WCS Group
The H_2O experts
MARLOWE Critical Services

WATER TREATMENT
WATER HYGIENE
AIR HYGIENE
ENGINEERING
TRAINING SERVICES

LEGIONELLA
RISK ASSESSMENT

CUSTOMER: Plymouth Marjon University

SITE: Studio School

SURVEY DATE: 30/03/2023

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Legionella Risk Assessment Contact Details

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Survey Date: 30/03/2023

Executive Summary

This report provides an assessment of the current risks with regards to the control of legionella and its proliferation potential within the water systems on site. Areas considered include:

- the presence of legionella bacteria
- conditions suitable for multiplication of legionella bacteria
- sources of breathable droplets
- the presence, susceptibility and number of people who may be exposed
- review of current control measures and system of control

The most significant concerns found from these key areas are highlighted in the executive summary.

Individual calculations can be found in the Evaluation of the Risk Factors section of this report.

The presence of legionella bacteria

No legionella samples are routinely taken at the site. Normally microbiological monitoring of domestic hot & cold water supplied by the mains is not usually required, unless the RA or monitoring indicate a problem However, as legionella bacteria are commonly encountered in environmental sources they may eventually colonise manufactured water systems and be found in cooling tower systems, hot and cold water systems and other plant which use or store water.

Conditions suitable for the multiplication of legionella bacteria and presence of breathable droplets

i.e. Temperature 20-45°C, source of nutrients: sludge, scale, rust, algae and other organic matter and biofilms, dead legs and parts of the system used intermittently.

There was evidence that stagnant conditions were present in some systems: CWST1

The following systems produce breathable droplets whilst operating under normal conditions: Showers

For the specific evidence see survey details for individual water systems and the recommendations.

The presence, susceptibility and number of people who may be exposed

It was not possible to identify specific individuals, however a variable proportion of any group of people will be susceptible to legionella infection: risk increases with age and notably for smokers, heavy drinkers and those who are immuno-compromised or have underlying predisposed clinical conditions.

There are around no members of staff on site every day and around 0 users on site who may be exposed to any breathable droplets.

Review of current control measures and system of control

No suitable training records were seen for the DH.

Survey Date: 30/03/2023

Scope & Site Description

Scope of survey and exclusions

This inspection was carried out as a Legionella Risk Assessment in accordance with the ACoP L8 and HSG274 (Legionnaires' disease – The control of Legionella bacteria in water systems) and WCS Group's documented in-house Standard Operating Procedures.

This assessment is only valid for the plant and areas listed as described in the site description and asset register. It is based on information provided by site including verbal statements, any relevant plans, explanations regarding operation and usage, etc., and only includes areas within the scope of the assessment and those made known to the Assessor whilst on site. All other plant, known or otherwise to WCS Group, has not been assessed.

Management Responsibilities - ACoP L8 paras 48 – 57

The ACoP L8 requires the duty holder to appoint a responsible person having sufficient authority, competence and knowledge. Clarity of duties, contact arrangements and defined lines of communication are important. These are to be understood, documented and audited regularly.

Risk Assessor (Legionella Control Association)

The competence of the assessor is of paramount importance and should be matched to the system being assessed. The assessor should be able to demonstrate that they have specialist knowledge of legionella bacteria and of the water system(s) to be assessed, and are competent to carry out the necessary surveys and sampling. In addition, the assessor should have undertaken the necessary practical training and gained experience with a competent assessor to be able to assess the systems described below.

Oliver Schofield has 13 years' experience in legionella risk assessments and is qualified to City and guilds standard.

Description of Site, Water Systems and Usage

The site is an education, located on a modern business park / in a residential area / on an industrial estate, and was constructed in approximately 2016

The water systems are for domestic use, i.e. toilet, washing and kitchen facilities, but also supply lab water, CAT5.

The incoming main enters the building in the plantroom and supplies the entire building, CAL1 and CWST1. CWST1 supplies the labs and the small water heaters in the labs. CAL1 supplies the rest of the building with hot water.

There is a list of all systems in the Asset Register and further details can be found in the individual survey sections, together with photographs where appropriate.

Seasonal Factors

The site usage is non existent as the building is shut down.

