

**Engineering Services**

**Technical Standard  
TS 112**

**Process and Instrumentation  
Diagrams (P&ID)**

**Revision: 2.0  
Date: 16 December 2015**

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Only the current revision of this Standard should be used which is available for download from the SA Water website.

## Significant/Major Changes Incorporated in This Edition

- Appendix B – Treatment Plant Area Numbers, Added

## Document Controls

### Revision History

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# 1 Introduction

SA Water is responsible for operation and maintenance of an extensive amount of engineering infrastructure.

This standard has been developed to assist in the design, maintenance, construction, and management of this infrastructure.

## 1.1 Purpose

The purpose of this standard is to detail minimum requirements to ensure that assets covered by the scope of this standard are constructed and maintained to consistent standards and attain the required asset life.

## 1.2 Glossary

The following glossary items are used in this document:

Term	Description
SA Water	South Australian Water Corporation
TG	SA Water Technical Guideline
TS	SA Water Technical Standard

## 1.3 References

### 1.3.1 Australian and International

The following table identifies Australian and International standards and other similar documents referenced in this document:

Number	Title
AS 1101	Graphical Symbols (numerous Parts are listed as obsolete and are to be used for historical reference only)
ISO 3511-3	Process Measurement Control Functions and Instrumentation; Symbolic Representation
ISO 3511-4	Industrial Process Measurement Control Functions and Instrumentation; Symbolic Representation

### 1.3.2 SA Water Documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Number	Title
TS 95	Requirements for Technical Drawings
4003-00001-01	P&ID Standard Drafting Symbols Chart
4003-00001-02	P&ID Standard Drafting Symbols Chart

## 1.4 Definitions

The following definitions are applicable to this document:

Term	Description
SA Water's Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): <ul style="list-style-type: none"><li data-bbox="635 421 1362 450">• Superintendent's Representative (e.g. AS 4300 &amp; AS 2124 etc.)</li><li data-bbox="635 454 970 483">• SA Water Project Manager</li><li data-bbox="635 488 1075 517">• SA Water nominated contact person</li></ul>
Responsible Discipline Lead	The engineering discipline expert responsible for TS 112 defined on page 3 (via SA Water's Representative)

## 2 Scope

This Technical Standard (TS) shall apply to all the Process / Piping and Instrumentation Diagrams (P&IDs) produced for or by SA Water, and for all SA Water projects.

SA Water requires P&IDs to be prepared at the Concept Design stage for all plant and systems that include operable elements or instrumentation. Operable elements include manual, actuated, and automatic operation. P&IDs may be prepared prior to the Concept Design stage as appropriate. P&IDs shall be revised for each subsequent phase of the project or works.

This Technical Standard specifies P&ID content and format, and particular SA Water requirements. It is generally consistent with Australian and International Standards and with water industry practice.

Reference to this Technical Standard shall also be taken to include reference to SA Water Drawings 4003-00001-01 and 4003-00001-02. Reference to drawings shall also be taken as reference to drawing sheets. Refer to TS 95 for explanation of the SA Water drawing-and-sheet system.

This Technical Standard and SA Water Drawings 4003-00001-01 and 4003-00001-02 supersede all previous SA Water documentation on this subject.

## 3 Precedence

Where symbols or codes differ across the relevant standards the following order of precedence shall apply, in descending order:

- SA Water TS 112 and supporting Standard Drawings 4003-00001-01 and 4003-00001-02
- Australian Standard 1101 (as current and applicable)
- ISO Standard 3511
- Custom symbol or code

## 4 P&ID Requirements

### 4.1 Introduction

A P&ID shows information on piping, fittings, equipment, instrumentation, and process plant in a representative and sequential arrangement on the basis of product flow paths. The P&ID layout does not necessarily reflect physical arrangements. A P&ID is not drawn to scale.

Where hydraulic elevations and levels of equipment are important to the process, this information shall be shown on the P&ID by referring to Elevation (EL) with respect to the Australian Height Datum (AHD).

Where multiple P&IDs are required, the layout shall be logical and sequential across the drawings and the break up between the drawings or sheets shall be based on plant or process areas.

This Technical Standard and Standard Drawings 4003-00001-01 and 4003-00001-02 specify numerous coding systems for use in P&IDs. If coding systems are required for other attributes, they may be developed on an individual project basis. In this case, the systems must be consistent in format with the specified systems and shall be defined on the drawing where they are used and/or in a master legend for the set of drawings.

The code formats specified in this Technical Standard and the codes specified on Standard Drawings 4003-00001-01 and 4003-00001-02 are specifically for use on P&IDs but may be used in other applications as appropriate (often on a general arrangement drawing showing a P&ID tag reference on a pipe, valve and/or other equipment for process clarity).

## 4.2 Process Flow Designation

### 4.2.1 General

The flow direction of main process streams shall, where possible, be from left to right. Flows shall leave P&IDs at the sides, not at the top or bottom.

Existing process streams, pipes and/or equipment shall be shown in a light weight, broken and/or dotted line. New or proposed process streams, pipes and/or equipment shall be shown in a solid heavy-weighted line distinct from the line for the existing process streams, pipes and/or equipment. The distinction between line styles must be such that it is clearly evident on a drawing printed at A3 size.

Additionally, P&IDs shall show the primary process streams, pipes and/or equipment in a solid heavy weighted line type – clearly identifying the primary process.

