ELECTRONIC DAMPER SCHEDULE

ITEM #	AREA SERVED	INLET SIZE	C.F.M.	VELOCITY F.P.M.	PRESSURE DROP (IN WG.)	MODEL #	MANUFACTURER	REMARKS
(1)	PREP/HOLDING 211	10"ø	580	1000	.03"	ZD-10	CARRIER	NEW
(2)	IR PROCEDURE 209	12"ø	745	900	.02"	ZD-12	CARRIER	NEW
(3)	IR PROCEDURE 207	10"ø	470	800	.02"	ZD-10	CARRIER	NEW
(4)	OBSERVATION 208	6"ø	230	1100	.06"	ZD-06	CARRIER	NEW
(5)	BYPASS DAMPER	16"ø	1445	1000	.01"	ZD-16	CARRIER	NEW

NOTES:
1) MINIMUM BOX SETTINGS FOR BOXES (2), (3), (4) AND (5) WILL BE AT ZERO.
2) MINIMUM BOX SETTINGS FOR BOX (1) WILL BE AT 200 C.F.M.

EXISTING HEAT PUMP SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE

ITEM#	AREA SERVED	FAN DATA					COOLING DATA				AUXILIARY ELEC. HEATING DATA			HEAT PUMP HEATING DATA		MANUAL SHUTDOWN PER NFPA 90A (YES/NO)	INDOOR UNIT			
		C.F.M.	E.S.P.	H.P.	R.P.M.	C.F.M. O.A.	TYPE	TOTAL BTU/HR	SENS. BTU/HR	EER	KW	BTU/HR	STEPS	VOLT/ PHASE	LOW-TEMP HEAT 17 O.A.T. BTUH	KW.		MFGR.	MODEL NO	WEIGHT	ELEC. DATA
HP-1	WAITING 100, CONFERENCE 103, SITE MANAGER 107, ETC.	1,465	.500"	1/2	MED.	350	DX	40,100	32,300	-	3.9	13,300	1	230/1	21,200	3.7	YES	TRANE	BWH 748	150	240/1
HP-2	CLERK 110, STAFF LOUNGE 115, DOCTOR 116, ETC.	1,385	.500"	1/2	MED.	100	DX	38,200	28,700	-	3.5	11,900	1	230/1	17,500	3.4	YES	TRANE	BWH 742	137	240/1
HP-3	PREP/HOLDING 211, NURSE WORK 210, ETC.	1,275	.500"	1/2	MED.	250	DX	38,200	28,700	-	3.5	11,900	1	230/1	17,500	3.4	YES	TRANE	BWH 742	167	240/1
HP-4	IR PROCEDURE 207, OBSERVATION 208, ETC.	1,445	.500"	1/2	MED.	100	DX	38,200	28,700	-	3.5	11,900	1	230/1	17,500	3.4	YES	TRANE	BWH 742	167	240/3

NOTES:
1) ALL EXISTING OUTDOOR HEAT PUMP UNITS MOUNTED ON THE ROOF TO REMAIN.
2) CONTRACTOR TO INSPECT EXISTING HEAT PUMP UNITS (INDOOR/OUTDOOR) SERVING THE GROUND FLOOR, EXCEPT HP-5. CLEAN FILTERS, LUBRICATE MOTORS AND REPLACE SHEAVES AND PULLEYS AS NEEDED TO ACHIEVE MAXIMUM CAPACITY.
3) CONTRACTOR TO PROVIDE AN ADD ALTERNATE PRICE TO REPLACE ALL EXISTING HEAT PUMP UNITS (INDOOR/OUTDOOR) FOR THE OWNER.

MISCELLANEOUS HEATING SCHEDULE

ITEM#	AREA SERVED	HEATER TYPE	C.F.M.	K.W.	BTU/HR	ELEC. DATA	STEPS OF CONTROL	CONTROL	MANUFACTURER/ MODEL #	REMARKS
EDH-1	WAITING 100	ELEC. DUCT MOUNTED HEATER	790	8.0	27,304	208/1	2	THERMOSTAT	INDEECO/SLIP-IN	NEW
1	STAFF TOILET 117	WALL HEATER FAN FORCED	100	2	6,842	208/1	1	INTEGRAL THERMOSTAT	GMARK/AWH-4208-2	NEW
2	PREP/HOLDING 211	WALL HEATER FAN FORCED	100	4	13,650	208/1	1	INTEGRAL THERMOSTAT	GMARK/AWH-4408-2	NEW

NOTE:
1) ELECTRIC DUCT HEATER (EDH-1) TO BE HEATER TYPE QUA SLIP-IN HEATER (OPEN COIL) WITH CONTROL OPTION 6 AND ROOM THERMOSTAT #C253-001.