Other Relevant Factors

The site is disused / has redundant areas due to it being a newly purchased building with no current plans as to what it will be.

The site was previously a school for disadvantaged children and has remaining water systems.

Survey Date: 30/03/2023

There are plans to change the use of the building and water systems within the next few years. This will involve a change of use.

The majority of the hot water outlets throughout the site are regulated by thermostatic mixer valves (TMV).

The showers within Shower Rooms are supplied by a single thermostatic mixer valve.

Review of Systems of Control

Specifications		**Comments**
Duty Holder detailed	Yes	Management structure / lines of communication / contact details were / were not seen listed as : **DH: Michelle Jones interim vice chancellor** RP: John Chadwick interim head of estates DR: Barrie Smith FM Contractor. Rock Compliance
Responsible Persons detailed	Yes	
Deputy Responsible Persons detailed	Yes	
Water hygiene service provider detailed	Yes	
Training Records	No	Records detailing the training of RP and DR relevant personnel on the control of legionella bacteria were found in site estates, by hydro-x 14th April 2022. There were no records found for the training of relevant personnel on the control of legionella bacteria for the DH
Roles and Responsibilities identified	Yes	
Is there a previous Risk Assessment?	No	Not seen
Have recommendations been carried out?	NA	
Schematics of Plant Layout	No	
Description of Safe Operation of water systems	Yes	Operating manual / instructions available for safe running of other risk systems, Office.
Defects entered into Log Book	NA	
Appropriate Corrective Actions Taken and recorded	NA	
Signatures or Electronic IDs Against All Records	NA	
Is a regular review of the control scheme undertaken by the RP or Deputy	NA	
If chemicals are used in any aspect of the scheme, is relevant Health and safety information available	NA	
Incident plan in the event of plant failure	No	
Incident plan in the event of an outbreak or positive legionella test	No	
Shut Down & Start Up Procedures	Yes	Relevant procedures are in place regarding shutdowns, commissioning / decommissioning, cleaning and disinfection and any infrequently used areas of the system.
Calorifiers		
Annual internal Inspection	No	Building is shut down, not in use currently
Annual blow down of drain	No	
Monthly Calorifier Readings	No	

Survey Date: 30/03/2023

Specifications		Comments
Hot Water Services		
Monthly One Min Tap Temps	No	
Circulation Loops Checked	No	
Annual One Min Tap Temps	No	
POUs (< 15 litres) Water Heaters		
Temperature / usage checks	No	
Combination Water Heaters		
Annual Inspections	na	
Cold Water Storage Tanks		
Annual internal Inspection and summer temperature checks	No	
Cold Water Services		
Monthly Two Min Sentinel Tap Temperatures	No	
Annual Two Min Tap Temperatures	No	
Annual inspection of the insulation on all system components	No	
Showers / Rinse Sprays / Spray Taps		
Quarterly dismantle, de-scale and clean	No	
Base exchange Softeners		
Weekly checks	NA	
Annual service and disinfect	NA	
Disposable Filters		
Filters checked as recommended	No	
Multiple Use Filters		
Backwash and regenerate as recommended	NA	
Infrequently Used Outlets		
Flushing regime in place	No	
Rotation Records for multiple pumps	No	
TMVs		
Maintenance regime in place	No	
Expansion Vessels		
Flush and purge to drain as recommended	No	

Survey Date: 30/03/2023

Specifications		Comments
Suggested monitoring above as directed from Table 2.1: Checklist for hot and cold water systems.		
Other Risk Systems		
Relevant checks in place	No	
Suggested monitoring above as directed from Appendix 3.1: Checklist for recommended frequency of inspection for other risk systems.		