Process streams leaving or entering drawings or sheets shall have a “process flow tag” at the side of the drawing indicating the direction of flow, as well as text describing the source and/or destination of the stream.

### 4.2.2 Process Flow Tag Format

Process flow tags shall contain the following information as appropriate:

- **FLUID** code or description with source or destination
- **EQUIPMENT** Name and Number
- **DRAWING NUMBER** of source or destination drawing.

Example: Incoming process (service) water from a booster pump on a previous sheet might be designated as shown in **Error! Not a valid bookmark self-reference.** below:



Figure 1 - Typical process flow tag format for incoming process flow (left of page)

## 4.3 Piping Designation

### 4.3.1 Piping Designation Code

Piping designation shall be in the form: **DIAM-FLU-MATL-XXX**

Where:

- **DIAM** is the pipe size, either nominal or actual
- **FLU** is the Fluid Code for the contained fluid as per Standard Drawing 4003-00001-02
- **MATL** is the pipe Material Code as per Standard Drawing 4003-00001-02
- **XXX** is the line number (optional)

Example: An effluent pipe of 200 diameter polyethylene on line 006 might be designated as 200-EFF-HDPE-006

In all cases where codes are used that are not shown on Standard Drawing 4003-00001-02 they shall be defined on the drawing where they are used and/or in a master legend for the set of drawings.

### 4.3.2 Tie-in or Termination Points (TPs)

New work that ties in to existing works at the termination points for contracts shall be designated with the Termination Point (TP) symbol.

Where more than one TP is used, each point will be designated with a unique identification number as shown in Figure 2 below:

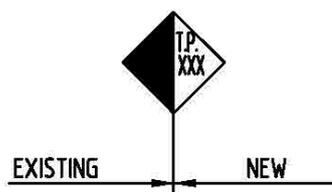


Figure 2 - Typical termination point indicator

## 4.4 Equipment Designation

### 4.4.1 General

Equipment titles shall be functionally descriptive in terms of process and generic in terms of equipment type (e.g., a treated water pump which could be abbreviated to TWP).

Equipment may be designated and numbered with respect to location as appropriate. Any new equipment added to a particular location shall be incremented numerically from the existing equipment in that location.

Equipment details shall be vertically aligned to the respective equipment on the P&ID.

### 4.4.2 Equipment Designation Code

Equipment designation shall be in the form: **EQPT-LOCN-XXX**

where:

- **EQPT** is the equipment or valve title abbreviation which often includes the fluid identifier and may be project specific
- **LOCN** is the location code (letters or numbers) – this refers to the location of the equipment within a treatment plant for example, not a geographic location/township, and is optional depending on the size and complexity of the plant
- **XXX** is the equipment number

Examples:

- A process water pump 2 in a chemical dosing area might be designated as PRWP-CHEM-002
- A manual ball valve might be designated as HV-010
- A process globe valve (pressure sustaining) in a chemical dosing area might be designated as PV-002-009
- A compressor at the Happy Valley WTP might be designated as CO-096-300
- A chlorinator at the Happy Valley WTP might be designated as CH-096-001

The equipment numbering/naming system shall be as advised by or agreed with SA Water Engineering.

In all cases where codes are used that are not shown on Standard Drawing 4003-00001-02 they shall be defined on the drawing where they are used and/or in a master legend for the set of drawings.

The equipment designation shall be shown inside or adjacent to the equipment symbol and/or representation on the P&ID.

## 4.5 Instrumentation

Instrumentation names and symbols shall be as per Standard Drawing 4003-00001-01.

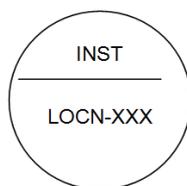
Instruments may be designated and numbered with respect to location as appropriate. Any new instruments added to a particular location shall be incremented numerically from the existing instruments in that location.

Instrument numbering shall be in the form: **INST-LOCN-XXX**

where:

- **INST** is the instrument title abbreviation
- **LOCN** is the location code
- **XXX** is the instrument number

Instrument identification shall be as shown in Figure 3 below:



**Figure 3 - Typical instrument identification symbol**

The instrument number shall be shown inside or near the equipment symbol on the P&ID.

## 4.6 Pressure Piping Hazard Levels

SA Water requires P&IDs to nominate and show the piping hazard level ratings according to the product (e.g., wastewater chemicals, chlorine gas, digester gas, sludge, supernatant, etc...). All chemicals and process fluids are grouped into one of three hazard level categories:

**Hazard Level B** (medium (average) level hazard): very harmful fluids, powders, etc... (e.g., typically acids pH<2 or alkalis pH>11)

**Hazard level C** (low hazard): harmful fluids or powders, low strength acids or alkalis, combustible, corrosive or high temperature fluids

**Hazard Level E** (negligible hazard): non-harmful fluids or powders, typically all water and wastewater streams and normal process air

The piping hazard level rating shall be shown on P&IDs using the symbols as shown in Figure 4 below:

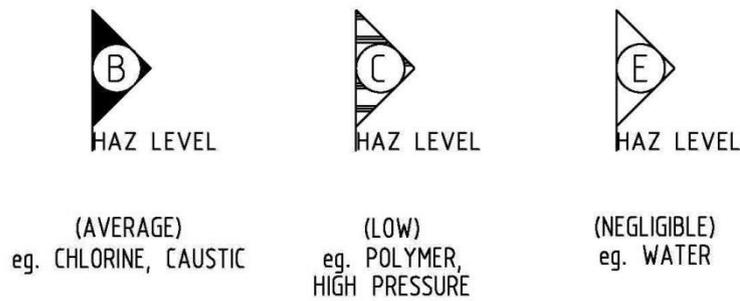


Figure 4 - SA Water hazard level classification

Piping hazard level symbols shall be shown on each process stream/pipe (i.e., positioned at left and right per drawing sheet and across the full process stream) - see the example as shown in Figure 5 below for a liquid chlorine system. Typical process fluids encountered in SA Water systems, and their associated piping hazard level ratings, are listed in Table 1 below.

