MECHANICAL LEGEND

SYMBOL	ABBREV.	DESCRIPTION
	POC	POINT OF CONNECTION
	POD	POINT OF DISCONNECT
E		COORDINATE WITH ELECTRICAL
CHW	CHW	CHILLED WATER
CHWR	CHWR	CHILLED WATER RETURN
CHWS	CHWS	CHILLED WATER SUPPLY
CD	CD	CONDENSATE DRAIN (A.C)
CWR	CWR	CONDENSER WATER RETURN
CWS	CWS	CONDENSER WATER SUPPLY
D	D	DRAIN
RD	RD	REFRIGERANT DISCHARGE
RL	RL	REFRIGERANT LIQUID
RS	RS	REFRIGERANT SUCTION
		PIPE DOWN
		PIPE UP
UP		PIPE RISE (OR DN. FOR DROP)
DN		DIRECTION OF FLOW IN PIPE
	AV	AIR VENT (VALVE)
	CHV	CHECK VALVE
	SD	SUCTION DIFFUSER
	CV (2W)	CONTROL VALVE (2-WAY)
	CV (3W)	CONTROL VALVE (3-WAY)
	FCD	AUTOMATIC FLOW CONTROL DEVICE
	GV	GATE VALVE
		GLOBE/BALL/BUTTERFLY VALVE
	BV	COMBINATION BALANCING & SHUT-OFF VALVE
	FEV	FLOW ELEMENT VENTURI
		VALVE ON RISE OR DROP
	STR.	STRAINER
	CL	CAPPED LINE
	DN.	DOWN OR DROP
	UP	RISE OR RISER
	RV	PRESSURE RELIEF VALVE
PG	PG	PRESSURE GAUGE WITH BALL VALVE
	R.	ECCENTRIC REDUCER
	R.	CONCENTRIC REDUCER
	FC	FLEXIBLE CONNECTION (PIPE)
	TW	TEST WELL (PETE'S PLUG) - PRESSURE AND/OR TEMPERATURE
	TI	THERMOMETER
	PA	PIPE ANCHOR
	U	UNION
10x6		DUCTWORK (1ST NUMBER INDICATES WIDTH SHOWN), NET INSIDE DIMENSION
TV	TV	SQUARE ELBOW WITH TURNING VANES
		RADIUS ELBOW
MVD	MVD	MANUAL VOLUME DAMPER
M	MOD	MOTOR OPERATED DAMPER
	BDD	BACKDRAFT DAMPER
FD	FD	FIRE DAMPER
SD	SD	DUCT MOUNTED SMOKE DETECTOR
SFD	SFD	AUTOMATIC SMOKE AND FIRE DAMPER
FLEX	FLEX	FLEXIBLE CONNECTION (DUCTWORK)
FLEX	FLEX	FLEXIBLE CONNECTION OR SEISMIC JOINT
		LINED DUCTWORK (OR PLENUM)
UP		DUCT RISE IN DIRECTION OF FLOW
DN		DUCT DROP IN DIRECTION OF FLOW
		ROUND DUCT UP
		ROUND DUCT DOWN
		SUPPLY DUCT UP
		SUPPLY DUCT DOWN
	RA/OA	RETURN AIR DUCT/OUTSIDE AIR DUCT UP
		RETURN AIR DUCT/OUTSIDE AIR DUCT DOWN
		EXHAUST AIR DUCT UP
		EXHAUST AIR DUCT DOWN

SYMBOL	ABBREV.	DESCRIPTION
		DUCT TRANSITION
	CD	CEILING DIFFUSER
	RR	RETURN REGISTER
	ER	EXHAUST REGISTER
T AC-3	TSTAT	THERMOSTAT OR TEMPERATURE SENSOR (NUMBER INDICATES EQUIPMENT ZONE SERVED)
H	HSTAT	HUMIDISTAT
CO2		CARBON DIOXIDE SENSOR
	CFM	CUBIC FEET PER MINUTE
OR		SYMBOL, SEE EQUIPMENT SCHEDULE
	AD/AP	ACCESS DOOR / ACCESS PANEL
	AFF	ABOVE FINISHED FLOOR
	BDD	BACK DRAFT DAMPER
	BOD	BOTTOM OF DUCT
	BOP	BOTTOM OF PIPE (ABOVE FIN. FLR.)
	CD	CEILING DIFFUSER
	CLG.	CEILING
	CFM	CUBIC FEET PER MINUTE
	CONC.	CONCRETE
	CONT.	CONTINUATION
	°F	DEGREES FAHRENHEIT
	DIA. ⌀	DIAMETER
	DN.	DOWN
	DWGS.	DRAWINGS
	DB	DRY BULB
	DTR	DUCT THRU ROOF
	(E)	EXISTING
	EA	EXHAUST AIR
	ER	EXHAUST REGISTER
	EFF.	EFFICIENCY
	ELEV.	ELEVATION
	ENT.	ENTERING
	EWT	ENTERING WATER TEMPERATURE
	EXH.	EXHAUST
	EXIST.	EXISTING
	FF	FINISHED FLOOR
	FIN.	FINISH
	FLR.	FLOOR
	GPM	GALLONS PER MINUTE
	IN.	INCH
	HD.	HEAD
	HOA	HAND-OFF-AUTOMATIC
	HP	HORSEPOWER
	LD	LINEAR DIFFUSER
	LVG.	LEAVING
	LWT	LEAVING WATER TEMPERATURE
	MAX.	MAXIMUM
	MBH	ONE THOUSAND B.T.U.'s PER HOUR
	MECH.	MECHANICAL
	MIN.	MINIMUM
	MTD.	MOUNTED
	MTG.	MOUNTING
	NC	NORMALLY CLOSED
	NO	NORMALLY OPEN
	OBD	OPPOSED BLADE DAMPER
	OA	OUTSIDE AIR
	PD	PRESSURE DROP
	PSIG	POUNDS PER SQUARE INCH GAUGE
	RA	RETURN AIR
	REG.	REGISTER
	RR	RETURN REGISTER
	SA	SUPPLY AIR
	SF	SQUARE FEET
	SS	STAINLESS STEEL
	ST	STEAM
	TYP.	TYPICAL
	UNO	UNLESS NOTED OTHERWISE
	UOS	UNLESS OTHERWISE SPECIFIED
	UTR	UP THRU ROOF
	VAV	VARIABLE AIR VOLUME
	VFD	VARIABLE FREQUENCY DRIVE
	VTR	VENT THRU ROOF
	WG	WATER GAUGE
	WB	WET BULB
	W/	WITH

PLAN CHECK NOTES

1. CERTIFICATE OF ACCEPTANCE (MECH-2A AND ENV-2A) AND ALL RELATED ACCEPTANCE DOCUMENTS SHALL BE SUBMITTED TO THE FIELD INSPECTOR DURING CONSTRUCTION. CERTIFICATE OF OCCUPANCY WILL NOT BE ISSUED UNTIL THESE FORMS ARE REVIEWED AND APPROVED.
2. ALL PIPING AND DUCT WORK SHALL BE INSULATED CONSISTENT WITH THE REQUIREMENTS OF SECTIONS 118, 123, 124 TITLE 24 ENERGY STANDARDS AND CHAPTER 6 OF CMC.
3. ALL HVAC SYSTEMS SHALL MEET THE CONTROL REQUIREMENTS PER SECTION 112 AND 122 E.E.S.
4. ALL HVAC EQUIPMENT AND APPLIANCES SHALL MET THE REQUIREMENTS PER SECTION 111-113, 115, 120-124 TITLE 24 ENERGY STANDARDS.
5. PROVIDE SMOKE DETECTORS IN MAIN SUPPLY AIR DUCTS OF AIR MOVING SYSTEMS EXCEEDING 2000 CFM PER SECTION 608.0 CMC.
6. EXHAUST DUCTS SHALL BE EQUIPPED WITH BACK-DRAFT DAMPERS PER SEC. 504.0 CMC.
7. A WATERTIGHT PAN OF CORROSION RESISTANT MATERIAL SHALL BE PROVIDED BENEATH HVAC UNITS PER SECTION 309.2 CMC.
8. ROOF ACCESS LADDER SHALL COMPLY WITH SECTION 304 CMC.
9. DRYER VENTS SHALL BE EQUIPPED WITH BACK-DRAFT DAMPERS PER SECTION 504.0 CMC.
10. SCREENS/LOUVERS SHALL NOT BE INSTALLED AT DRYER VENT TERMINATIONS PER SEC. 504.3.1 CMC.
11. EXHAUST DUCT FOR TYPE II DRYERS SHALL COMPLY WITH SECTION 905.5 CMC.
12. ALL CLOTHES DRYERS INSTALLED FOR MULTIPLE-FAMILY OR PUBLIC USE SHALL BE EQUIPPED WITH APPROVED SAFETY SHUT-OFF DEVICES AND SHALL BE INSTALLED AS SPECIFIED FOR A TYPE 2 CLOTHES DRYER UNDER SECTION 905.5 CMC (NFPA 54 10.4.6)
13. TYPE II CLOTHES DRYERS SHALL BE EQUIPPED OR INSTALLED WITH LINT CONTROLLING MEANS.

