

CHRISTCHURCH CITY COUNCIL

CITY WATER & WASTE

TAGGING CONVENTION

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1 REVISION CONTROL

Version	Comments	Author	Date of Issue
1	Draft release for comments	CWW	04/04/2006
2	Tender version	CWW	12/05/2006
2.1	Updated to reflect Ocean Outfall Pumping Station changes.	MJ	04/09/2006
2.2	Appendix A updated	MJ	08/12/2006
2.3	Section 3.8 updated. Appendix A updated and Appendix B removed.	MJ	12/12/2006
2.4	Table 2 Updated	LP	10/01/2007
2.5	Table 1 Updated to include MLC-K	MJ	17/01/2007
2.6	Section 3.6 and Appendix A updated.	MJ	09/03/2007
2.7	Table 1 Updated	MJ	27/04/2007
2.8	Table 6 Updated	MJ	08/01/2008
2.9	Table 1 Updated (Estuary Sampling Sites)	LP	15/08/2008
2.10	Table 1 Updated (815 Water Systems)	LP	09/03/2008
2.11	Table 1 Updated (840 Biosolids Drying Energy Centre)	LP	14/10/2009
2.12	Table 1 Updated (510 Landfill Gas Scheme)	LP	02/12/2009
2.13	Energy centre and LF Gas Switchboards added	MJ	11/03/2010
3.0	Water supply treatment plant process structure added. Example added. Document restructured.	MJ	23/06/2010
3.1	Innovatics PNS standard update included	MJ	13/09/2010
4.0	Updated to include tag prefix and pumping stations	MJ	21/09/2010
4.1	P&ID's for worked example added into Appendix 2	MJ	04/10/2010
4.2	Section 3.4 Water Zones updated. Appendix 5 added.	MJ	28/10/2010
4.3	Appendix 5 updated	MJ	16/11/2010
4.4	General update following AMT and CPG reviews	MJ	22/11/2010
4.5	Treatment plant ID numbers changed	MJ	17/12/2010
4.6	Table 4. CNS Equipment Coding update	MJ	08/02/2011
4.7	Section 2 updated.	MJ	11/02/2011
5.0	Major update. Index and sections 2 to 7 updated. Appendix 2 worked example removed due to errors.	MJ	14/02/2011
5.1	Appendix 5 – CWW Facilities List Updated	MJ	01/04/2011
5.2	Appendix 5 – CWW Facilities List Updated	MJ	18/05/2011
5.3	Appendix 5 – BPWw Odour Control stations added	MJ	05/07/2011
5.4	Appendix 5 – Short Name field added for sites	MJ	13/09/2011
5.5	Appendix 3 – Unite 815.7 Fire Main added	MJ	17/09/2011
5.6	Appendix 5 – Update to include OC0480 Beach 2	MJ	28/2/2012
5.7	Appendix 5 – Tables re-ordered numerically	MJ	14/03/2012
5.8	Appendix 5 – Updates to tables + Appendix 3 error fixed	MJ	30/3/2012
5.9	Appendix 6 – Tsunami stations + Networks added	MJ	22/8/2012
6.0	The use of the Chain/Zone/Area within the site prefix has been removed and made an attribute in SCADA/SAP instead.	MJ	13/09/2012
6.1	General updates including – Appendix 1 – Short Form Tagging Guide	MJ	20/11/2013
6.2	Appendices 5&6 removed and now referenced externally	MJ	30/05/2014
6.3	Appendix 3 – Extensive update to CWTP tables	LL	26/06/2019
	Minor function and equipment code clarification	SM	25/05/2020
6.4	Table 1a. UV and Chlorine Disinfection process areas added	KSB	10/07/2020

2 GENERAL

The Council operates a standard for equipment tagging at its water and wastewater facilities.

This document details the Councils tagging convention which must be adopted and adhered to by consultants, contractors and other approved service providers undertaking work within City Water & Waste (CWW) facilities.

It shall be carefully noted that the specification details set out here are **mandatory** and shall not be varied without the vendor having sought and received the WRITTEN agreement of the CCC SCADA Systems Engineer.

Refer Appendix 1 – “Tagging convention short form guide”, *TRIM File: 13/1176566* for a quick reference to the convention and applied formats.

Refer separate CCC controlled document *TRIM File: 14/515340 “Assets Management - CWW Process Tagging - Spreadsheet Tool”*.

City Water & Waste “Plant Tag” names identify items of equipment related to a particular process within a particular site/facility. These tags are not to be confused with the “Equipment ID” often referred to as “Asset ID” used by the councils Asset management Information System (AMIS).

The “Equipment ID” uniquely identifies an asset within AMIS and remains assigned to that asset for the life of that asset whereas the “Plant tag” is assigned to the process that it relates to and so when an asset is replaced the “Plant Tag” is assigned to the new asset and removed from the old asset.

The “Plant Tag” comprises of 4 main parts, the *Site Prefix, Process Tag, Equipment Tag* and *Equipment Suffix*.

The “Site Prefix” is closely related to the “Functional Location” identifier within the AMIS and is further sub divided into “Region”, “Utility”, “Type” and “Site ID”. The “Site prefix” is generally only used by the council’s electronic database systems as a means of filtering and is supplied by the Councils Asset Management Team (AMT) for new sites on request. The site prefix is described in section 3 of this document and a register of sites is maintained within a separate CCC controlled document *TRIM File: 13/887845 “Assets Management - CWW Functional Location Tagging Register”*.

The “*Process Tag*” and “*Equipment Tag*” are closely related to the Piping & Instrumentation Diagrams that describe the process diagrammatically. The council have produced a “*Process Tagging - Spreadsheet Tool*” to assist with the assignment of process tags which is available upon request.

The process tag naming scheme provides for a tag of the form **ZUUS ECNNN FCNN** broken down in the following form and is described in detail under section 4 of this document.

- ZUUS
 - Zone (Z) assigned
 - Unit (UU) assigned / contractor choice
 - subunit (S) assigned / contractor choice
- ECNNN
 - Equipment code (EC) assigned
 - Equipment ID (NNN) contractor choice*

- FCNN
 - Function code (FC) assigned
 - Function ID (NN) contractor choice **

For "assigned" codes the choice is fixed in the tag naming document which shall be used.

For "assigned / contractor choice" the choice is fixed if an area has already been defined. The only time contractor choice exists is for a major project providing new plant where it is appropriate to allocate new areas. When this is necessary the Contractor shall select numbering appropriate to the process and these shall be provided to the client for approval. On receipt of approval of the new codes the client will update the tag naming document to include these new area codes.

NOTE the allocation of zones does impact on the ability to assign equipment numbers and the Contractor needs to assign codes such that the overall result is in line with the examples provided herein.

For "contractor choice*" a unique serial identifier beginning at 01 is preferred for each type of equipment. Where an item of equipment has a number of associated items each of the associated items shall share a common unique identifier within a zone/unit. "Associated" equipment in this regard is any items of equipment necessarily present to effect control of the item of equipment both most directly associated with the process and with the equipment code most descriptive of the process purpose of the equipment.

In addition to the equipment tag *Programmable Logic Controllers (PLC), Remote Telemetry Units (RTU) and Supervisory Control And Data Acquisition (SCADA) packages* often need to add additional information to describe the attributes of a piece of equipment. It is for this reason we add an "Equipment Suffix". Suffixes will vary for each type of equipment (object). For example the motor on a pump may have a hardwired signal wired into the RTU so we may have a **.FLT** suffix. These suffixes are primarily used to identify parameters for a device described within software. For example an analogue signal representing the level in a tank on a plant may have the overall Plant Tag Name, BPPwTP3505_0101OT001LT01.PVS

Where

BPPwTP3505 is the site prefix (and the name of the RTU)

_0101OT001LT01 is the base plant tag (and instance name for a software code object)

.PVS represents the Process Variable Scaled parameter for the level instrument.