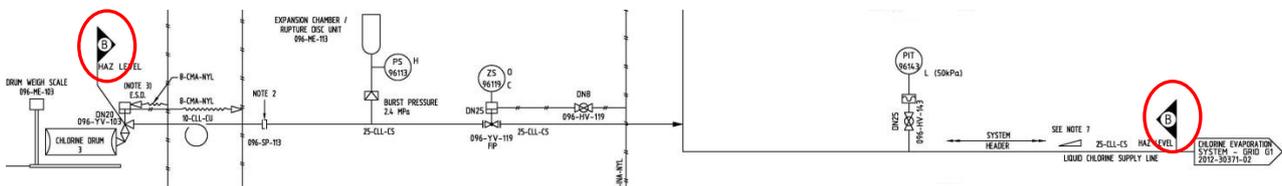


Figure 5 - Example P&ID hazard classification for a liquid chlorine draw off system

Table 1 - List of typical chemical fluids and typical hazard level rating used by SA Water

TYPICAL FLUIDS USED BY SA WATER	SA WATER TYPICAL HAZARD LEVEL FOR PIPING
Activated Carbon (PAC) (up to 10% slurry)	E
Activated Silicate	B
Air, compressed	E
Aluminium Sulphate (Alum) (50% solution)	B
Ammonia, Anhydrous (100% gas/liquid)	B
Ammonia, Aqua (25% solution)Ammonia Solution	B
Calcium Hydroxide (Hydrated lime) (up to 20% slurry)	B
Calcium Oxide (Quicklime) (up to 20% slurry)	B
Chlorine (100% liquid & gas)	B
Chlorine Solution	C
Citric Acid (50% solution)	C
Diesel / Fuels	C
Ferrous Chloride (42% solution)	B
Fluorosilicic Acid (20% solution)	B
Formic Acid (up to 85% solution)	B
Hydrochloric Acid (up to 10% solution)	B
Hydrogen Sulphide (up to 400 ppm in Sewer Gas)	C

TYPICAL FLUIDS USED BY SA WATER	SA WATER TYPICAL HAZARD LEVEL FOR PIPING
Magnesium Hydroxide (60% slurry)	E
Methane or Natural Gas (Digester gas: 70% Methane)	B
Oxygen, compressed (100% liquid & gas)	B
Polyelectrolytes (various) (> 60% solutions)	E
Potassium Permanganate (5% solution)	C
Sodium Carbonate (Soda Ash) (Assume 15% solution)	E
Sodium Chloride (Saturated Brine) (up to 25% solution)	E
Sodium Hydroxide (Caustic Soda) (up to 50% solution)	B
Sodium Hypochlorite (13% solution)	B
Sodium Silicate	B
Sucrose (Liquid Sugar or Molasses) (up to 67% solution)	E
Sulfamic Acid (30% solution)	B
Sulphuric Acid (98% liquid)	B
Water, fresh & sea water (including wastewater)	E
Water, hot or steam (including wastewater)	C

### 4.7 Summary Equipment Technical Information

The top of the P&ID drawing sheet shall be reserved for all equipment technical information, such as process equipment titles, equipment descriptors, number and size, capacity, duty, duty arrangement, power and energy ratings. A typical example is shown in Figure 2Figure 6 below.