TITLE 24 NOTES

1. HVAC SYSTEMS SHALL MEET THE LATEST CONTROL REQUIREMENTS OF SECTIONS 112 & 122 ENERGY EFFICIENCY STANDARDS.
2. DOORS AND WINDOWS SHALL MEET MINIMUM INFILTRATION REQUIREMENTS OF SECTION 116 ENERGY EFFICIENCY STANDARDS.
3. INSULATION AND FLEXIBLE DUCT SHALL COMPLY WITH STATE FIRE MARSHAL CRITERIA AND SHALL NOT EXCEED FLAME SPREAD OF 25 AND SMOKE DEVELOPED OF 50 PER ASTM-84, NFPA-225, AND U.L. 723.
4. ALL WORK SHALL BE IN ACCORDANCE WITH CITY CODES, CALIFORNIA ENERGY CONSERVATION STANDARDS, TITLE - 24, AND ALL OTHER APPLICABLE CODES.
5. ALL PIPING AND DUCT WORK SHALL BE INSULATED CONSISTENT WITH THE REQUIREMENTS OF SECTIONS 118, 123, 124 TITLE 24 ENERGY STANDARDS AND CHAPTER 6 OF CALIFORNIA MECHANICAL CODE.
6. ALL ENVELOPE AND MECHANICAL CERTIFICATE OF ACCEPTANCE FORMS AND ALL RELATED ACCEPTANCE DOCUMENTS SHALL BE SUBMITTED TO THE FIELD INSPECTOR DURING CONSTRUCTION. CERTIFICATE OF OCCUPANCY WILL NOT BE ISSUED UNTIL THESE FORMS ARE REVIEWED AND APPROVED.
7. MECH-04-A FORM FOR DUCT LEAKAGE SEALING AND TESTING SHALL BE SUBMITTED TO THE FIELD INSPECTOR DURING CONSTRUCTION. CERTIFICATE OF OCCUPANCY WILL NOT BE ISSUED UNTIL THESE FORMS ARE REVIEWED AND APPROVED.
8. BUILDING COMMISSIONING SHALL BE INCLUDED IN THE DESIGN AND CONSTRUCTION PROCESSES OF THE BUILDING SYSTEM AND COMPONENTS MEET THE OWNER'S OR OWNER REPRESENTATIVE'S PROJECT REQUIREMENTS. COMMISSIONING SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 5.410.2 BY TRAINED PERSONNEL WITH EXPERIENCE ON PROJECTS OF COMPARABLE SIZE AND COMPLEXITY.
9. A COMPLETE REPORT OF COMMISSIONING PROCESS ACTIVITIES UNDERTAKEN THOUGH THE DESIGN, CONSTRUCTION, AND REPORTING, RECOMMENDATIONS FOR POST-CONSTRUCTION PHASES OF THE BUILDINGS PROJECT SHALL BE COMPLETED AND PROVIDED TO THE OWNER OR REPRESENTATIVE.
10. INSULATION MATERIAL SHALL MEET THE CALIFORNIA QUALITY STANDARD PER SECTION 110.8 ENERGY EFFICIENCY STANDARDS.

CA GREEN BUILDING NOTES

1. IN MECHANICALLY VENTILATED BUILDINGS, PROVIDE OCCUPIED AREAS OF BUILDING WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR PRIOR TO OCCUPANCY THAT PROVIDES AT LEAST MERV OF 8 (REF. SECTION 5.504.5.3).
2. PROVIDE TESTING AND ADJUSTING OF HVAC SYSTEMS AND CONTROLS PER 5.713.10.4.
3. THE PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING OR AREAS OF ADDITION OR ALTERATION WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, RETURN AIR FILTERS WITH A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 8, BASED ON ASHRAE 52.2-1999, OR AN AVERAGE EFFICIENCY OF 30% BASED ON ASHRAE 52.1-1992 SHALL BE USED. ALL FILTERS SHALL BE REPLACED IMMEDIATELY PRIOR TO OCCUPANCY OR AT THE CONCLUSION OF CONSTRUCTION. (REF SECTION 5.504.1.3).
4. INSTALLED HVAC EQUIPMENT SHALL NOT CONTAIN CFC'S OR HALONS PER 5.714.8.1.
5. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATING EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, SHEETMETAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM. (REF SECTION 5.504.3).
6. EXCEPTION TO CAL GREEN SECTION 5.504.5.3 - AN ASHRAE 10% - 15% EFFICIENCY FILTER SHALL BE PERMITTED FOR AN HVAC UNIT MEETING THE 2013 CALIFORNIA ENERGY CODE HAVING 60,000 BTUH OR LESS CAPACITY PER FAN COIL, IF THE ENERGY USE OF THE AIR DELIVERY SYSTEM IS 0.4 W/CFM OR LESS AT DESIGN AIR FLOW.
7. MECHANICALLY OR NATURALLY VENTILATED SPACES IN BUILDINGS SHALL MEET THE MINIMUM REQUIREMENTS OF SECTION 121 OF THE 2010 CALIFORNIA ENERGY CODE, OR THE APPLICABLE LOCAL CODE, WHICHEVER IS MORE STRINGENT, AND DIVISION 1, CHAPTER 4 OF CCR, TITLE 8. (REF SECTION 5.506.1).
8. FOR BUILDINGS OR ADDITIONS EQUIPPED WITH DEMAND CONTROLS VENTILATION, C02 SENSORS AND VENTILATION CONTROLS SHALL BE SPECIFIED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF 2013 CALIFORNIA ENERGY CODE, SECTION 120(C)(4) (REF SECTION 5.506.2).
9. INSTALLATIONS OF HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT SHALL COMPLY WITH SECTIONS 5.508.1.1 AND 5.508.1.2.
10. PROVIDE THE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTIES/WARRANTIES FOR EACH SYSTEM. O&M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUIREMENTS IN CCR, TITLE 8 SECTION 5142, AND OTHER RELATED REGULATIONS.

GENERAL NOTES:

1. THESE DRAWINGS ARE A GENERAL GRAPHIC PRESENTATION OF THE WORK. DUCTWORK, PIPING, AND EQUIPMENT, AS SHOWN, ARE SCHEMATIC. FABRICATE AND INSTALL BASED ON ACTUAL FIELD MEASUREMENT. COORDINATE WITH OTHER TRADES. PROVIDE A COMPLETE SET OF SHOP DRAWINGS REFLECTING ACTUAL DIMENSIONS, ACCESS REQUIREMENTS, AND DETAILS BASED UPON THE ACTUAL EQUIPMENT PROCURED. MAINTAIN AN UP TO DATE SET OF AS-BUILT DRAWINGS AT THE JOB SITE.
2. COMPLY WITH CALIFORNIA MECHANICAL CODE (CMC), CALIFORNIA PLUMBING CODE (CPC), AND NATIONAL FIRE PROTECTION AGENCY (NFPA), AND GOVERNING CODES. THERE SHALL BE NO EXCEPTION. REPORT DEFICIENCIES WITHIN THIRTY (30) DAYS UPON AUTHORIZATION TO PROCEED.
3. REVIEW ALL DRAWINGS AND SPECIFICATIONS INCLUDING ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL. ANY QUESTIONS SHALL BE BROUGHT UP, IN WRITING, TO THE ATTENTION OF THE ENGINEER BEFORE THE START OF CONSTRUCTION.
4. PROVIDE ACCESS AND CLEARANCE FOR MAINTENANCE FOR MECHANICAL EQUIPMENT AND COMPONENTS AS RECOMMENDED BY EQUIPMENT MANUFACTURER AND APPLICABLE CODES.
5. HANDLE, STORE AND INSTALL EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.
6. INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUT-DOWN.
7. BRACE AND SUPPORT PIPES, CONDUIT, AND DUCTWORK IN ACCORDANCE WITH SMACNA GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL AND PLUMBING PIPING SYSTEM.
8. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF DIFFUSERS, REGISTERS, GRILLES, AND ACCESS PANELS.
9. ALL DUCT DIMENSIONS, AS SHOWN ON MECHANICAL DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
10. INSULATION AND FLEXIBLE DUCT SHALL COMPLY WITH STATE FIRE MARSHALL CRITERIA AND SHALL NOT EXCEED FLAME SPREAD OF 25 AND SMOKE DEVELOPED OF 50 PER ASTM-84, NFPA-223, AND UL 723.
11. INSULATE PIPING AND DUCTWORK IN ACCORDANCE WITH THE GOVERNING CODES.
12. COMMISSION AND START-UP THE MECHANICAL SYSTEMS TO ASSURE A COMPLETE AND OPERATIONAL HVAC SYSTEM IN ACCORDANCE WITH ASHRAE AND NEBB.
13. ALL SQUARE ELBOWS IN DUCTWORK SHALL HAVE DOUBLE THICKNESS TURNING VANES. ALL RADIUS ELBOWS IN DUCTWORK SHALL BE MINIMUM 1.5W (1.5xWIDTH) AND HAVE 3 SPLITTER VANES. PROVIDE MANUAL VOLUME DAMPER AT EACH BRANCH DUCT TAKE- OFF SERVING EACH AIR TERMINAL DEVICE. PROVIDE BALANCING DAMPERS FOR EACH MAIN DUCT TAKE-OFF IN ACCORDANCE WITH SMACNA IN ORDER TO ASSURE A COMPLETELY BALANCED SYSTEM.
14. FIRE DAMPER ASSEMBLIES, INCLUDING LOCATION, SLEEVES, AND INSTALLATION PROCEDURES SHALL BE APPROVED BY THE BUILDING INSPECTOR PRIOR TO PROCUREMENT AND INSTALLATION. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF FIRE RATED WALLS AND SMOKE SEPARATIONS.
15. COORDINATE WITH ELECTRICAL AND CONTROL CONTRACTORS FOR ALL POWER REQUIREMENTS PRIOR TO BID.
16. COORDINATE WITH ELECTRICAL AND CONTROL CONTRACTORS FOR ALL POWER REQUIREMENTS PRIOR TO ORDERING ANY EQUIPMENT.
17. UPON INSTALLATION OF ALL EQUIPMENT, DEVICES, VIBRATION ISOLATION, ETC., PROVIDE WRITTEN CONFIRMATION BY EQUIPMENT MANUFACTURER'S REPRESENTATIVES TO ENSURE COMPLIANCE WITH MANUFACTURER'S REQUIREMENTS.
18. PROVIDE DETAILS AND SEISMIC CALCULATIONS FOR ALL EQUIPMENT ON VIBRATION ISOLATION. ALL DETAILS SHALL BE STAMPED BY A STRUCTURE ENGINEER FROM VIBRATION ISOLATION MANUFACTURER.

