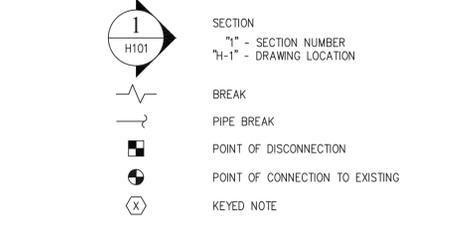
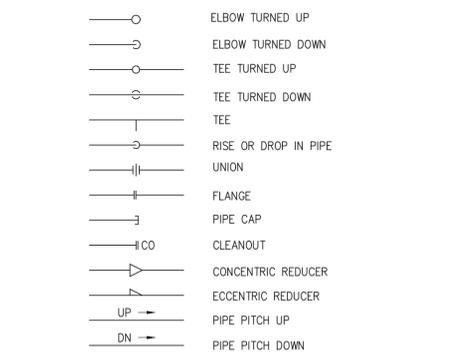


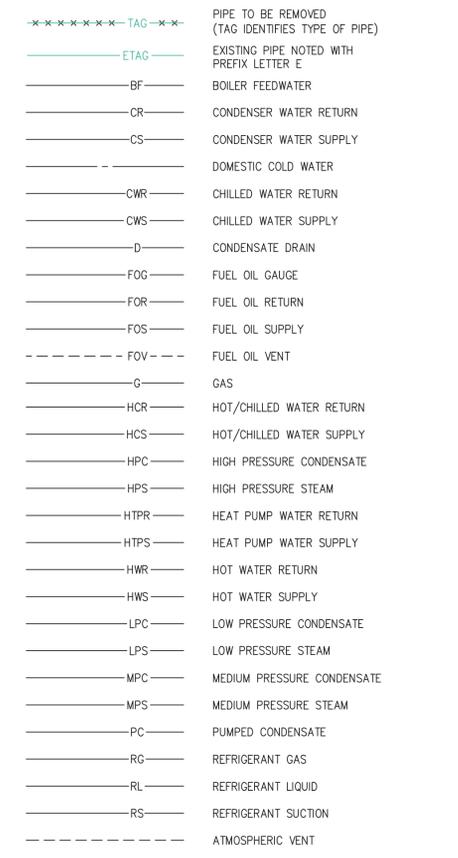
GENERAL DRAWING SYMBOLS LEGEND



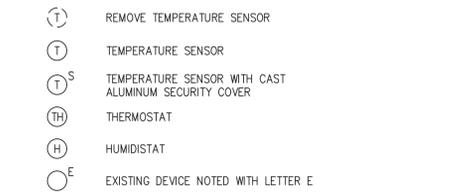
HVAC PIPE FITTINGS LEGEND



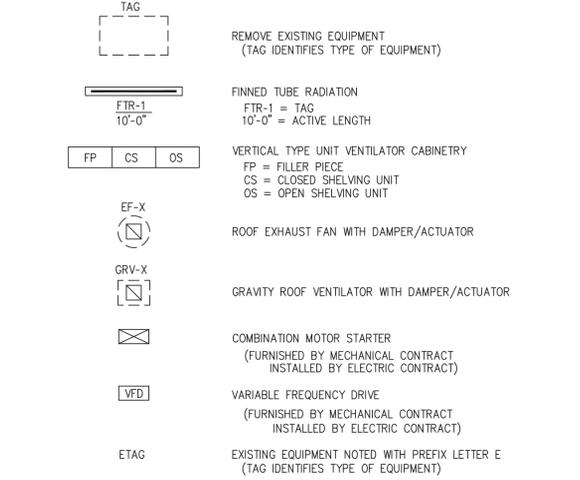
HVAC PIPE LEGEND



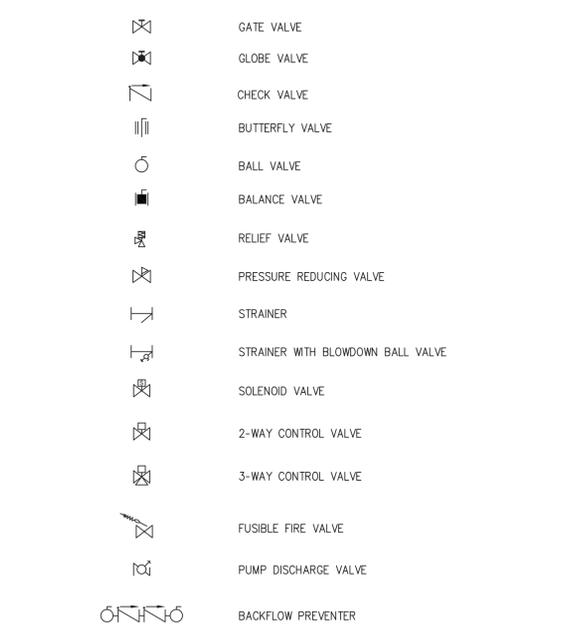
CONTROLS SYMBOLS LEGEND



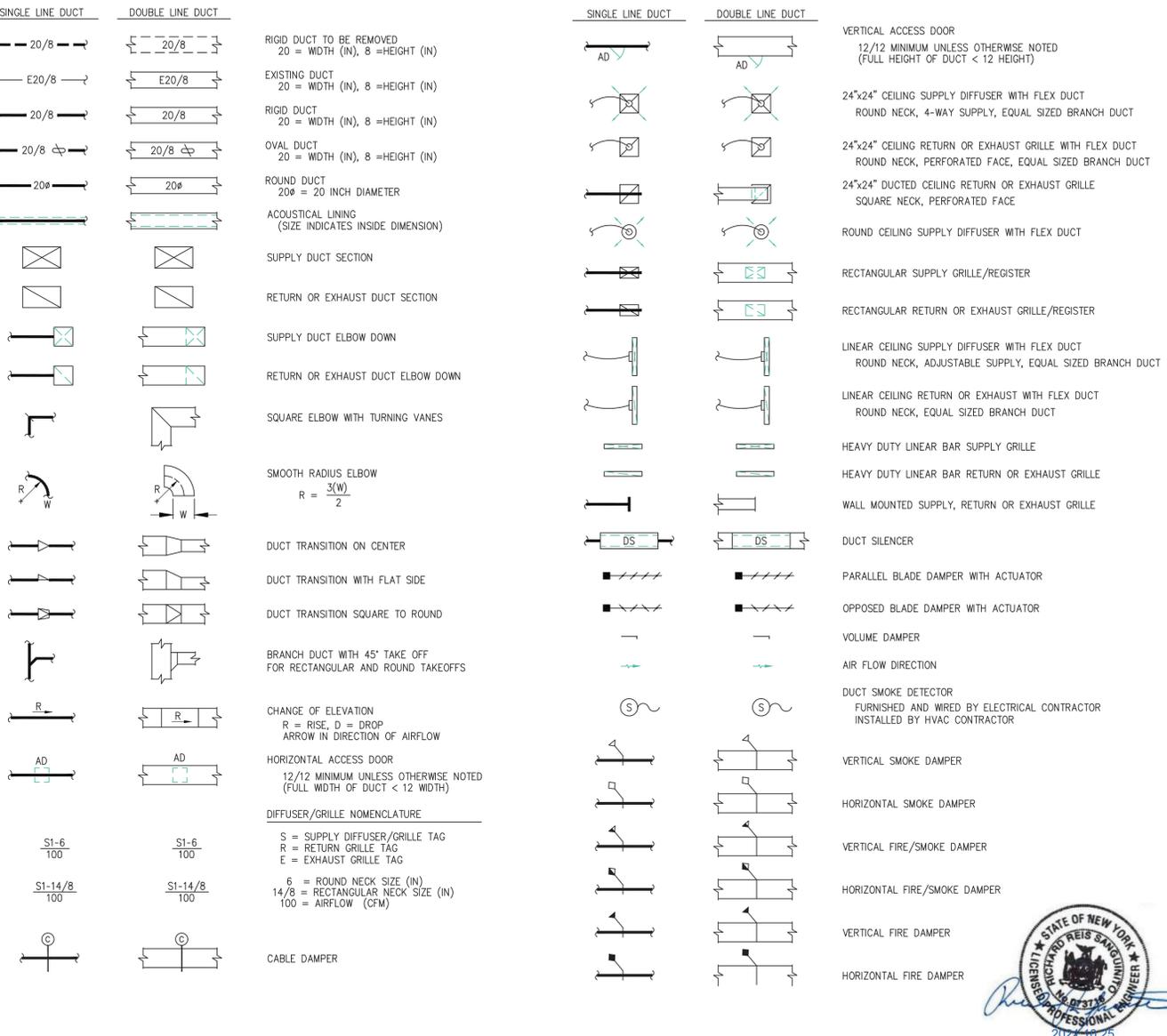
HVAC EQUIPMENT SYMBOLS LEGEND



HVAC VALVE AND SPECIALTIES LEGEND



DUCTWORK & ACCESSORIES SYMBOLS LEGEND



ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
ACC	AIR-COOLED CONDENSER	EF	EXHAUST FAN	L	LOUVER	RP	RETURN PANEL
ACCU	AIR-COOLED CONDENSING UNIT	EG	EXHAUST GRILLE OR REGISTER	LAT	LEAVING AIR TEMPERATURE	RPM	REVOLUTIONS PER MINUTE
AD	ACCESS DOOR	EH	ELECTRIC HEATER	LBS/HR	POUNDS PER HOUR	RTU	ROOFTOP UNIT
AF	AIR FILTER	EHC	ELECTRIC HEATING COIL	LF	LINEAR FOOT	S	DUCT SMOKE DETECTOR
AFF	ABOVE FINISHED FLOOR	ERC	ENERGY RECOVERY COIL	LPC	LOW PRESSURE CONDENSATE RETURN	SA	SUPPLY AIR
