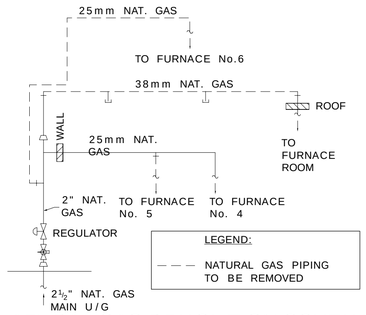
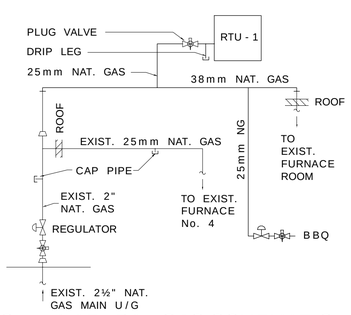


NATURAL GAS DEMOLITION SCHEMATIC



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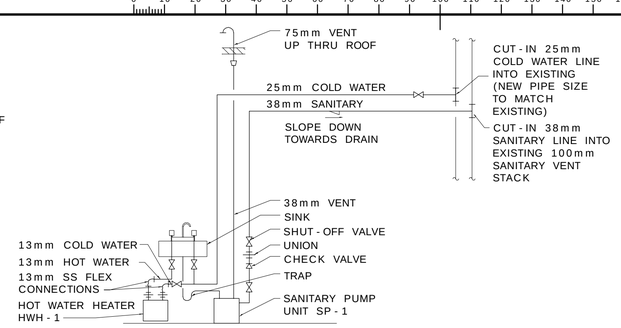
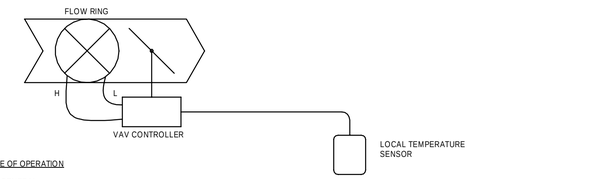


PLUMBING SCHEMATIC

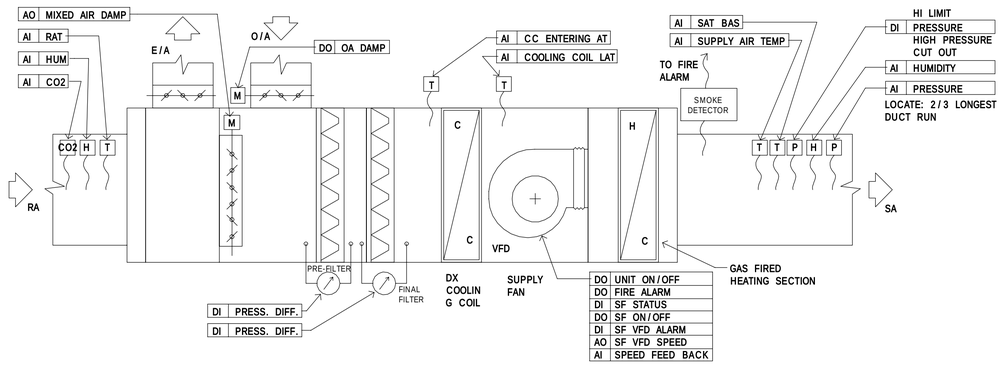


SEQUENCE OF OPERATION

1. GENERAL
   a. THE LOCAL TEMPERATURE SENSOR SHALL ALLOW FOR THE VAV BOX INITIATE A RUN REQUEST TO THE RTU SERVING THE VAV.
   b. ONCE OPERATING, THE VAV BOX SHALL SEND COOLING REQUEST AND DAMPER POSITION INFORMATION TO THE SERVING RTU FOR SUPPLY TEMPERATURE AND STATIC PRESSURE OPTIMIZATION STRATEGIES.
   c. THE VAV DAMPER SHALL MODULATE BETWEEN THE MAXIMUM AND MINIMUM AIR FLOW SETPOINTS AS INDICATED ON THE DESIGN SCHEDULE.
2. TEMPERATURE CONTROL
   a. THE VAV DAMPER SHALL MODULATE TO MAINTAIN THE SPACE COOLING TEMPERATURE SETPOINT AT 22.5 DEG. C (ADJUSTABLE).
   b. WHEN THE SPACE TEMPERATURE IS ABOVE SETPOINT THE VAV DAMPER SHALL MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE COOLING SETPOINT.
   c. WHEN THE SPACE TEMPERATURE IS BELOW SETPOINT THE VAV DAMPER SHALL MODULATE CLOSED TO MAINTAIN SPACE TEMPERATURE COOLING SETPOINT.