PROJECT NOTES

1. CONTRACTOR SHALL COORDINATE ARCHITECTURAL REFLECTED CEILINGS PLANS WITH ALL DISCIPLINES TO VERIFY CLEARANCES BETWEEN HVAC DUCTS, HVAC PIPING, LIGHT FIXTURES, ELECTRICAL DATA CONDUITS, PLUMBING LINES, FIRE PROTECTION LINES, STRUCTURAL MEMBERS, ETC. SPECIAL ATTENTION IS REQUIRED ALONG THE LENGTH OF MAIN MECHANICAL SUPPLY AND RETURN AIR DUCTS WHERE THERE IS LIMITED CLEARANCE FOR PASSAGE OR ROUTING OF UTILITIES.
2. THE SPACE FOR DUCT WORK & MECHANICAL EQUIPMENT FOR THIS PROJECT IS LIMITED. COORDINATION WITH OTHER TRADES IS CRITICAL. PROCEED WITH PREPARATION OF SHOP DRAWINGS IMMEDIATELY UPON RECEIVING AN AUTHORIZATION TO PROCEED FOR THE PROJECT. COMPLETE SHOP DRAWINGS PRIOR TO MATERIAL FABRICATION AND INSTALLATION. SHOP DRAWINGS SHALL BE REVIEWED BY COMMISSIONING AGENT PRIOR TO SUBMITTAL.
3. PROVIDE ORIGINALLY PREPARED CONTRACTOR'S SHOP DRAWINGS IN ELECTRONIC FORMAT. IN ADDITION TO THE REQUIREMENTS SPECIFIED ELSEWHERE, THE SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING:
   a. DUCT, PIPE AND PLUMBING ELEVATIONS.
   b. DOUBLE LINE DUCTWORK AND PIPING (6" AND LARGER).
   c. ACTUAL SIZE OF PURCHASED EQUIPMENT. PER APPROVED CONTRACTOR'S SHOP DRAWINGS.
   d. ACCESS PANELS INCLUDING CEILING PANELS.
   e. ACCESS CLEARANCES FOR EQUIPMENT.
   f. ACTUAL LOCATIONS OF CEILING DIFFUSERS, REGISTERS, AND RETURN REGISTERS.
   g. LOCATIONS OF STRUCTURAL MEMBERS SUCH AS BEAMS.
   h. ACTUAL LOCATIONS OF CONTROL PANELS AND POWER CONNECTIONS TO EQUIPMENT.
   i. COLOR CODED DUCT AND PIPING BASED ON MATERIAL USED.
   j. MINIMUM 1/4"=1'0" SCALE DRAWINGS.
   k. LABEL AND TAG SCHEDULE FOR EQUIPMENT.
   l. DUCT TRANSITIONS TO CLEAR BEAMS OR TIGHT AREAS.
   m. ROOM TEMPERATURE SENSOR LOCATIONS.
   n. POINT OF CONNECTION TO UTILITIES OUTSIDE THE BUILDING.
   o. SECTIONS OR 3-D DRAWINGS OF CONGESTED AREAS.
   p. GRID LINES.
   q. UTILITY PROFILES FOR UNDERGROUND PIPING.
4. DO NOT COMMENCE WITH ANY INSTALLATION, ORDERING OF ANY EQUIPMENT OR MATERIAL FABRICATION WITHOUT AN APPROVED SHOP DRAWING SUBMITTAL.
5. FOR EACH SUBMITTAL, THE CONTRACTOR SHALL PROVIDE A LETTER (ON COMPANY LETTERHEAD) AND SIGNED BY THE PROJECT MANAGER INDICATING THE SUBMITTAL HAS BEEN FULLY IN HOUSE REVIEWED TO ENSURE FULL COMPLIANCE WITH THE CONTRACT DOCUMENTS AND COORDINATION WITH OTHER TRADES. ANY EXCEPTIONS TO THE CONTRACT DOCUMENTS SHALL BE CLEARLY INDICATED ON THIS LETTER. ANY DISCREPANCIES/EXCEPTIONS NOT IDENTIFIED IN WRITING SHALL BE CORRECTED AT THE SOLE EXPENSE OF THE CONTRACTOR AND AT NO EXPENSE TO THE OWNER AND ENGINEER.

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03-06-15	CITY RESUBMITTAL
12-05-14	PLAN CHECK SUBMITTAL
11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMMER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

5512

PROJECT NO: 5432.00
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MECHANICAL LEGEND AND GENERAL NOTES

DRAWING NO:

M0.1

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DUCTLESS SPLIT SYSTEM SCHEDULE

SYMBOL	DESCRIPTION	SERVICE	INDOOR FAN SECTION						OUTDOOR SECTION														REMARKS
			INDOOR FAN		ELECTRICAL DATA			OPER. WT. (LBS.)			ELECTRICAL DATA					OPER. WT. (LBS.)	COMBINED CAPACITY						
			CFM	DRIVE	V	PH	Hz				MCA	MOCP	V	PH	Hz		TOTAL CAP.(MBH)	SENSIBLE CAP.(MBH)	AMB °F	ENT DB°F	ENT WB°F	SEER	REFRIGERANT TYPE	
DFC 2-1	LG LSN090HEV	ELEVATOR MACH. ROOM	225	DIRECT	208	1	60	65	CU 2-1	LG LSU090HEV	9	15	208	1	60	150	9.0	9.0	95	80	67	16	R-410A	1 2 5 6
DFC 3-1, DFC 3-2	LG LMN024/ LMN024	ELECTRICAL 307	390/ 390	DIRECT	208	1	60	65	CU 3-1	LG LMU540HV	26.4	40	208	1	60	150	46.0	46.0	95	80	67	18	R-410A	1 2 3 4 5 6

1 FOR MOUNTING SEE DETAIL 9/M5-1 2 INDOOR UNIT POWERED BY OUTDOOR UNIT; PROVIDE SEPARATE DISCONNECTS 3 A SINGLE OUTDOOR CONDENSER SERVES BOTH INDOOR FAN COILS 4 PROVIDE LG PMBD 3620 UNIT WITH (2) PORTS; REQUIRES 208/1/60, 16 W INPUT, 0.08 AMPS 5 DFC - CONDENSATE PUMP REQUIRED (SEE PLUMBING PLANS)
6 PROVIDE WITH CONDENSER COIL CORROSION PROTECTION

EXHAUST & SUPPLY FAN SCHEDULE

SYMBOL	DESCRIPTION	CFM	ESP (IN.)	DRIVE	RPM	MIN WHEEL DIA (IN.)	MOTOR				MAX OPER WT (LBS)	REMARKS
							BHP	HP	V	PH		
EF 1-1	GREENHECK SQ-95-VG	475	0.5	DIRECT	1572	10.875	0.1	1/6	115	1	60	1
EF 1-2	GREENHECK SQ-65D	50	0.35	DIRECT	1550	8.125	0.02	1/30	115	1	60	1
EF 1-3	GREENHECK SQ-65D	50	0.35	DIRECT	1550	8.125	0.02	1/30	115	1	60	1
EF 2-1	GREENHECK SQ-95-VG	475	0.5	DIRECT	1572	10.875	0.1	1/6	115	1	60	1
EF 3-1	GREENHECK SQ-90-VG	400	0.5	DIRECT	1636	10.875	0.08	1/6	115	1	60	1
EF 3-2	GREENHECK SQ-80-VG	200	0.5	DIRECT	1560	10.875	0.05	1/6	115	1	60	1
EF 4-1	GREENHECK BCF-112-10	2000	1.5	BELT	1105	11.625	0.65	3/4	460	3	375	2
EF 4-2	GREENHECK BCF-112-10	2000	1.5	BELT	1105	11.625	0.65	3/4	460	3	375	2
MUA 1-1	GREENHECK BCF-112-10	1830	1.5	BELT	1144	11.625	0.85	1	460	3	375	2
MUA 2-1	GREENHECK BCF-112-7	1350	1.5	BELT	1105	11.625	0.58	3/4	460	3	375	2
RF 1	GREENHECK GB-180-15	4000	1.0	BELT	1269	--	1.4	1 1/2	460	3	140	3 5 6
SCF 1-1	GREENHECK TBI-FS-SLS4-500	70000	1.2	BELT	1172	--	49.25	50	460	3	2400	4 5 7
SCF 1-2	GREENHECK TBI-FS-SLS4-500	70000	1.2	BELT	1172	--	49.25	50	460	3	2400	4 5 7
BF 1	FANTECH DBF4XLT-705	130	0.4	DIRECT	-	--	83 W	83 W	120	1	20	8
BF 2	FANTECH DBF4XLT-705	130	0.4	DIRECT	-	--	83 W	83 W	120	1	20	8

