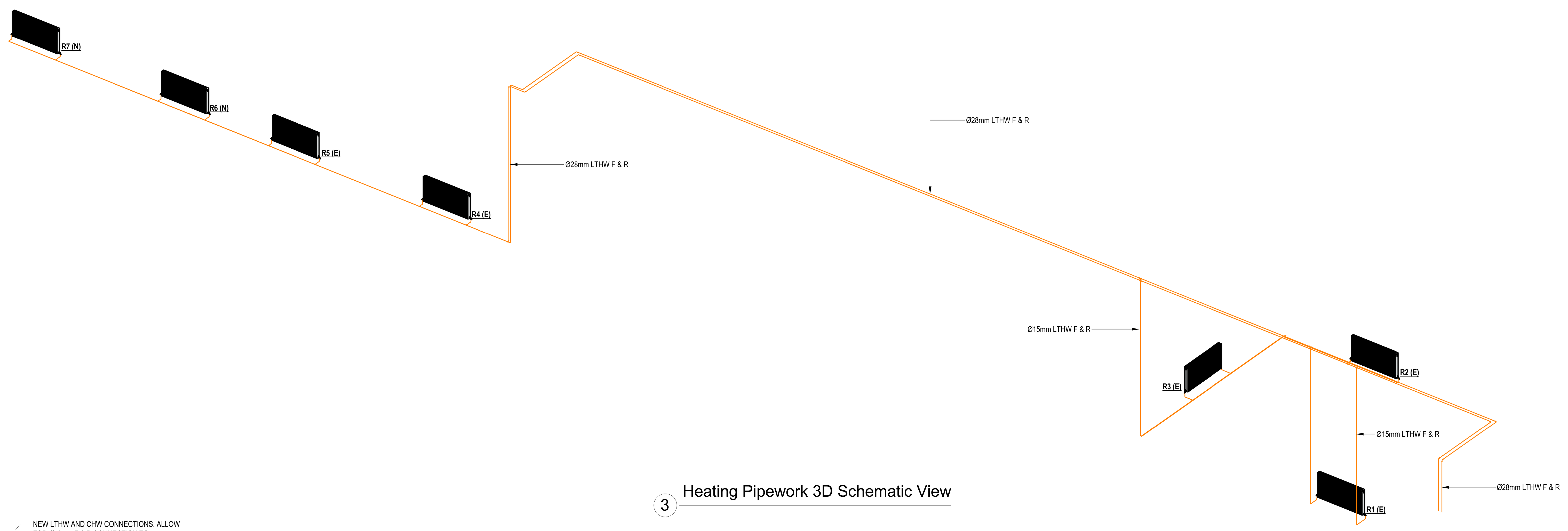
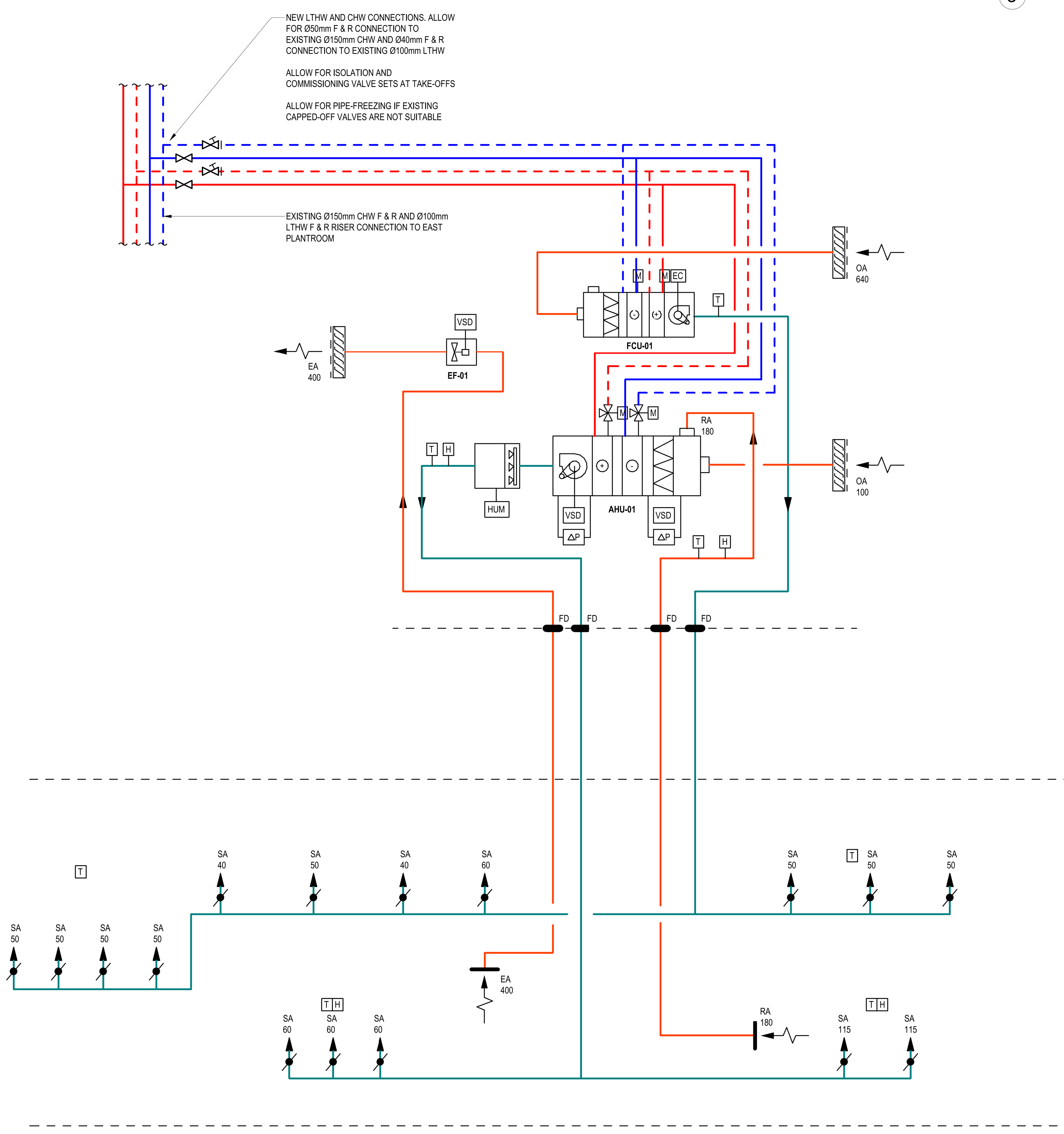