ITEM	DO	DI	AI	AO	PART
SPACE TEMPERATURE		X	X	X	SPACE TEMPERATURE SENSOR W/ DISPLAY, ADJUSMENT AND OVERRIDE
AIR FLOW			X		VAV CONTROLLER / FLOW RING
VAV DAMPER CONTROL				X	DAMPER ACTUATOR / VAV CONTROLLER

VAV CONTROLS



CONTROLS DIAGRAM RTU-1

SCALE: 1 : 16

SEQUENCE OF OPERATION

ROOF TOP UNIT DESCRIPTION
1. VARIABLE VOLUME SUPPLY AIR, WITH PRE-FILTER AND FINAL FILTERS, DIRECT EXPANSION (DX) COOLING COIL, MODULATING NATURAL GAS HEAT AND SUPPLY FAN.
2. ECONOMIZER: ECONOMIZER WITH OUTDOOR AIR, RETURN AIR AND EXHAUST AIR DAMPERS.
3. SUPPLY FAN CONTROL: SUPPLY FAN IS CONTROLLED VIA SUPPLY DUCT STATIC PRESSURE.

DESIGN INTENT
1. CONTINUOUS, 24 HOURS PER DAY OPERATION WITH MANUAL START/STOP.
2. SYSTEM SAFETIES ACTIVE WITH LOCAL SWITCH SET TO EITHER AUTO OR HAND.
3. CONTROL OF COOLING COIL AND GAS HEATING TO DISCHARGE/SUPPLY AIR SET POINT TEMPERATURE.
4. ECONOMIZER CONTROL BASED ON COMPARISON OF OUTDOOR AIR AND RETURN AIR ENTHALPY.
5. OUTDOOR AIR DAMPER SHALL OPEN TO MAXIMUM POSITION UPON A SIGNAL FROM CO2 SENSOR.

SYSTEM START:
1. UPON START UP OF THE SUPPLY FAN MOTOR, THE CURRENT SWITCHES INSTALLED IN THE FAN VFD'S SHALL BE MONITORED. THE SWITCHES SHALL CONFIRM THE FAN IS IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM MESSAGE IF THE STATUS DEVIATES FROM THE DDC START/STOP.
2. THE GAS-FIRED HEATING, MIXED AIR DAMPERS, AND DIRECT EXPANSION (DX) COOLING SHALL WORK IN SEQUENCE TO MAINTAIN THE SET POINT TEMPERATURES.
3. WHEN THE OUTDOOR TEMPERATURE IS BELOW 10 DEGREES CELSIUS, THE DX COOLING COIL IS LOCKED OFF.
4. WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS BELOW THE ECONOMIZER CHANGEOVER VALUE (15 DEGREES CELSIUS) THE MIXING DAMPERS MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE SET POINT. THE DAMPERS SHALL HAVE AN ADJUSTABLE MINIMUM OUTDOOR AIR SETTING.
5. THE SUPPLY AIR TEMPERATURE SET POINT SHALL BE RESET AT 13 DEGREES CELSIUS (ADJUSTABLE) BY ONE SPACE TEMPERATURE IN THE ZONE.

HEATING:
1. THE HEATING SET POINT SHALL BE RESET BETWEEN 24C AND 22C AS THE OUTDOOR AIR TEMPERATURE IS BETWEEN 11C AND 15C.
2. WHEN THE ZONE AIR TEMPERATURE IS LESS THAN 0.5C ABOVE THE HEATING SETPOINT, THE OUTDOOR DAMPERS SHALL BE AT THE MINIMUM OUTDOOR AIR SETTING AND THE COOLING SHALL BE OFF.
3. DISCHARGE AIR TEMPERATURE IS INCREASED WHEN THE SPACE TEMPERATURE IS 0.5C BELOW THE HEATING SETPOINT AND SHALL MODULATE TO MAINTAIN SETPOINT.