FAN SCHEDULE

ITEM #	AREA SERVED	C.F.M.	E.S.P.	WATTS/HP	R.P.M.	CONTROL	ELEC. DATA	SONES	MODEL #	MFGR.	REMARKS
F-1	SOILED HOLDING 212 *	100	.375"	63/-	1500	ENERGIZED DURING OCCUPIED HOURS INTERLOCK ON/OFF LIGHT SWITCH	120/1	3.6	GC-140	COOK	-
F-2	PUBLIC TOILET 101	75	.500"	63/-	1500	INTERLOCK ON/OFF LIGHT SWITCH	120/1	4.3	GC-140	COOK	-
F-3	PATIENT TOILET 202 AND JANITOR 214	150	.500"	99/-	1500	ENERGIZED DURING OCCUPIED HOURS INTERLOCK ON/OFF LIGHT SWITCH	120/1	3.4	GN-160	COOK	-
F-4	STAFF TOILET 117	75	.375"	63/-	1500	INTERLOCK ON/OFF LIGHT SWITCH	120/1	3.6	GC-140	COOK	-
F-5	STAFF LOUNGE 117	100	.375"	63/-	1500	INTERLOCK ON/OFF LIGHT SWITCH	120/1	3.6	GC-140	COOK	-
F-6	OXYGEN 201	100	.500"	1/6	1657	24 HOUR OPERATION	120/1	8.8	60SGN-B	COOK	EXPLOSION PROOF

NOTES:
1) MANUFACTURER FAN SELECTIONS SHALL INCLUDE EXTERNAL PRESSURE DROP AND FAN DRIVE LOSS.
2) ELECTRICAL CONTRACTOR TO BE PROVIDE AND INSTALL ON/OFF SWITCH FOR EXHAUST FANS F-2, F-4 AND F-5.
3) IN-LINE VENTILATION FAN F-6 TO HAVE EXPLOSION PROOF MOTOR, EXPLOSION PROOF DISCONNECT AND BACKDRAFT DAMPER. BACKDRAFT DAMPER TO BE MANUFACTURED BY COOK, MODEL #BD-12.

PLUMBING FIXTURE SCHEDULE

ITEM #	DESCRIPTION	PIPE SIZES C.W.	PIPE SIZES H.W.	PIPE SIZES SAN.	PIPE SIZES VENT	TRAP TYPE	REMARKS
P-1	WATER CLOSET	3/4"	-	4"	2"	INTEGRAL	HANDICAPPED
P-1A	CLINICAL SERVICE SINK	1"	-	4"	2"	INTEGRAL	HANDICAPPED
P-2	WALL HUNG SINK	1/2"	1/2"	2"	2"	"P"	HANDICAPPED
P-2A	PROCEDURE SINK	1/2"	1/2"	2"	2"	"P"	-
P-2B	NURSE/EXAM SINK	1/2"	1/2"	2"	2"	"P"	-
P-2C	LOUNGE SINK	1/2"	1/2"	2"	2"	"P"	-
P-2D	SCRUB SINK	1/2"	1/2"	2"	2"	"P"	-
P-2E	EYE WASH	1/2"	-	-	-	-	-
P-3	JANITOR'S SINK	3/4"	3/4"	3"	2"	"P"	-
P-4	REFRIG. ICE MAKER	1/2"	-	-	-	-	-
P-5	COUNTERTOP COFFEE MAKER	1/2"	-	-	-	-	-