AFM	AIRFLOW MEASURING DEVICE	ET	EXPANSION TANK	LPS	LOW PRESSURE STEAM (15 PSIG AND BELOW)	SD	SUPPLY DIFFUSER
AHU	AIR HANDLING UNIT	EWT	ENTERING WATER TEMPERATURE	LWT	LEAVING WATER TEMPERATURE	SKD	SMOKE DAMPER
APD	AIR PRESSURE DROP	FC	FAN COIL UNIT	MAX	MAXIMUM	SKF	SUPPLY AIR FAN
AS	AIR SEPARATOR	FD	FIRE DAMPER	MBH	ONE THOUSAND BRITISH THERMAL UNITS PER HOUR	SG	SUPPLY GRILLE OR REGISTER
AT	AIR TERMINAL UNIT	FD/SD	COMBINATION FIRE/SMOKE DAMPER	MCA	MINIMUM CURRENT AMPACITY	SP	STATIC PRESSURE
AV	AIR VENT	FF	FINAL FILTER	MIN	MINIMUM	SPS	STATIC PRESSURE SENSOR
B	BOILER	FM	FLOW MEASURING STATION	M	DAMPER ACTUATOR	SPG	SPECIFIC GRAVITY
BTUH	BRITISH THERMAL UNITS PER HOUR	FP	FILLER PIECE	MOCPP	MAXIMUM OVERCURRENT PROTECTION	TAG	EQUIPMENT IDENTIFICATION
C	CONVECTOR	FPM	FEET PER MINUTE	MPC	MEDIUM PRESSURE CONDENSATE RETURN	TG	TOP GRILLE OR REGISTER (WALL TYPE)
CC	COOLING COIL	FT	FEET	MPS	MEDIUM PRESSURE STEAM (16-59 PSIG)	TO	TRANSFER OPENING
CHLR	CHILLER	FTR	FINNED TUBE RADIATION	MV	MANUAL VENT	TWU	THRU-THE-WALL UNIT
CFM	CUBIC FEET PER MINUTE	GAL	GALLONS	NIC	NOT IN CONTRACT	TYP	TYPICAL