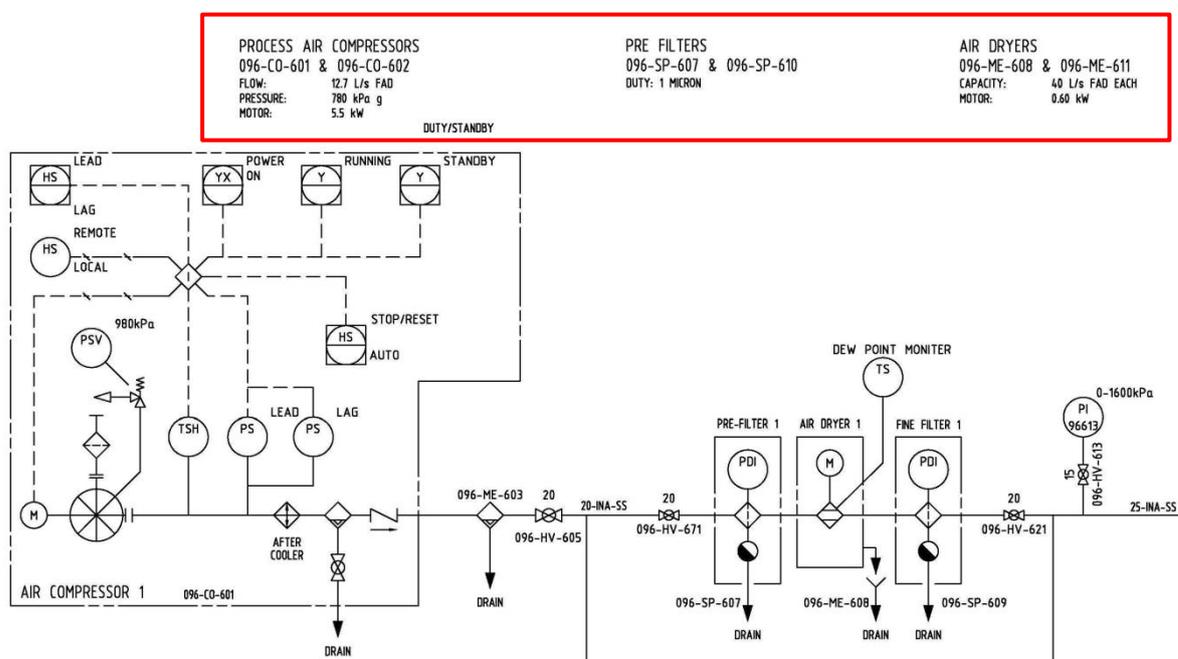


Figure 6 - Example summary equipment information (located top of page)

### 4.8 Existing Numbering and Tagging Conventions

There may be occasions where new capital plant needs to be retro-fitted and/or interfaced with existing operational plant. It is possible that existing numbering and tagging conventions exist for

specific sites. At the commencement of design works, designers shall engage with plant operators and/or the contract superintendent's representative to establish if a site has an existing (and established) numbering and tagging convention. This rule only applies to work associated with a site and/or plant that has an established convention and where introduction of a new convention would lead to operator and maintenance staff confusion and error.

Any established convention identified within the design phase of a new project shall be communicated back to SA Water Engineering for assessment and confirmation.

## 5 Drawing & Drafting Requirements

P&IDs are considered to be Engineering Drawings. They shall be prepared, managed, formatted (i.e., line types and styles), presented and numbered in accordance with TS95 "Requirements for Technical Drawings".

Symbols and representations used on P&IDs shall be as per Standard Drawings 4003-00001-01 and 4003-00001-02.

## Appendix A P&ID Standard Drawings

**Note:** P&ID standard drawings included in this appendix were those current at the time of issue of this standard and are subject to change without notice. The current revision of these drawings at any point in time is available from the SA Water Website Standard Drawings page.



A2 4003-00001-02

### GENERAL EQUIPMENT SYMBOLS

### INSTRUMENTS

	FIELD MOUNTED	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATE	AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATE	NORMALLY INACCESSIBLE TO OPERATE (BEHIND THE PANEL)
DISCRETE INSTRUMENTS	(X)	(X)	(X)	(X)
COMPUTER FUNCTION	(X)	(X)	(X)	(X)
SHARED DISPLAY SHARED CONTROL	(X)	(X)	(X)	(X)
PROGRAMMABLE LOGIC CONTROL (P.L.C.)	(X)	(X)	(X)	(X)

### CHEMICAL CODES

CODE	CHEMICAL
ACP	ACTIVATED CARBON POWDER
ACS	ACTIVATED CARBON SLURRY
ALC	ALUMINUM CHLOROHYDRATE
ALS	ALUMINUM SULPHATE (ALUM)
CI	CITRIC ACID
CDG	CARBON DIOXIDE GAS
CLG	CHLORINE GAS
CLL	CHLORINE LIQUID
CLS	CHLORINE SOLUTION
ESL	ETHANOL SOLUTION
ETH	ETHANOL
FE	FERRIC OR FERROUS CHLORIDE SOLUTION
FLA	FLUOROSILICIC ACID (HYDROFLUOROSILIC)
FLP	SODIUM FLUORIDE POWDER
FLS	SODIUM FLUORIDE SOLUTION
FA	FORMIC ACID
HCA	HYDROCHLORIC ACID
HLP	HYDRATED LIME POWDER
LIS	LIME SOLUTION
MHL	MAGNESIUM HYDROXIDE LIQUID
MO	MOLASSES
NUT	NUTRIENT (PROPRIETARY)
PHA	PHOSPHORIC ACID
POS	POLYMER SOLUTION
QLP	QUICKLIME POWDER
SBI	SODIUM BISULPHITE
CA	SODIUM HYDROXIDE (CAUSTIC SODA)
SH	SODIUM HYPOCHLORITE
SUA	SULPHURIC ACID
SUC	SUCROSE (SUGAR)
SBA	SODIUM BISULPHATE

### PIPE MATERIAL CODES

CODE	MATERIAL
ABS	ABS
AC	ASBESTOS CEMENT
CICL	CAST IRON CEMENT LINED
CS	CARBON STEEL
CSG	CARBON STEEL (GALVANIZED)
CU	COPPER TUBE
DICL	DUCTILE IRON CEMENT LINED
GRP	GLASS FILAMENT REINFORCED PLASTIC
HDPE	HIGH DENSITY POLYETHYLENE
MSCL	MILD STEEL CEMENT LINED
NYL	NYLON TUBE
PVC	PVC (UPVC/MPVC/OPVC)
RC	REINFORCED CONCRETE
RRJ	RUBBER RING JOINT
SS	STAINLESS STEEL
VC	VITRIFIED CLAY

