



Hunter Water Corporation A.B.N. 46 228 513 446

Standard Technical Specification for:

<p style="text-align: center;"><b>STS 906</b></p> <p style="text-align: center;"><b>OPERATION AND MAINTENANCE MANUAL REQUIREMENTS</b></p>
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# Standard – STS 906 OPERATION AND MAINTENANCE MANUAL REQUIREMENTS

## 1 Purpose

All assets, equipment and components that have operating or maintenance regimes that have regulatory, statutory or warranty impacts or require specialist training or tools must be supplied with an Operation and Maintenance (O&M) Manual. This Standard Technical Specification (STS) details the requirements for the provision of an O&M Manual for Hunter Water systems which comprise the construction or installation of several assets.

These systems include, but are not limited to:

- Wastewater pumping stations
- Water pumping stations
- Treatment facilities
- Chemical dosing facilities
- Actuated and remotely operated equipment

O&M manuals are required to detail the function of the asset and components, detail the equipment installed, equipment maintenance and servicing requirements and fault finding / troubleshooting references. The O&M Manual also contains contract and WAC information required as part of the commissioning process. It does not cover requirements for:

- Work as Constructed (WAC) Drawings specified in *STS 903*
- Electrical Drawings specified in *STS 904*
- Mechanical Structural and Civil Drawings specified in *STS 911*

The O&M Manual is prepared in two stages:

- The first stage is provided by the Designer as part of the detailed design deliverables.
- The final stage is provided by the Contractor as part of Work as Constructed (WAC) deliverables.

O&M Manuals are required for assets, equipment and components that meet one or more of the following criteria:

- The item has a specific maintenance or operating regime that must be applied if regulatory (e.g. flowmeter calibration), statutory (e.g. safety, environmental legislation) and/or warranty requirements are to be met.
- The item performs a critical functional role in the treatment or transport process (i.e. if the item were not appropriately maintained/operated the process would be compromised).
- The item requires specialist training for operators and/or maintainers.
- The item requires specialist tools or spares for operation and/or maintenance.

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While parts of this STS (along with the layout of Table 2 and the two templates) are written around pump stations which are the largest asset group which Hunter Water owns and maintains, the general requirements for an O & M Manual along with categories and elements listed in table 1: Safety and Risk Information and Table 2: O & M Manual Information are valid for all asset Types.

Refer to Appendix 2 “O & M Manual General Instructions” for details on adapting the “O & M manual Information” table to create an O & M manual for small standalone assets. Appendix 2 also contains additional information to assist in the creation of the O & M Manual.

Refer to Appendix 3 “O & M Manual Instructions for Treatment Plants” for details on expanding and adapting the STS along with the tables to create the O & M manual volumes for a treatment Plant.

## 2 Interpretation

For the purposes of the interpretation of *STS 906*, except where the context requires otherwise:

- 'Drawings' means the drawings detailing the work involved in a particular project.
- 'Include' means including but not limited to, and is used to provide clarification or examples of the type and nature of items intended.
- 'Specification' means a specification detailing the work involved in a particular project.
- 'Standards' means applicable industry standards including the Australian Standards (AS), Australian / New Zealand Standards (AS/NZS).
- 'Standard Drawings' means Hunter Water Corporation drawings.
- 'Standard Technical Specification' (STS) is a reference to any of Hunter Water's Standard Technical Specifications, as implied by the text.

Headings are for the convenience of the reader and shall not be used in the interpretation of this STS.

Unless the stated otherwise any expression such as "give notice", "submit", "approval", or "directed" means give notice to, submit to, approval by, or directed by the person nominated by the Hunter Water.

Approval does not imply acceptance of responsibility by Hunter Water for compliance with this STS. Unless approval has been issued in writing by Hunter Water, approval has not been granted.

### 2.1 Order of Precedence

The hierarchy of specifications unless stated otherwise in project specific specifications are:

1. Specification, Drawings, Standard Drawings (project documents)
2. Facility related STS
3. Equipment related STS
4. STS 906

### **3 Roles and Responsibilities**

#### **3.1 Document Owner**

The Document Owner of this STS is the Group Manager Planning and Engineering.

#### **3.2 Responsibilities**

Any request for a variation to this STS shall be made in accordance with the change management process in *Hunter Water Asset Standards Management Plan*.

The Document Owner shall approve in writing the issue of any updates.