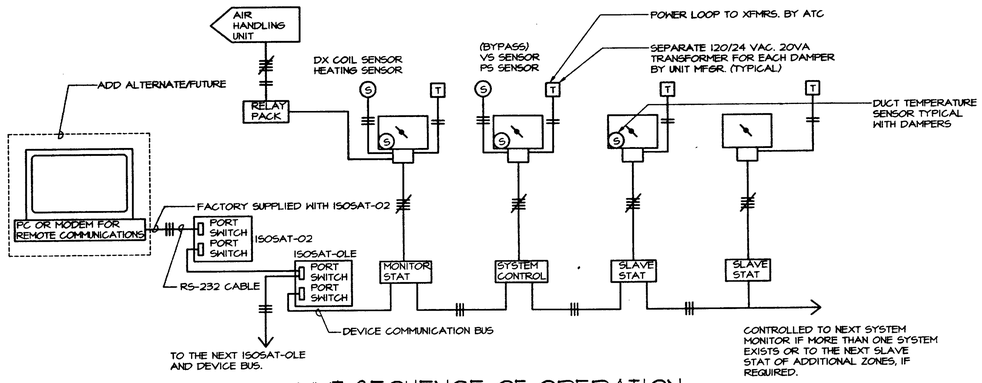
ELECTRIC WATER HEATER SCHEDULE

ITEM #	AREA SERVED	KW ELEMENT	SIZE HEIGHT xDIAMETER (INxIN)	RECOVERY RATE (GPH)	TANK CAPACITY (GALLONS)	PIPE CONNECTIONS INLET (IN.)	PIPE CONNECTIONS OUTLET (IN.)	ELEC. DATA	MANUFACTURER/ MODEL #
WH-1	TOILET RMS, ETC.	6	54-3/4"X26-1/4"	30	52	3/4"	3/4"	208/3	STATE/ SBG-52-6-IFE-NSF

NOTE:
1) PROVIDE 80°F TEMPERATURE WATER RISE FOR 40°F ENTERING WATER TEMEPERATURE.

AIR BALANCE SCHEDULE

ITEM#	SUPPLY AIR	RETURN AIR	OUTSIDE AIR	EXHAUST AIR	MAKE UP AIR
HVAC UNITS	3,560	4,860	700	-	-
TOILET ROOMS	-	-	-	500	-
SUB TOTALS	3,560	4,860	700	500	-
TOTAL BUILDING PRESSURE				POSITIVE PRESSURE = 200 CFM	



VVT SEQUENCE OF OPERATION

THE VVT SYSTEM SHALL CONTROL IN THE FOLLOWING MANNER:

1 THE MONITOR THERMOSTAT SHALL DETERMINE THE DEMAND FOR HEATING OR COOLING BASED ON THE NUMBER OF ZONES CALLING FOR THE GREATEST DEMAND FOR A PARTICULAR MODE. THE MONITOR SHALL ESTABLISH THE ZONE WITH THE GREATEST DEMAND FOR THE MODE SELECTED AS THE REFERENCE ZONE.

2 THE MONITOR THERMOSTAT SHALL COMMUNICATE WITH ITS SLAVE THERMOSTATS AND THE BYPASS CONTROLLER VIA A THREE WIRE COMMUNICATION BUS. THIS COMMUNICATION SHALL OCCUR NO LESS THAN ONCE EVERY 30 SECONDS. THE MONITOR THERMOSTAT(S) SHALL BE CAPABLE OF COMMUNICATING WITH UP TO 62 SLAVE THERMOSTATS AND A BYPASS CONTROLLER.

3 DURING THE COMFORT OR SETBACK MODE, THE MONITOR THERMOSTAT SHALL ACCESS ZONE DEMAND FOR HEATING AND COOLING FROM EACH ZONE SLAVE THERMOSTAT AND USE THIS INFORMATION TO CONTROL THE HVAC UNIT BASED ON ZONE DEMAND.

4 WHEN ANY THERMOSTAT SENSES A TEMPERATURE DEVIATION OF 1.5 DEGREES OR MORE FROM ITS CURRENT SETPOINT IT BECOMES A ZONE HEATING OR COOLING CALLER. WHEN A ZONE BECOMES A CALLER, THE MONITOR REGISTERS ITS DEMAND AND WHETHER ITS A HEATING OR COOLING CALLER. WHEN THE MONITOR THERMOSTAT REGISTERS THE MINIMUM REQUIRED NUMBER OF ZONE CALLERS, AS DETERMINED BY THE SYSTEM MODE DEMAND, AND THE MODE SELECTED MEETS ANY LOCKOUT TEMPERATURE CRITERIA (IF APPLICABLE), THE MONITOR SHALL ENERGIZE THAT SPECIFIC MODE VIA ITS RELAY PACK THAT IS INTERFACED TO THE HVAC UNIT. ON A RISE TO TWO DEGREES THE MONITOR SHALL ENERGIZE A RELAY FOR THE SECOND STAGE IF THE TEMPERATURE-TRENDING PROGRAM ALLOW SECOND STAGE OPERATION.

5 THE MONITOR THERMOSTAT SHALL HOLD THE SYSTEM MODE UNTIL THE REFERENCE ZONE IS WITHIN .5 DEGREES F OF ITS SETPOINT OR UNTIL THE SYSTEM MODE RESELECT TIME LIMIT HAS EXPIRED AND THE SYSTEM'S DEMAND IS SUCH THAT THE MONITOR SELECTS THE OPPOSITE MODE.