1 SEE DETAIL 3/M5-2 FOR MOUNTING INFORMATION 2 SEE DETAIL 7/M5-1 FOR MOUNTING INFORMATION 3 SEE DETAIL 8/M5-1 FOR MOUNTING INFORMATION 4 SEE DETAIL 4/M5-2 FOR MOUNTING INFORMATION 5 PROVIDE VFD WITH INTEGRAL DISCONNECT 6 PROVIDE PRESSURE CONTROL TO MAINTAIN +0.02" INSIDE BUILDING
7 FANS SHALL COMPLY WITH 2013 CFC SECTION 909, "SMOKE CONTROL SYSTEMS". 8 DRYER EXHAUST DUCT POWER VENTILATOR, 83 WATTS

VRF FAN COIL UNIT SCHEDULE

SYMBOL	DESCRIPTION	SERVES	INDOOR FAN SECTION							CAPACITY					SYSTEM	SEER	HSPF	REMARKS
			INDOOR FAN MOTOR							COOLING				HEATING OUTPUT MBH	MIN. OA CFM	OPER. WT. LBS.				
			CFM	E.S.P.	V	PH	Hz	RLA	MCA	MFA	TOTAL CAP. MBH	SENSIBLE CAP. MBH	ENT DB °F	ENT WB °F						
FC 1-1	LG ARNU243BGA2	SEE ZONING PLANS	650	0.62	208	1	60	2.3	--	--	23.8	18.7	80	67	18.7	40	150	HP 1	18	10.0	2 3 4 5
FC 1-2	LG ARNU423BGA2	SEE ZONING PLANS	1400	0.47	208	1	60	2.3	--	--	42.0	29.4	80	67	29.4	420	150	HP 1	18	10.0	1 2 3 4 5
FC 1-3	LG ARNU763BGA2	SEE ZONING PLANS	2100	0.98	208	1	60	4.5	--	--	75.2	53.3	80	67	53.3	215	240	HP 1	18	10.0	1 2 3 4 5
FC 1-4	LG ARNU543BGA2	SEE ZONING PLANS	1890	0.98	208	1	60	4.5	--	--	53.1	41.7	80	67	41.7	135	240	HP 1	18	10.0	1 2 3 4 5
FC 1-5	LG ARNU123BGA2	SEE ZONING PLANS	310	0.47	208	1	60	0.9	--	--	12.1	8.9	80	67	8.9	105	150	HP 1	18	10.0	2 3 4 5
FC 1-6	LG ARNU123BGA2	SEE ZONING PLANS	310	0.47	208	1	60	0.9	--	--	12.1	8.9	80	67	8.9	105	150	HP 1	18	10.0	2 3 4 5
FC 1-7	LG ARNU123BGA2	SEE ZONING PLANS	310	0.47	208	1	60	0.9	--	--	12.1	8.9	80	67	8.9	105	150	HP 1	18	10.0	2 3 4 5
FC 1-8	LG ARNU283BGA2	SEE ZONING PLANS	750	0.62	208	1	60	2.3	--	--	27.6	20.6	80	67	20.6	80	150	HP 1	18	10.0	1 2 3 4 5
FC 1-9	LG ARNU363BGA2	SEE ZONING PLANS	1200	0.78	208	1	60	2.3	--	--	35.7	26.7	80	67	26.7	135	150	HP 1	18	10.0	1 2 3 4 5
FC 1-10	LG ARNU283BGA2	SEE ZONING PLANS	850	0.62	208	1	60	2.3	--	--	27.6	20.6	80	67	20.6	130	150	HP 1	18	10.0	2 3 4 5
FC 1-11	LG ARNU283BGA2	SEE ZONING PLANS	860	0.62	208	1	60	2.3	--	--	27.6	20.6	80	67	20.6	80	150	HP 1	18	10.0	1 2 3 4 5
FC 2-1	LG ARNU763BGA2	SEE ZONING PLANS	2280	0.98	208	1	60	4.5	--	--	75.2	53.3	80	67	53.3	355	240	HP 2	18	10.0	1 2 3 4 5
FC 2-2	LG ARNU483BGA2	SEE ZONING PLANS	1590	0.78	208	1	60	2.3	--	--	47.4	35.9	80	67	35.9	275	150	HP 2	18	10.0	1 2 3 4 5
FC 2-3	LG ARNU283BGA2	SEE ZONING PLANS	870	0.62	208	1	60	2.3	--	--	27.6	20.6	80	67	20.6	70	150	HP 2	18	10.0	1 2 3 4 5
FC 2-4	LG ARNU183BGA2	SEE ZONING PLANS	500	0.62	208	1	60	2.3	--	--	18.8	14.8	80	67	14.8	180	150	HP 2	18	10.0	2 3 4 5
FC 2-5	LG ARNU363BGA2	SEE ZONING PLANS	1060	0.78	208	1	60	2.3	--	--	35.7	26.7	80	67	26.7	275	150	HP 2	18	10.0	2 3 4 5
FC 2-6	LG ARNU763BGA2	SEE ZONING PLANS	2030	0.98	208	1	60	4.5	--	--	75.2	53.3	80	67	53.3	330	240	HP 2	18	10.0	1 2 3 4 5
FC 2-7	LG ARNU243BGA2	SEE ZONING PLANS	700	0.62	208	1	60	2.3	--	--	23.8	18.7	80	67	18.7	240	150	HP 2	18	10.0	2 3 4 5
FC 2-8	LG ARNU283BGA2	SEE ZONING PLANS	840	0.62	208	1	60	2.3	--	--	27.6	20.6	80	67	20.6	250	150	HP 2	18	10.0	2 3 4 5
FC 2-9	LG ARNU763BGA2	SEE ZONING PLANS	2050	0.98	208	1	60	4.5	--	--	75.2	53.3	80	67	53.3	270	240	HP 2	18	10.0	1 2 3 4 5
FC 2-10	LG ARNU123BGA2	SEE ZONING PLANS	390	0.47	208	1	60	0.9	--	--	12.1	8.9	80	67	8.9	70	150	HP 2	18	10.0	2 3 4 5
FC 2-11	LG ARNU243BGA2	SEE ZONING PLANS	790	0.62	208	1	60	2.3	--	--	23.8	18.7	80	67	18.7	120	150	HP 2	18	10.0	2 3 4 5
FC 2-12	LG ARNU283BGA2	SEE ZONING PLANS	940	0.62	208	1	60	2.3	--	--	27.6	20.6	80	67	20.6	455	150	HP 2	18	10.0	2 3 4 5

1 PROVIDE WITH DUCT MOUNTED SMOKE DETECTOR 2 SEE SHEET M6-1 FOR WIRING DIAGRAMS, ADDITIONAL HEAT RECOVERY BOXES 'PRHR' ELECTRICAL REQUIREMENTS 3 SEE DETAIL 4/M5-1 FOR MOUNTING INFORMATION 4 CONDENSATE PUMP REQUIRED (SEE PLUMBING PLANS) 5 PROVIDE WITH HIGH EFFICIENCY FILTER BOX WITH MERV 8 FILTERS

VRF HEAT PUMP SCHEDULE

SYMBOL	DESCRIPTION	FAN COILS SERVED	ELECTRICAL DATA							OPER. WT. LBS.	CAPACITY				REFRIGERANT		SEER	HSPF	REMARKS
			V	PH	Hz	MCA	MOCP	RLA	FAN AMPS		COOLING		HEATING		TYPE	CHARGE (LBS)			
											TOTAL CAP. MBH	AMB °F	AMB °F	OUTPUT MBH					
HP 1	LG ARUB336DTE4	FC-1-1, FC-1-2, FC-1-3, FC-1-4, FC-1-5, FC-1-6, FC-1-7, FC-1-8, FC-1-9, FC-1-10, FC-1-11	460	3	60	--	--	--	--	2220	336.0	95	36	378.0	R-410A	70.77	18	10.0	1 2 3 4 5
	MODULE 1 ARUB144DTE4		460	3	60	31.6	40	28.4	2.6	740	145.0	95	36	145.0					
	MODULE 2 ARUB096DTE4		460	3	60	23.2	35	19.1	2.6	740	121.0	95	36	121.0					
	MODULE 3 ARUB096DTE4		460	3	60	23.2	35	19.1	2.6	740	121.0	95	36	121.0					
HP 2	LG ARUB432DTE4	FC-2-1, FC-2-2, FC-2-3, FC-2-4, FC-2-5, FC-2-6, FC-2-7, FC-2-8, FC-2-9, FC-2-10, FC-2-11, FC-2-12	460	3	60	--	--	--	--	2340	432.0	95	36	486.0	R-410A	94.3	18	10.0	1 2 3 4 5
	MODULE 1 ARUB145DTE4		460	3	60	35.8	50	31.7	2.6	780	145.0	95	36	145.0					
	MODULE 2 ARUB145DTE4		460	3	60	35.8	50	31.7	2.6	780	145.0	95	36	145.0					
	MODULE 3 ARUB145DTE4		460	3	60	35.8	50	31.7	2.6	780	145.0	95	36	145.0					