## 4 Definitions

Where the following terms, abbreviations or expressions occur in this STS, it is defined as follows, unless the context implies otherwise:

<b>Term / Abbreviation / Expression</b>	<b>Definition</b>
ACMM	Automatic Control and Monitoring Manual
AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
Asset Information	Hazard Class Management plan, Name Plates Details, Program Maintenance, Work Instructions
Contractor	The organisation undertaking some or all of the manufacture, supply, installation, construction or commissioning of assets.
Ellipse	Hunter Water Enterprise Resource Planning System
FMEA	Failure Modes and Effects Analysis
Hunter Water	Hunter Water Corporation
O&M / O & M	Operation and Maintenance
OEM	Original Equipment Manufacturer
TRIM	Hunter Water Document Management System

The following additional terms are defined in the Work Health and Safety Act, NSW, 2011:

- o Designer
- o Manufacturer
- o Supplier
- o Installing, constructing or commissioning



## 5 Compliance Requirements

### 5.1 Standards

O&M Manuals shall comply with:

- This STS
- Other relevant Hunter Water Standards
- Relevant Australian Standards

Any deviation from *STS 906* shall be approved in writing on a case by case basis by an authorised Hunter Water representative.

#### 5.1.1 Australian Standards

Where a Hunter Water Standard or other requirement has not been specified, drawings are to comply with the current relevant Australian Standards.

#### 5.1.2 Hunter Water Standards

Documentation is to be provided as per this STS and other Hunter Water documentation as referenced in Section 2.1.

Where the standards are referenced throughout this STS, they will refer to the number only.

### 5.2 Copyright

All electronic files supplied by Hunter Water are the property of Hunter Water. This includes, but is not limited to, the contents of the O&M Manual Information Package (“the Files”). Hunter Water retains all intellectual property and related rights in or relating to the Files including without limitation copyright (including future copyright); confidential information, and all other rights conferred by statute, common law or equity in relation to the Files.

The purpose of the Files is to assist the user in the production of O&M Manual information for Hunter Water in accordance with this Standard Technical Specification and to confirm whether the O&M Manuals produced for Hunter Water are compliant with this STS (Intended Use).

The Files are not to be used, copied, modified, manipulated, supplied, reproduced, provided or disclosed by or to any other person or for any purpose other than the Intended Use without the prior written consent of Hunter Water.

To the extent permitted by law, all conditions and warranties concerning the Files expressed or implied by statute, common law, equity, trade, custom or usage or otherwise are expressly excluded. Hunter Water makes no representation as to the stability of the Files and accepts no liability for any loss or damage arising from the instability of the Files.

Hunter Water is not required to provide maintenance support for the Files or detailed instructions on operational use.

The user must ensure that the Files are used:

- In accordance with any instructions provided by Hunter Water;
- Appropriately and only for such of the Intended Use for which the user is appropriately insured;

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- Not used, accessed, operated or copied by or provided to any persons, other than those officers, employees or agents of the user who are aware of and have agreed to be bound by these terms and conditions.

The user indemnifies and will keep indemnified Hunter Water against all actions, suits, claims, demands, costs, charges, damages, liabilities, loss and expenses to which Hunter Water may incur arising out of the provision to the user of, and any use, reproduction or disclosure of or change to, the Files by the user or any other person claiming through the user, which is in any way connected with or arises from the use of the Files.

Files submitted to Hunter Water shall become the copyright property of Hunter Water.

## **6 O&M Manual**

### **6.1 Information Provided by Hunter Water**

#### **6.1.1 Operation and Maintenance Information Package**

Hunter Water will provide an Operation and Maintenance Information Package of two file templates as follows within two weeks of request:

- OM\_Manual\_Template.doc
- Technical\_Data\_Sheet template.xls

#### **6.1.2 OM\_Manual\_Template**

The OM\_Manual\_Template is to be used to create the O & M Manuals for pump stations and minor assets. For treatment plant manuals the template is to be used as a style and formatting guide with the instructions in Appendix 3.

#### **6.1.3 Hunter Water Pump Pack Template and Asset data Collection Sheet Template**

Hunter Water requires technical information on each asset to be supplied to Hunter Water utilising our standard templates that we make available for use.

The two templates made available are:

1. The Asset Data Collection Sheet Template
2. The Hunter Water Pump Pack Template

The relevant Technical\_Data\_Sheet template will be supplied for the asset type/s covered under the contract and is available on our Hunter Water web site.

#### **6.1.4 Asset Information**

The Hunter Water Project Manager, Contract Officer or Accounts Executive shall also supply the following asset information within two weeks of request:

- Asset Name
- Equipment Reference Number
- Civil, Structural or Mechanical Drawing Number
- Electrical Drawing Number
- TRIM References

### **6.2 Information Provided To Hunter Water**

The designer shall review the O&M Manual requirements and template and ensure that the documentation and drawing requirements from the relevant Hunter Water Design Code or Manual are fully addressed. Where required, the O&M Manual template is to be adjusted or expanded to meet the current Design Code specifications. The revision is done in consultation with the HWC representative.

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If required the revised template replaces the original template and revised table of requirements is attached to the revised template document as an appendices. The appendices is removed from the template before submission.

The Designer and Contractor shall complete these documents and shall provide support documentation as additional Appendixes.

- Editable document formats shall be provided without data protection or passwords and in the same Microsoft Word format as the supplied OM\_Manual\_Template.doc.
- The style of the O&M Manual shall be in accordance with modern technical writing practice. The text shall be in English and easily understood by plant operator's electricians and fitters.
- All pumps supplied to Hunter Water require a Hunter Water Pump Pack template to be submitted.