6 ONLY ONE MONITOR WITH A 7 DAY ELECTRONIC CLOCK SHALL BE ON EACH DEVICE COMMUNICATION BUS. THIS MONITOR SHALL BE CAPABLE OF BROADCASTING THE TIME OF DAY TO ALL OTHER MONITORS AND DEVICES ON THE BUS. ALL ZONES SHALL BE CAPABLE OF THEIR OWN INDEPENDENT TIME OF DAY PROGRAM SCHEDULES FOR OCCUPIED AND UNOCCUPIED OPERATION.

7 ONLY ONE MONITOR THERMOSTAT WITH AN OUTSIDE AIR SENSOR SHALL BE ON EACH DEVICE COMMUNICATION BUS. THIS MONITOR THERMOSTAT SHALL BROADCAST OUTSIDE AIR TEMPERATURE TO EVERY OTHER MONITOR THERMOSTAT INTERFACED TO ITS DEVICE BUS.

8 THE BYPASS CONTROLLER SHALL WORK IN CONJUNCTION WITH ALL ZONE THERMOSTATS TO MAXIMIZE THE AMOUNT OF SUPPLY AIR IN THE DUCT SYSTEM AND TO PREVENT INADEQUATE AIR FLOW THROUGH THE HVAC UNIT.

9 THE BYPASS CONTROLLER SHALL BE CAPABLE OF PREPOSITION ITS DAMPER(S) TO THE MAXIMUM OPEN POSITION PRIOR TO SYSTEM STARTUP, THE BYPASS SHALL REGULATE PRESSURE FROM MINIMUM SYSTEM PRESSURE, DURING STARTUP, TO MAXIMUM SYSTEM PRESSURE, NORMAL OPERATING CONDITION.

10 THE BYPASS CONTROLLER SHALL ALSO MONITOR SUPPLY AIR TEMPERATURE SO THAT, WHEN SYSTEM CHANGE OVER OCCURS, THE BYPASS CONTROLLER CAN OPEN THE BYPASS DAMPERS TO PRE-CONDITION THE SUPPLY AIR IF IT IS COUNTER-PRODUCTIVE FOR USE BY THE REFERENCE ZONE.

11 THE INDIVIDUAL THERMOSTATS SHALL BE CAPABLE OF OPERATING IN THE VENTILATION MODE UNTIL THEY BECOME 1.5 DEGREES OUT OF SETPOINT IN EITHER DIRECTION. AT THIS POINT, THE THERMOSTAT SHALL REQUEST THE APPROPRIATE MODE FROM THE MONITOR THERMOSTAT.

12 ALL THERMOSTATS IN COMFORT SHALL DISPLAY THEIR SEPARATE HEATING AND COOLING COMFORT SETPOINTS, THE CURRENT SYSTEM MODE, AND SYSTEM FAN OPERATION.

13 ALL THERMOSTATS IN SETBACK SHALL DISPLAY THEIR SEPARATE HEATING AND COOLING SETBACK SETPOINTS, THE CURRENT SYSTEM MODE, SYSTEM FAN OPERATION, AND THEIR ANNUNCIATORS SHALL INDICATE THE THERMOSTAT IS IN SETBACK.

14 MONITOR THERMOSTAT SHALL HAVE SMART START AND ALLOW THE MONITOR TO START THE SYSTEM HVAC EQUIPMENT PRIOR TO THE FIRST OCCUPIED PERIOD TO GRADUALLY HEAT/COOL THE BUILDING TO ACHIEVE THE COMFORT SETPOINT BY THE START OF THE OCCUPIED PERIOD.

15 SMART START (MSST) SHALL SET THE MAXIMUM TIME (IN HOURS) BEFORE THE FIRST OCCUPIED PERIOD THAT THE MONITOR MAY START IS ASSOCIATED SYSTEM TO PERFORM THE SMART START OPERATION. FOR EXAMPLE, MSST IS SET FOR 3 HOURS AND THE FIRST OCCUPIED PERIOD IS 7 AM, THE MONITOR WON'T START SYSTEM WARM UP OR COOL DOWN PRIOR TO 4 AM.

16 ENABLE SMART STOP TO ADJUST THE MONITOR'S HVAC STAGING ALGORITHM DURING THE LAST HOUR AND A HALF OF THE FIRST OCCUPIED PERIOD TO LOWER ENERGY CONSUMPTION WITHOUT SACRIFICING COMFORT.