1 FOR HP MOUNTING INFORMATION SEE 6/M5-1 2 EACH INDIVIDUAL HEAT PUMP MODULE REQUIRES ITS OWN SEPARATE POINT OF POWER CONNECTION AND DISCONNECT 3 LG IS THE BASIS OF DESIGN FOR THE PROJECT. THE CONTRACTOR IS REQUIRED TO BID THE BASIS OF DESIGN FOR THE PROJECT. CONTRACTORS MAY SUBSTITUTE MANUFACTURER AT THEIR OWN RISK; HOWEVER, SUBSTITUTION WILL REQUIRE FULL REDESIGN BY THE MECHANICAL CONTRACTOR AT THEIR OWN COST. FULL REDESIGN MAY INCLUDE, BUT NOT BE LIMITED TO, MECHANICAL, STRUCTURAL, ELECTRICAL AND MULTIPLE OTHER DESIGN CHANGES THAT WILL BE REQUIRED OF THE CONTRACTOR AND SUBCONTRACTORS AT THEIR OWN COST AND WITHOUT NEGATIVE SCHEDULE IMPACT.
4 PROVIDE VRF SYSTEM WITH LG BACnet CONTROLLER GATEWAY MODEL # "PQNFB1TC1". ONLY (1) GATEWAY NEEDED FOR VRF SYSTEM
5 PROVIDE WITH CONDENSER COIL CORROSION PROTECTION

AIR DISTRIBUTION SCHEDULE

SYMBOL	TYPE	NECK SIZE	CFM RANGE	MODEL	ACCESSORIES	STYLE
A	SUPPLY AIR	8x8	0-230	FOR INSTALLATION IN LAY-IN CEILING: PRICE PDMC PERFORATED FACE. FOR INSTALLATION IN HARD CEILING, DUCTWORK OR FOR NECK SIZES ABOVE 18x18: PRICE SMCD	OPPOSED BLADE DAMPER	MODULAR CORE
		10x10	231-350			
		12x12	351-500			
		14x14	501-680			
		16x16	681-840			

SYMBOL	TYPE	NECK SIZE	MAX CFM	MODEL	ACCESSORIES	STYLE
B	RETURN OR EXHAUST	8x8	200	FOR INSTALLATION IN LAY-IN CEILING: PRICE PDDR PERFORATED FACE. FOR INSTALLATION IN HARD CEILING, DUCTWORK OR FOR NECK SIZES ABOVE 22x22: PRICE 530 FOR INSTALLATION IN FIRE RATED CEILING: PRICE PDDR-FR	OPPOSED BLADE DAMPER	RETURN, EXHAUST, OR TRANSFER AIR GRILLE
		10x10	300			
		12x12	450			
		14x14	600			
		16x16	800			
		18x18	1000			
		20x20	1200			

SYMBOL	TYPE	NECK SIZE	CFM RANGE	MODEL	ACCESSORIES	STYLE
C	SUPPLY AIR	SEE PLANS	SEE PLANS	PRICE RCD	OPPOSED BLADE DAMPER	ROUND CONE DIFFUSER, ADJUSTABLE CONE
D	SUPPLY AIR	SEE PLANS	SEE PLANS	PRICE ND-A	APERTURE DAMPER	AIR NOZZLE
E	RETURN AIR	SEE PLANS	SEE PLANS	PRICE 530	OPPOSED BLADE DAMPER	SIDEWALL RETURN OR EXHAUST
F	SUPPLY AIR	SEE PLANS	SEE PLANS	FOR INSTALLATION IN HARD LID: PRICE JET SLOT JSP230	OPPOSED BLADE DAMPER; ENGINEERED PLENUM	SUPPLY LINEAR
G	RETURN AIR	SEE PLANS	SEE PLANS	FOR INSTALLATION IN HARD LID: PRICE JET SLOT JSP230	OPPOSED BLADE DAMPER; ENGINEERED PLENUM	RETURN LINEAR

CHILLER SCHEDULE AIR COOLED

SYMBOL	DESCRIPTION	CAPACITY (TONS)	REFRI-GERANT	EVAPORATOR DATA				CONDENSER DATA			COMPRESSOR ELECT. DATA				KW/TON (MAX.)	OPER. WT. (LBS.)	REMARKS
				GPM	EWT	LWT	MAX PD	H.P	V	PH	RLA	V	PH	HZ			
CH 1	DAIKIN #AWS310CDP	295.1	R134-a	506	56	42	10.4	1.4 (QTY. 20)	460	3	238 (QTY. 2)	460	3	60	1.06	25,930	1 2 3 4 5

1 SINGLE POINT POWER CONNECTION: MCA = 568.6A, MOP = 700A 2 AMBIENT = 90.0 F, LOW AMBIENT CONTROL TO 35.0 F 3 PROVIDE VFD WITH INTEGRAL DISCONNECT AND HARMONIC MITIGATION.
4 PROVIDE WITH NETWORK INTERFACE CARD 5 PROVIDE WITH CONDENSER COIL CORROSION PROTECTION

PUMP SCHEDULE

SYMBOL	DESCRIPTION	SERVICE	FLOW GPM	HEAD FT.	INLET WATER TEMP.	MOTOR					EFF.	OPER WT. (LBS.)	REMARKS
						MAX HP	V	PH	HZ	RPM			
P 1	B&G 2EB-SERIES E-150	CHW	257	100	56	10	460	3	60	1750	73.64%	750	1 2 3
P 2	B&G 2EB-SERIES E-150	CHW	257	100	56	10	460	3	60	1750	73.64%	750	1 2 3

1 STAINLESS STEEL FITTED CONSTRUCTION 2 PROVIDE WITH VFDS WITH INTEGRAL DISCONNECTS 3 PROVIDE WITH SUCTION DIFFUSER

EXPANSION TANK SCHEDULE

SYMBOL	DESCRIPTION	CAPACITY (GAL.)	ACCEP-TANCE (GAL.)	DIAMETER (IN.)	HEIGHT (IN.)	ASME RATED PRESSURE (PSI)	OPER. WT. (LBM)	CHARGE PRESS (PSIG)	FEEDER PRESS (PSIG)	RELIEF PRESS (PSIG)	REMARKS
EX 1	B & G XYLEM B-400	132	132	24	78	125	1500	12	--	--	1

1 BLADDER TYPE

BUFFER TANK SCHEDULE

SYMBOL	DESCRIPTION	GPM	DIMENSION (IN.)	MAX OPER. WT. LBS.	ASME RATED PRESSURE (PSI)	REMARKS
BT 1	WESSELS CBT-500	500	36" DIA x 72"	5600	125	1

1 PROVIDE WITH TOP AIR VENT

VRF HEAT RECOVERY BOX SCHEDULE

SYMBOL	DESCRIPTION	FAN COILS SERVED	ELECTRICAL DATA				OPER. WT. LBS.	REMARKS
			V	PH	Hz	RLA		
HRB 1-1	LG PRHR031A	FC-1-9, FC-1-10, FC-1-11	120	1	60	0.12	50	1 2
HRB 1-2	LG PRHR021A	FC-1-4	120	1	60	0.08	50	1 2
HRB 1-3	LG PRHR041A	FC-1-5, FC-1-6, FC-1-7, FC-1-8	120	1	60	0.16	50	1 2
HRB 1-4	LG PRHR041A	FC-1-1, FC-1-2, FC-1-3	120	1	60	0.16	50	1 2
HRB 2-1	LG PRHR041A	FC-1-9, FC-1-10, FC-1-11	120	1	60	0.16	50	1 2
HRB 2-2	LG PRHR041A	FC-1-9, FC-1-10, FC-1-11	120	1	60	0.16	50	1 2
HRB 2-3	LG PRHR041A	FC-1-9, FC-1-10, FC-1-11	120	1	60	0.16	50	1 2
HRB 2-4	LG PRHR021A	FC-1-9, FC-1-10, FC-1-11	120	1	60	0.08	50	1 2