### 6.3 O&M Manual Document Configuration Requirements

#### 6.3.1 Filenames

The generic files in the O&M Manual Information Package are to be renamed to become asset specific for the Information Package. Rename the two files in the package as follows

- The Equipment Reference Number will replace the word "template" in the O & M Manual Template file (e.g. O&M\_Manual\_SSBER018.Doc).
- The Equipment Reference Number will replace the characters "XXXX" in the filename of the Technical Data Sheet Template file (e.g. technical\_data\_sheet\_SSBER018.xls).

Name each Appendix as a separate file (e.g. OM Manual SSBER018 Appendix 1-#.doc, where # is the number of Appendixes in the manual)

The PDF file of the O&M Manual is to be labelled the same as the Template with the letters PDF at the end. (E.g. O&M\_Manual\_SSBER018\_PDF.pdf)

Refer to Appendix 3 "O & M Manual Instructions for Treatment Plants" for filenames to be used with the volumes of the O & M manuals for Treatment Plants. Filename for small standalone asset will be supplied by the Hunter Water nominated representative on request.

#### 6.3.2 Configuration Management

All documents supplied electronically, including appendices, shall include the revision number in filename, as follows:

- Initial Draft <filename as per Section 6.3.1> r 0.1<.xls or .doc or .pdf>
- Subsequent Draft <filename as per Section 6.3.1> r 0.2<.xls or .doc or .pdf>
- Final <filename as per Section 6.3.1> r 1.0<.xls or .doc or .pdf>

File revisions must be updated for each submission to Hunter Water.

The document templates supplied by Hunter Water also include a Configuration Management Section which shall be updated to reflect the revision status of the document.

Documents with incorrect configuration management will be rejected and will require resubmission.

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### **6.3.3 Document Quality**

All scanned documents must be 300 dpi or greater and easily read online or when printed.

Supply all information in English.

### **6.3.4 Appendices**

After scanning original signed sheets or certificates (checklist warranties etc.) are to be attached in the appropriate appendices in the hard copy.

Relevant information to Hunter Water is that which relates to maintaining or repairing the equipment and identifying replacement parts.

List the appendices in the table of contents and add a cross reference in the relevant section of the document.

If information is from a third party, only relevant pages are to be included.

If a page contains relevant and none relevant information, clearly identify the relevant information.

Information that does not directly relate to the installed equipment is to be removed or shown in strikethrough.

### **6.3.5 Hardcopy layout**

The document shall be neatly bound in loose leaf hardback (4 ring “D” type) binders at A4 Size. The front and side labels shall be securely attached to the folder.

Each section of the O&M manual is to be separated by a labelled divider. A3 print outs shall be folded so they can be suitably opened.

## **6.3.6 Submission**

### **6.3.6.1 Electronic**

Submit the Operation & Maintenance Information Package electronically as follows:

One editable file of the O&M Manual, Asset Data Collection Sheet and Pump Pack (in the same format as the Hunter Water template).

A separate file for each appendix, in the same format as the O&M Manual template.

One copy of the O&M Manual completed as a single PDF document, including appendices.

The updated Asset Data Collection Sheet Template File.

The updated Pump Pack Template File

Suitably labelled CD, USB Key or other suitable device.

### **6.3.6.2 Hard Copy**

Provide one hardcopy printed from the draft/final editable file of the O&M Manual, all appendices and the printout of the exported data sheet file from the Technical Data Sheets.

## **6.4 O&M Information to be provided**

### **6.4.1 Submitting and Acceptances of Documentation**

The Designer and Constructor shall submit the required documentation in electronic and hardcopy.

### **6.4.2 Safety and Risk Information**

Hunter Water and Hunter Water stakeholders, including designers, manufacturers, suppliers, and organisations involved in installing, constructing and commissioning, have obligations defined within:

- The WHS Act, NSW, 2011
- The WHS Regulations NSW, 2011
- WHS Codes of Practice
- Relevant Australian Standards

In order to meet those obligations, Hunter Water requires appropriate risk and safety information to be provided as part of the O&M Manual package. This information will be confirmed by Hunter Water on a project by project basis and will include, but not necessarily be limited to, the following table.