CH	CABINET HEATER	GC	GENERAL CONTRACTOR	NOM	NOMINAL	UH	UNIT HEATER
CO	CLEAN OUT	GPM	GALLONS PER MINUTE	OA	OUTSIDE AIR	UNO	UNLESS NOTED OTHERWISE
CONT.	CONTINUED	GRV	GRAVITY ROOF VENTILATOR	OS	OPEN SHELVING UNIT	UV	UNIT VENTILATOR
CS	CLOSED SHELVING UNIT	H	HUMIDIFIER	P	PUMP	VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
CT	COOLING TOWER	HC	HEATING COIL	PC	PUMPED CONDENSATE	VFD	VARIABLE FREQUENCY DRIVE
DB	DECIBELS	HE	HEAT EXCHANGER	PD	PRESSURE DROP	VP	VACUUM PUMP
DBT	DRY BULB TEMPERATURE	HGT	HEIGHT	PF	PREFILTER	VR	VACUUM STEAM CONDENSATE RETURN
DIA	DIAMETER	HP	HORSEPOWER	PRV	PRESSURE REDUCING VALVE	WBT	WET BULB TEMPERATURE (°F)
DPT	DEW POINT TEMPERATURE	HRU	HEAT RECOVERY UNIT	PSIG	POUNDS PER SQUARE INCH WATER GAUGE	WEF	WALL TYPE EXHAUST FAN
DX	DIRECT EXPANSION	IN	INCH	RA	RETURN AIR	WG	WATER GAUGE
E'TAG'	EXISTING EQUIPMENT	KW	KILOWATT	RF	RETURN AIR FAN	WPD	WATER PRESSURE DROP
EA	EXHAUST AIR			RG	RETURN GRILLE OR REGISTER	ZD	ZONE DAMPER
EAT	ENTERING AIR TEMPERATURE			RM	ROOM		