1 CONDENSATE PUMP REQUIRED (SEE PLUMBING PLANS) 2 PROVIDE MOUNTING PER MANUFACTURER'S INSTALLATION INSTRUCTIONS

VIBRATION ISOLATION SCHEDULE

SYMBOL	SERVICE	DESCRIPTION	VIBRATION ISOLATION				REMARKS
			QUANTITY	ANCHOR BOLT SIZE & No.	ARCH. ATTACH. DET.	ISOLATION SPRG./ LONG SIDE	
P -	ROOF MOUNTED PUMPS	MASON # BMK/KSL BASE WITH # SLF SPRING MOUNTS & # Z1225 SEISMIC RESTRAINTS	SEE PLANS	--	--	1" DEF	--
FC - EF - MUA - HRB -	FAN COILS / INLINE EXHAUST FANS/ MUA-FANS/ HR BOXES	MASON # RW30 SPRING HANGERS WITH # SCB/SCHB SEISMIC CABLE BRACES	SEE PLANS	--	--	1" DEF	PROVIDE # UCC SEISMIC ROD CLAMPS WHERE REQUIRED
RF -	ROOF MOUNTED EXHAUST FANS	MASON # SSLFH DEFLECTION SEISMIC SPRING MOUNTS	SEE PLANS	--	--	1" DEF	--
CU -	ROOF MOUNTED CONDENSING UNITS	MASON # SWM 3/4" NEOPRENE PADS & # HG NEOPRENE BOLT GROMMETS	SEE PLANS	--	--	--	PROVIDE NEOPRENE PADS WITH LOAD DISTRIBUTION PLATES
HP -	ROOF MOUNTED VRF HEAT PUMPS	MASON # MSL BASE WITH # SLREBP SEISMIC SPRING MOUNTS	SEE PLANS	--	--	2" DEF	--
CH -	ROOF MOUNTED AIR COOLED CHILLER	MASON # SLRSEB06 SEISMIC SPRING MOUNTS	SEE PLANS	--	--	2" DEF	--
SCF -	SMOKE CONTROL FANS	MASON # SLRSEB06 SEISMIC SPRING MOUNTS	SEE PLANS	--	--	2" DEF	--

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AIRBORNE SAN DIEGO
1401 IMPERIAL AVENUE
SAN DIEGO CA. 92101

03-06-15	CITY RESUBMITTAL
12-05-14	PLAN CHECK SUBMITTAL
11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER DANIEL J. GRAMMER M34498 Exp. 6/30/15 MECHANICAL STATE OF CALIFORNIA

5512

PROJECT NO: 5432.00
FILE NAME: \\BIM\Central\5432.00_Arch-Central.rvt
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TITLE:

MECHANICAL SCHEDULES

MA ENGINEERS
5160 Carroll Canyon Rd, Suite 200
San Diego, California 92121
Consulting Mechanical Engineers
Ⓣ858 200-0030 Ⓕ858 200-0037
www.ma-engr.com

DRAWING NO:
M0.2

PERFORMANCE CERTIFICATE OF COMPLIANCE (Part 1 of 3) PERF-1C

Project Name			Date
Airborne San Diego			*3/5/2015*
Project Address	Climate Zone	Total Cond. Floor Area	Addition Floor Area
1401 Imperial Avenue San Diego	*CA Climate Zone 07*	*14,714*	*n/a*

GENERAL INFORMATION

Building Type: ☑ Nonresidential ☐ High-Rise Residential ☐ Hotel/Motel Guest Room
☐ Relocatable - indicate ☐ specific climate zone ☐ all climates
Phase of Construction: ☑ New Construction ☐ Addition ☐ Alteration

STATEMENT OF COMPLIANCE

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation author hereby certifies that the documentation is accurate and complete.

Documentation Author

Name	Daniel Grammier	Signature	
Company	MA Engineers	Date	3/5/2015
Address	5160 Carrol Canyon Rd. Suite 200	Phone	858.200.0030
City/State/Zip	San Diego, CA 92121		

The Principal Designer hereby certifies that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building has been designed to meet the energy efficiency requirements contained in sections 110.0, 116.0 through 118.0, and 140.0 through 149.0 of Title 24, Part 6.
Please check one:

ENV.	LTG.	MECH.	
☐	☐	☒	I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
☐	☐	☒	I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code by section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
☐	☐	☒	I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538 and 6737.1.

Principal Envelope Designer

Name	Carrier Johnson	Signature	
Company	Carrier Johnson	Date	
Address	1301 third avenue	License #	
City/State/Zip	San Diego, CA 92101	Phone	

Principal Mechanical Designer

Name	Daniel Grammier	Signature	
Company	MA Engineers	Date	03-05-2015
Address	5160 Carroll Canyon Rd. Suite 200	License #	M34498
City/State/Zip	San Diego, CA 92121	Phone	858-200-0030

Principal Lighting Designer

Name		Signature	
Company	Lighting Compliance Not In The Scope Of This Submittal	Date	
Address		License #	
City/State/Zip		Phone	

INSTRUCTIONS TO APPLICANT COMPLIANCE & WORKSHEETS (check box if worksheets are included)

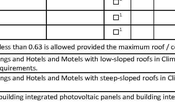
☑	ENV-01	Certificate of Compliance. Required on plans.	☒	MCH-01	Certificate of Compliance. Required on plans.
☐	LTI-01	Certificate of Compliance. Required on plans.	☒	MCH-02	HVAC AirWater Side Requirements.
☐	LTI-02	Lighting Controls Credit Worksheet.	☒	MCH-03	Mechanical Ventilation and Reheat.
☐	LTI-03	Indoor Lighting Power Allowance.	☒	MCH-06	Mechanical Equipment Details.

PERFORMANCE CERTIFICATE OF COMPLIANCE (Part 2 of 3) PERF-1C

Project Name	Date
Airborne San Diego	*3/5/2015*

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating	*47.10*	*3.33*	*43.78*
Space Cooling	*2,061.86*	*1,346.01*	*715.85*
Indoor Fans	*321.63*	*331.97*	*-10.33*
Heat Rejection	*0.00*	*0.00*	*0.00*
Pumps & Misc.	*0.00*	*0.00*	*0.00*
Domestic Hot Water	*18.63*	*42.85*	*-24.22*
Lighting	*57.95*	*57.95*	*0.00*
Receptacle	*47.50*	*47.50*	*0.00*
Process	*4,439.08*	*4,439.08*	*0.00*
Process Lighting	*0.00*	*0.00*	*0.00*
TOTALS	*6,993.75*	*6,268.68*	*725.07*
Percent better than Standard		*10.4 %*	*(28.4 % excluding process)*



BUILDING COMPLIES

GENERAL INFORMATION

Building Orientation	*(N) 0 deg*	Conditioned Floor Area	*14,714* sqft.
Number of Stories	*3*	Unconditioned Floor Area	*0* sqft.
Number of Systems	*27*	Conditioned Footprint Area	*7,367* sqft.
Number of Zones	*26*	Natural Gas Available On Site	*Yes*

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	*(N)*	*2,104*	sqft.	*1,894*	sqft.	*90.0 %*
Left Elevation	*(E)*	*2,124*	sqft.	*0*	sqft.	*0.0 %*
Rear Elevation	*(S)*	*640*	sqft.	*0*	sqft.	*0.0 %*
Right Elevation	*(W)*	*2,269*	sqft.	*2,043*	sqft.	*90.0 %*
Total		*7,137*	sqft.	*3,937*	sqft.	*55.2 %*
Roof		*3,472*	sqft.	*0*	sqft.	*0.0 %*

	Standard		Proposed		
Prescriptive Lighting Power Density	*0.921*	W/sqft.	*0.921*	W/sqft.	Prescriptive Values for Comparison only. See LTI-01 for allowed LPD.

Remarks:

PERFORMANCE CERTIFICATE OF COMPLIANCE (Part 3 of 3) PERF-1C

Project Name	Date
Airborne San Diego	*3/5/2015*

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf)	Ctrl. Credits (W/sf)	Allowed LPD Area (W/sf)	Allowed LPD Tailored (W/sf)	Proc. Loads (W/sf)
FC-1-1	*FC-1-1*	*Kitchen, Food Preparation*	*266*	**1.600*				
FC-1-2	*FC-1-2*	*Dining*	*736*	**1.100*				*0.500*
FC-1-3	*FC-1-3*	*Corridor/Restroom/Support*	*1,293*	**0.600*				*0.500*
FC-1-4	*FC-1-4*	*Corridor/Restroom/Support*	*892*	**0.600*				
FC-1-5	*FC-1-5*	*Classroom, Lecture, Training*	*136*	**1.200*				*0.500*
FC-1-6	*FC-1-6*	*Classroom, Lecture, Training*	*134*	**1.200*				*0.500*
FC-1-7	*FC-1-7*	*Classroom, Lecture, Training*	*200*	**1.200*				*0.500*
FC-1-8	*FC-1-8*	*Corridor/Restroom/Support*	*431*	**0.600*				*0.500*
FC-1-9	*FC-1-9*	*Corridor/Restroom/Support*	*900*	**0.600*				
FC-1-10	*FC-1-10*	*Office <= 250 sqft*	*437*	**1.000*				*0.500*
FC-1-11	*FC-1-11*	*Corridor/Restroom/Support*	*482*	**0.600*				
FC-2-1	*FC-2-1*	*Waiting Area*	*1,172*	**1.100*				*0.500*
FC-2-2	*FC-2-2*	*Retail Sales, Wholesale*	*905*	**1.200*				*0.500*
FC-2-3	*FC-2-3*	*Office > 250 sqft*	*456*	**0.750*				
FC-2-4	*FC-2-4*	*Classroom, Lecture, Training*	*240*	**1.200*				*0.500*
FC-2-5	*FC-2-5*	*Classroom, Lecture, Training*	*712*	**1.200*				*0.500*
FC-2-6	*FC-2-6*	*Waiting Area*	*960*	**1.100*				*0.500*
FC-2-7	*FC-2-7*	*Lounge, Recreation*	*451*	**1.100*				*1.000*
FC-2-8	*FC-2-8*	*Lounge, Recreation*	*500*	**1.100*				*1.000*
FC-2-9	*FC-2-9*	*Waiting Area*	*960*	**1.100*				*0.500*