**Table 1: Safety and Risk Information**

Area	Designer	Contractor (Installing, Commissioning, Supplying)
<b>Mandatory Information to Identify Risks, Controls and Residual Risk</b>		
Overall	Safety in Design Report	Pre and Post Commissioning Risk Assessments All risk information from sub consultants and suppliers of equipment installed or commissioned.
<b>Project Based Information</b>		
Mechanical or Electrical guarding Equipment with E-Stops	Design Risk Assessments to AS 4024.1-2006 Series Safety of Machinery FMEA	Final Risk Assessments to AS 4024.1-2006 Series Safety of Machinery
Installation of Plant and Equipment		Equipment Risk Assessments for manufactured plant and products Commissioning and Operational SOP's and SWM
Commissioning and Operations		Safe Operating Procedures Safe Work Method Statements
Processes and Integrated Systems	HAZOP	HAZOP Systems Integration Risk Assessment

Risk assessments are to be conducted based on:

- Hunter Water Risk Management Framework Version 3.0
- AS/NZS ISO 31000:2009 Risk management – Principles and guidelines

Regardless of the information requested by Hunter Water, stakeholders must ensure they meet their obligations within the WHS Act, WHS Regulation, and associated legislation and standards.

### 6.4.3 O&M Manual Information

Submit O&M manual information in the following format.

**Table 2: O&M Manual Information**

Template Paragraph No	Item	Stage		Format
		Design Stage - Designer to Provide	WAC Stage - Contractor to Provide	
1	<b>Contact Information</b>			
	Contact Details	Name Address Phone Fax Email	Name Address Phone Fax Email	Word
	Reference Number	The Designer Project or Job number	The Contractor Project or Job number	Word
	Hunter Water Contract Number	The Hunter Water reference number	The Hunter Water reference number	Word
1.1 1.2	Description of work	Design brief: Scope of work to be completed	Scope of work to be completed under the contract	Word
2	<b>Defect Liability</b>			
	Equipment covered by warranties	NA	All equipment covered by warranty and warranty period. Warranty certificates attached as Appendix 1	PDF
	Spare Parts and Special Tools	NA	List of any spare parts supplied under the contract: <ul style="list-style-type: none"> <li>• Critical Spares</li> <li>• Operational Spares</li> <li>• Special Tools</li> </ul>	Spreadsheet
3	<b>WAC Information</b>			
	WAC Drawings	NA	Supplied in accordance with STS 903	AutoCAD



Template		Item	Stage		Format	
Paragraph No	Design Stage - Designer to Provide	WAC Stage - Contractor to Provide				
3.1	WAC and Construction Drawings Location	NA	List the location of the WAC Drawings and the Trim References of the Construction Drawings files with in the Hunter Waters electronic system.			Word
3.2	Commissioning	NA	The commissioning and any re-commissioning original signed sheets are to be included as Appendix 2			PDF
<b>4</b>	<b>Asset Operational and Maintenance Details</b>					
4.1	Asset Function	A description of <ul style="list-style-type: none"> <li>The asset function (what does it do?)</li> <li>Asset operation (how does it do it?)</li> <li>Interactions with other assets</li> </ul>	NA	Word		
4.2	System hydraulic overview	A graphical representation of where the asset fits in the Hunter Water system and how it interacts with the other assets in the system, for more details See Appendix 2.	NA	PDF		
<b>5</b>	<b>Operation Procedures</b>					
5.1	Assets Operation	A description of asset general operation. Include relevant information such as: <ul style="list-style-type: none"> <li>Level settings</li> <li>Overflow points</li> <li>The way the Asset control works</li> <li>Interactions with other assets in the system</li> </ul>	An overview of the function and intended operation of equipment and installed components within each functional unit. Include relevant process flow diagrams and P&ID drawings.			Word
5.2	Restriction on Asset Operation	List any limitation on the asset or any individual part of the asset caused by factors within the network or the asset.	List any limitation on the asset or any individual part of the asset caused by factors within the network or the asset.			Word
5.3	Start Up/Shut Down	Step by step procedures for start-up & shut down for the asset and other associated equipment	Step by step procedures for start-up & shut down for the asset and other associated equipment			Word
5.4	Isolation	Safe isolation procedures for the asset for shut down and maintenance, including:	Safe isolation procedures for the asset for shut down and maintenance, including:			Word

Template Paragraph No	Item	Stage		Format
		Design Stage - Designer to Provide	WAC Stage - Contractor to Provide	
		<ul style="list-style-type: none"> <li>Safe isolation isolate the asset from the whole system</li> <li>Safe operation of the system without the asset</li> </ul>	<ul style="list-style-type: none"> <li>Safe isolation isolate the asset from the whole system</li> <li>Safe operation of the system without the asset</li> </ul>	
5.5	Fault Conditions	NA	<p>A full list of fault conditions, including:</p> <ul style="list-style-type: none"> <li>How the fault is generated,</li> <li>Consequence of each fault</li> <li>How to reset or overcome the fault</li> </ul>	Word
5.6	Emergency Procedures	List of possible emergency scenarios and procedures.	List of possible Emergency scenario and procedures.	Word
5.7	Surcharge Details	<p>For wastewater collection system only, such as:</p> <ul style="list-style-type: none"> <li>Wastewater Pump Station,</li> <li>Storm flow bypass pumping system or</li> <li>Offline storage</li> </ul> <p>Details as per the Technical Data Sheet See Appendix 2</p>	<p>For wastewater collection system only, such as:</p> <ul style="list-style-type: none"> <li>Wastewater Pump Station,</li> <li>Storm flow bypass pumping system or</li> <li>Offline storage</li> </ul> <p>Details as per the Technical Data Sheet See Appendix 2</p>	Template
5.8	Generator Connection Details	Only if portable generator connections are required See Appendix 2 Details as per the Technical Data Sheet	Only if portable generator connections are required. See Appendix 2 Details as per the Technical Data Sheet	Template
5.9	Standard Operating Procedures (SOPs) / Safe Work Method Statements (SWMSS)	Supply copies of SOPs for all equipment & SWMSS or summary of what is required in SWMSS as specified in Claus A.2.4.6.	Revise or supply copies of SOPs for all equipment & SWMSS or summary of what is required in SWMSS as specified in Claus A.2.4.6.	Word
5.10	Safety Data Sheets (SDS) Register	NA	A register of all chemicals required for use in the day to day operation and routine and periodic maintenance of the equipment.	
<b>6</b>	<b>Asset Equipment</b>			
<b>6.1</b>	<b>Equipment Technical details Tables</b>			
	6.1.1	Pump and Motor	Details as per Pump Details section in Technical Data Sheet	Template