### GENERAL EQUIPMENT SYMBOLS (Continued)

### SERVICE FLUID CODES

CODE	FLUID
AEA	AERATION AIR
ASW	AIR SATURATED WATER
BWW	BACKWASH WATER
CEN	CENTRATE
CMA	COMPRESSED AIR
DGG	DIGESTER GAS
DGS	DIGESTED SLUDGE
DRN	DRAIN
DSN	DIGESTER SUPERNATANT
EFF	EFFLUENT
FIL	FILTRATE
FIW	FILTERED WATER
FWS	FIRE WATER SERVICE
FLA	FLOUL AIR
GAS	NATURAL GAS
GSL	GRIT SOLUTION
GSN	GRIT SUPERNATANT
HTW	HOT WATER
INA	INSTRUMENT AIR
MLO	MIXED LIQUOR
MLR	MIXED LIQUOR RETURN
PER	PERMATE
PRW	SERVICE WATER (PROCESS WATER)
PTW	POTABLE WATER
RAS	RETURN (RECYCLED) ACTIVATED SLUDGE
RAW	RAW WATER
REW	RECYCLED WATER (REUSE WATER)
SCM	SCUM
SEW	RAW SEWAGE
SLG	SLUDGE
SSN	SLUDGE SUPERNATANT
SRS	SCREENED RAW SEWAGE
WWW	WASTE WASHWATER
WAS	WASTE ACTIVATED SLUDGE

### LETTER CODE FOR IDENTIFICATION OF INSTRUMENT FUNCTION

LETTER	FIRST LETTER		SUCCEEDING LETTER		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS	-	ALARM	-	-
B	BURNER, FLAME	-	USERS CHOICE	USERS CHOICE	USERS CHOICE
C	USERS CHOICE	-	-	CONTROL	-
D	DISSOLVED OXYGEN	DIFFERENTIAL	-	-	-
E	VOLTAGE	-	SENSOR	-	-
F	FLOW RATE	RATIO	-	-	-
G	USERS CHOICE	-	VIEWING DEVICE	-	-
H	HAND	-	-	-	HIGH
I	CURRENT (ELECTRICAL)	-	INDICATOR	-	-
J	POWER	SCAN	-	-	-
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE	-	CONTROL STATION	-
L	LEVEL	-	LIGHT	-	LOW
M	USERS CHOICE	MOMENTARY	-	-	MIDDLE INTERMEDIATE
N	USERS CHOICE	-	USERS CHOICE	USERS CHOICE	USERS CHOICE
O	USERS CHOICE	-	ORIFICE RESTR.	-	-
P	PRESSURE, VACUUM	-	POINT CONNECTION	-	-
Q	QUANTITY	INTERGRATE, TOTALIZE	-	-	-
R	RADIATION	-	RECORD	-	-
S	SPEED, FREQUENCY	SAFETY	-	SWITCH	-
T	TEMPERATURE	-	-	TRANSMIT	-
U	MULTIVARIABLE	-	MULTI FUNCTION	MULTI FUNCTION	MULTI FUNCTION
V	VIBRATION, MECHANICAL ANALYSIS	-	-	VALVE, DAMPER, LOUVER	-
W	WEIGHT, FORCE	-	WELL	-	-
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS	-	RELAY, COMPUTE, CONVERT	-
Z	POSITION, DIMENSION	Z AXIS	-	DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	-

**NOTE**  
THIS DRAWING SHOWS THE STANDARD SYMBOLS TO BE USED WHEN PRODUCING P & ID'S FOR SA WATER AND ON ALL SA WATER PROJECTS. REFER TO TS112

REV#	DATE	DRN	DESCRIPTION	APPROVED	DESIGNED	E.J.A.	24/05/12	AUTHORIZED	14/08/15
1	14/08/15	P.H.	ISSUED FOR USE						

**SA Water**

SA WATER STANDARDS

PROCESS AND INSTRUMENTATION DIAGRAMS  
STANDARD DRAFTING SYMBOLS CHART  
SA WATER STANDARDS

CONTRACTOR/COMPANY NAME: SA WATER

DESIGN APPROVED FOR USE: [Signature]