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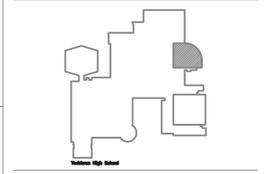
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MS - #66-24-02-06-0-007-027
CES - #66-24-02-06-0-003-022
MES - #66-24-02-06-0-004-025
BES - #66-24-02-06-0-002-020



DISTRICT WIDE IMPROVEMENTS 2020 PHASE II

YORKTOWN HIGH SCHOOL
2727 CROMPOND RD.
YORKTOWN HEIGHTS, NY 10598

REVISIONS

No.	Description	Date

ISSUED: BID ISSUE

DATE: 10/25/2021

SCALE: AS NOTED

SHEET NAME:
HVAC LEGENDS, SYMBOLS & ABBREVIATIONS

SHEET NUMBER:

YHS-H001



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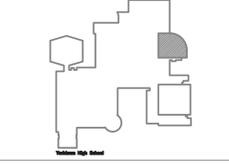
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DISTRICT WIDE
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YORKTOWN HIGH SCHOOL
 2727 CROMPOND RD.
 YORKTOWN HEIGHTS, NY 10598

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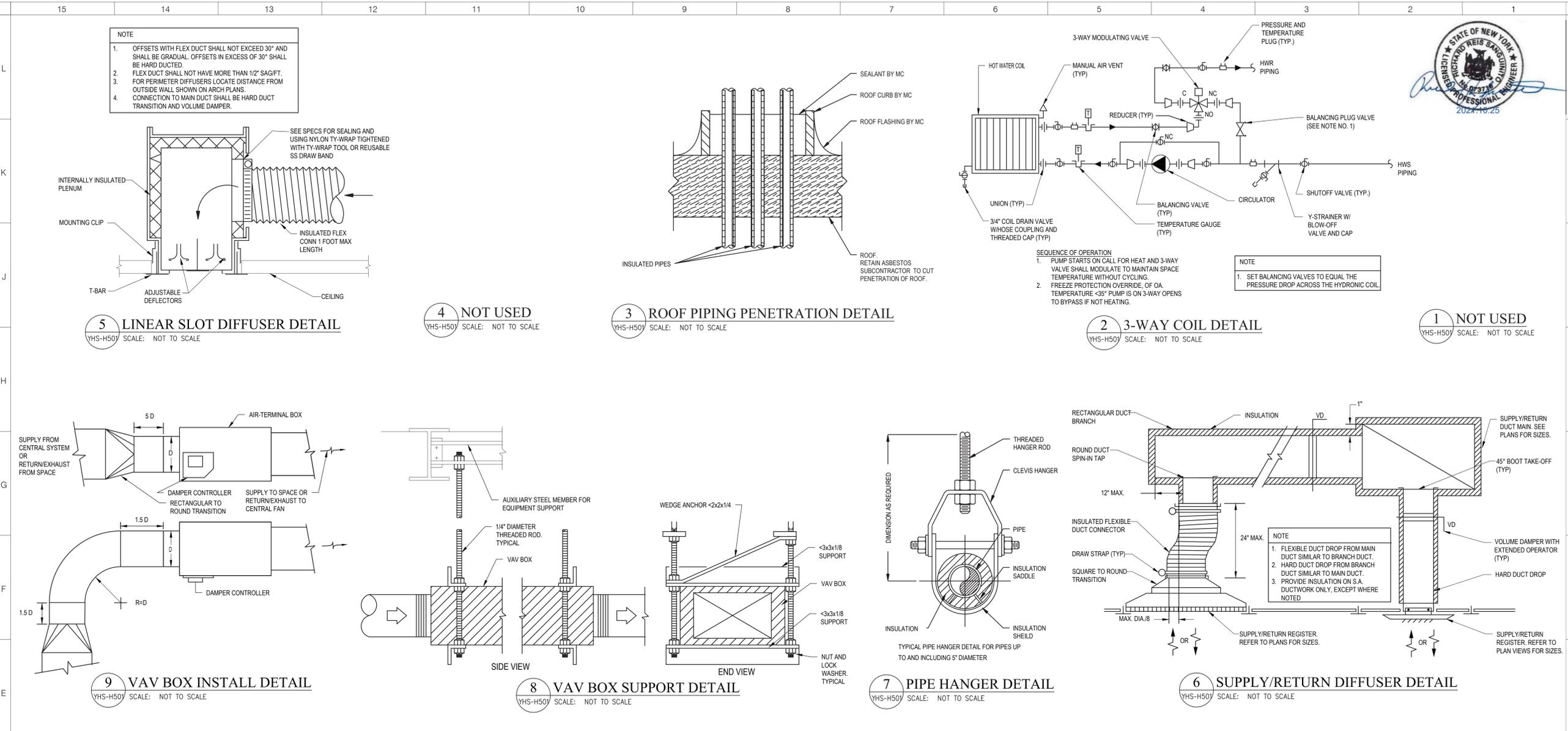
DATE: 10/25/2021