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Template		Item	Stage		Format
Paragraph No		Design Stage - Designer to Provide	WAC Stage - Contractor to Provide		
	6.1.2	Level Monitors	NA	Details as per this section in Technical Data Sheet	Template
	6.1.3	PLC & Telemetry	NA	Details as per this section in Technical Data Sheet	Template
	6.1.4	Valves	NA	Details as per this section in Technical Data Sheet	Template
<b>6.2</b>	<b>Pump Details (Remove if not a pump station)</b>				
	6.2.1	Pump certified test curves	NA	Provided by the pump manufacturer.	PDF
	6.2.1 a	Pump Published Curves	Provided by the pump manufacturer	Provided by the pump manufacturer	PDF
	6.2.2	Motor test curves	NA	Provided by the pump manufacturer	PDF
	6.2.2 a	Motor published curves	Provided by the pump manufacturer	Provided by the pump manufacturer	PDF
	6.2.3	Test result log sheet	Provided by the pump manufacturer	Provided by the pump manufacturer	PDF
	6.2.4	Motor torque/speed/efficiency characteristic curves	NA	Provided by the pump manufacturer	PDF
6.3		Drawings:	NA	General Arrangements including pump & discharge bend assembly (dimensioned). Sectional Arrangement with parts and material lists Dimensioned Motor Arrangement Sectional Arrangement with parts list and material lists Gland Sealing Arrangement including submersible power cables	PDF
<b>6.4</b>	<b>PLC and Telemetry (if installed)</b>				
		Operation of the PLC & telemetry	Update the draft Automatic Control and Monitoring Manual (ACMM) or if relevant a Functional Specification refer to Claus A.2.4.5	Update the draft Automatic Control and Monitoring Manual (ACMM) or Functional Specification refer to Claus A.2.4.5	Word
<b>6.5</b>	<b>Peripheral Equipment (If installed)</b>				

Template		Item		Stage		Format	
Paragraph No		Design Stage - Designer to Provide	WAC Stage - Contractor to Provide				
		Includes: <ul style="list-style-type: none"> <li>Compressor</li> <li>Generators</li> <li>Odour &amp; Sterilising units</li> <li>Overhead Cranes</li> <li>Pressure Vessels</li> </ul>	NA	Refer to Section <b>Error! Reference source not found.</b> Details as per Peripheral Equipment section in Technical Data Sheet		Template	
<b>6.6</b>		<b>Other Installed Equipment (equipment which is not detailed in another section of the O&amp;M Manual)</b>					
	6.6.1	List of Other Installed Equipment	NA	List of components installed: <ul style="list-style-type: none"> <li>Of the class listed in the Approved Product list; or</li> <li>Valued at more than \$5,000; and</li> <li>Components not on an Approved Product List that has been approved for this project.</li> </ul>		Word	
	6.6.2	Technical and Replacement Details	NA	Technical specifications for components listed above		Word	
<b>6.7</b>		<b>Maintenance Information</b>					
	6.7.1	Trouble shooting instructions for large components (e.g. pump and motors etc.).	NA	Step by step procedures for: <ul style="list-style-type: none"> <li>Dismantling and reassembly of the unit (pumps, motors etc.)</li> <li>the use of special tools</li> <li>Replacement of wearing parts such as bearings, seals, wear rings, etc.</li> </ul>		Word	
	6.7.2	Maintenance scheduling		Supply sufficient information from the OEM Manual to allow maintenance to be carried out including routine overhauls required to achieve operational design life. Refer to Claus A.2.4.7.1		Word	
	6.7.3	Drawings and schedules	NA	As required for asset installation, operation and maintenance		PDF	

Template Paragraph No	Item	Stage		Format
		Design Stage - Designer to Provide	WAC Stage - Contractor to Provide	
	Performance Testing	NA	Metrics and procedures to measure equipment performance to ensure it is operating at required function and capacity.	Word
7	OEM Manuals	NA	A summary of the OEM manuals for the major components to be attached as Appendix 6..	PDF
<b>8</b>	<b>Risk Information</b>			
		A summary of Safety and Risk information as per Section <b>6.4.2</b> Risk Assessments and supporting information to be provided within Appendix 5 Safety and Risk	As per Section 6.4.2	PDF

#### **6.4.4 Design Stage Information**

The Designer shall provide draft documentation and summarise the information specified in Table 2 within the O&M Manual Template and Technical Data Sheets.