3 Heating Pipework 3D Schematic View



1 Air & Water Schematic

BMS CONTROL SEQUENCE OF OPERATION

TEMPERED AIR FAN COIL UNIT SYSTEM
THE FAN COIL UNIT SYSTEMS PROVIDE TEMPERED VENTILATION AIR TO NON-CLIMATE CONTROLLED STORAGE SPACES.

THE SUPPLY FAN TYPE SHALL BE AN EC (ELECTRICALLY COMMUTATED) MOTOR DRIVEN. THE FAN SHALL BE ENABLED/DISABLED VIA AN ADJUSTABLE TIME CLOCK VIA THE BMS. THE FAN IS PROVEN WHEN THE DIFFERENTIAL PRESSURE SWITCH IS MADE DUE TO PRESSURE RISING ABOVE A MINIMUM SETPOINT. IF THE FAN IS NOT PROVEN, A WARNING IS SENT TO THE BMS AND THE SUPPLY AND EXTRACT FANS ARE DISABLED.

THE RELIEF FAN IS INTERLOCKED TO THE SUPPLY FAN SO IT CAN ONLY OPERATE ONCE THE SUPPLY FAN HAS BEEN PROVEN. THIS IS TO ENSURE THAT A NEGATIVE PRESSURE IS NOT GENERATED IN THE SPACES SERVED.

THE COOLING PROVIDED BY THE CHILLED WATER COIL SHALL BE CONTROLLED BY A 3-WAY VALVE TO MODULATE FLOW ACROSS THE COIL. ALLOW FOR REQUIRED 'COOLING CALL' AND DISABLE SIGNALS TO/FROM THE CENTRAL THERMAL PLANT. THE VALVE IS POSITIONED IN RESPONSE TO A PI CONTROL SIGNAL ACTING ON THE TEMPERATURE DIFFERENTIAL BETWEEN THE SUPPLY OR ZONE TEMPERATURE SET-POINT. THE ZONE COOLING SET-POINT SHALL BE 25DEGC (ADJUSTABLE).