SCALE: AS NOTED

SHEET NAME:
 DETAILS & SCHEDULES

SHEET NUMBER:

YHS-H501



VENTILATION REQUIREMENTS

Space Designation	Area Area SF	Occupants		Ventilation Required		Uncorrected Ventilation	Efficiency Factor	Corrected CFM
		/1000 SF	Total	Per Occup.	Per SF			
HS Cafeteria	4,330	85	368	7.50	0.18	3,540	80%	4,430
HS Servery	1,660	12	20	7.50	0.18	450	80%	560
Total	5,990		388			3,990	80%	4,990

PUMP SCHEDULE

TAG	SERVICE	TYPE	FLUID	GPM	HEAD	RPM	ELECTRICAL		DISCONNECT		
							HP	VOLTS/PH/HZ	TYPE	FURNISHED BY	INSTALLED BY
P-3	RTU-3	IN-LINE CIRC.	HW	35	23	1725	3/4	120/1/60	COMB STARTER	EC	EC

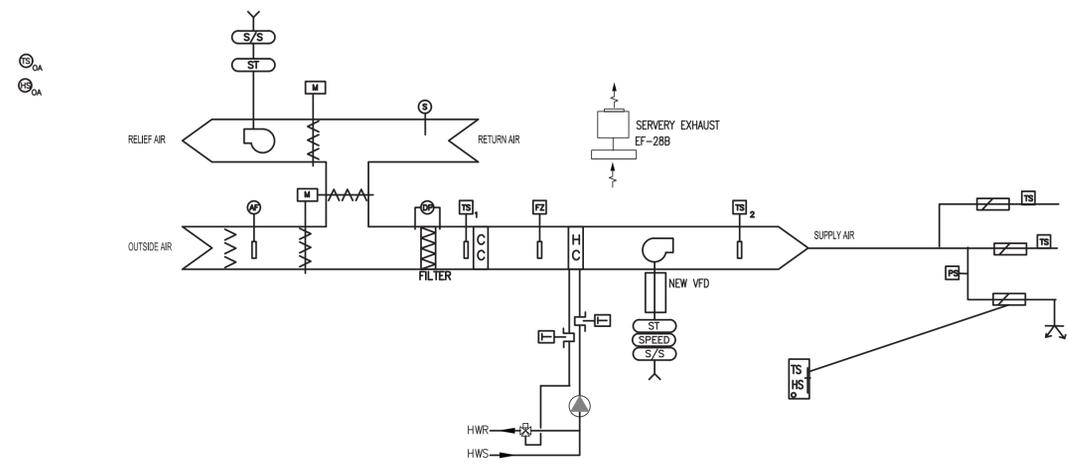
CEILING DIFFUSER SCHEDULE

MARK	USE	TYPE	PATTERN	CORE STYLE	DUCT SIZE	PERFORMANCE				MOUNTING	FRAME	MATERIAL	FINISH	MAKE/MODEL
						CFM	TP	THROW	MAX. NC					
S1	SUPPLY	HIGH THROW	1-WAY	2G	18"	-	-	-	-	DUCT	-	STEEL	WHITE	MODEL RCD
S2	SUPPLY	DIRECTIONAL LOUVERED FACE	4-WAY	4A	12"	-	-	-	-	24/24 LAY-IN	3P	STEEL	WHITE	MODEL SPD
S3	SUPPLY	LINEAR SLOT DIFFUSER	1-WAY	1S	10"	-	-	-	-	48"	3P	STEEL	WHITE	MODEL SDS
R1	RETURN	DIRECTIONAL LOUVERED FACE	1-WAY	-	24/24	1375	-	-	-	24/24 PLENUM	3P	STEEL	WHITE	MODEL 96FH
R2	RETURN	DIRECTIONAL LOUVERED FACE	1-WAY	1S	12"	-	-	-	-	24/24 LAY-IN	3P	STEEL	WHITE	MODEL PDDR
R3	RETURN	DIRECTIONAL LOUVERED FACE	1-WAY	1S	18"	-	-	-	-	24/24 LAY-IN	3P	STEEL	WHITE	MODEL PDDR

ROOFTOP UNIT SCHEDULE

TAG	SERVICE	TYPE	AIRFLOW (CFM)	OUTSIDE AIR (CFM)	SUPPLY FAN				EXHAUST FAN				DX COOLING						HOT WATER HEATING COIL						ELECTRICAL											