The software object will of course have a number of additional parameters associated with it that are automatically created for each instance.

For additional information on suffixes for typical items of plant such as valves, motors, analogue signals and PID loops refer electronic document *TRIM Elec07/716 CCC PLC & SCADA User Requirements Specification*.

3 SITE PREFIX

Tags entered into most Programmable Logic Controllers (PLC), Remote Telemetry Units (RTU) and Supervisory Control And Data Acquisition (SCADA) packages cannot cope with tag names that start with numeric characters or include full stops.

The Site Prefix is used to overcome this issue and to also provide a unique tag within the SCADA and AMIS databases that can facilitate filtering of equipment by type, site, utility, area etc.

Structure

The convention adheres to the structure illustrated in figure 3-1 below.

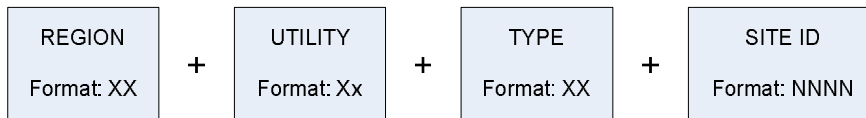


Figure 3-1 Site Prefix Structure Diagram

Examples:

- BPWwPS0608 - **B**anks **P**eninsula **W**astewater **P**umping **S**tation number **0608**
"Duvauchelle Camp Ground".
- CCPwPS1001 - **C**hristchurch **C**ity **P**otable **w**ater-supply **P**umping **S**tation number
1001 "Addington".
- CCWwTP2001 - **C**hristchurch **C**ity **W**astewater **T**reatment **P**lant.
- BPPwTP3502 - **B**anks **P**eninsula **P**otable **w**ater **T**reatment **P**lant **3502** "Akaroa
L'Aube Hill".

Region

A facility will be located within one of the Christchurch City Council Regions. At present there are only two regions to choose from represented by two letters. Format XX.

Options:

CC	Christchurch City
BP	Banks Peninsula

Utility Group

A facility will be associated with one of the council's utility groups represented by two letters. Format Xx.

Options:

Pw	Potable water
Ww	Wastewater
Sw	Stormwater
So	Solids

Tw Tsunami Warning Systems

Site Type

A facility will be of a particular type represented by two letters. Format XX. Note: In some cases a site may be considered to be of more than one type such as the Grehan intake station in Banks Peninsula which is a Stream Intake, Motorised diversion valve and Monitoring station. In this particular case the primary role of the site is chosen. Hence for Grehan this will be a SI site.

Options:

TP	Treatment Plant
PS	Pumping Station or Reservoir or Tidal Barrage
SI	Stream Intake
MV	Motorised Valve Station (Diversion valve or Zone Valve)
OC	Odour Control Station
MS	Monitoring Station (Level, Turbidity, Flow, Pressure, pH etc)
RR	Radio Repeater
SS	Tsunami Siren Station
LS	Lift Station
VS	Vacuum Station

Site ID

A facility will have a particular site identifier represented by four digits. Format NNNN

Refer CCC controlled document *TRIM File: 13/887845 "Assets Management - CWW Functional Location Tagging Register"*.

4 PROCESS TAG

Structure

The convention adheres to the structure illustrated in figure 4-1 below.

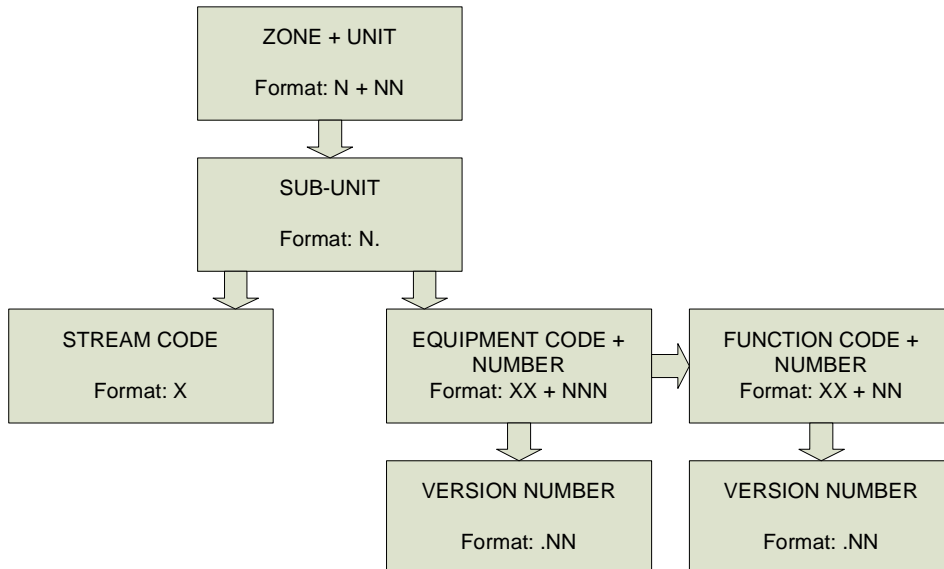


Figure 4-1 Process Tag Structure

Zone +Unit Number

A facility will be divided into a number of zones according to process type. It may also be further divided into units corresponding to major operations or areas along the processing pathway.

The Zone + Unit code comprises three numerical digits. The first represents the Zone while the second two represent the process Unit. **Tables 1a, b and c Section 7** identify the base Zone and unit codes for all types of council City Water & Waste facilities. Please note that additional Zone or Unit codes may only be added with the approval of the councils Asset Management Team.

In addition Appendix 4 - **Table 1. Zone, Unit and Sub-Unit Identity Codes** sets out example Zone + Unit + Sub-Unit Identity Codes adopted specifically for the Christchurch wastewater treatment plant at Bromley.

Within the CWW Process package “Operator 10”, (OP10), the Zone is equivalent to “Process” and Unit to “Location”.

Example: 215.

Zone 2 - Secondary + 15 -Trickling Filter Process + “.”

Sub-unit Number

The Sub-Unit Number comprises 1 digit following the Zone + Unit Code after a decimal point. 0 refers to the unit as a whole. 1 – 9 refer to groups of processing equipment within a unit.

Note: For software packages that cannot support the “.”, decimal point convention this is omitted.

Examples:

215.0	Or	2150	Trickling Filter Process
215.1	Or	2151	Trickling Filter 1
215.2	Or	2152	Trickling Filter 2

Units that require additional Sub-Units are accommodated by an increment of the Unit Number. For example to accommodate say a Trickling Filter 10 this would be represented as **216.1**

Stream Code

Stream codes are not compulsory and are only of any benefit in larger installations. Streams are labelled from the upstream unit with a one letter descriptive code. Stream codes are set out in Section 6 **Table 2** and are optional.

Examples:

225.0L	Clarifier Process Clear Liquid Effluent Stream
225.1L	Clarifier 1 Clear Liquid Effluent Stream
225.3S	Clarifier 3 Solid Effluent Stream

Equipment Code (EC) + Number

Groups of equipment (assets) throughout each of the council facilities are labelled according to the Councils Tagging Convention (CTC). CTC is based on the Innovatic numbering convention. The Equipment Code comprises two letters, the second representing a general equipment group and the first specifying the equipment type within that group.

CTC based Equipment Code Tables are set out in section 6 -**Table 3. CNS Equipment Coding – Equipment Group** and **Table 4. CNS Equipment Coding – First Letter**. Examples of Equipment Codes for common items are set out in **Table 5. CNS Equipment Coding – Common Items**.