Management Programme Risk Calculation

Risk Parameter	Risk Rating	Numerical Value	Mark 'x'
A. Recommendations from Current Risk Assessment	Everything completed	10	
	Most completed	15	
	Some completed	25	
	None completed	30	x
B. Management structure	Good	10	x
	Partial	20	
	None	30	
C. Management communication	Good	10	x
	Fair	20	
	Poor	30	
D. Training	Current	10	
	Over two years ago	20	
	None for DH	30	x
E. Monitoring programme	Good	10	
	Fair	20	
	None	30	x
F. Control Scheme	Good	10	
	Partial	15	
	Poor	25	
	None	30	x
G. Corrective Actions to faults	Logged and completed	10	
	Logged but not completed	20	
	Not logged	30	x

Total Numerical Value	Risk Rating
70 - 95	Low
100 - 140	Medium
145 - 210	High
Management Programme Risk	**160 High – Because building not in use**

Survey Date: 30/03/2023

Plant Asset Register

Asset	Systems	Location	Notes
S1-S10	Showers	Changing rooms	
S11	Shower	Staff shower	
TMV	WHB's & sinks plus one for each shower room	Most water outlets	
CAL1	Hot water	Plantroom	
CWST1	Lab water	Plantroom	
PU 1	Pressurisation Unit	Plantroom	
AHU1	Air handling unit	Plantroom 2	

Survey Date: 30/03/2023

Evaluation of Risk Factors

Using the Risk Scoring Matrix below, the risk rating is calculated by the addition of the numerical values for each of the risk parameters of each system.

Risk Parameter	Risk Rating	Numerical Value
A) Formation of Droplets		
Still water	Low	10
Droplets	Medium	20
Aerosol	High	30
B) Water Condition		
Chemical regime	Low	10
Clean	Low / Medium	15
Contaminated	Medium / High	25
Heavily contaminated	High	30
C) Water temperature		
Below 20°C	Low	10
21°C – 25°C	Medium	20
26°C – 45°C	High	30
46°C – 50°C	Medium	20
Above 50°C	Low	10
D) Water turnover		
High turnover	Low	10
Moderate turnover	Medium / Low	15
Low turnover	Medium	20
Stagnant	High	30
E) Susceptibility of exposed persons		
Average population	Medium	20
Susceptible population	High	30
F) Population density of exposed persons		
Low density	Low	10
Medium density	Medium	20
High density	High	30

Having determined the value using the Risk Scoring Matrix above, the risk rating is determined as below:

Total Numerical Value	Risk Rating
70 – 105	Low
110 – 140	Medium
145 – 180	High

Survey Date: 30/03/2023

The overall risk rating for each system must be evaluated in conjunction with other influences observed during the survey and with consideration for systems breakdowns, abnormal operations, commissioning and other unusual circumstances.

System Risk Rating								
Asset / Systems	A. Formation of droplets	B. Water Condition	C Water Temperature	D Water Turnover	E. Susceptibility of Exposed Persons	F. Population Density	Risk Score	Risk Rating
CAL1	30	NA	NA	NA	NA	NA	NA	Not in use
CWST1	20	NA	NA	NA	NA	NA	NA	Not in use
Mains	30	NA	NA	NA	NA	NA	NA	Not in use
LVPOU1 to LVPOU4	20	NA	NA	NA	NA	NA	NA	Not in use

Survey Date: 30/03/2023

Recommendations Table

		ACTIONED	
High Priority		**BY**	**DATE**
CWST1	Clean and disinfect to BS8558 / chemical manufactures instructions cold water storage tank		
Hot & Cold Water Services	Flush entire building when it is brought back online • Every outlet, be aware to protect against aerosols		
Log Book	Ensure that all monitoring tasks are being carried out as per 'Recommendations for a Monitoring Programme' section of this assessment.		
Training	Ensure all personnel associated with legionella control and responsibility at site are suitably trained		
Medium Priority			
CWST1	Fit a screened breather to the lid of cold water storage tank		
CWST1	Fit suitable insulation to cold water storage tank		
Hot Water Services	Fit caution hot water labels to hot outlets where TMVs are not required		
Low Priority			
Hot & Cold Water Services	Ensure flexible hoses are WRAS approved or equivalent. If not then replace with copper rigid fittings. If WRAS approved then at point of replacement these should be plumbed in with rigid fittings as it has been known over time for the inner linings to break down a provide a suitable home for bacteria to multiply.		