SEQUENCE OF OPERATIONS

SPLIT SYSTEM HEAT PUMP UNITS

1 DURING OCCUPIED PERIOD AS PROGRAMMED ON ASSOCIATED HP THERMOSTAT, BLOWER FAN SHALL RUN CONTINUOUSLY AND OUTSIDE AIR DAMPERS OPEN.

2 ON A CALL FOR HEATING, IF ALL SAFETIES ARE SENSED, THEN HEAT PUMP/ELECTRIC HEATER SHALL BE ENERGIZED, HEATER SHALL RUN UNTIL SETPOINT IS SATISFIED.

3 ON A CALL FOR COOLING, THE UNIT MOUNTED CONTROLS SHALL ENERGIZE OUTDOOR COMPRESSOR (MECHANICAL COOLING) SHALL BE ENERGIZED. THE UNIT COOLING CYCLE SHALL RUN UNTIL SETPOINT IS SATISFIED.

4 DURING NIGHT SETBACK PERIOD AS PROGRAMMED ON ASSOCIATED HP UNIT THERMOSTAT, BLOWER FAN SHALL BE OFF AND OUTSIDE AIR DAMPERS SHUT. ON A CALL FOR HEATING OR COOLING, THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED AND THE FAN OR ASSOCIATED

5 ROOMS WITH DUCT MOUNTED VVT DAMPERS SHALL HAVE THERMOSTAT CONTROL, BUT WILL BE UTLIZED AS A SLAVE DAMPER. (HEAT PUMP UNIT #3 ONLY)

ALL COMPONENTS OF THE VVT SYSTEM SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER. CONTROL CONTRACTOR SHALL INSTALL ALL COMPONENTS OF THE SYSTEM WITH THE EXCEPTION OF THE ZONE DAMPERS. (HEAT PUMP UNIT #3 ONLY)

ALL COMPONENTS OF THE VVT SYSTEM SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER. CONTROL CONTRACTOR SHALL INSTALL ALL COMPONENTS OF THE SYSTEM WITH THE EXCEPTION OF THE ZONE DAMPERS AND BYPASS DAMPERS. (HEAT PUMP UNIT #4 ONLY)

OPERATION OF THE VVT SYSTEM SHALL BE IN ACCORDANCE WITH SYSTEM MANUFACTURER'S SEQUENCE. REFER TO VVT SEQUENCE OF OPERATION. (HEAT PUMP UNIT #4 ONLY)

ELECTRIC HEATER/ COMPRESSOR SHALL CYCLE UNTIL SPACE SETPOINTS ARE SATISFIED.

5 UNIT SHALL BE DE-ENERGIZED IF SMOKE DETECTOR SENSES SMOKE OR ANY SAFETY/CONTROL EXCEEDS ITS LIMITS.

EXHAUST FANS

1 TOILET ROOM EXHAUST FAN (F-1, F-5) SHALL BE INTERLOCKED WITH TIME CLOCK. TOILET ROOM EXHAUST FAN SHALL BE ENERGIZED DURING OCCUPIED MODE AND DE-ENERGIZE DURING UNOCCUPIED MODE.

2 TOILET ROOM EXHAUST FAN (F-2, F-4, F-5) SHALL BE INTERLOCKED WITH ON/OFF LIGHT SWITCH.

MISCELLANEOUS HEAT

1 WALL RECESSED FAN FORCED HEATER SHALL BE CONTROLLED VIA UNIT/FACTORY MOUNTED INTEGRAL THERMOSTAT. HEATER SHALL BE ENERGIZED UPON A CALL FOR HEAT. UPON REACHING SET POINT HEATER SHALL BE DE-ENERGIZED.

REVISIONS

REV#	DATE	DESCRIPTION

MECHANICAL & ELECTRICAL DESIGN CONSULTANTS, INC.
1101 N. Fountain Green Road
Bel Air, MD 21015-1411
OFFICE 410-893-2822
Fax 410-803-0442
jrdesign@starpower.net

FREDRICK WARD ASSOCIATES, INC.
ENGINEERS
ARCHITECTS
SURVEYORS
P.O. Box 727, 5 South Main Street Bel Air, Maryland 21014-0727
Phone: 410-879-2090 or 410-838-7900 Fax: 410-893-1243
Columbia, Maryland Warrenton, Virginia

TENANT RENOVATIONS FOR:
RMS LIFE LINE
2405 YORK ROAD /
TIMONIUM, MARYLAND 21093

DATE 10/10/00
SCALE NO SCALE
REVIEWED BY GWB/DLI
DRAWN BY DLI
DRAWING NO. M5
SHEET 5 OF 6
PUB. JOB NUMBER 2001216.00
JLR# 20136A