The Equipment Number comprises three digits, enabling the specification of individual equipment items where there are multiple items with the same code in the same location.

Examples:

225.1	PL001	Clarifier 1 Influent Pipework
230.1	OP001	RAS Pump 1
230.1	MA001	RAS Pump 1 motor
230.1	DQ001	RAS Pump 1 Variable speed Dr
230.1	YE001	RAS Pump 1 Soft starter or DOL starter

Note: In the example given above for RAS Pump 1 the electrical isolator/breaker housed in the Motor Load Centre would actually be assigned the “Utilities” Zone number and “Electrical” Unit number so would typically read **820.1 PE002 RAS Pump 1 Isolator**

Function Code (FC) + Number

The function code is designed to convey information from instruments, switches etc. used for plant monitoring and control. The Function Code and Number follow the Equipment Code and Number, and are determined by the ANSI/ISA-5.1-1984 internationally recognised standard of instrumentation labelling. These codes are set out in Section 6 -**Table 6. Function Codes (ANSI/ISA-5.1-1984)** Furthermore, the international system of units, (abbreviated **SI** from the French **Système international d'unités**) has been adopted for all the units of measurement.

The Function Code Number comprises two digits, enabling the specification of individual equipment items where there are multiple items with the same code in the same location.

On P&ID's the tag number may be truncated to aid readability, the two letter Equipment and Function Codes are easily distinguished by their relationship to Zone+Unit+Sub-Unit they relate.

TIP: Equipment Codes are always followed by a three digit Equipment Number, while Function Codes are followed by a two digit Function Number.

The use of the function code allows the various instruments on an item of equipment to be named as properties of the equipment to which they belong.

Examples:

220.4 TT001 **LT01** Solid Contact Tank 4 Level Transmitter 1

220.4 TT001 **LS01** Solid Contact Tank 4 Level Switch 1

314.4 OP001 **SC01**..OOPS Wet Well 4 Pump 1 Speed Controller

015.0 PL001 **FT01** Potable water pumping station discharge pipe-work flow meter 1

Notes:

- 1.) Limit switches and inputs from electrical control equipment other than instrumentation do not have to be uniquely identified on the P&ID's it is sufficient to identify a single entry to the PLC/RTU.
- 2.) For software packages that cannot support the ".", decimal point or spaces convention this is to be omitted.

Version Number (not currently implemented by CCC)

When an item is replaced, the old tag name is retired. The new item uses the same tag name structure, with the two digit version number at the end of the tag increased by one. The version number will not appear on P&ID drawings, or in the PLC and SCADA systems and in fact is seldom used by the council as the equipments unique Asset Number is used in preference.

Examples:

225.0 ZU001.**01** Clarifier Process Structure Set Version 1
225.1 ZU001.**01** Clarifier 1 Structure Set Version 1
225.3 RI001.**01** Clarifier 3 Stilling Ring Set Version 1
225.1 PL001.**01** Clarifier 1 Influent Pipework Set Version 1
225.1 PL002.**01** Clarifier 1 Effluent Pipework Set Version 1
225.1 PL003.**01** Clarifier 1 RAS/WAS Pipework Set Version 1
220.0 BP002.**02** Activated Sludge System Blower Set 2 Version 2
220.0 BP003.**02** Activated Sludge System Blower Set 3 Version 2
230.1 OP001.**01** RAS Pump 1 Version 1
230.1 MA001.**01** RAS Pump 1 Motor Version 1
230.1 MA001.**02** RAS Pump 1 Motor Version 2
230.2 OP001.**02** WAS Pump 1 Version 2
230.2 MA001.**02** WAS Pump 1 Motor Version 2

5 SCADA / PROGRAMMABLE CONTROLLERS

Separately, but closely linked to the tag naming scheme is the representation of the equipment within the Programmable Logic Controllers (PLC), Remote Telemetry Units (RTU) and Supervisory Control And Data Acquisition (SCADA) systems.

While the tag naming scheme applies to all equipment, not just equipment connected to a Programmable Controller, the representation of tags within the control system imposes some additional constraints on use of the tag naming scheme for equipment identification.

One constraint is that the tag naming scheme identifies both the particular equipment and it's function. This means that the process tag name cannot move with the item and that **when a replacement item of equipment is introduced it must be given a tag name identical to that held by the item of equipment it is replacing.**

Two other constraints are imposed by the object model used in the Programmable Controllers and SCADA. A limited set of object models is desirable to aid management of the Control System. There will be occasions where a single physical device is represented in the Control System by two separate tag names. Conversely there will also be occasions where several items of equipment are represented by a single tag name in the Control System.

Where a single item of equipment is represented by two or more tag names within the control system the higher level function shall be the sole identifier of the device in the field. For example, a pressure transducer with a transmitter capable of producing both analogue indication and digital high / low indication might have the following Control System tags, *005.1 TT001 LT01*, *005.1 TT001 LS01* and *005.1 TT001 LS02*, in the field the equipment shall be labeled *0051 TT001 LT01*.

Where several items of equipment are represented by a single tag name within the control system the most informative and most directly process related tag name shall be used in the control system. For example, a pump / motor / VSD set might have the following process tag names, *460.8 OP005*, *460.8 MA005*, and *460.8 DQ005*, in the control system and on motor control centre doors the *460.8 OP005* shall be used.

5.1 CABLES / CORES

Power cables to equipment are identified by the equipment code **EJ**. There are often several sections of cable for a single process equipment item and maintaining the unique numbering assigned is impractical. Power cables may be labelled sequentially from 001.

Signal cables are identified by the equipment code **SJ**. Signal cables are often multicore cables carrying information from several devices.

Data communications cables are identified by the equipment code **DJ**.

Similarly to power cables these may be labelled sequentially from 001.

Cable cores labelling is not defined in this standard and may be labelled in the most appropriate manner.

6 EXAMPLES

Note the numbers highlighted in bold must match for each example, the underlined tags shall be used for PLC and SCADA tag names.

	Example 1	Example 2	Example 3	Example 4
<i>Primary device</i>	<i>Fan</i>	<i>Pump</i>	<i>Valve</i>	<i>Level switch(s)</i>
Primary device tag name	<u>005.1 FX001</u>	<u>005.1 OP002</u>	<u>005.1 OV002</u>	<u>005.1 TT001 LS01</u>
<i>Associated device 1</i>	<i>Motor</i>	<i>Motor</i>	<i>Air actuator</i>	<i>n/a</i>
Associated device 1 tag name	005.1 MA 001	005.1 MA 002	005.1 OA 002	n/a
cable	005.1 EJ016	005.1 EJ018	n/a	005.1 SJ053
<i>Associated device 2</i>	<i>VSD</i>	<i>VSD</i>	<i>Solenoid valve</i>	<i>n/a</i>
Associated device 2 tag name	005.1 DQ 001	005.1 DQ 002	005.1 OA 002 ZZ01	n/a
cable	005.1 EJ015	005.1 EJ017	005.1 EJ019	n/a
DB door label	005.1 FX 001	005.1 OP 002	n/a	n/a
PLC tag name(s)	0051FX 001	0051OP 002	0051OV 002	0051TT001LS01 0051TT001LS02
SCADA tag name(s)	0051FX 001	0051OP 002	0051OV 002	0051 TT001LS01 0051 TT001LS02

Note: Cable core labeling not defined in this standard.