Survey Date: 30/03/2023

Recommendations for a Monitoring Programme

In order to comply with the routine and maintenance required by the Approved Code of Practice and Guidance L8, “Legionnaires’ Disease – The Control of Legionella Bacteria in Water Systems” and HSG274, the following programme should be implemented fully when the building is back on-line: -

Weekly

- Flush through any infrequently used outlets and purge to drain before use without release of aerosols.

Monthly

- Check that temperature is below 20°C after running for up to two minutes in the cold-water sentinel taps.
- Check temperatures at the calorifiers, flow around 60°C, not below, and return not below 50°C.
- For point of use water heaters (no greater than 15 litres), confirm they operate at 55-60°C or have high turnover.
- Check temperatures of a representative selection of other sentinel outlets on a rotational basis.
- Check hot water temperature for up to one minute to see if it has reached 50°C in the hot water sentinel taps. Return legs on the principal loops on circulation systems are considered as sentinel points.

Quarterly

- Dismantle, clean and descale showerheads and hoses, including rinse sprays.
- For circulating systems on a rotational basis, check that temperatures of subordinate loops are above 50°C.

Annually

- Visually inspect cold water storage tanks and carry out remedial work where necessary.
- Check cold water storage tank temperatures (summer) and mains supply (below 20°C),
- Check thermal insulation of water services to ensure it is intact and consider weatherproofing where components are exposed to the outdoor environment.
- Visual check on internal surfaces of the calorifiers for scale and sludge where possible. If not possible purge from drain and note condition of the drain water for clarity, quantity of debris and temperature.
- The calorifiers should then be cleaned if considered necessary.
- Check the temperature of a representative number of hot and cold water taps on a rotational basis.
- TMV’s: carry out routine service. Consider removing if not required.

Survey Date: 30/03/2023

Surveys & Photographs

Cold Water Storage Tanks

CWST Number/ Reference:	CWST1
Location:	Plantroom
Are there any restrictions to safely access / inspect / clean the CWST?	No
Materials of construction of CWST?	Plastic
Dimensions of CWST in (m) L x W x H?	.4 x .3 x .5
Nominal capacity in litres?	150
External condition of CWST?	Ok
Is the CWST sufficiently insulated?	No
Evidence of unapproved WRAS fittings?	No
Is CWST linked to another?	No
Is the lid suitably fitted and have a screened air vent present?	Yes
Are suitable screened warning overflow pipes fitted?	Yes
Fed by?	Mains
Material and diameter of inlet / outlet pipe?	15mm copper in 42mm copper out
Is pipe work associated to the CWST insulated adequately?	Yes
Do any open vent pipes/ HWS expansion pipes return to CWST?	No
Supply / stored / ambient temperature (°C)?	Off, 10
Any sediment / scale / corrosion / biofilm or other contaminants present?	Sediment and biofilm
Does CWST turn over within a 24-hour period?	No
Is there adequate cross flow?	Yes
Are there any hollow support columns in the CWST?	No

CWST1, BOOSTED TO LABS

Comments:

Survey Date: 30/03/2023

Calorifiers

CAL Number/ Reference:	CAL1
Location:	Plantroom
Are there any restrictions to safely access / inspect the CAL?	No
Configuration?	Individual
Calorifier Size (h x w) or water volume (estimated litres)	300L
Heat source?	GAS
Fed by?	Mains
Material and diameter of inlet pipe?	42mm copper
Material and diameter of outlet pipe?	42mm copper
Condition of Insulation including pipework?	Yes
System circulated?	Yes
Shunt pump fitted?	No
Drain present?	Yes
Temperature gauge present?	Yes
Storage temperature?	Off
Flow temperature?	Off
Return temperature?	Off
Evidence of unapproved WRAS fittings?	No

CAL1

Comments:

Building shutdown and isolated. Unused.

