monitoring equipment performance.
<p>3</p>	<p>Fault Protection and Rectification These shall include when applicable:</p> <ul style="list-style-type: none"> • Alarm, Protection and Safety Devices The Contractor shall specifically identify each alarm, protection or other safety device that is included in the equipment or system supplied. For each item state its description, where it is installed, its operation, and any maintenance requirements. • Consequences of Power Failure The Contractor shall describe what actions (such as the re-setting of control devices) are necessary, and any adverse consequences that could result, in the event of a power failure. • Trouble Shooting The Contractor shall describe whatever fault finding and trouble shooting experience has been gained in the operation of similar equipment. This should incorporate causes of breakdown or failure and recommended remedial action.

4	<p>Start Up and Shut Down Procedures</p> <p>Detailed step-by-step instructions for starting and running the equipment after restoration of power supplies; and detailed step-by-step instructions for shutting down the equipment upon completion of operations to the point it can be isolated if required.</p> <p>For those Contracts specifying large plant with complex operating requirements a separate comprehensive and dedicated Operations Manual shall be provided by the Contractor. Where such an Operations Manual is provided the operation procedures described in this section of the Operations and Maintenance Manual need be only those applicable to commissioning and maintenance personnel (e.g. local-manual control).</p>
5	<p>Isolation and Restoration Procedures</p> <p>The Contractor shall provide detailed isolation or lock-out procedures for the equipment to be taken from an in-service situation where all supplies connected and energised.</p> <p>The Contractor shall provide detailed procedures for restoring the equipment to service from an out-of-service situation with all energy states reduced to zero.</p>
6	<p>Preventative Maintenance</p> <p>The Contractor shall describe what preventative maintenance tasks must or should be done, and at what intervals (eg. Hours, cycles). This shall be further divided into the various types of equipment and function such as electrical and mechanical.</p>
7	<p>Corrective Maintenance</p> <p>The Contractor shall provide detailed maintenance instructions for all items of supplied equipment separating the mechanical and electrical maintenance. Safety warnings and cautions will be included and any necessary protective clothing and equipment listed. Where applicable, the following shall be supplied for each item:</p> <ul style="list-style-type: none"> • lubrication schedule with oil/grease specifications, • fastener torque settings, loadings, • allowable tolerances, clearances, wear limits, etc., • component electrical ratings (minimum, normal, maximum), • weld procedures and consumables used.
8	<p>List of Sub-Contractor and Proprietary Equipment</p> <p>The Contractor shall provide a listing of all proprietary equipment supplied in the Contract likely to require replacement during the life of the asset. For each item the list shall state: model, serial number, brief description, and the manufacturer's name and address.</p>
9	<p>Recommended Spare Parts and Special Tools</p> <p>The Contractor shall provide a list of all available spare parts and special tools including, and in addition to, those provided under the Contract. For each item the manufacturer's reference number, correct description and recommended quantity used shall be stated. Any special storage, environmental protection, shelf-life restrictions, handling or routine maintenance of spare parts shall be included.</p>

10	<p>Handling, Unpacking and Storage</p> <p>The Contractor shall detail any special precautions needed in handling, unpacking or storage of equipment prior to installation or an overhaul.</p>
11	<p>List of Manufacturer and Supplier details</p> <p>The Contractor shall provide a list of all manufacturers and suppliers who supplied equipment, components and materials to the Contract and/or also spare parts distributors for all the equipment supplied. The list will include personal details of the company and business name, Email address, business address, postal address, contact name, phone number, fax number, scope of products. Where any of the above details do not refer to a South East Queensland address, the local distributor or closest distributor shall be identified.</p>
Volume 3	<p>DRAWINGS, DRAWING REGISTER, UNDERGROUND CABLE ROUTING DETAILS</p>
1	<p>Drawing Register</p> <p>The Contractor shall provide a complete list of drawings relating to all parts either supplied or altered under the Contract.</p> <p>The Drawing Register shall include at a minimum the following information for each drawing: Queensland Urban Utilities Drawing Number, Drawing Title, Date, Revision and Discipline (Electrical, Mechanical, Civil)</p> <p>The electronic version of the 'Drawing Register' shall be provided as an Excel (.xls) spread sheet and as an Acrobat (.pdf) file.</p>
2	<p>'As Constructed' Drawings</p> <p>Note: Refer to document 'PRO307: Drafting Guidelines – Contract Requirements for full details regarding the drawings.</p> <p>The Contractor shall provide, in alpha-numeric sequence, a complete list of all applicable Contract drawings giving the QUU drawing number, issue status, full title, size of the original, and the Contractor's drawing reference.</p> <p>The Contractor shall provide all drawings as detailed within the Drawing Register. These shall be supplied in the following formats:</p> <p>Colour Hard Copy</p> <ul style="list-style-type: none"> • Mechanical : A1 and A3 Marked up 'As Constructed' in Red • Civil : A1 and A3 Marked up 'As Constructed' in Red • Electrical : A3 Marked up 'As Constructed' in Red <p>Colour Electronic Copy supplied in two (2) formats: AutoCAD .dwg and Acrobat .pdf file.</p> <ul style="list-style-type: none"> • Mechanical : A3 Marked up 'As Constructed' in Red • Civil : A3 Marked up 'As Constructed' in Red • Electrical : A3 Marked up 'As Constructed' in Red
3	<p>Underground Cable Routing Details</p> <p>The Contractor shall permanently record the route of underground mains cables in all installations on a durable card or other suitable material, which shall be completed and fixed inside the meter box (or adjacent to the MCB).</p> <p>Refer to the latest version of 'Energex - Electricity Connection and Metering Manual' Doc ID: BMS 01606 (Section 4.3.5 Page 22 of version 4.2 01/06/2005)</p>