					ESP (IN. WG)	TOTAL SP (IN. WG)	FAN TYPE	DRIVE	HP	ESP (IN. WG)	TOTAL SP (IN. WG)	FAN TYPE	DRIVE	HP	IEER	NOMINAL TONNAGE	TOTAL (MBH)	SENS. (MBH)	LAT. (MBH)	DRY BULB (°F)	WET BULB (°F)	DRY BULB (°F)	WET BULB (°F)	ENTERING AIR DRY BULB (°F)	LEAVING AIR DRY BULB (°F)	MBH	SOURCE	GPM	WATER PRESS DROP (FT)	EWT	LWT	FLA	MCA	MOP	MOTOR VOL/PH/HZ	BASIS OF DESIGN
RTU-3	CAFETERIA	RTU	9,200	5,000	2.5	4.0	PLENUM	VFD	15	1.0	1.15	AXIAL	VFD	5	12	38	448	298	150	84	69	55	55	34	89	584	HEATING HOT WATER	40	1.5	180	150	197	208	250	208/3/60	AAON

- NOTES:
 1. PROVIDE 2 STAGE FILTER, 2" MERV-8 & 4" MERV-14
 2. PROVIDE SMOKE DETECTOR IN RETURN
 3. VFD TO BE MOUNTED INTERNALLY BY MANUFACTURER
 4. PROVIDE FACTORY WIRED 115V CONVENIENCE OUTLET
 5. PROVIDE NON-FUSED DISCONNECT SWITCH
 6. PROVIDE WITH ECONOMIZER O.A. CAPABILITY
 7. PROVIDE WITH STAINLESS STEEL DRAIN PAN
 8. HEATING DESIGN CONDITIONS ARE AS FOLLOWS:
 8.1. O.A. TEMP 9°F DB, -1°F WB
 8.2. R.A. TEMP 75°F DB, 62°F WB



CAFETERIA RTU CONTROL DIAGRAM

UNOCCUPIED MODE:

- WITHOUT A CALL FOR HEATING THE UNIT SHALL REMAIN OFF.
 - THE FAN CONTROLLER SHALL BE IN THE OFF POSITION
 - THE OUTSIDE AIR AND RELIEF DAMPERS SHALL BE FULLY CLOSED
- UPON A CALL FOR HEAT THE SYSTEM SHALL OPERATE AS FOLLOWS:
 - THE NIGHT SETBACK TEMPERATURE SHALL BE
 - HEATING: 62° F (ADJUSTABLE)
 - COOLING: NO OPERATION
 - THE VAV ZONE DAMPERS CALLING FOR HEAT SHALL OPEN TO MAXIMUM. THE CIRCULATING PUMP SHALL START.
 - THE SUPPLY FAN SHALL RAMP UP TO MEET THE DOWNSTREAM PRESSURE SETPOINT
 - THE CIRCULATING PUMP SHALL BE ENERGIZED AND THE HEATING COIL SHALL MODULATE OPEN TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 100° F (ADJUSTABLE) AT TS2.
 - WHEN ALL ZONES REACH THE SETBACK TEMPERATURE THE FAN WILL SHUT DOWN. THE PUMP WILL SHUT DOWN IF NOT IN FREEZE PROTECTION MODE.