Smaller Hot Water Systems

Asset Reference	Location	System Usage / Frequency	Outlet Temps > 50°C?	Comments
LVPOU1	Lab S1	None	N	
LVPOU2	Prep	None	N	
LVPOU3	Main Lab	None	N	
LVPOU4	Lab S2	None	N	

EXAMPLE LVPOU

Comments:

- LVPOU = Low volume point of use water heater (equal to or less than 15 litres)

Survey Date: 30/03/2023

Other System Number/ Reference:	Dead Legs

BOILER ROOM BIB TAP

BOILER ROOM BIB TAP 2

GF BY WCS

Survey Date: 30/03/2023

Other System Number/ Reference:	Various
 **IM IN BOILER ROOM**	 **PUMP SET FROM CWST1 FOR LAP SINKS PLANTROOM**
 **PU PLANTROOM**	 **AHU, MAINTAIN ALL AHUS ON SITE TO MANUFACTURERS INSTRUCTIONS**

Survey Date: 30/03/2023

Equipment, Outlet & Temperature Survey

Location / Asset Reference	Little used	Sentinel	Sink	WHB	Local WH	Shower / rinse spray	Clean and free from contaminants?	Others (inc deadleg)	Spray tap	TMV / TMT	Mains °C <2 min	DCWS °C <2 min	DHWS °C or to TMV <1 min	DHWS Mixed °C at TMV
Plantroom GF	Yes	CWST1 Mains			CAL1		Yes	1 mains bib tap 1 CWST1 bib tap IM			Off	Off		
AHU Plantroom GF							Yes	AHU						
Room G.21		CAL1		1			Yes			1				
Lab S1 GF		LVPOU1	1		LVPOU1		Yes					Off	Off	
Prep room GF		LVPOU2	1		LVPOU2		Yes					Off	Off	
Lab GF		LVPOU3	5		LVPOU3		Yes	1 Hot and cold sink only				Off	Off	
Lab S2		LVPOU4 CWST1	1		LVPOU4		Yes					Off	Off	
Corridor by WCs	Yes		1				Yes				Off		Off	
GF WCs				6			Yes	7 WC		6 TMT 6	Off		Off	
Disabled WC GF				1			Yes			1	Off		BO	
GF corridor							Yes	BIB tap			Off			
GF Kitchen		Mains CAL1	2	1			Yes	DW			Off		Off	