Volume 4	INSTALLATION, PRE-COMMISSIONING, COMMISSIONING, SYSTEM TESTING, TRAINING, METHOD STATEMENTS, Q.A.
1	<p>Training</p> <p>In this Section, the Contractor shall list any training assistance, programs or materials (eg. manuals, videos) that are available to the Principal for the Contract equipment; and to provide a training needs analysis on those topics and activities that are considered essential for the safe, reliable and effective operations and maintenance of the equipment and systems installed. This information is required whether training is supplied as part of the Contract or not.</p>
2	<p>Commissioning Reports</p> <p>The Contractor shall provide the report which shall include all commissioning data and test reports gathered during commissioning.</p>
3	<p>Commissioning Procedure</p> <p>The Contractor shall provide detailed instructions for commissioning the plant or equipment by the Commissioning Engineer after installation and all Contractor pre-commissioning inspections and tests have been completed.</p> <p>The Contractor shall provide procedures for re-commissioning after a major overhaul or shutdown where these differ from commissioning.</p>
4	<p>Inspection and Test Plans</p> <p>This shall include copies of all inspection and test plans listed completed during the course of the Contract.</p>
5	<p>Pre-commissioning Test Procedures</p> <p>The Contractor shall detail those inspections and tests necessary after delivery and/or installation of equipment to ensure that transit damage or deterioration after dispatch has not occurred.</p>
6	<p>Site Acceptance</p> <p>The Contractor shall include a completed copy of the Site Acceptance Test Reports.</p>
7	<p>Installation Procedure</p> <p>The Contractor shall provide detailed installation procedures for the equipment, even when undertaken by the Sub-Contractors.</p> <p>The Contractor shall consider:</p> <ul style="list-style-type: none"> • required services, • handling unpacking and storage processes, • installation process, • pre-commissioning process.
8	<p>Factory Acceptance</p> <p>The Contractor shall include a copy of the Factory Acceptance Test Reports</p>
9	<p>Manufacturers Test Data and Certificates</p> <p>The Contractor shall provide all applicable documentation relating to the testing and certification of all components within the facility necessitating such certification. Such as:</p> <ul style="list-style-type: none"> • pump Flow v Head test results, • pressure or Flow transducer test result and certification.

10	<p>Required Services</p> <p>Where applicable, the Contractor shall detail requirements for services such as electricity, compressed air, water supply and other interfaces required before the Contract equipment may be installed and operated.</p>
11	<p>Construction and Work Method Statements</p> <p>The Contractor shall provide Construction / Work Method Statements.</p>
12	<p>Quality Assurance Records</p> <p>To be provided before Pre-Commissioning of the facility.</p> <p>The Contractor shall provide all necessary documents and certificates relating to Quality Assurance, such as:</p> <ul style="list-style-type: none"> • AS3000 Certification for any switchboard / electrical installation, • hydro testing of pipework, wet wells, grit collectors, etc, • spark test certificates for wet wells, • concrete specifications / test certificates.
Volume 5	DESIGN REPORTS, APPROPRIATE RECORDS & APPENDICES
1	<p>Design Details</p> <p>This will include details of design criteria, process description and operational modes.</p>
2	<p>Design Criteria</p> <p>If the Contract is a design and construct, the Contractor shall provide the original design criteria and parameters, operational modes and performance data. For completeness, this is to repeat relevant data contained in Contract documents as well as that provided by the Contractor. Such data will be used during commissioning and for comparative tests of performance to be done in subsequent years. The following parameters are typical of those that should be included:</p> <ul style="list-style-type: none"> • technical reference sources (eg. standards), • design objectives, outputs and performance targets, • design input assumptions, • physical measures, weights, masses, forces, etc., • plant capacities, pressures (max/min), flow rates, etc.
Note:	For Contracts which are not Design and Construct, the Contractor shall liaise with the QUU for coordination of the Design Details documentation.
3	<p>Process Design Description</p> <p>The Contractor shall describe the process or operational functional elements.</p>

	APPROPRIATE RECORDS
	<p>List of Contract Variations and Plant Modifications</p> <p>As the Contractor is responsible, until expiry of the Defects Liability period for any necessary modifications to the Contract supplies to achieve satisfactory performance, the Manual shall be continually updated, as necessary, by the Contractor to reflect these changes.</p> <p>In addition to revising the Manual, all modifications should be listed in this Section, such that the 'As Built' status of the Contract is fully and accurately documented.</p>
	<p>Modifications to Existing Plant</p> <p>Changes required to existing plant to accommodate, or interface with, the equipment to be supplied by the Contractor.</p>
	APPENDICES
	<p>Should the Manual require the inclusion of any additional information which has not been covered by the indexed section above, it may be included in this section - one Appendix for each item.</p> <p>Where available only original printed materials should be included. Only where these are not locally obtainable will good photocopies be acceptable. Faxed documents shall not be acceptable.</p> <p>Where a number of items are contained in the one document (eg. a catalogue) the specific Contract item(s) shall be referenced on a Title Page to that Appendix listing the following:</p> <ul style="list-style-type: none"> • Manufacturer's description • Manufacturer's name. • Type, Model and Serial No. <p>The item(s) shall also be identified in the document by suitable marking or highlighting and the crossing-out of those items not applicable.</p> <p>The use of catalogues and standard printed materials does not nullify the need to provide individual portions of information within the five volumes of the Operational and Maintenance Manual. Where such information is not possible, they shall be suitably referenced to the appendices.</p>