#### **6.4.5 Design Stage Information**

The Designer shall provide the Operation and Maintenance Information Package. The package contains:

- If required (refer 6.1.1) use the revised Table 2 (O&M Manual Information), attached as an appendix to the O&M Manual.
- The Designers part of the O&M Manual completed as specified in approved table 2 (Originator or Revised) and it file relabelled.
- The Asset Data Collection sheet with its file relabelled.
- The Pump Pack Template with its file relabelled.
- A PDF version of the O&M Manual. Provide hard copies of any original scanned documents.

#### **6.4.6 Work as Constructed Stage Information**

Prior to the commissioning stage, the contractor shall:

- Use the Table 2 in STS 906 unless a revised Table 2 has been included as an appendix to the O&M Manual in the Operation and Maintenance Information Package.
- Complete the O&M Manual by providing the information required as specified in Table 2.
- Complete the Asset Data Collection Sheets in the Excel spreadsheet supplied.
- Complete the Hunter Water Pump Pack Template in the Word template supplied.
- Review any information provided in the Design Stage and revise any which has changed during Construction.
- Provide all associated documentation as outlined in Section 6.3.6

## 7 Related Documents

Other Hunter Water drawing standards include:

- STS 904 – Standard Technical Specification – Preparation of Electrical Drawings
- STS 903 – Standard Technical Specification – Preparation of Work as Constructed Drawings
- STS 911 – Standard Technical Specification – Mechanical Civil and Structural Drawings

## 8 Document Control

**Document Owner:** Group Manager Planning and Engineering

**Document Approver:** Executive Manager Customer Delivery

Document review is as per the Integrated Management System Document Management Standard

[HW2013-421/22.002](#).

Version	Author	Details of Change	Approval Date	Approved by
1.0	R Payne	New Standard	Jan 2015	S Horvath
1.1	R Payne	Table 2 – Add Pump Published Curves	July 2016	S Horvath
2	R Payne T Thompson	Addition of WWTW and Minor Assets. Additional details for ACMM, SOPs, SWMSs, Maintenance Scheduling. Update Pump Pack information.	12 April 2023	R Main

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## Appendix 1. Australian Standards

Name	Number
AS 4024.1-2006	Series Safety of Machinery
AS/NZS ISO 31000:2009	Risk management – Principles and guidelines

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## Appendix 2. O & M Manual Creation General Instructions

### A.2.1 Introduction

These instructions are to be used in conjunction with Table 2: O & M Manual Information to assist in the creation of O & M Manuals.

### A.2.2 O & M Manuals for Minor Asset

In consultation with Hunter Waters designated representative adapting the “Table 2: O & M Manual Information” and the template to create an O & M manual containing the relevant information for the small standalone asset.

### A.2.3 Documents Required to Create an O&M Manual for Pump Stations are

1. O&M Manual Template.doc
2. Technical Data Sheet Template.xls

### A.2.4 Additional Information for Table 2

#### A.2.4.1 System Hydraulic Overview

Sewer Station

- For most sewer stations, show all upstream stations and the next downstream also the treatment works joined with a dotted line to the downstream station. For any station that has too many upstream stations to show on one page, show as much of the network as can be fitted on the page working from the station in this contract. Above the last station on each branch that can fit on the page list the rest of the contributing stations, in their location order.

Water Stations

- Show as much of primary configuration of the upstream water system and the next downstream pump station or reservoirs that can fit on one page, starting from the station in this contract

#### A.2.4.2 P & ID Tag and Drawing Numbers

- P&ID Tag Number This is the identifier used in Hunter Water’s database of equipment. The information is supplied by Hunter Water and is available on the P&ID drawings.
- P&ID Drawing Number Relevant drawing number where equipment is shown.

#### A.2.4.3 Generator Connection Details

If no generator connection is available at the asset enter the following text:

- “Not set up to be connected to a portable generator”

If a generator is permanently installed enter the following text:

- “Permanent Generator Installed, Refer to Peripheral Section for details”

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#### **A.2.4.4 Peripheral Equipment**

If peripheral equipment is not installed, enter the following text:

- “Permanent No Peripheral Equipment Installed”

#### **A.2.4.5 Automatic Control and Monitoring Manual**

Update the draft Automatic Control and Monitoring Manual (ACMM) to reflect the equipment installed and any changes to set-points.