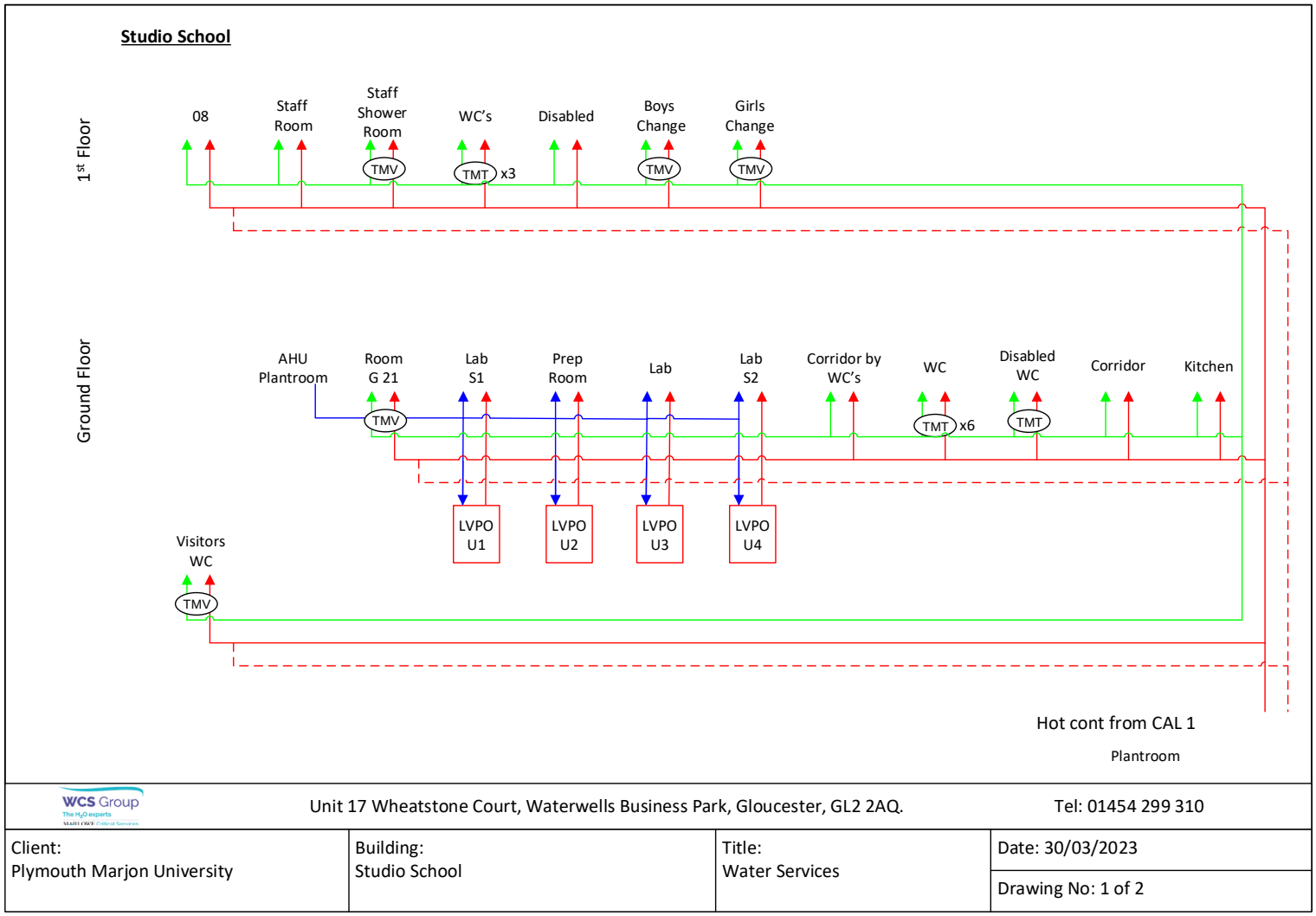
Survey Date: 30/03/2023

Job Ref.:

Studio School

Location / Asset Reference	Little used	Sentinel	Sink	WHB	Local WH	Shower / rinse spray	Clean and free from contaminants?	Others (inc deadleg)	Spray tap	TMV / TMT	Mains °C <2 min	DCWS °C <2 min	DHWS °C or to TMV <1 min	DHWS Mixed °C at TMV
								Spray deck WB						
GF Visitors WC				1			Yes	WC		1	Off		BO	
1F 08							Yes	DM			Off		Off	
1F Staff room		CAL1 Mains	1				Yes	DW WB			Off		Off	
1F staff shower room				1		1	Yes	WC		1	Off		Off	
1F WCs				3			Yes	4 WC		3 TMT 3	Off		Off	
1F disabled				1			Yes	WC			Off		Off	
Boys change						5	Yes			1	Off		Off	
Girls change		CAL1 Mains				5	Yes			1	Off		Off	