FREEZE PROTECTION:

- IF THE OA < 40° F, THE CIRCULATING PUMP SHALL RUN.
- THE 3-WAY VALVE SHALL MODULATE A MINIMUM OF 15% DESIGN FLOW TO THE HW COIL OR AS REQUIRED TO MAINTAIN DISCHARGE AIR TEMPERATURE.
- IN UNOCCUPIED MODE, THE HEATING COIL SHALL MAINTAIN A MINIMUM TEMPERATURE IN THE UNIT OF 50° F AS MEASURED BY TS2.

PRE-OCCUPIED START-UP:

- THE PRE-OCCUPIED STARTUP TIME SHALL BE ONE HOUR BEFORE THE START OF SCHOOL (ADJUSTABLE).
 - THE OA DAMPER AND RELIEF DAMPER SHALL REMAIN CLOSED.
 - THE VAV THERMOSTATS SHALL REVERT TO THE OCCUPIED TEMPERATURE SETPOINTS.
 - THE SUPPLY FAN SHALL RAMP UP TO MAINTAIN THE DOWNSTREAM STATIC PRESSURE SETPOINT.
 - 30 MINUTES BEFORE THE START OF SCHOOL THE OA DAMPER AND RELIEF SYSTEM WILL GO TO 50% DESIGN MINIMUM.

OCCUPIED SCHEDULE OPERATION:

- THE OCCUPIED SCHEDULE SHALL BE UNIQUELY PROGRAMMABLE FROM THE BUILDING CONTROL SYSTEM HEAD END.
- THE RTU SUPPLY FAN SHALL OPERATE THROUGH ENTIRE THE OCCUPIED CYCLE AND MODULATE TO MAINTAIN THE DOWNSTREAM STATIC PRESSURE.
 - AIR BALANCER SHALL PROVIDE A FINAL STATIC PRESSURE SETTING VALUE TO THE CONTROLS CONTRACTOR.
 - INITIAL DOWNSTREAM STATIC PRESSURE SETTING SHALL BE .52" WC.
 - DURING HEATING MODE, THE DISCHARGE AIR TEMPERATURE AT TS2 SHALL MODULATE SUCH THAT ALL VAV TERMINALS ARE ABLE TO MAINTAIN THEIR SETPOINT WITH AIR FLOW LESS THAN OR EQUAL TO 80% MAXIMUM SPECIFIED.
 - TEMPERATURE AT TS2 SHALL NOT EXCEED 100° F (ADJUSTABLE). THIS MAXIMUM TEMPERATURE SHALL SUPERSEDE THE MAXIMUM FLOW ALGORITHM.
 - CONTROLS CONTRACTOR TO COORDINATE WITH THE BALANCE CONTRACTOR TO DETERMINE THE DAMPER POSITION WHICH EQUATES TO 80% AIR FLOW.
 - COOLING MODE:
 - THE VAV TERMINALS SHALL MODULATE OPEN OR CLOSED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.
 - THE RTU'S LOGIC SHALL CYCLE THE COMPRESSORS TO MAINTAIN A DISCHARGE AIR TEMPERATURE SUCH THE VAV TERMINAL WITH GREATEST PERCENT DEMAND CAN MAINTAIN THE SETPOINT TEMPERATURE AT 90% FULL VOLUME.
 - IF AFTER 15 MINUTES THE SPACE RELATIVE HUMIDITY EXCEEDS 60% THE BMS SHALL LOWER THE DISCHARGE AIR TEMPERATURE BY 2° F.
- EACH VAV TERMINAL SHALL REPORT TO ITS OWN TEMPERATURE SENSOR.
 - THE VAV DAMPER POSITION SHALL MODULATE TO MAINTAIN THE SETPOINT TEMPERATURE.
 - TEMPERATURE SETTINGS SHALL BE ADJUSTABLE BY THE BMS HEAD END ONLY.
- VENTILATION AND AIR BALANCE PARAMETERS
 - INITIAL VENTILATION SETTINGS:
 - START OF SCHOOL UNTIL THE START OF THE 1ST LUNCH PERIOD: 50% DESIGN MINIMUM
 - DURING SCHEDULED LUNCH PERIODS: 100% DESIGN MINIMUM

- FROM END LUNCH PERIODS TO 30 MIN. AFTER LAST CLASS: 50% DESIGN MINIMUM
- OUTSIDE AIR TO BE MEASURED AND CONTROLLED BY THE AIR FLOW MONITOR.