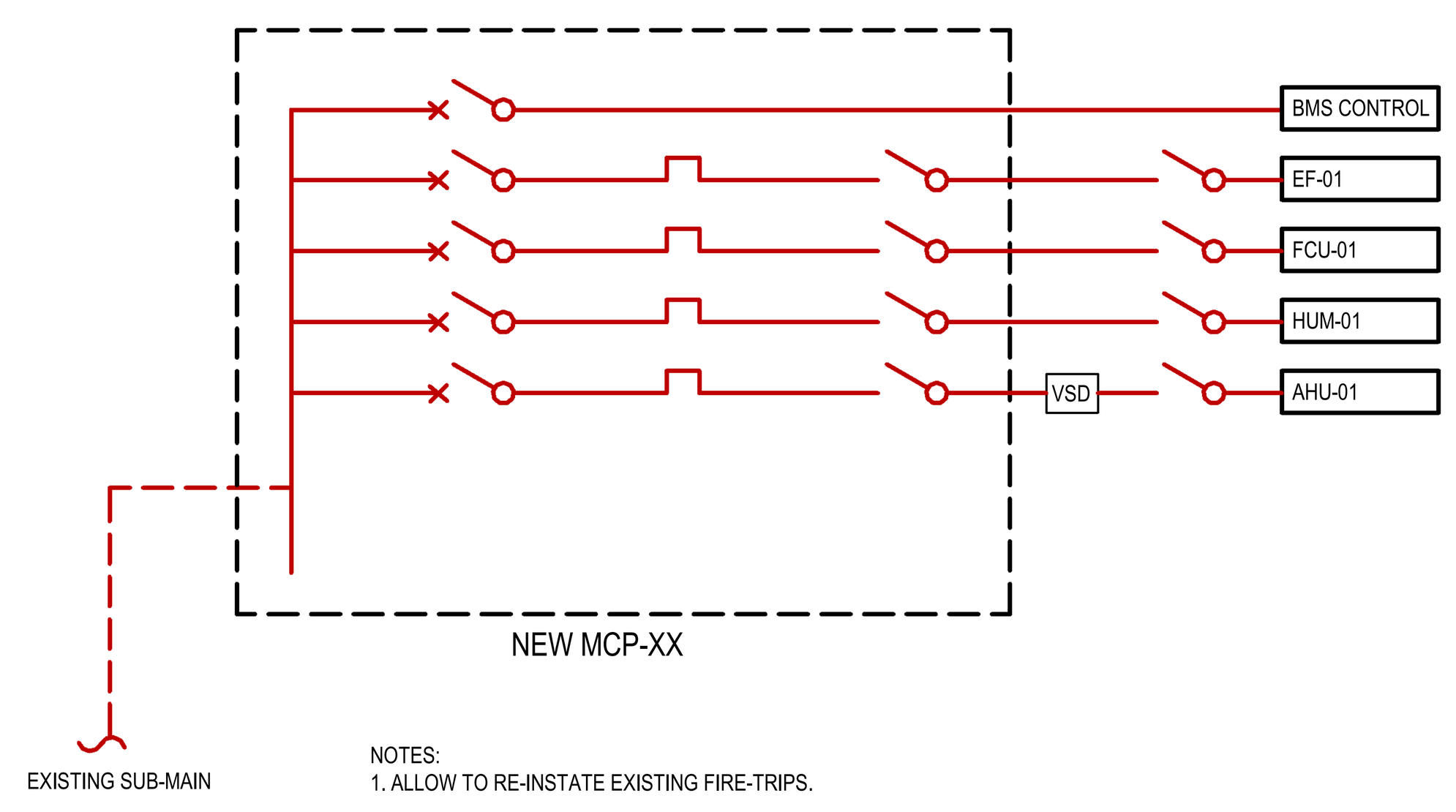
THE HEATING COIL IS OPERATIONAL WHEN THE BMS SIGNALS LOW ZONE TEMPERATURE CONDITION, THE SUPPLY FAN IS PROVEN AND THE VALVE MODULATES UNDER PI CONTROL TO OBTAIN THE ZONE TEMPERATURE SET-POINT. THE ZONE HEATING SET-POINT FOR NON-CLIMATE CONTROLLED AREAS SHALL BE 19DEGC (ADJUSTABLE). LOW TEMPERATURE INTERLOCKS ARE TO PROTECT THE COIL WATER CONTENT FROM FREEZING.

CLIMATE CONTROL AIR HANDLING UNIT SYSTEM
THE AIR HANDLING UNIT PROVIDES TEMPERATURE AND HUMIDITY CONTROL AND VENTILATION FOR THE CLEAN WORKSHOP AND STORAGE.

THE ENVIRONMENTAL PARAMETERS FOR TEMPERATURE AND HUMIDITY IS 16-25DEGC (DB), 40-60% RH WITH A MAXIMUM TOLERABLE CUMULATIVE CHANGE OF 2DEGC (DB) AND 10%RH IN 1HOUR. WITH CONSIDERATION TO HUMAN THERMAL COMFORT THE LOWER TEMPERATURE LIMIT IS TO BE 19DEGC. BASED ON THESE VALUES THE DEW POINT DEAD BAND OR THROTTLING RANGE (SUBJECT TO PI CONTROL LOGIC) SHALL BE BETWEEN 6DEGC (DP) AND 16DEGC (DP) WITH DRY BULB TEMPERATURE MAINTAINED BETWEEN 19-25DEGC.