CONTRACT NO: 4003-00001-02

SHEET NO: 1 OF 1

SA WATER PROJECT NO: 4003-00001-02

CONTRACT NO: 4003-00001-02

DRAWING NO: 4003-00001-02

## Appendix B Treatment Plant Area Numbers

### B1 Bolivar WWTP

#### B1.1 Treatment Plant

Area	Sub Area	Description	Area	Sub Area	Description
<b>B00</b>		<b>GENERAL</b>	<b>B60</b>		<b>DISSOLVED AIR FLOTATION THICKENERS</b>
	01	Plant Site, Hazardous Goods Store		61	DAFT 1
	02	HV & LV Substation		62	DAFT 2
	03	Site Electrics		63	DAFT 3
	04	Main Switchroom		64	DAFT 4
	05	Existing Main Plant Control Room		65	DAFT Effluent Tanks, Recycle & Effluent Pumps
				66	DAFT Sludge Tank & Sludge Pumps
				67	Compressed Air System
				68	DAFT Bottom Sludge Pumps
<b>B10</b>		<b>RAW SEWAGE INLET WORKS &amp; ODOUR CONTROL WORKS</b>	<b>B70</b>		<b>SLUDGE DIGESTION</b>
	11	Salisbury Pump Station		71	Digester 1
	12	Adelaide Pump Station		72	Digester 2
	13	Screens and Inlet Channel		73	Digester 3
				74	Digester 4
				75	Digester 5
				76	Digester 6
				77	Digester 1 & 4 Sludge Recycle Pumps
				78	Digester 2 & 3 Sludge Recycle Pumps
				79	Digester 5 & 6 Sludge Recycle Pumps
<b>B20</b>		<b>GRIT REMOVAL &amp; PRIMARY SEDIMENTATION</b>	<b>B80</b>		<b>DIGESTED SLUDGE &amp; GAS HANDLING</b>
	21	Primary Sedimentation Tank 1		81	Bolivar Digested Sludge Pumps
	22	Primary Sedimentation Tank 2		82	Gas Separation Facility
	23	Primary Sedimentation Tank 3		83	Digested Gas Burners
	24	Primary Sedimentation Tank 4		84	Digester Gas Mixing Compressor System
	25	Primary Sludge Pumps		85	Digester Gas Turbine Booster Compressor System
	26	Grit Hoppers & Pumps		86	Port Adelaide Glenelg Sludge Booster PS
	27	Primary Effluent Wet Well & Pumps		87	Sludge Dewatering (Centrifuge) Plant
				88	Digester Gas Fired Standby Boiler
<b>B30</b>		<b>ACTIVATED SLUDGE REACTORS &amp; AERATION BLOWERS</b>	<b>B90</b>		<b>EFFLUENT WATER SYSTEM</b>
	31	Activated Sludge Reactor 1		91	Potable Water (General)
	32	Activated Sludge Reactor 2		92	
	33	Activated Sludge Reactor 3		93	
	34	Activated Sludge Reactor 4		94	Ferrous Chloride Dosing
				95	Fluoride Storage
<b>B40</b>		<b>SECONDARY SEDIMENTATION TANKS</b>			
	41	RAS Pump Station 1			
	42	RAS Pump Station 2			
	43	RAS Pump Station 3			
	44	RAS Pump Station 4			
<b>B50</b>		<b>PRIMARY GRAVITY THICKENERS</b>			
	51	Thickened Primary Sludge Pumps			
	52	PGT Scum Tank & Scum Pumps			
	53	PGT Effluent Tank & Effluent Pumps			

**B1.2 DAFF Plant**

Area	Sub Area	Description	Area	Sub Area	Description
<b>00</b>		<b>NOT USED</b>	<b>60</b>		<b>RECYCLE DISPERSION SYSTEM</b>
				61	Saturation Vessel #1 (Modules 1-3)
				62	Saturation Vessel #2 (Modules 4-6)
				63	Saturation Vessel #3 (Modules 7-9)
				64	Saturation Vessel #4 (Modules 10-12)
<b>10</b>		<b>GENERAL</b>	<b>70</b>		<b>CHEMICAL DOSING</b>
	11	Siteworks		71	Alum. Dosing
	12	Electrical		72	Polymer Dosing
	13	Control/Machinery/Switch Build.		73	Chlorine Dosing
	14	Chem. Dosing Building			
	15	Alum. Tank Area			
	16	Chlorine Building			
	17	Instrument and Control			
<b>20</b>		<b>RAW WATER INLET WORKS</b>	<b>80</b>		<b>BACKWASH AND SLUDGE HANDLING</b>
	21	Control Weir Lagoons 1,2 & 3		81	Wash Water Recovery System
	22	Control Weir Lagoons 4,5 & 6		82	Sludge Transfer System
	23	Raw Water Pump Station			
<b>30</b>		<b>DAFF PLANT STAGE 1</b>	<b>90</b>		<b>TREATED WATER OUTLET WORKS</b>
	31	DAFF Module 1		91	Plant Sampling & Analysis
	32	DAFF Module 2		92	Laboratory Sampling & Analysis
	33	DAFF Module 3		93	Flow Split, Bypass & Contact Channel
	34	DAFF Module 4			
	35	DAFF Module 5			
	36	DAFF Module 6			
<b>40</b>		<b>DAFF PLANT STAGE 2</b>			
	41	DAFF Module 7			
	42	DAFF Module 8			
	43	DAFF Module 9			
	44	DAFF Module 10			
	45	DAFF Module 11			
	46	DAFF Module 12			
<b>50</b>		<b>MACHINERY ROOM</b>			
	51	Backwash System			
	52	Air Scour System			
	53	Compressed Air System			
	54	Plant Water System (Potable)			
	55	Plant Water System (Non - Potable)			