7 STRUCTURE, EQUIPMENT AND FUNCTION TABLES

Table 1a. Wastewater & Stormwater - Zone, Unit and Sub-Unit Identity Codes

Zone		Unit		Zone + Unit Code
0	Pretreatment	00		000
		05	Source (Inlet to works)	005
		10	Storage	010
		15	Raw Sewage Screening	015
		20	Grit Removal	020
		25	Bypass	025
		30	Additional Process Code(s) By agreement	030
1	Primary	00		100
		05	Primary Sedimentation/Clarification	105
		10	Additional Process Code(s) By agreement	110
2	Secondary	00		200
		05	Pumping	205
		15	Filtering Process	215
		20	Solids Contact Process	220
		25	Secondary Clarification	225
		30	Sludge Activation	230
		35	Vacuum Generation	235
		40	Additional Process Code(s) By agreement	240
3	Tertiary	00		300
		05	Oxidation Ponds & Irrigation	305
		10	Toe Drains & Pumping	310
		15	Ocean Outfall & Pumping	315
		20	Ocean Outfall Pipeline	320
		25	UV Disinfection	325
		30	Chlorine Disinfection	330
		35	Additional Process Code(s) By agreement	335
4	Solids	00		400
		05	Activated Sludge Thickening	405
		07	Raw Sludge Storage	407
		10	Mesophilic Digestion	410
		15	Thermophilic Digestion	415
		20	Grit and Screenings Treatment	420
		25	Biosolids Dewatering	425
		30	Emergency Sludge Buffering	430
		35	Additional Process Code(s) By agreement	435
5	Gas	00		500
		05	Biogas System	505
		10	Landfill Gas	510
		15	Additional Process Code(s) By agreement	515
6	Foul Air	00		600
		05	Biofiltering	605
		10	Vacuum Air Filtering	610

A&NP - ENGINEERING STANDARDS
DOCUMENT: Assets management - CWW - Tagging Convention.DOC

		15	Additional Process Code(s) By agreement	615
7	Ancillaries	00		700
		05	Buildings	705
		10	No longer used	710
		25	Plant	725
		30	Additional Process Code(s) By agreement	730
8	Utilities	00		800
		05	Gas	805
		10	Air	810
		15	Water	815
		20	Electrical	820
		25	Power Generation	825
		30	Fuel Storage and Distribution	830
		40	Additional Process Code(s) By agreement	840
9	Controls	00		900
		05	<i>Control & Information Systems</i>	905
		10	Additional Process Code(s) By agreement	910

Table 1b. Water-supply – Zone, Unit and Sub-Unit Identity Codes

Zone		Unit		Zone + Unit Code
0	Pre-treatment	00		000
		05	<i>Source</i>	005
		10	<i>Storage</i>	010
		15	<i>Pumping</i>	015
		20	Additional Process Code(s) By agreement	020
1	Dosing	00		100
		05	Polymer Dosing	105
		10	Additional Process Code(s) By agreement	110
2	Clarification/Settling	00		200
		05	Additional Process Code(s) By agreement	205
3	Filtration	00		300
		05	Pumping	305
		10	Primary	310
		15	Secondary	315
		20	Additional Process Code(s) By agreement	320
4	Disinfection	00		400
		05	UV	405
		10	Chlorine	410
		15	Additional Process Code(s) By agreement	415
5	Treated Water	00		500
		10	Storage	510
		15	Pumping / Reticulation	515
		20	Additional Process Code(s) By agreement	525
6	Waste Water	00		600
		05	Storage	605
		10	Pumping	610
		15	Disposal	615
		20	Additional Process Code(s) By agreement	620
7	Ancillaries	00		700
		05	<i>Buildings</i>	705
		25	Plant	725
		30	Additional Process Code(s) By agreement	730
8	Utilities	00		800
		05	Gas	805
		10	Air	810
		15	Water	815
		20	<i>Electrical</i>	820
		25	<i>Power Generation</i>	825
		30	Additional Process Code(s) By agreement	830
9	Controls	00		900
		05	<i>Control & Information Systems</i>	905
		10	Additional Process Code(s) By agreement	910

Table 1c. Solids Handling Zone, Unit and Sub-Unit Identity Codes

Zone		Unit		Zone + Unit Code
0	Pre-treatment	00		000
		05	Weighing	005
		10	Storage	010
		15	Pumping	015
		20	Additional Process Code(s) By agreement	020
1	In Feed	00		100
		05	In-feed conveyors	105
		10	Tramp removal	110
		15	Picking station	115
		20	Shredding	120
		25	Additional Process Code(s) By agreement	125
2	Digester	00		200
		05	Tunnels	205
		10	Drainage	210
		15	Probes (temperature)	215
		20	Additional Process Code(s) By agreement	220
3	Process Air	00		300
		05	Ducts	305
		10	Fans	310
		15	Additional Process Code(s) By agreement	315
4	Waste Air	00		400
		05	Ducts	405
		10	Fans	410
		15	Bio-filtering	415
		20	Humidifying	420
		25	Additional Process Code(s) By agreement	425
5	Process Water	00		500
		05	Collection	505
		10	Storage	510
		15	Reticulation	515
		20	Spray system	520
		25	Additional Process Code(s) By agreement	525
6	Waste Water	00		600
		05	Storage	605
		10	Reticulation	610
		15	Additional Process Code(s) By agreement	615
7	Ancillaries	00		700
		05	Buildings	705
		10		710
		25	Plant	725
		30	Additional Process Code(s) By agreement	730
8	Utilities	00		800
		05	Gas	805

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		10	Air	810
		15	Water	815
		20	Electrical	820
		25	Power Generation	825
		30	Additional Process Code(s) By agreement	830
9	Controls	00		900
		05	Process control & information systems	905
		10	Additional Process Code(s) By agreement	910

Table 2. Stream Codes

Stream Code	Description
LE (L in OP10)	Liquid Effluent Stream
SE (S in OP10)	Solid Effluent Stream
AF (A in OP10)	Foul Air Stream
BG (G in OP10)	Biogas Stream
DF	Fuel Stream
CA	Chemical Additive Stream (eg Polymer)
Pw	Potable Water Stream
Ww	Waste Water Stream
GR	Grit
HL	Heat Loop Water
AH	High Pressure Compressed Air
AL	Low Pressure Compressed Air
EP	Power
EI	Instrumentation
ES	SCADA
EC	Control

Table 3. CNS Equipment Coding – Equipment Group

A	Actuators like turning-, driving-, lifting- and slewing gear, motors, transmissions, manipulators.
B	Boilers, burners, heating-, sterilization- and combustion equipment.
C	Conveyors, elevators, feeders, cranes.
D	Dryers, detoxication- and decomposition equipment, catalytic converters etc. with only one end product and no waste material.
E	Electrical equipment, lighting, generators.
F	Filters with absorption/filter material.
G	Gauges like flow, level, pressure, temperature, current, voltage conductivity, pH, redox, gas, arc alarm.
H	Human machine interface (HMI) and panel devices like push-buttons, signal lamps, displays and safety switches.
I	Other equipment (User defined)
J	Junction boxes and racks, clamps, flanges, unions, connectors, electrical and optical cables.
K	Crushers, mills, grinders and other size reduction equipment.
L	Pipes, tubes and ducts links.
M	Mixers, agitators, breakers, coaters, dressers, nozzles.
N	Nuclear assemblies or user defined equipment.
O	Other equipment (User defined)
P	Pumps, blowers and compressors.
Q	Automation and communication equipment.
R	Robots/NC, assembly-, cutting-, moulding-, painting-, welding and drilling machines.
S	Separating and sorting equipment like screeners, magnets, centrifuges and expellers.
T	Tanks, vessels, basins, silos, columns, storage equipment.
U	Other equipment (user defined).
V	Valves, distributors, dampers, gates, rupture disk equipment.
W	Weighers and dosing equipment.
X	Heat exchangers, coolers, condensers, reboilers, fans, air condition.
Y	Tapping- and packaging equipment.
Z	Building parts and assemblies. Mobile units.