B. VENTILATION AIR BALANCE:

- UNDER ALL CONDITIONS:
 - OUTSIDE AIR IN CFM = RELIEF AIR + SERVERY EXHAUST (EF-28B) + 300
- THE BMS SHALL REPORT THE ON/OFF STATUS OF EF-28B TO THE RTU CONTROLLER.
- THE BALANCING CONTRACTOR SHALL PROVIDE THE EF-28B OPERATING CFM TO THE CONTROLS CONTRACTOR.
- THE BALANCING CONTRACTOR SHALL ALSO PROVIDE TYPICAL RELIEF FAN & DAMPER POSITIONS FOR A MINIMUM OF 4 CONDITIONS.

5. SPECIAL EVENT OVERRIDE:

- THE SYSTEM SHALL HAVE A SPECIAL EVENT OVERRIDE FUNCTION THAT MAY BE INITIATED THROUGH THE BMS.
- THE OPERATOR SHALL BE ABLE TO SPECIFY THE DATE, START TIME AND END TIMES FOR THE EVENT.
- IF THE EVENT OCCURS AFTER AN UNOCCUPIED PERIOD, IT SHALL HAVE A BUILT IN 1 HOUR PRE-OCCUPIED CYCLE.

STATUS, ALARMS AND SETPOINTS:

- THE CONTROLLER SHALL INTERFACE EITHER DIRECTLY OR VIA AN OPEN PROTOCOL BACNET CONNECTION TO THE BUILDING AUTOMATION SYSTEM HEAD END.
- AT A MINIMUM THE FOLLOWING SETPOINTS SHALL BE DISPLAYED ON THE GRAPHICS. SETPOINTS SHALL BE USER ADJUSTABLE:
 - SPACE TEMPERATURE AND SETPOINT
 - SPACE RELATIVE HUMIDITY
 - OUTSIDE AIR TEMPERATURE AND RELATIVE HUMIDITY
 - RTU TEMPERATURE SET POINTS AND STATUS
 - OA TEMPERATURE
 - RETURN AIR TEMPERATURE
 - MIXED AIR TEMPERATURE (TS1)
 - FREEZE STAT ALARM STATUS
 - DISCHARGE AIR TEMPERATURE (TS2)
 - FROM BMS SYSTEM THE HW SUPPLY TEMPERATURE.
 - VAV DAMPER POSITION
 - FAN STATUS
 - SUPPLY FAN INCLUDING VFD POSITION
 - RELIEF FAN (AND DAMPER POSITION)
 - SERVERY EXHAUST EF-28B
 - DOWNSTREAM DUCT PRESSURE ACTUAL AND SETPOINT.
 - HW CIRCULATING PUMP STATUS.
 - 3-HW COIL POSITION
 - FILTER PRESSURE DROP AND ALARM STATUS.
- THE FOLLOWING ADDITIONAL ALARMS SHALL BE REPORTED:
 - SPACE TEMPERATURE 3° (ADJUSTABLE) ABOVE OR BELOW THE SETPOINT.
 - FAN FAILURE, SUPPLY AND RELIEF.
 - DX COMPRESSOR FAILURE
 - HIGH FAN STATIC PRESSURE.
 - THE BMS SHALL RECORD SMOKE ALARMS SENT TO THE FIRE ALARM SYSTEM AND THE UNIT WILL NOT RESTART UNTIL THE FIRE ALARM HAS BEEN CLEARED.
- SMOKE ALARM:
 - THE SMOKE DETECTOR SHALL REPORT TO THE FIRE ALARM SYSTEM WHICH WILL SHUT THE RTU DOWN IN THE EVENT OF SMOKE/FIRE
 - THE BMS SHALL INTERFACE WITH THE FIRE ALARM AND NOT ALLOW THE UNIT TO BE RESTARTED UNTIL THE FIRE ALARM HAS BEEN CLEARED

1 ROOFTOP UNIT SEQUENCE OF OPERATIONS
YHS-H701 SCALE: NTS



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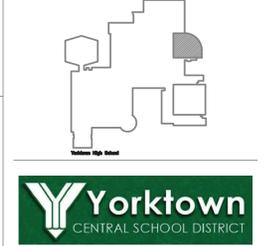
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