## B2 Port Adelaide Re-Lift PS (PARPS)

Area	Sub Area	Description	Area	Sub Area	Description
<b>P00</b>		<b>GENERAL</b>	<b>P70</b>		<b>NOT USED</b>
	01	Plant Site			
	02	HV & LV Substation			
	03	Site Electrics			
	04	Main Switchroom			
	05	Dry Well			
<b>P10</b>		<b>FEEDER PUMP STATIONS</b>	<b>P80</b>		<b>NOT USED</b>
	11	Fulham Gardens Pump Station			
	12	West Lakes Pump Station			
	13	Woodlake Pump Station (SPS No. 202)			
	14	Queensbury Pump Station			
	15	Royal Park Pump Station (SPS No.198)			
	16	Port Adelaide Pump Station			
	17	Ethelton Pump Station			
	18	Port River Outfall Return Pump Station			
<b>P20</b>		<b>INLET WORKS</b>	<b>P90</b>		<b>SITE UTILITIES</b>
	21	Inlet Screens, Washer Units & Conveyors		91	
	22	Grit Removal System		92	
	23	Foul Air Collection		93	
	24	Odour Scrubber Unit		94	
	25	Odour Control Plant Chemical Dosing & Storage		95 96	
<b>P30</b>		<b>RELIFT PUMP STATION DRY WELL</b>			
	31	Emergency Gas Driven Pumpset			
	32	Dry Well Sumps			
	33	Pump Station Ventilation Systems			
<b>P40</b>		<b>TRANSFER PIPELINE</b>			
	41	Transfer Pipeline-PARPS to South Rd Expressway			
	42	Transfer Pipeline-South Rd Expressway to Dry Creek Transfer			
	43	Transfer Pipeline-Dry Creek Transfer to Bolivar High Salinity WWTP			
<b>P50</b>		<b>GLENELG / PORT ADELAIDE PS</b>			
<b>P60</b>		<b>NOT USED</b>			

## B3 Glenelg WWTP

### B3.1 Treatment Plant

Area	Sub Area	Description	Area	Sub Area	Description
<b>G00</b>		<b>GENERAL/SITE UTILITIES</b>	<b>G60</b>		<b>CHEMICAL DOSING</b>
	00	HV Supply		61	
	01	Mains Natural Gas Supply		62	Chlorination
	02	Site Electrical (inc. General Light & Power)		63	
	03	On-Site Power Generation (Power Generation)		64	
	04			65	
	05	Fire Detection and Evacuation System		66	Carbon / Molasses Dosing
	06	Stormwater Drainage			
<b>G10</b>		<b>PRELIMINARY TREATMENT</b>	<b>G70</b>		<b>SLUDGE TREATMENT</b>
	11	Inlet WWPS		70	
	12			71	WAS Pumping
	13	Inlet Screens		72	WAS Thickening Filtrate
	14	Vortex Grit Removal & Grit Handling		73	WAS Thickening Sludge
	15			74	Dissolved Air Flotation Thickener (DAFT)
	16			75	DAFT Thickened Sludge Tank
	17	Inlet Works Foul Air Collection			
	18	Inlet Works Odour Control Plant			
<b>G20</b>		<b>PRIMARY TREATMENT</b>	<b>G80</b>		<b>DIGESTION</b>
	20	Grit Removal (Old)		80	Digester Gas Detection System
	21	Primary Sed. Tank 1		80	Digester Gas Ventilation System
	22	Primary Sed. Tank 2		81	Sludge Digester 1
	23	Primary Sed. Tank 3		82	Sludge Digester 2
	24	Primary Sed. Tank 4		83	Sludge Digester 3
	25	Raw Sludge Pumps		84	Sludge Digester 4
	26	Foul Air Removal Duct		85	Sludge Digester 5
				86	Sludge Digester 6
				87	Digester Hot Water System
				88	
				89	Digester Gas System
<b>G30</b>		<b>SECONDARY TREATMENT</b>	<b>G90</b>		<b>TERTIARY TREATMENT</b>
	30	Air Blowers		90	Effluent Pumping
	31	Aeration Tank B1			
	32	Aeration Tank B2			
	33	Aeration Tank B3			
	34	Aeration Tank B4			
	35	Aeration Tank C1			
	36	Aeration Tank C2			
	37	Aeration Tank C3			
	38	Aeration Tank C4			
	39	Aeration Tanks D			
<b>G40</b>		<b>CLARIFIERS &amp; RAS</b>			
<b>G50</b>		<b>NOT USED</b>			

### B3.2 Glenelg to Park Lands Treatment Plant (GAP)

Area	Sub Area	Description	Area	Sub Area	Description
<b>G00</b>		<b>GENERAL</b>			
	00		<b>G50</b>		<b>ULTRA VIOLET</b>
	01			50	
	02			51	UV Reactors
				52	
				53	
				54	Comp Room Ventilation
<b>G10</b>		<b>PRELIMINARY TREATMENT</b>	<b>G60</b>		<b>CHEMICAL DOSING</b>
	10			60	
	11			61	Chlorine Storage
	12	Effluent PS		62	Chlorination
	13	Screens		63	Chlorination
	14	Screens Waste		64	
				65	
				66	Sampling/Quality Monitoring Post CL2
				67	Sampling/Quality Monitoring Post UV
<b>G20</b>		<b>FEED WATER</b>	<b>G70</b>		<b>TREATED WATER STORAGE</b>
	20			70	
	21			71	Transfer PS Basin 1
	22			72	Transfer PS Basin 2
				73	Sample Pump Post Cl2
<b>G30</b>		<b>FEED PUMPS</b>	<b>G80</b>		<b>TRANSFER PS</b>
	30			80	Transfer Pumps
	31	UF Feed Pumps		80	Transfer Large Pumps
	32			81	Surge Vessel
	33			82	Surge vessels Air
	34			83	Transfer PS ventilation
	35				
	36				
	37				
	38				
	39				
<b>G40</b>		<b>ULTRA FILTRATION</b>	<b>G90</b>		<b>EFFLUENT</b>
	40	Sample Pumps		90	
	41	CIP General		91	Chlorine Booster Pumps
	42	Scour Air Blowers		92	
	43	Inst Air			
	44	UF CIP Recirc			
	45	UF CIP Hypo			
	46	UF CIP Citric Acid			
	47	UF CIP Sulphuric Acid			
	48	UF CIP Waste			
	49	UF BW Pumps			