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Table 4. CNS Equipment Coding – First Letter (Type)

TYPE	Equipment Group A	Equipment Group B	Equipment Group C	Equipment Group D	Equipment Group E
A	Arrestor	Autoclave	Apron Conveyor/Feeder	Deaerator	(Lighting) Arrestor
B	Brake	Burner	Belt Conveyor	Biological Decomposer	Battery
C	Coupling	Combustion equip.	Chain/Wire Conveyor	Catalytic Converter	Controller
D	Mechanical Dr	Distillation equip.	Discharge Feeder	Dehydrator	DC equipment
E	Electric Actuator	Electric Heater	(Bucket) Elevator/Excavator	Freeze Dryer	Earthing
F		Furnace	Feeder		Fuse
G	Gearbox	Steam Generator	Grate		Generator
H	Hydraulic Cylinder	Fired Heater	Hoist/Winch	Dehumidifier	High Voltage Switchgear
I	Shaft		Distributor		Insulator
J		Steam Ejector	Jog Conveyor/Tripper		
K	Manipulator	Kiln	Crane	Crystallizer	Cathodic Protection
L	Lift		Table Feeder		Lamp, Light Fixture
M	Motor		Monorail, Cable Way		Medium Voltage Switchgear
N	Gas or Diesel Engine				Navigation equipment
O	Actuator	Boiler	Conveyor/Feeder	Dryer	Electrical equipment
P	Pneumatic Cylinder	Preheater	Pneumatic Conveyor		Protective Switch
Q	Bearing		Extractor/Singulator		Circuit Breakers (MCCB's)
R	Roller Station	Flame Trap	Roller Conveyor/Feeder	Rotary Dryer	Rectifier
S	Steam Turbine	Sterilization Funnel	Screw Conveyor / Auger	Spray Dryer	Low Voltage Switchgear
T	Gas Turbine	Toaster	Trolley		Transformer
U					UPS
V	Vibration Damper		Vibration Feeder	Vacuum Dryer	Vision system
W	Water Turbine		Wobbler Feeder		Power supply
X	Pneumatic Motor	Evaporator	Rotary Feeder/Airlock	Fluid Bed Dryer	Filters, Compensation
Y	Hydraulic Motor	Flare			Starter (not VSD)
Z	Silencer		Conveyor Group		Converter

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TYPE	Equipment Group F	Equipment Group G	Equipment Group H	Equipment Group I	Equipment Group J
A	Air Filter			Scraper	
B	Bag Filter	Turbidity Gauge	Button	User defined	Bus Bar
C	Cartridge Filter	Clarity Gauge	Card Reader	Sludge Collector – Cross	Clamp
D	Drum Filter	Dissolved Oxygen Gauge	Display/VDU	User defined	Data Comms Cable
E	Electrostatic Precipitator		Emergency Stop	Eductor Tube	Low Voltage Cable
F	Filth Strainer	Flow Gauge	Fire Alarm System	Filter Media	Flexible Joint/Hose
G	Gravel Bed Filter	Test equipment	Instrument(Gauge) Indicator	Grit Washer	
H	Filter Housing	pH	Horn/Bell/Siren/Klaxon	Hot Rot Composter	High Voltage Cable
I			Indicator	User defined	
J			Joystick	User defined	Junction Box
K			Keyboard/Keypad	Skimmer	Connector
L	Biofilter Bed	Level Gauge	Signal Lamp	Sludge Collector	Optical Fibre Cable
M	Micro Filter		Mouse/Trackerball	Scum Removal	Medium Voltage Cable
N	Nutsch Filter	Transmission		User defined	Network/Data Cable
O	Filter	Instrumentation/Gauge	HMI	User defined	Union
P	Filter Press	Pressure Gauge	Projection Equipment	Screen Pressure Plate	Power Outlet
Q	Fuel Filter		Quality Indicator	User defined	Quick Connection
R	Reversed Osmosis	Density Gauge		Stilling Ring	Rack/Tray work
S	Scrubber	Sight Glass	Safety Switch	Step Screen	Signal/Controls Cable
T		Temperature Gauge	Tag Reader/Scanner	User defined	Tele Com. Cable
U	Ultra Filter			User defined	Cables
V	Vacuum Cleaner			User defined	
W	Wet Scrubber			Water Spray	
X		ORP Gauge		User defined	Expansion/Flexible Joint
Y				User defined	Pipe Penetration
Z			Light Grid/Curtain	Clarifier Arm Seals	Flange

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TYPE	Equipment Group K	Equipment Group L	Equipment Group M	Equipment Group N	Equipment Group P
A		Air Duct, Aeration	Agitator	Absorber	Air Compressor / Aerator
B	Ball Mill	Blow-off Pipe	Blender	Breeder	Blower
C	Crumbler	Cable Duct	Coater		Circulating Pump Compressor
D	Disc Mill	Drain Pipe/Hose	Dresser Diffuser		Dry-Mount Pump
E	Extruder, Expander	Exhaust Pipe		Burnable Absorber	Extruder, Expander
F		Fuel Pipe Funnel		Fuel Element	Fuel Pump Fan
G	Granulator	Gas Pipe			
H	Hammer Crush./Mill	Hydraulic Pipe/Hose	Homogenizer		Hydraulic Pump
I	Impact Crusher	Inert Gas Pipe/Hose	Injector		
J	Jaw Crusher	Hose (General)	Stirrer		Jet/Ejector Pump
K	Cutter	Channel	Kneader		
L	Lump Crusher	Spout	Liquid Adder		Lubricating Pump
M	Mill	Mailing Tube Manifold		Moderator	
N		Slurry Pipe	Mixing Nozzle	Neutron Source	
O	Crusher	Line/Link	Mixer/Mixing Plant	Nuclear Assembly	Pump (General)
P	Pelletizer, Pillet Press	Pipe	Paddle	Plenum Assembly	Pillet Press
Q	Grinder	Fuel Pipe			
R	Roller Crusher/Mill	Refrigeration Pipe/H.	Dresser	Reactor (inc UV)	
S		Steam Pipe/hose	Screw Mixer	Shield	Submerged Pump
T		Toxic Material Pipe/Hose	Aerator Turbine		
U		Tapped Hole			
V	Vertical Mill	Air Vent System	Mixing Valve	Reflector	Vacuum Pump
W	Wash Mill	Water Pipe/Hose	Humidifier		
X		Heating Pipe/Hose		X-ray equipment	Fan Group
Y	Gyratory Crusher		Scum Breaker		
Z		Fixed Chute			Pump Group

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TYPE	Equipment Group Q	Equipment Group R	Equipment Group S	Equipment Group T	Equipment Group U
A	Antenna Pole	Assembly equipment	Clarifier Arm	Water Tank	User defined
B	Not Used	Bending Machine	Belt Press	Bin – Skip	User defined
C	Control System	Cutting Machine	Centrifuge	Column/HPLC, Chamber	Control Panel
D	Drive (VSD)	Drilling and Milling	Decanter	Drum	Dist/Fuse Board
E	Receiver	Forming equipment	Expeller	Expansion Tank	User defined
F	Firewall		Fluid Bed	Fuel Tank	Flametrapp
G	Gateway/Bridge	Handling Robot	Cyclone Gravity Belt	Hopper	Gas Detector
H	Hub		Grit Classifier		Interceptor
I	Not Used			Ion Exchanger	
J	Not Used			Cyclone	Cooling Tank
K	Not Used		Moulding equipment	Liquid Separator	Well
L	Not Used	Magnetic Separator Gas Foam Separator		Pressure Tank	User defined
M	Modem	Robot	Sorter/Separator		Tank (General)
N	Network Switch		Painting equipment	Purger	Pit
O	Quick Number	Radio		Oil Separator	Sphere
P	PLC/RTU Unit		Software	Rotary Screen	Reactor / Digester
Q	Outstation/RTU	Repeater		Screen, Sieve	Silo
R	Radio		Not Used	Trap Condensate	Wetwell / Column/Tray/Tier
S	Software	Not Used		Trap Assembly	Sump
T	Repeater		Not Used	Vibration Screen	Vessel
U	Not Used	Welding equipment		Water Separator	Basin / Pond
V	Not Used		Not Used	Chute	Ion Exchanger Oxidation Pond
W	Not Used	Column/HPLC			Container
X	Not Used				
Y	Not Used				
Z	Not Used				