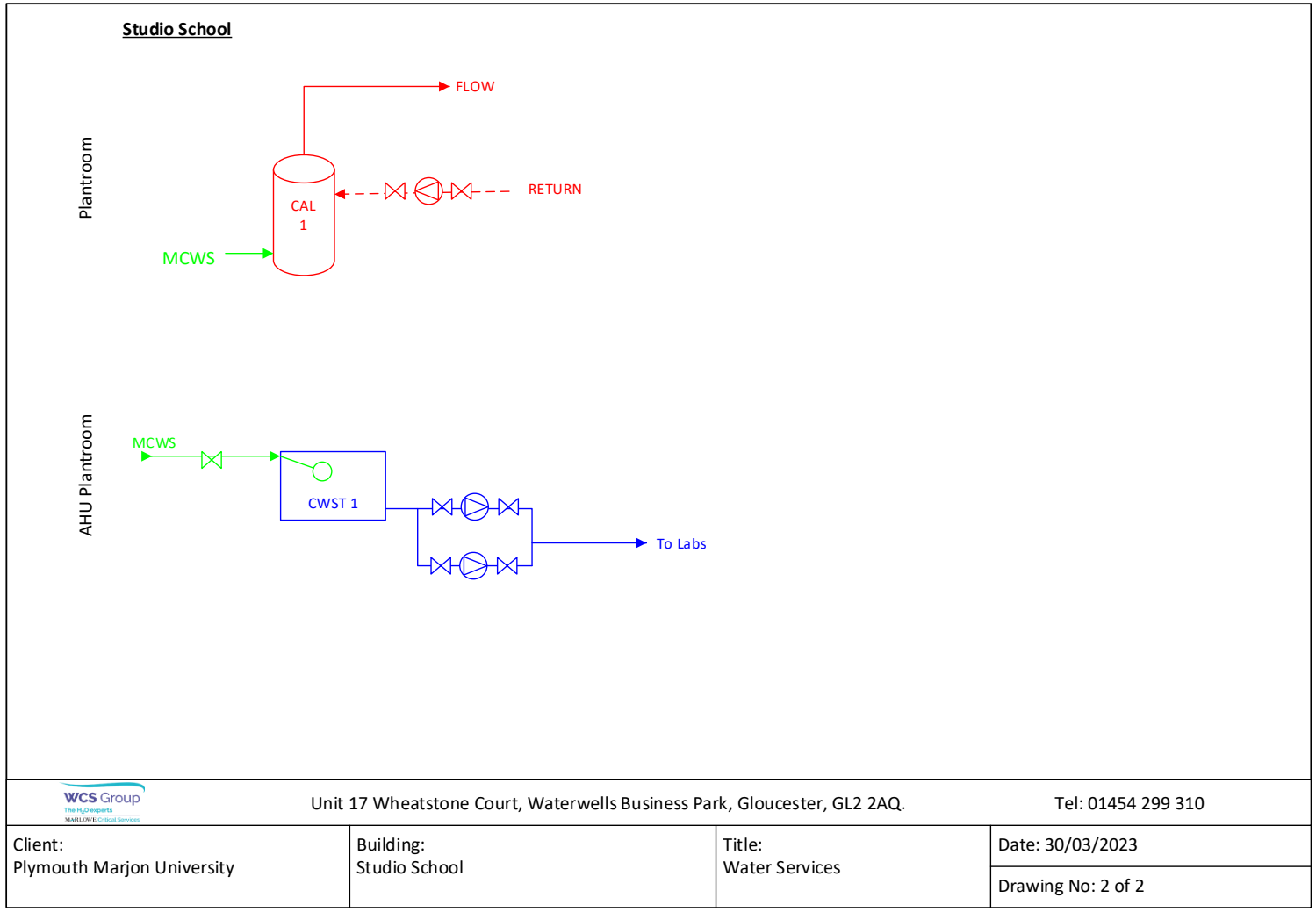
Studio School



WCS Group	Unit 17 Wheatstone Court, Waterwells Business Park, Gloucester, GL2 2AQ.		Tel: 01454 299 310
Client: Plymouth Marjon University	Building: Studio School	Title: Water Services	Date: 30/03/2023
			Drawing No: 1 of 2

Survey Date: 30/03/2023

Job Ref.:



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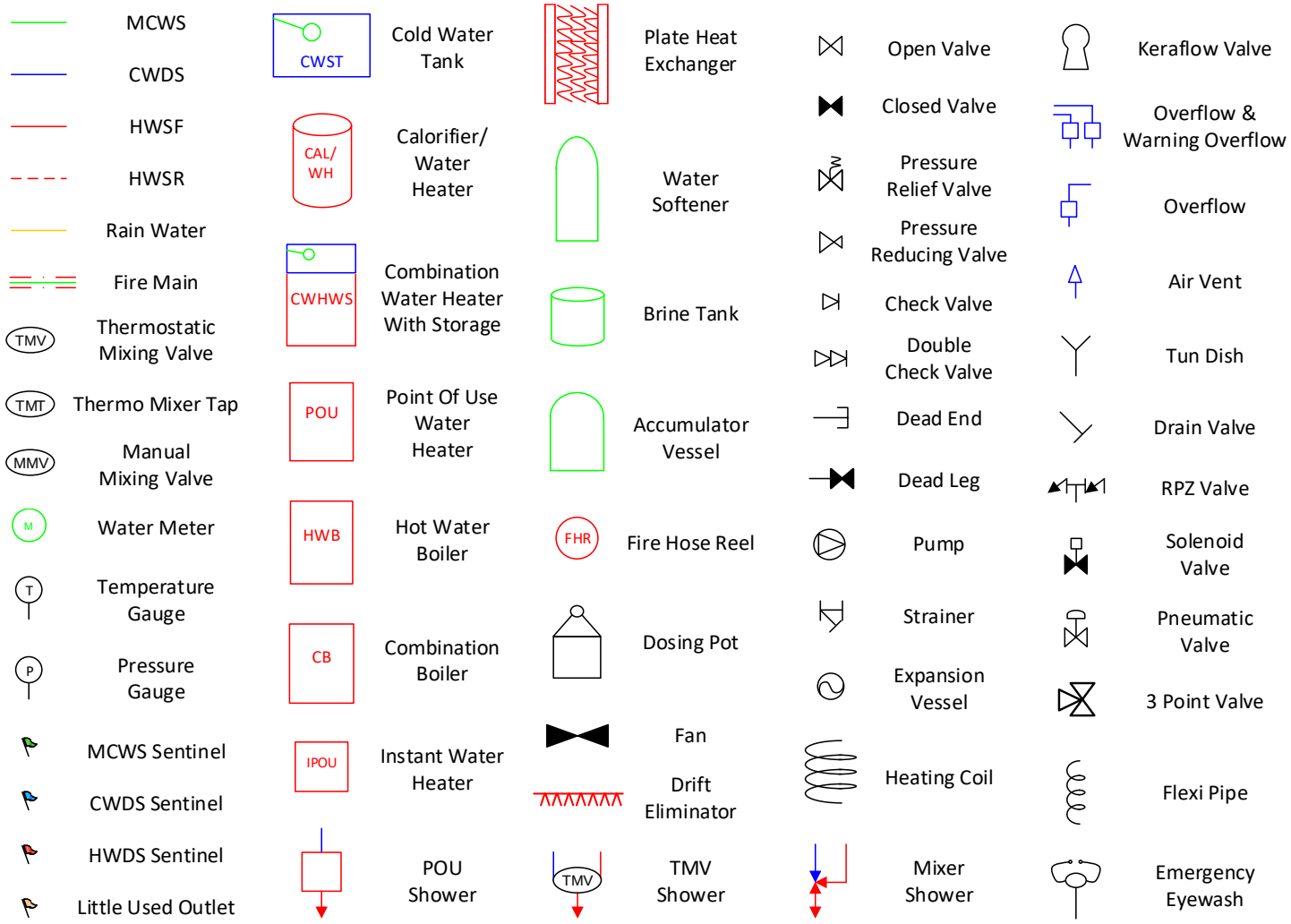
Survey Date: 30/03/2023

Job Ref.:

Schematic Legend



Survey Date: 30/03/2023

Job Ref.:

Asset Abbreviation Key			
AC = air conditioning	BCWS = boosted cold water services	BF = Brita filter	BM = Bain Marie
BP = brat pan	BT = bib tap	BV = buffer vessel	CD = chemical disposal
CM = coffee machine	CO = combi oven	CT = cooling tower	CWDS = cold water down services
CWV = cold water vendor	DC = drinks carbonator	DE = dead end	DF = drinking fountain
DL = dead leg	DM = drinks machine	DOC = drain off cock	DV = drain valve
DW = dish washer	DWT = drinking water tap	ES = emergency shower	FHR = fire hose reel
GR = grinder	GW = glass washer	HDM = hot drinks machine	HPU = heating pressurisation unit
HT = hot tap	HWB = hot water boiler	HWDS = hot water down services	HU = humidifier unit
IM = ice machine	IS = inline strainer	JM = juice machine	JW = jet wash
MCC = macerators	MCWS = mains cold water services	MMV = manual mixing valve	PCV = pressure control valve
PP = potato peeler	PRP = prett pan	PU = pressurisation unit	QFL = quick fill link
RH = rinse hose	SDM = soft drinks machine	SL = sluice	SO = steam oven
SRH = spray rinse hose	STD = sanitary towel disposal	STE = steamer	STR = strainer
UR = urinal	VM = vending machine	WB = water boiler	WC = water cistern (toilet)
WCH = water chiller	WCO = water cooler	WD = waste disposal	WDG = wash down gun
WDH = wash down hose	WF = water features	WHB = wash hand basin	WM = washing machine