## B4 Christies Beach WWTP

Area	Sub Area	Description	Area	Sub Area	Description
<b>00</b>		<b>GENERAL</b>	<b>60</b>		<b>CHEMICAL DOSING</b>
	01	Plant Site		61	Ethanol Dosing
	02	Electrical – HV Sup., Transformers, LV Bld./Dist.		62	Chlorine Dosing
	03	On-Site Power Generation		63	
	04			64	Polymer Dosing - DAFT/Dewatering
	05	Workshop/Administration Areas		65	Polymer Dosing - RSTs
	06			66	
	07			67	Membrane Chemical Cleaning System
<b>10</b>		<b>INLET WORKS</b>	<b>70</b>		<b>ROTARY SCREW THICKENERS</b>
	11			71	RST Thickening
	12	Inlet Screens		72	RST Thickening Filtrate Return
	13				
	14	Vortex Grit Removal/Flow Splitting			
	15	C Plant Fine Screens			
	16				
	17	Inlet Works Foul Air Collection			
	18	Inlet Works Odour Control Plant			
<b>20</b>		<b>GRIT REMOVAL AND PSTs</b>	<b>80</b>		<b>SLUDGE DIGESTION</b>
	21	Primary Sedimentation Tank A1		81	Digester 1
	22	Primary Sedimentation Tank A2		82	Digester 2
	23	Primary Sedimentation Tank B1		83	Digested Sludge Recirculation
	24	Primary Sedimentation Tank B2		84	Digested Sludge Transfer
	25	Primary Sludge and Scum Pumping		85	Digested Sludge Disposal
				86	Digested Sludge Supernatant
				87	Digester Hot Water System
				88	Digesters 3 and 4 (Future)
				89	Digester Gas Handling and Conditioning
<b>30</b>		<b>ASRs &amp; AERATION FACILITY</b>	<b>90</b>		<b>TERTIARY TREATMENT &amp; OUTFALLS</b>
	31	ASR A1		91	
	32	ASR A2		92	UV Disinfection
	33	ASR B1		93	Effluent Outfalls and Reuse
	34	ASR B2		94	Recycled Water Transfer Pump Station (SURP)
	35	ASR C1		95	
	36	ASR C2		96	
				97	
				98	
				99	
<b>40</b>		<b>SECONDARY SEDIMENTATION</b>	<b>100</b>		<b>SLUDGE CONDITIONING</b>
	41	A Plant Sludge Wasting		101	Sludge Hydrolysis
	42	B Plant Sludge Wasting		102	
	43	C Plant Sludge Wasting		103	
				104	
				105	
<b>50</b>		<b>DAFT THICKENERS</b>	<b>110</b>		<b>DIGESTED SLUDGE DEWATERING</b>
	51	DAFT Cell 1		111	Digested Sludge Dewatering (Centrifuges)
	52	DAFT Cell 2		112	Digested Sludge Loading
	53			113	Sludge Dewatering Odour Control
	54				
	55	DAFT Effluent System			
	56	DAFT Sludge System			
	57	DAFT Compressed Air System			
	58	DAFT Bottom Sludge Pumps			

Area	Sub Area	Description	Area	Sub Area	Description
120		<b>C PLANT MEMBRANE SEPARATION</b>	230		<b>SITE UTILITIES</b>
	121	C Plant Membrane UF Train 1		231	Potable Water
	122	C Plant Membrane UF Train 2		232	Fire Fighting
	123	C Plant Membrane UF Train 3		233	Natural Gas
	124	C Plant Membrane UF Train 4		234	Process Water
	125	C Plant Membrane UF Train 5		235	Site Waste Pump Station
	126	C Plant Membrane UF Train 6		236	Liquid Waste Disposal Station
	127	C Plant Membrane Process Pumps		237	
	128	C Plant Mixed Liquor Recycle		238	
	129			239	

## B5 Water Treatment Plants

Area	Sub Area	Description	Area	Sub Area	Description
<b>00</b>		<b>GENERAL</b>	<b>50</b>		<b>CHEMICAL DOSING</b>
	00			50	
	01			51	Alum Dosing
	02			52	Poly Dosing
	03			53	
	04			54	Fluoride Dosing
	05			55	
				56	
				57	Lime Dosing
				58	
<b>10</b>		<b>RAW WATER</b>	<b>60</b>		<b>CHEMICAL STORAGE</b>
	10			60	
	11			61	Alum Storage
	12			62	Poly Storage
	13			63	
	14			64	Fluoride Storage
	15			65	
				66	
				67	Lime Storage
<b>20</b>		<b>SLUDGE PROCESSING</b>	<b>70</b>		<b>TREATED WATER STORAGE</b>
	20			70	
	21			71	
	22			72	
	23			73	
	24			74	
	25			75	
<b>30</b>		<b>SEDIMENTATION / FLOCCULATION</b>	<b>80</b>		<b>TREATED WATER PUMPING</b>
	30			80	
	31			81	
	32			82	
	33			83	
	34			84	
	35				
	36				
<b>40</b>		<b>FILTRATION</b>	<b>90</b>		<b>CHLORINATION</b>
	40			90	
	41			91	
	42			92	
	43			93	
	44			94	
	45			95	
				96	
				97	
				98	
				99	