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TYPE	Equipment Group V	Equipment Group W	Equipment Group X	Equipment Group Y	Equipment Group Z
A	Turnhead / Distributor		Air Conditioning Fresh Air Supply	Bag Applicator	Access Shaft
B	Bleeder/Drain Valve Condensate Drain	Belt Weigher	Reboiler	Bag Loader	Barrier Building
C	Control Valve (PID)	Check Weigher	Condenser	Case Packer	Chute
D	Damper		Evaporator		Door
E	Emergency Shutdown		Fan / Aspirator Freezer	Bag Flattening Belt	Elevator, Lift
F	Fire Damper		Grate Cooler		Fire Door
G	Slide Gate/Shutter/Penstock	Hopper Scale	Heat Exchanger		Gate
H	Hand Operated Valve				Shed
I	Sprinkler				
J	Fire Hydrant				Support
K			Cooler	Cartoning Machine	
L	Louvre	Loss-in-Weight		Loading Machine	Limiters/Flow Restrictor
M	Throttle Valve/Gate	Micro Weigher			Maintenance Equipment
N	Non-return / Reflux Valve / Gate	Nuclear Scale			
O	Valve/Gate (General)	Weigher	Exchanger	Packer	Building Assembly
P	Purge Valve	Metering/Dosing Pump	Heat Pump /Cooling Pump	Palletizer	Port
Q	Sample/Check Valve		Quench Cooler	Blister Packer	
R	Reduction Valve Relief Valve		Refrigerator/Freezer		Roof
S	Safety Relief Valve	Scale			Solar Shielding
T	Two Way Valve/Gate Thermostat Housing		(Hot-water) Tank	Tapping equipment	Structure
U			Floor Heating		Barrier
V	Vacuum Valve				
W	Sprinkler Weir	Weigh Bridge	Waste Heat Recovery	Wrapping Machine	Window
X	Explosion/Rupture Disk				Fire Extinguisher
Y			Radiator		Funnel, Spout Property
Z			Cooling Tower		Foundation

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Table 5. CNS Equipment Coding – Examples for Common Items

First Letter	Second Letter	Description	First Letter	Second Letter	Description
O	A	Actuator	H	Q	Hub
A	P	Aerator / Compressor	F	I	Filter Media
A	M	Agitator	O	M	Mixer
S	C	Auger	M	A	Motor
B	P	Blower	G	V	Slide Gate/Shutter/Penstock
O	B	Boiler	P	L	Pipework
P	U	Property / Building	P	Q	PLC Unit
E	J	Low Voltage Cable	W	T	Pond
M	J	Medium Voltage Cable	B	S	Belt Press
J	J	Junction Box	Y	Z	Property
S	J	Control/Signal Cable	O	P	Pump
D	J	Network/Data Cable	Z	P	Pump Set
C	C	Chainset	R	Q	Radio
C	P	Circulating Pump	M	C	Monrail / Cable Way
C	Q	Control System	T	Q	Repeater
O	C	Conveyor / Feeder	A	I	Scraper
B	C	Conveyor -Belt	P	I	Screen Pressure Plate
K	X	Cooler	M	I	Scum Removal
K	C	Crane	K	I	Skimmer
H	A	Cylinder	B	T	Skip Bin
R	T	Reactor / Digester			Sludge Collector -
D	Q	VSD (VFD)	L	I	Longitudinal
O	D	Dryer	S	Q	Software
E	I	Eductor Tube	S	I	Step Screen
O	E	Electrical Equipment	R	I	Stilling Ring
N	A	Engine	T	Z	Structure
F	X	Fan	U	T	Sump
O	F	Filter	T	E	Transformer
L	F	Filter bed	U	E	UPS
Y	B	Flare	V	P	Vacuum
G	V	Gate	O	V	Valve (general)
G	E	Generator	H	V	Hand Operated Valve
G	S	Gravity Belt	W	I	Water Spray
I	S	Grit Classifier Set	W	L	Water System
H	X	Heat Exchanger	W	V	Sprinkler
S	P	Sump Pump	L	T	Well inc Wet-well
U	T	Sump	A	T	Tank - Water
O	T	Tank (Diesel/water/Suction)	C	I	Sludge Collector - Cross
C	T	Chamber (Valve/Flow etc)	A	V	Distributor
N	V	Non-return valve inc RPZ	Z	A	Silencer
C	U	Control Panel	H	X	Exchanger
Y	E	Starter inc DOL/Soft Start	B	B	Burner
P	L	Pipework	A	A	Arrestor
			B	A	Brake

Table 6. Function Codes (ANSI/ISA-5.1-1984)

Initial Letter(s)		Succeeding Letter		Optional	
A	Analysis/Unclassified	A	Alarm	HH	High-High
B	Burner Flame	B		H	High
C	Conductivity (Electrical)	C	Controller	L	Low
D	Density (Mass) or Spec. Grav.	D		LL	Low-Low
E	Voltage (EMF)	E	Primary Element		
F	Flow	F			
G	Gauging (Dimensional)	G	Glass (Sight)		
H	Hand (Manually Initiated)	H			
I	Current (Electrical)	I	Indicator		
J	Power	J			
K	Time or Time Schedule	K	Control Station		
L	Level	L	Light (inc Pilot)		
M	Moisture or Humidity	M	Monitor		
N		N			
O		O	Orifice (Restriction)		
P	Pressure or Vacuum	P	Point (Test Connection)		
Q	Quantity or Event	Q	Sampler		
R	Radioactivity	R	Record or Print		
S	Speed or Frequency	S	Switch		
T	Temperature	T	Transmitter		
U	Multivariable	U	Multifunction		
V	Vibration	V	Valve, Damper or Louver		
W	Weight/Force	W	Well		
X	Unclassified	X	Unclassified		
Y	Force	Y	Relay or Compute		
Z	Position	Z	Dr, Actuate or Unclassified Final Control Element		
		A	Alarm		
Council specific codes					
pH	pH	EA	Cos(phi)	MA	Angle
PD	Pressure Differential	EB	Magnetic Inductance	MF	Force
SB	Sludge Blanket	EC	Capacitance	MT	Toque
SD	Sludge Density	EG	Conductivity	LI	Light Intensity
SS	Suspended Solids	EH	Magnetic Field	VI	Viscosity
Tu	Turbidity	EI	Reactive Current	RX	Redox
UV	UV Transmittance or Intensity	EJ	Reactive power		
Hu	Humidity	EL	Unductance		
DO	Dissolved Oxygen	ER	Resistance		

8 APPENDICES

APPENDIX 1 – Short form tagging guide

APPENDIX 2 – Worked Example

APPENDIX 3 - Wastewater Treatment Plant structure. Christchurch City
Wastewater Treatment Plant Bromley (*CCWwTP2001*)

APPENDIX 4 – Example Potable Water Supply Treatment Plant structure. Banks
Peninsula Water-supply Treatment Plant, Birdlings Flat
(*BPPwTP3504*)

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APPENDIX 1 – Tagging Convention Short Form Guide