In accordance with the terms of the contract submit one hard copy and one digital copy (on CD or DVD as appropriate) for review generally at least four weeks prior to Commissioning.

Hunter Water may provide comments within three weeks of having received the draft updated ACMM. Comments may include advice regarding settings determined by Hunter Water that are not already included in the draft manual (e.g. alarm priority levels). Configure the PLC and SCADA with these settings prior to commissioning.

Update the ACMM to reflect comments and any changes made during the commissioning process.

Submit one hard copy and two digital copies of the final ACMM in a maximum of one week after commissioning. Submission of the final ACMM is a prerequisite for Completion.

For small Assets (Flow meters ETC) that are telemetered or have minor PLC functionality were an ACMM is not justified, supply a Functional Specification of the PLC & telemetry expressed such that it is easily understood and does not rely on technical jargon. The determination of which Assets only require a Functional Specification is to be made in consultation with Hunter Water nominated representative.

#### **A.2.4.6 Standard Operating Procedures, Safe Work Method Statements (SWMSs) and Asset Information**

##### **A.2.4.6.1 General**

In accordance with paragraphs below develop either Standard Operating Procedures (SOPs) or Safe Work Method Statements (SWMSs) for each unique operation or maintenance task not addressed in the OEM manual. These additional SOPs and SWMSs are for each individual piece of equipment as well as combinations of equipment groups, up to ones covering the whole Asset if required. The OEM manuals generic SOPs & SWMSs are where necessary to be customised to take into account any unique characteristics of the assets operating environment or other feature. Tasks shall include, but not be limited to, installation, removal, repair, overhauling and dismantling of equipment. Confirm for each tasks whether a SOP or SWMS is required. Typically, SOPs will be required for tasks undertaken by plant operators and SWMSs will be required for tasks undertaken by electrical or mechanical maintenance staff.

- Review whether relevant SOPs / SWMSs have already been developed for this item of equipment or a similar item of equipment at this Asset or another Asset of the same type operated by Hunter Water.
- Provide SOP and SWMSs templates for use within 3 working days of request.

If an existing SOP or SWMSs already exists, use the existing document as a basis and modify only where required to make it compatible with the new item of equipment supplied.

As a minimum, SOPs / SWMSs shall include the following sections:

- Scope outlining the purpose of the procedure

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- |   |                        |   |
|---|------------------------|---|
| - | Background Information | outline the background information for the item of equipment                            |
| - | Pre-requisites         | any specific training / skills required to perform the task                             |
| - | Timing                 | outline the frequency and how long the task will take                                   |
| - | References             | any references or documents required to complete the procedure                          |
| - | Risk Assessment        | identification of hazards involved in the procedure                                     |
| - | Procedure              | outline of the procedure broken into individual steps, including start up and shut down |
| - | Review Information     | include details of revisions  |

Liaise with Hunter Water nominated representative during development to obtain operators and maintenance staff input.

The SOPs & SWMSs as required in the Safe Work Australia Managing Risk of Plant in the Workplace.

#### **A.2.4.6.2 SOPs**

The SOPs for the Asset and/or its equipment are to be listed in Appendix 3 of the O & M Manual. The SOPS are to be listed in order of importance's and then by procedure, the most critical first.

#### **A.2.4.6.3 Mechanical SWMSs**

The SWMSs for the Asset and/or its equipment are to be listed in Appendix 3 of the O & M Manual. The SWMSs are to be listed in order of importance's and then by procedure, the most critical first.

#### **A.2.4.6.4 Electrical SWMSs, Work Instructions and Hazard Class Management plan**

In the O & M Manual Appendix 3 provide a summary of what SWMSs, Work Instructions and Hazard Class Management plan are required for this Asset and/or its equipment. Include any operational or environmental factors that will have to be considered when preparing these instructions.

The detailed instructions are to be inputted into the formatted Microsoft XLS Spreadsheets, supplied by Hunter Waters Asset Management Electrical Group.

The Summaries for SWMSs, Work Instructions and Hazard Class Management plan are to be listed in Appendix 3. The Summaries are to be listed in order of importance's and then by procedure, the most critical first.

#### **A.2.4.7 Routine and Periodic Maintenance Schedule**

##### **A.2.4.7.1 General**

In accordance with paragraphs below prepare maintenance schedules for the Asset and or its equipment.

Maintenances Schedules shall be as recommended by the OEM. Include sufficient information from the OEM Manual to allow maintenance to be carried out including routine overhauls required to achieve operational design life. (Not the whole manual) In addition to the maintenances requirements specified in the OEM for individual pieces of equipment, provide where necessary any maintenances requirement for equipment grouping with in the Asset that are not covered in any of the OEM. OEM manuals generic maintenance requirements are where necessary to be customised to take into account any unique characteristics of the assets operating environment or other feature.

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Routine Maintenance shall include step-by-step procedures for preventive maintenance works carried out at intervals optimise the life of the equipment.