Notes: 1. See LTI-01 (Items marked with asterisk, see LTI-01 by others) 2. See LTI-02 3. See LTI-03 (by others) 4. See LTI-04 Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justifications, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The Chilled Water Pump includes a Variable Speed Drive.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

PERFORMANCE CERTIFICATE OF COMPLIANCE (Part 3 of 3) PERF-1C

Project Name	Date
Airborne San Diego	*3/5/2015*

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf)	Ctrl. Credits (W/sf)	Allowed LPD Area (W/sf)	Allowed LPD Tailored (W/sf)	Proc. Loads (W/sf)
FC-2-10	*FC-2-10*	*Office > 250 sqft*	*130*	**0.750*				*0.500*
FC-2-11	*FC-2-11*	*Office > 250 sqft*	*228*	**0.750*				*0.500*
FC-2-12	*FC-2-12*	*Classroom, Lecture, Training*	*335*	**1.200*				*0.500*
CU-2-1/DFC-2-1	*CU-2-1/DFC-2-1*	*Electrical, Mechanical Room*	*53*	**0.700*				*30.000*
CU-3-1/DFC-3-1 & DFC-3-2	*CU-3-1/DFC-3-1 & DFC-3-2*	*Electrical, Mechanical Room*	*245*	**0.700*				*30.000*
Process load (Daiken Chiller)	*Process load (Daiken Chiller)*	*Electrical, Mechanical Room*	*1,460*	**0.700*				*710.000*

Notes: 1. See LTI-01 (Items marked with asterisk, see LTI-01 by others) 2. See LTI-02 3. See LTI-03 (by others) 4. See LTI-04 Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justifications, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

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Authorized Signature or Stamp _____

STATE OF CALIFORNIA
ENVELOPE COMPONENT APPROACH
CEC-NRCC-ENV-01-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ENV-01-E
Envelope Component Approach	(Page 1 of 4)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

A. GENERAL INFORMATION

1	**Project Location:**	1401 Imperial Avenue	6	**Compliance Method:**	☑ Component ☐ Unconditioned (file Affidavit)
2	**CA City and Zip Code:**	San Diego, 92101	7	**Building Front Orientation (deg or cardinal):**	0 deg
3	**Climate Zone:**	7	8	**Permitted Scope of Work**	☑ New Construction ☐ Addition ☐ Alteration
4	**Total Conditioned Floor Area:**	14,714	9	**Building Type(s)**	☑ Nonresidential ☐ High-Rise Residential ☐ Hotel/Motel Guest Room
5	☐ Schools (Public School) ☐ Relocatable Public School Bldg. ☑ Conditioned Spaces ☐ Unconditioned Spaces ☐ Skylight Area for Large Enclosed Space > 5000 ft² (If checked include the NRCC-ENV-04-E with submittal)				

B. ENVELOPE DETAILS – Framed

1 Tag/ID	2 Assembly Type	3 Frame Material	4 Frame Depth	5 Frame Spacing	6 Appendix JA4 Reference	7 Cavity R-value	8 Continuous Insulation R-value	9 Proposed U-Factor	10 Required U-Factor From Tables, B, C, D	11 Comments
1	Wall	Metal	2x4 @ 16		4.3.3-A4	13	0.0	0.217		R-13 Wall Metal Stud
2	Roof	Wood	No Firepro		4.2.6-A8	0	30.0	0.031		R-30 Roof

C. ENVELOPE DETAILS – Non-framed

1 Tag/ID	2 Assembly Type	3 Assembly Materials	4 Thickness (inches)	5 Interior or Core Insulation R-value	6 Continuous Insulation R-value	7 Appendix JA4 Reference	8 Proposed U-Factor	9 Required U-Factor from Tables, B, C, D	10 Comments

D. ENVELOPE DETAILS – Mass

1 Tag/ID	2 Mass Type	3 Density (lb/ft³)	4 Mass Thickness (inches)	5 Furring Strip Thickness (inches)	6 Interior Insulation R-value	7 Exterior Insulation R-value	8 Appendix JA4 Reference	9 Proposed Insulation U-factor	10 Required U-Factor from Tables, B, C, D	11 Comments
1	Wall	23.0			0.0	0.0	4.3.6-J2	0.450		Concrete Wall

STATE OF CALIFORNIA
ENVELOPE COMPONENT APPROACH
CEC-NRCC-ENV-01-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ENV-01-E
Envelope Component Approach	(Page 3 of 4)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

G. FENESTRATION PROPOSED AREAS AND EFFICIENCIES

1 Tag/ID	2 Fenestration Type	3 Area	4 Orientation N, S, W, E or Roof	5 # of Panes	6 Max U-Factor	7 Overhang	8 Max (R)SHGC	9 Min VT	10 Label	11 Conditions Status	12 Comments
10	Storefront	405	W	2	0.67	No	0.30	0.46		New	
11	Storefront	73	W	2	0.67	No	0.30	0.46		New	
12	Storefront	348	N	2	0.67	No	0.30	0.46		New	
13	Storefront	70	W	2	0.67	No	0.30	0.46		New	
14	Storefront	644	N	2	0.67	No	0.30	0.46		New	
15	Storefront	72	W	2	0.67	No	0.30	0.46		New	
16	Storefront	574	N	2	0.67	No	0.30	0.46		New	

H. ENVELOPE MANDATORY MEASURES

Indicate location on building plans of Mandatory Envelope Measures Note Block: ENV-MM

INSTRUCTIONS TO APPLICANT ENVELOPE COMPLIANCE & WORKSHEETS (check box if worksheet are included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, please refer to the Nonresidential Compliance Manual.

☑	NRCC-ENV-01-E	Certificate of Compliance. Required on plans for all submittals.
☐	NRCC-ENV-04-E	Use when minimum skylight requirements for large enclosed spaces are required in climate zones 2 through 15. Optional on plans.

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CEC-NRCC-MCH-01-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-01-E
Mechanical Systems	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

MECHANICAL COMPLIANCE FORMS & WORKSHEETS (check box if worksheet is included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, refer to the 2013 Nonresidential Manual
Note: The Enforcement Agency may require all forms to be incorporated onto the building plans.

YES	NO	Form/Worksheet #	Title
☑	☐	NRCC-MCH-01-E (Part 1 of 3)	Certificate of Compliance, Declaration. Required on plans for all submittals.
☑	☐	NRCC-MCH-01-E (Part 2 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-02A to 11A). Required on plans for all submittals.
☑	☐	NRCC-MCH-01-E (Part 3 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-12A to 18A). Required on plans where applicable.
☑	☐	NRCC-MCH-02-E (Part 1 of 2)	Mechanical Dry Equipment Summary is required for all submittals with Central Air Systems. It is optional on plans.
☑	☐	NRCC-MCH-02-E (Part 2 of 2)	Mechanical Wet Equipment Summary is required for all submittals with chilled water, hot water or condenser water systems. It is optional on plans.
☑	☐	NRCC-MCH-03-E	Mechanical Ventilation and Reheat is required for all submittals with multiple zone heating and cooling systems. It is optional on plans.

MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)

Designer:
This form is to be used by the designer and attached to the plans. Listed below are all the acceptance tests for HVAC systems. The designer is required to check the applicable boxes for all acceptance tests that apply and list all equipment that requires an acceptance test. All equipment of the same type that requires a test, list the equipment description and the number of systems.

Installing Contractor:
The contractor who installed the equipment is responsible to either conduct the acceptance test them self or have a qualified entity run the test for them. If more than one person has responsibility for the acceptance testing, each person shall sign and submit the Certificate of Acceptance applicable to the portion of the construction or installation for which they are responsible.

Enforcement Agency:
Plancheck – The NRCC-MCH-01-E form is not considered a completed form and is not to be accepted by the building department unless the correct boxes are checked.
Inspector - Before occupancy permit is granted all newly installed process systems must be tested to ensure proper operations.

Test Description: Equipment Requiring Testing or Verification	# of units	MCH-02A Outdoor Air	MCH-03A Single Zone Unitary	MCH-04A Air Distribution Ducts	MCH-05A Economizer Controls	MCH-06A Demand Control Ventilation (DCV)	MCH-07A Supply Fan VAV	MCH-08A Valve Leakage Test	MCH-09A Supply Water Temp. Reset	MCH-10A Hydronic System Variable Flow Control	MCH-11A Automatic Demand Shed Control
High Efficiency	3	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	7	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	3	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	1	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	4	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	2	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CEC-NRCC-MCH-01-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-01-E
Mechanical Systems	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

MECHANICAL COMPLIANCE FORMS & WORKSHEETS (check box if worksheet is included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, refer to the 2013 Nonresidential Manual
Note: The Enforcement Agency may require all forms to be incorporated onto the building plans.