PIPING & INSTRUMENTATION DIAGRAM (P&ID)	SITE PREFIX	ZONE N	UNIT NN		SUB-UNIT N	EQUIPMENT CODE XX	EQUIPMENT CODE No. NNN	FUNCTION CODE XX	FUNCTION CODE No. NN	OPTIONAL
	Eg. General	CCWwTP2001	2	30	.	2	OP	002		
Eg. Analogue Instrument	CCWwPS0123	2	05	.	0	PL	001	FT	01	
Eg. Digital Instrument	CCWwPS0123	0	10	.	1	TT	001	LS	01	H

PLC/SCADA & INFORMATION SYSTEMS	SITE PREFIX	ZONE N	UNIT NN		SUB-UNIT N	EQUIPMENT CODE XX	EQUIPMENT CODE No. NNN	FUNCTION CODE XX	FUNCTION CODE No. NN	SUFFIX
	Eg. General	CCWwTP2001	2	30		2	OP	002		
Eg. Analogue Instrument	CCWwPS0123	2	05		0	PL	001	FT	01	.PVS
Eg. Digital Instrument	CCWwPS0123	0	10		1	TT	001	LS	01	.EN

WIRING	ZONE N	UNIT NN		SUB-UNIT N	EQUIPMENT CODE XX	EQUIPMENT CODE No. NNN
	Eg. Low Voltage Cable	8	25		1	EJ
Eg. Signal/Controls Cable	2	05		1	SJ	001

PHYSICAL LABEL ON EQUIPMENT	ZONE N	UNIT NN		SUB-UNIT N	EQUIPMENT CODE XX	EQUIPMENT CODE No. NNN	FUNCTION CODE XX	FUNCTION CODE No. NN
	Eg. Pump	2	05	.	1	OP	002	
Eg. Pressure Transmitter	2	05	.	0	PL	001	PT	01
Eg. Valve Chamber	0	10	.	1	CT	001		

ASSET MANAGEMENT INFORMATION SYSTEM (AMIS)	SITE PREFIX	ZONE N	UNIT NN		SUB-UNIT N	EQUIPMENT CODE XX	EQUIPMENT CODE No. NNN	FUNCTION CODE XX	FUNCTION CODE No. NN
	Eg. General	CCWwTP2001	2	30	.	2	OP	002	
Eg. Analogue Instrument	CCWwPS0123	2	05	.	0	PL	001	FT	01
Eg. Digital Instrument	CCWwPS0123	0	10	.	1	TT	001	LS	01

APPENDIX 2 – Worked Examples

To be added.

APPENDIX 3 – Process Plant Structure – Christchurch City Wastewater Treatment Plant, Bromley (CCWwTP2001)

Table 1. Zone, Unit and Sub-Unit Identity Codes

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
0	Pretreatment	05	Influent Structure	005		
		05	Tradewaste Reception Facility	007	1 2 4	Station 1 Station 2
		10	Bypass	010		
		15	Raw Sewage Screening	015	1 2 3 4 5 7 8	Screen 1 Screen 2 Screen 3 Screen 4 Rag Conveyer & Bin Rag Press/Washer Ventilation System & Air
		20	Grit Removal	020	1 2 3 4 5 6 7 8 9	Grit Tank 1 Grit Tank 2 Grit Tank 3 Grit Tank 4 Grit Tank 5 Grit Bin Separation & Washer Ventilation System & Air Water

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
1	Primary	05	Primary Sedimentation	105	1 2 3 4 5 6	Primary Tank 1 Primary Tank 2 Primary Tank 3 Primary Tank 4 Primary Tank 5 Primary Tank 6

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Zone		Unit		Zone + Unit Code	Sub-Unit Number	
					7	Primary Tank 7
					8	Air
					9	Water
2	Secondary	05	Old Pumping Station A (Historical only, 205.5 devices reused for air compressor cooling)	205	1	Pump 1
					2	Pump 2
					3	Pump 3
					4	Pump 4
					5	Heat Exchanger
					7	Gas
					8	Air
					9	Water
		06	Pumping Station A	206	1	Pump 1
					2	Pump 2
					3	Pump 3
					4	Pump 4
					5	Heat Exchanger
					7	Gas
					8	Air
					9	Water
		10	Pumping Station B	210	1	Pump 1
					2	Pump 2
					4	Sludge
					8	Air
					9	Water
		15	Trickling Filter Process	215	1	Trickling Filter 1
					2	Trickling Filter 2
					8	Ventilation System
		20	Solids Contact Process	220	1	Solid Contact Tank 1
					2	Solid Contact Tank 2
					3	Solid Contact Tank 3

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					4	Solid Contact Tank 4
					8	Aeration System
		25	Secondary Clarification	225	1	Clarifier 1
					2	Clarifier 2
					3	Clarifier 3
					4	Clarifier 4
					5	Scum Sumps
					6	Drain Sumps
		30	Activated Sludge and Air Pumping Station	230	1	RAS
					2	WAS
					8	Air

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
3	Tertiary	05	Oxidation Ponds	305	1	Pond 1
					2	Pond 2
					3	Pond 3
					4	Pond 4
					5	Pond 5
					6	Pond 6
					7	Wells
					8	Aerator
		10	Toe Drains and Toe Drain Pumping Stations	310	1	South
					2	North
		15	Ocean Outfall Pumping Station	315	1	Wet well 1
					2	Wet well 2
					3	Wet well 3
					4	Gravity Feed Line
					5	Valve Chamber
					6	Stilling Chamber
					7	Control Valve Chamber
					8	Pigging Wye Chamber
		20	Ocean Outfall Pipeline	320	1	Valve Chamber 1

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Zone		Unit		Zone + Unit Code	Sub-Unit Number	
4	Solids	05	Activated Sludge Thickening	405	1	Gravity Belt 1
					2	Gravity Belt 2
					3	Gravity Belt 3
					4	Polymer
		07	Raw Sludge Buffer Tank	407		
		10	Mesophilic Digestion	410	1	Digester 1
					2	Digester 2
					3	Digester 3
					4	Digester 4
					5	Sludge Line A
					6	Sludge Line B
					7	Biogas
					8	Air
					9	Water
		15	Thermophilic Digestion	415	1	Digester 5
					2	Digester 6
					7	Biogas
					9	Sludge heat recovery
		25	Biosolids Dewatering	425	1	Belt Press 1
					2	Belt Press 2
					4	Polymer
					8	Air
					9	Water
		40	Dewatered Biosolids Storage	440	1	Dryer Feed 1
					2	Dryer Feed 2
					3	Wet Biosolids Silo
					4	Biosolids Transfer
					8	Foul Air
		50	Biosolids Dryer 1	450	1	Biosolids Drying & Transport
					2	Dried Biosolids Discharge
					3	Process Air ventilation
					4	Heating

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					5	Dried Biosolids Storage
					6	Dried Biosolids Truck Loading
					7	Dried Biosolids Backmixing
					8	Gas Treatment
					9	Washing and Fire Water Equipment
		60	Biosolids Dryer 2	460	1	Biosolids Drying & Transport
					2	Dried Biosolids Discharge
					3	Process Air ventilation
					4	Heating
					5	Dried Biosolids Storage
					6	Dried Biosolids Truck Loading
					7	Dried Biosolids Backmixing
					8	Gas Treatment
					9	Washing and Fire Water Equipment

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
5	Gas	05	Biogas System	505	1	High Pressure
					2	Low Pressure
					3	Waste Gas (Flare)
					5	Boiler 1
					9	Boiler 2
		10	Landfill Gas Scheme	510	1	LFP Compression