Periodic Maintenance shall include step-by-step procedures for fault correction and preventive maintenance carried out at intervals in excess of two weeks. Periodic maintenance shall include, but not be limited to:

- Servicing equipment.
- Calibrating instruments.
- Cleaning equipment.
- Condition inspections, e.g. inspection for wear.
- Functionality checks, e.g. safety equipment.
- Statutory inspections, e.g. pressure vessels.

#### **A.2.4.7.2 Mechanical Maintenance**

The maintenance schedules for the Asset and/or its equipment are to be listed in Appendix 4 of the O & M Manual. The maintenance schedules are to be listed in order of importance's and then by procedure.

#### **A.2.4.7.3 Electrical Program Maintenances**

In the O & M Manual Appendix 4 provide a summary of what maintenances is required for this Asset and/or its equipment. Include any operational or environmental factors that will have to be considered when preparing these instructions.

The detailed of maintenances requirements are to be inputted into the formatted Microsoft XLS Spreadsheets, supplied by Hunter Waters Asset Management Electrical Group.

#### **A.2.4.7.4 Electrical Name Plates Details**

The Name Plates Details are to be inputted into the formatted Microsoft XLS Spreadsheets, supplied by Hunter Waters Asset Management Electrical Group.

### Appendix 3. O&M Manual Creation Instructions for Treatment Plants

#### A.3.1 Introduction

Prepare a combined O&M Manual for the plant containing individual volumes for each process unit (e.g. aeration tank). The list of process unit requiring a volume of their own is to be prepared in consultation with the Hunter Water nominated representative. In addition to the volumes for each process unit include an overview volume for the whole plant. For upgrades revise or produce a volume for the process unit being upgraded and any associated volumes that require revision as determined by the Hunter Water nominated representative.

Each of the O & M Manual volumes for the various process unit and the overview volume for the whole plant are to set out as outline in the table of content (A.3.2). The cross reference column in this table lists what is to be included in each chapter. The cross reference column is for preparation purposes only and is not to be included in the manual.

Use the main part of this STS along with table 1: Safety and Risk Information, Content Table (A.3.2) and the Appendix to create the O & M Manual volumes for the various process units of the plant covered by the contract.

#### A.3.2 Contents

The contents of each of volumes shall be presented as follows:

Table of Contents

Table 2: O&M Manual Information - Template Paragraph No

Chapter 1	Plant Overview	4 & 5.1 & 5.2
Chapter 2	Process systems SOPs / SWMSs	5.3 to 5.6 & 5.9
Chapter 3	Plant Control Systems	6.4
Chapter 4	Maintenance Schedules	6.7.2 & 7
Chapter 5	Contract & contact details For the Principal Contractor, sub-contractors and suppliers for each major item of equipment.	1
Appendix 1	Installation and Commissioning Instructions	3 & 6.7.3
Appendix 2	Test Data and Troubleshooting	6.7.1 & 6.7.4
Appendix 3	Spare Parts and Special Tools List	2.2
Appendix 4	Test Certificates and Performance Curves	6.2
Appendix 5	Equipment warranties	2.1
Appendix 6	MSDS Register	5.1
Appendix 7	Drawings	6.3

#### A.3.3 Hardcopy layout

The O&M information for more than one process unit may be incorporated physically into a single folder where practicable to minimise the number of folders. This shall be reflected in the table of contents and cross-referencing from any separate folders.

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### A.3.4 Filenames

The files Names to be used for the electronic version of O&M Manual for treatment works are to be as follows.

- Start the filename with “O&M\_Manual” followed by the Ellipse References number, then the Ellipse code for the process (e.g. O&M\_Manual\_ST-BEL-WAS.Doc).
- Name each Appendix as a separate file (e.g. O&M\_Manual\_Ellipse-No-Process\_App-#.doc), where the # is the number of the appendix in the manual.
- The PDF file of the O&M Manual is to be labelled the same as the file except with the letters PDF after the process code before the .pdf suffix (E.g. O&M\_Manual\_ST-BEL-WAS\_PDF.pdf).

### A.3.5 References

Other Hunter Water Documents used in the creation of O&M manual for Treatment plants:

- HW2008-1521/2.001 Guideline – Working Copy - Design Guideline
- HW2008-1521/2.002 Procedure – Standard for Process and Instrumentation Diagram for Treatment Plants
- HW2008-1521/4/1 ACMM Template (Automatic Control and Monitoring Manual)
- HW2008-1522/1.003 Template – Commissioning and Training Specification Section B



## Appendix 4. Hunter Water Pump Pack Template – Example

The following document is supplied as an example ONLY of the Hunter Water Pump Pack Template that is required to be supplied with every pump supplied to Hunter Water in any project. The Hunter Water Pump Pack Template is a controlled template that is made available by Hunter Water for the supplier's utilisation.



**Pump Pack Template,  
Hunter Water - Exam**