COOLING:
1. WHEN THE SPACE AIR TEMPERATURE IS HIGHER THAN 1C ABOVE THE COOLING SETPOINT THE OUTDOOR AIR DAMPERS SHALL BE AT THE MINIMUM POSITION.
2. THE COOLING SETPOINT SHALL BE RESET BETWEEN 25C AND 23C AS THE OUTDOOR AIR TEMPERATURE IS BETWEEN 11C AND 15C.
3. COOLING STAGES CYCLE AS REQUIRED TO MAINTAIN DISCHARGE AIR TEMPERATURE.
4. WHEN RETURN AIR HUMIDITY SENSOR CALLS FOR DEHUMIDIFICATION, THE UNIT CONTROLLER WILL CYCLE MECHANICAL COOLING TO MAINTAIN THE RETURN AIR RELATIVE HUMIDITY. MEANWHILE, THE HEATING IS ENABLED TO MAINTAIN THE SUPPLY AIR TEMPERATURE.

SYSTEM ALARMS
1. AN ALARM SHALL BE GENERATED IF ANY COOLING STAGE IS ENERGIZED WITHIN 10 MINUTES OF A HEATING STAGE RUNNING.
2. ON HIGH TEMPERATURE CONDITION, THE FIRE STAT CONTACT WILL OPEN DE-ENERGIZING THE FAN MOTOR. THE DX COOLING AND GAS HEATING WILL TURN OFF. ALL DAMPERS RETURN TO THEIR NORMAL OFF POSITION AFTER THE UNIT IS DE-ENERGIZED.
3. THE FOLLOWING SAFETY CONTROLS SHALL BE HARDWIRED TO THE SUPPLY FAN VFD CONTROL CIRCUIT. THE SYSTEM SHALL REQUIRE A MANUAL RESET ON ACTIVATION OF ANY SAFETY EXCEPT AS NOTED.
   a. UNIT OUTSIDE AIR DAMPER LIMIT SWITCH. PROVIDE AUTOMATIC RESET.
   b. LOW AIR TEMPERATURE SWITCH (FREEZE STAT)
   c. SUPPLY AIR SMOKE DETECTOR. SEPARATE INPUT TO FIRE ALARM SYSTEM.
   d. SUPPLY AIR HIGH DUCTWORK STATIC PRESSURE SWITCH.
   e. SUPPLY AIR SMOKE DETECTOR. SEPARATE INPUT TO FIRE ALARM SYSTEM.

RETURN REGISTER SCHEDULE

MARK	REMARKS
RR - 1	EH PRICE - EGG CRATE SERIES 80 MODEL # 600x300/80DAL/TB/B12 OR APPROVED EQUAL

SUPPLY DIFFUSER / GRILLE SCHEDULE

MARK	SIZE NECK (mm)	REMARKS
SD - 1	250	EH PRICE CEILING TWIST OUTLETS RSD SERIES, SQUARE SLOT ARRANGEMENT - ADJUSTABLE - RSD/500x500/TOP OR APPROVED EQUAL.
SG - 1		EH PRICE LOUVERED FACE SUPPLY 350x350/620DAL/F/L/A/B12 OR APPROVED EQUAL

ROOFTOP HVAC UNIT SCHEDULE

MARK	l/s	E.S.P. kPa WATER	HEATING SECTION				COOLING COILS							FILTERS	ELECTRICAL				REMARKS
			AIR TEMP. °C		INPUT kW	OUTPUT kW	AIR TEMP. °C				COIL SENS. LOAD kW	COIL TOTAL LOAD kW	TOTAL LOAD TONS		MCA	V	HZ	PHASE	
			EAT	LAT			EAT D.B.	EAT W.B.	LAT D.B.	LAT W.B.									
RTU - 1	1320	0.311	10	39.2	59	47	25.7	18.6	12.7	12.7	21	27	7.5	MERV8 & MERV13	38.4	600	60	3	ROOFTOP UNIT WITH DX COILS, NAT. GAS HEATING, ENTHALPY ECONOMIZER, ROOF CURB, CO_2 SENSOR (DEMAND CONTROL VENTILATION) DUCT MOUNTED, C/W R410A REFRIGERANT DAIKIN REBEL MODEL # DPS007A OR APPROVED EQUAL. REFER TO SPECIFICATION SECTION 23 74 00 FOR MORE DETAILS AND CONTROLLER SPECIFICATIONS.