THE ELECTRIC-STEAM GENERATING UNIT INTRODUCES STEAM INTO THE AIR STREAM WHEN THE BMS SIGNALS NORMAL OPERATION OF THE AIR HANDLING PLANT WITH THE SUPPLY FAN PROVEN. A HUMIDIFICATION DEMAND SIGNAL IS PRODUCED ACCORDING TO THE MEASURED DEW-POINT DEVIATION FROM THE SET-POINT. THE AVERAGED DEW POINT IS MEASURED BY COMBINED TEMPERATURE AND HUMIDITY SENSORS LOCATED IN EACH SPACE. THE PI CONTROL SIGNAL SENT TO THE HUMIDIFIER ADJUSTS THE CURRENT TO PRODUCE THE REQUIRED HEATING EFFECT TO PRODUCE THE STEAM. THE PI CONTROL PARAMETERS SHALL TAKE INTO ACCOUNT THE RELATIVELY SLOW CHANGE IN ZONE DEW-POINT LEVELS. A COMBINED TEMPERATURE AND HUMIDITY SENSOR IN THE SUPPLY DUCT LIMITS THE UPPER RANGE OF MOISTURE CONTENT SUPPLIED TO THE SPACE TO AVOID THE RISK OF CONDENSATION AND OVER-SHOOTING THE SET-POINT.

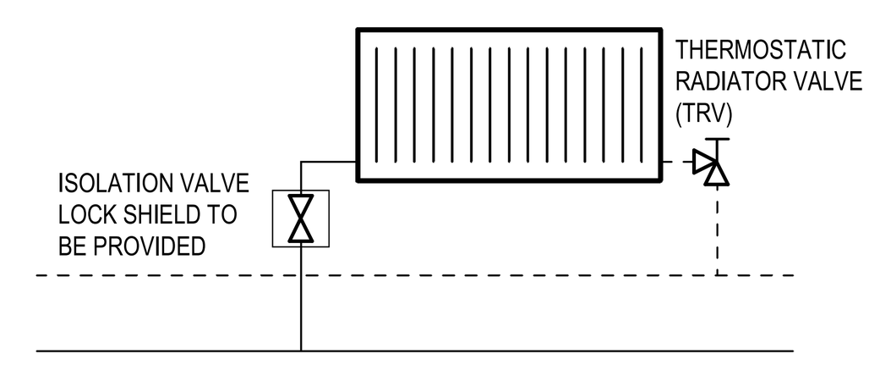
THE CHILLED WATER COIL PROVIDES BOTH COOLING AND DEHUMIDIFICATION BY THE MOST ECONOMICAL METHOD. DEHUMIDIFICATION IS ENABLED WHEN A ZONES DEWPOINT SET-POINT IS OUTSIDE THE SPECIFIED PARAMETERS, A CALCULATION AT THE BMS DETERMINES THE REQUIRED SUPPLY AIR DEW-POINT CONDITION. THE CHILLED WATER 3-WAY CONTROL VALVE MODULATES TO OBTAIN THE REQUIRED DEWPOINT TEMPERATURE. ADDITIONAL HEATING IF REQUIRED IS APPLIED TO TO OBTAIN THE SUPPLY AIR CONDITION AND HUMIDITY.



NOTES:
1. ALLOW TO RE-INSTATE EXISTING FIRE-TRIPS.

ELECTRICAL WIRING DIAGRAM

2 Electrical Wiring Diagram



4 Typical Radiator Connection Detail

STATUS

NOTES

AMENDMENTS

REV	DESCRIPTION	DATE
P1	Draft Technical Design Issue	09.02.18
P2	Tender Issue	09.03.18
P3	Tender Issue	16.03.18

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PROJECT
IMPERIAL WAR MUSEUM SOUTH EAST BLOCK

DRAWING TITLE
MECHANICAL SERVICES
Air, Water Schematic & Electrical Wiring Diagram

A0

CREATED	DRAWN	DESIGNED	CHECKED
Jan' 18	AA	AB	AB

APPROVED	SCALE	NORTHPOINT
-	NTS	

PROJECT No.	DRAWING No.	REVISION
174034	TIWML4-SV-XX-XX-DR-E-6000	P3