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
6	Foul Air	05	Biofilter 1 (main CWTP biofilter)	605		
		10	Biofilter 2 (dewatering)	610		
		15	Dryer 1 Biofilter	615	1	Biofilter 1 Dryer 1
		20	Dryer 2 Biofilter	620	1	Biofilter 1 Dryer 2

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
7	Ancillaries	05	Control Room	705		
		10	Engine Room	710	4	Sludge
					7	Gas

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					9	Water
		15	North Gallery	715	4	Sludge
					7	Gas
					8	Air
					9	Water
		20	Operation Building	720		
		25	Plant	725		
		30	Safety Room	730		
		35	Store	735		
		40	Workshop	740	7	Gas
					8	Air
		45	South Gallery	745	4	Sludge
					6	Grit
					8	Air
					9	Water
		50	Emergency Equipment Store	750		
		55	Laboratory	755		
		60	Administration Building	760		
		65	Boiler House	760	5	Diesel

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Zone		Unit		Zone + Unit Code	Sub-Unit Number	
8	Utilities	05	Hot Water Plant / Heat Loop	805	7	Gas
					8	Air
					9	Water
		10	Air	810	8	Plant/Process Air
					9	Powerhouse Start Air
		15	Water	815	1	Process water (C2) 1 (Main)
					2	Potable/Domestic water
					3	Well 3
					4	Recycled Effluent (C3)
					6	Stormwater
					7	Fire Main
		20	Electrical	820		Low Voltage (<1000V)
					1	MLC J
					2	MLC H
					3	MLC G1
					4	MLC A
					5	MLC C
					6	MLC D
					7	MLC E
					8	MLC F
					9	
			Electrical – Ocean Outfall	821	1	OOPS MLC1
					2	OOPS MLC2
					3	OOPS CP1
					4	MLC K
					5	Northern Toe Drain
			Electrical – Drying Plant	822	1	MLC L
			Electrical – Energy Centre		2	MLC M
			Electrical – Biosolids Building	8231	1	MLC G

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		25	Power Generation	825	4 5 6 8 9	Waukesha G3 Standby Diesel Generator Air Water
		26	Power generation	826	2 7 9	Waukesha G2 Biogas Water
		27	High Voltage Electrical (>1000V)	827	1 2	CB 24 (Sewage Plant North) CB 11 (Sewage Plant South)
		30	Diesel Storage and Distribution	830	1 2 3 4 5	Storage Tank 1 Storage Tank 2 Drain Daytank Outlet Workshop Dispenser
		40	Biosolids Drying Energy Centre	840	1 2 3 4	LFG Boiler Solid Fuel Boiler High Pressure Water Solid Fuel Handling

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
9	Control & Information Systems	05	Control & Information Systems	905	1 2 3 4	PLC Based SCADA Based Security Systems IT Based

APPENDIX 4 – Example Potable Water Supply Treatment Plant Process Structure – Birdlings Flat (BPPwTP3504)

Table 1. Zone, Unit and Sub-Unit Identity Codes

Zone		Unit		Zone + Unit Code	Sub-Unit Number	
0	Pre-Treatment	05	Source	005	1	Well M***
		10	Storage	010		
		15	Pumping	015		
1	Dosing			100		
2	Clarification/Settling			200		
3	Filtration	15	Pumping	315		
		10	Primary	310		
		15	Secondary	315		
4	Disinfection	05	UV	405	1	UV Reactor 1
					2	UV Reactor 2
		10	Chlorine	410		
5	Treated Water	05	Storage	505	1	Reservoir 1
					2	Reservoir 2
					3	High Level Reservoir
		10	Reticulation	510	1	Low Level Reticulation
					2	High Level Reticulation
		15	Pressure Boosting	515		
6	Waste Water	05	Storage	605		
		10	Pumping	610		
		15	Disposal	615	1	Irrigation Field
					2	Pond
					3	Stormwater Drain
7	Ancillaries			700	1	Plant Building
					2	Chemical/Filter Shed
8	Utilities	05	Hot Water Plant / Heat Loop	805	7	Gas
					9	Water
		10	Air	810	8	Process Air
					2	Heat Pumps/Air Conditioning
					3	Fresh Air Supply
		15	Water	815	1	System 1 (Main)
					2	System 2 (Potable, Domestic)

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					3	System 3 (Irrigation)
					4	Filtered Recycled Water
					5	Disinfected Recycled Water
					6	Stormwater
		20	Electrical	820	1	Low Voltage (<1000V)
					9	High Voltage (>1000V)
		25	Power Generation	825	1	Generator 1
					2	Generator 2
		30	Diesel Fuel Tanks	830	1	Tank 1
9	Control & Information Systems	05	Control & Information Systems	905	1	PLC Based
					2	SCADA Based
					3	Security Systems
					4	IT Based

APPENDIX 5 – Christchurch City Water And Waste Facilities

Region + Site Utility	Station/Site Group Description	Range of Station No.s (nnnn)
CCWw PSnnnn	CC Wastewater Pumping Stations	0001 to 0200
CCSw PSnnnn	CC Stormwater Pumping Stations + Tidal Barrage + Detention Basins	0201 to 0300
BPSw PSnnnn	BP Stormwater Pumping Stations + Tidal Barrages + Detention Basins	0301 to 0450
CCWw Ocnnnn	CC Wastewater Odour Control Stations	0451 to 0600
BPWw PSnnnn	BP Wastewater Pumping Stations	0601 to 0800
BPWw Ocnnnn	BP Wastewater Odour Control Stations	0801 to 1000
CCPw PSnnnn	CC Potable Water Pumping Station	1001 to 1500
BPPw PSnnnn	BP Potable Water Pumping Station	1501 to 2000
CCWw TPnnnn	CC Wastewater Treatment Plants	2001 to 2050
CCWw PSnnn	CC Temp Wastewater Pumping Stations	2051 to 2300
CCWw MSnnnn	CC Wastewater Monitoring Stations (overflows+ flow gauges etc)	2301 to 2500
BPWw TPnnnn	BP Wastewater Treatment Plants	2501 to 2550
CCWwLSnnnn	CC Wastewater Lift Stations	2551 to 2800
BPWw MSnnnn	BP Wastewater Monitoring Stations	2801 to 3000
CCPw TPnnnn	CC Potable Water Treatment Plants	3001 to 3050
CCPw Slnnnn	CC Water Stream Intake	3051 to 3100
CCPw MVnnnn	CC Potable Water Motorised Valve Station	3101 to 3200
CCWw MVnnnn	CC Wastewater Motorised Valve Station	3201 to 3300
CCPw MSnnnn	CC Potable Water Monitoring Stations	3301 to 3500
BPPw TPnnnn	BP Potable Water Treatment Plants	3501 to 3550
BPPw Slnnnn	BP Water Stream Intake	3551 to 3600
BPPw MVnnnn	BP Potable Water Motorised Valve Station	3601 to 3700
BPWw MVnnnn	BP Wastewater Motorised Valve Station	3701 to 3800

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BPPw MSnnnn	BP Potable Water Monitoring Stations	3801 to 4000
CCWwVSnnnn	CC Vacuum Pumping Stations	5001 to 5500
CCSoLFnnnn	CC Solid Waste Land Fill sites	6001 to 6050
BPSoLFnnnn	BP Solid Waste Land Fill sites	6051 to 6100
CCSoTSnnnn	CC Solid Waste Transfer Stations	6101 to 6200
BPSoTSnnnn	BP Solid Waste Transfer Stations	6201 to 6300
CCSw MVnnnn	CC Storm Water Motorised Valve	6301 to 6400
CCSw MSnnnn	CC Storm Water Monitoring Stations	6401 to 6500
CCWw RRnnnn	Christchurch City Water & Waste Repeater Sites	9001 to 9050