VARIABLE AIR VOLUME BOX SCHEDULE

MARK	ROOM SERVED	SIZE (mm)	L/s		REMARKS
			MAX.	MIN.	
VAV - 1	THEATRE	300	793	238	VARIABLE AIR VOLUME SINGLE DUCT TERMINAL UNIT, C/W WIRELESS RECEIVER, DDL CONTROLLER, DDC CONTROLLED ACTUATOR, EH PRICE SDV12 C/W 5 FT. LONG ATTENUATOR OR APPROVED EQUAL
VAV - 2	MECHANICAL ROOM	150	170	51	VARIABLE AIR VOLUME SINGLE DUCT TERMINAL UNIT, C/W WIRELESS RECEIVER, DDL CONTROLLER, DDC CONTROLLED ACTUATOR, EH PRICE SDV6 C/W 5 FT. LONG ATTENUATOR OR APPROVED EQUAL
VAV - 3	WORKSHOP	200	359	108	VARIABLE AIR VOLUME SINGLE DUCT TERMINAL UNIT, C/W WIRELESS RECEIVER, DDL CONTROLLER, DDC CONTROLLED ACTUATOR, EH PRICE SDV8 C/W 5 FT. LONG ATTENUATOR OR APPROVED EQUAL

DOMESTIC HOT WATER HEATER SCHEDULE (ELECTRIC)

MARK	TYPE	TEMP. RISE °F 0.5 GPM	VOLTAGE	ELECT. RATING KW	REMARKS
HWH - 1	INSTANTANEOUS	41	120	3	BRADFORD WHITE TANKLESS WATER HEATER MODEL ES-3000-1-S-10 OR APPROVED EQUAL

SILENCER SCHEDULE

MARK	SYSTEM SERVED	AIR FLOW (l/s)	SIZE		LENGTH	TYPE	MAX. PD (kPa)	DYNAMIC INSERTION LOSS								MODEL	REMARKS
			WIDTH	HEIGHT				63	125	250	500	1000	2000	4000	8000		
SL - 1	RTU - 1	1320	508	610	1200	ELBOW	0.015	4	6	9	15	22	23	17	15	RED-L-18027	CASING TO BE HTL EQUIVALENT TO 14 GAUGE DUCT WALL TO CONTROL BREAKOUT. TRANSITIONAL ELBOW SILENCER. INLET 864x762, OULET: 457x864
SL - 2	RTU - 1	1198	450	600	1500	ELBOW	0.022	6	8	14	19	32	27	24	19	T-RED-L-18027	CASING TO BE HTL EQUIVALENT TO 18 GAUGE DUCT WALL TO CONTROL BREAKOUT. TRANSITIONAL T-ELBOW SILENCER. INLET 457x457 AND 254x457, OULET: 1200x457

SANITARY PUMP SCHEDULE

MARK	FLOW L/s	FULL LOAD AMPS	HEAD kpa	HP	ELECTRICAL	REMARKS
SP - 1	0.2	5	60	0.3	120V/1PH	LIBERTY PUMPS MODEL 404 OR APPROVED EQUAL

DILLON CONSULTING LIMITED 3200 DEZIEL DRIVE, SUITE 608, WINDSOR, ONTARIO, N8W 5K8, PHONE (519) 948-5000, FAX (519) 948-5054

PARKS CANADA
PARCS CANADA

SOUTHWESTERN ONTARIO FIELD UNIT

ASSET MANAGEMENT SECTION

DILLON CONSULTING

NOT FOR CONSTRUCTION

revision		date
1	ISSUED FOR TENDER	2015-08-26

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the engineer of all discrepancies.

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C drawing no. - where detailed dessin no. - ou detaille

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LEAMINGTON ONTARIO
PARKS CANADA
1118 POINT PELEE DR.
LEAMINGTON, N8H 3V4
VISITOR CENTRE THEATRE

drawing title / titre du dessin
MECHANICAL SCHEMATICS & SCHEDULES

drawn by / dessine par: TKD
designed by / conc par: CWW
approved by / approuve par: - - -
tender / soumission: MARK MAJOR
project manager / administrateur de projets
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