YES	NO	Form/Worksheet #	Title
☑	☐	NRCC-MCH-01-E (Part 1 of 3)	Certificate of Compliance, Declaration. Required on plans for all submittals.
☑	☐	NRCC-MCH-01-E (Part 2 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-02A to 11A). Required on plans for all submittals.
☑	☐	NRCC-MCH-01-E (Part 3 of 3)	Certificate of Compliance, Required Acceptance Tests (MCH-12A to 18A). Required on plans where applicable.
☑	☐	NRCC-MCH-02-E (Part 1 of 2)	Mechanical Dry Equipment Summary is required for all submittals with Central Air Systems. It is optional on plans.
☑	☐	NRCC-MCH-02-E (Part 2 of 2)	Mechanical Wet Equipment Summary is required for all submittals with chilled water, hot water or condenser water systems. It is optional on plans.
☑	☐	NRCC-MCH-03-E	Mechanical Ventilation and Reheat is required for all submittals with multiple zone heating and cooling systems. It is optional on plans.

MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)

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Test Description: Equipment Requiring Testing or Verification	# of units	MCH-02A Outdoor Air	MCH-03A Single Zone Unitary	MCH-04A Air Distribution Ducts	MCH-05A Economizer Controls	MCH-06A Demand Control Ventilation (DCV)	MCH-07A Supply Fan VAV	MCH-08A Valve Leakage Test	MCH-09A Supply Water Temp. Reset	MCH-10A Hydronic System Variable Flow Control	MCH-11A Automatic Demand Shed Control
High Efficiency	1	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	1	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	1	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	1	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
High Efficiency	2	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
Daiken	1	☐	☐	☐	☐	☐	☐	☑	☑	☑	☐

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AIRBORNE SAN DIEGO
1401 IMPERIAL AVENUE
SAN DIEGO CA. 92101

03-06-15	CITY RESUBMITTAL
12-05-14	PLAN CHECK SUBMITTAL
11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER DANIEL J. GRAMMIER M34498 Exp. 6/30/15 MECHANICAL STATE OF CALIFORNIA

5512

PROJECT NO: 5432.00
FILE NAME: \BIM\Central\5432.00_Arch-Central.rvt
DRAWN BY: Author CHECKED BY: Checker
PLOT DATE: 3/5/2015 5:00:49 PM
TITLE:

TITLE 24 CALCULATIONS

DRAWING NO:

M0.3

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San Diego, California 92121
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STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CEC-NRCC-MCH-01-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-01-E
Mechanical Systems	(Page 2 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)

Designer:
This form is to be used by the designer and attached to the plans. Listed below are all the acceptance tests for HVAC systems. The designer is required to check the applicable boxes for all acceptance tests that apply and list all equipment that requires an acceptance test. All equipment of the same type that requires a test, list the equipment description and the number of systems.

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Inspector - Before occupancy permit is granted all newly installed process systems must be tested to ensure proper operations.

Test Description: Equipment Requiring Testing or Verification	# of units	MCH-12A Fault Detection & Diagnostics for DX Units	MCH-13A Automatic Fault Detection & Diagnostics for Air & Zone	MCH-14A Distributed Energy Storage DX AC Systems	MCH-15A Thermal Energy Storage (TES) Systems	MCH-16A Supply Air Temperature Reset Controls	MCH-17A Condenser Water Reset Controls	MCH-18A ECMS
High Efficiency I	3	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	7	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	3	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	1	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	4	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	2	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	1	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	1	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	1	☐	☐	☐	☐	☐	☐	☐
High Efficiency I	1	☐	☐	☐	☐	☐	☐	☐

STATE OF CALIFORNIA
MECHANICAL SYSTEMS
CEC-NRCC-MCH-01-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-01-E
Mechanical Systems	(Page 2 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

MECHANICAL HVAC ACCEPTANCE FORMS (check box for required forms)

Designer:
This form is to be used by the designer and attached to the plans. Listed below are all the acceptance tests for HVAC systems. The designer is required to check the applicable boxes for all acceptance tests that apply and list all equipment that requires an acceptance test. All equipment of the same type that requires a test, list the equipment description and the number of systems.

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Test Description: Equipment Requiring Testing or Verification	# of units	MCH-12A Fault Detection & Diagnostics for DX Units	MCH-13A Automatic Fault Detection & Diagnostics for Air & Zone	MCH-14A Distributed Energy Storage DX AC Systems	MCH-15A Thermal Energy Storage (TES) Systems	MCH-16A Supply Air Temperature Reset Controls	MCH-17A Condenser Water Reset Controls	MCH-18A ECMS
High Efficiency I	2	☐	☐	☐	☐	☐	☐	☐
Daiken	1	☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐	☐	☐

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-1-1	FC-1-2	FC-1-3
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents[2]*		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
3. *The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. Where appliance standards apply (110.1), identify where equipment is required to be listed per Title 20 1601 et seq.*
4. *Identify where the ventilation requirements are documented for each central HVAC system. Include references to both central unit schedules and sequences of operation. If one or more space is naturally ventilated identify where this is documented in the plans and specifications. Multiple zone central air systems must also provide a MCH-03-E form.*
5. *If one or more space has demand controlled ventilation identify where it is specified including the sensor specifications and the sequence of operation.*
6. *If one or more space has occupant sensor ventilation control identify where it is specified including the sensor specifications and the sequence of operation*
7. *If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable).*
8. *Identify where the heating, cooling and deadband airflows are scheduled for this system. Include a reference to the specification of the zone controls. Provide a MCH-03-E form.*
9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-1-4	FC-1-5	FC-1-6
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents[2]*		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
3. *The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. Where appliance standards apply (110.1), identify where equipment is required to be listed per Title 20 1601 et seq.*
4. *Identify where the ventilation requirements are documented for each central HVAC system. Include references to both central unit schedules and sequences of operation. If one or more space is naturally ventilated identify where this is documented in the plans and specifications. Multiple zone central air systems must also provide a MCH-03-E form.*
5. *If one or more space has demand controlled ventilation identify where it is specified including the sensor specifications and the sequence of operation.*
6. *If one or more space has occupant sensor ventilation control identify where it is specified including the sensor specifications and the sequence of operation*
7. *If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable).*
8. *Identify where the heating, cooling and deadband airflows are scheduled for this system. Include a reference to the specification of the zone controls. Provide a MCH-03-E form.*
9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-1-7	FC-1-8	FC-1-9
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents[2]*		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
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6. *If one or more space has occupant sensor ventilation control identify where it is specified including the sensor specifications and the sequence of operation*
7. *If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable).*
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9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-1-10	FC-1-11	FC-2-1
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents[2]*		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
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9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 08/14) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-2-2	FC-2-3	FC-2-4
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents[2]*		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
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10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

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03-06-15	CITY RESUBMITTAL
12-05-14	PLAN CHECK SUBMITTAL
11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMLER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

5512

PROJECT NO: 5432.00
FILE NAME: \\BIM\Central\5432.00_Arch-Central.rvt
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STATE OF CALIFORNIA

HVAC SYSTEM REQUIREMENTS

CEC-NRCC-MCH-02-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-2-5	FC-2-6	FC-2-7
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents*[2]		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
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7. *If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable).*
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9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-2-8	FC-2-9	FC-2-10
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents*[2]		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
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STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		FC-2-11	FC-2-12	CU-2-1/DFC-2-1
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents*[2]		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	M0.2
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	M0.2
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	M0.2
Low leakage AHUs	110.2(f)	M0.2	M0.2	M0.2
Ventilation[4]	120.1(b)	M0.2	M0.2	M0.2
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	M0.2
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	M0.2
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	M0.2
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	M0.2
Isolation Zones	120.2(g)	M0.2	M0.2	M0.2
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	M0.2
Economizer FDD	120.2(i)	M0.2	M0.2	M0.2
Duct Insulation	120.4	M0.2	M0.2	M0.2
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	Y
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	M0.2
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	M0.2
Economizer	140.4(e)	M0.2	M0.2	M0.2
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	M0.2
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	M0.2
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	M0.2

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
3. *The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. Where appliance standards apply (110.1), identify where equipment is required to be listed per Title 20 1601 et seq.*
4. *Identify where the ventilation requirements are documented for each central HVAC system. Include references to both central unit schedules and sequences of operation. If one or more space is naturally ventilated identify where this is documented in the plans and specifications. Multiple zone central air systems must also provide a MCH-03-E form.*
5. *If one or more space has demand controlled ventilation identify where it is specified including the sensor specifications and the sequence of operation.*
6. *If one or more space has occupant sensor ventilation control identify where it is specified including the sensor specifications and the sequence of operation*
7. *If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable).*
8. *Identify where the heating, cooling and deadband airflows are scheduled for this system. Include a reference to the specification of the zone controls. Provide a MCH-03-E form.*
9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA
HVAC SYSTEM REQUIREMENTS
CEC-NRCC-MCH-02-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Dry System Requirements	(Page 1 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		CU-3-1/DFC-3-1 8	Process load (Dai	
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents*[2]		
Heating Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	
Cooling Equipment Efficiency[3]	110.1 or 110.2(a)	M0.2	M0.2	
HVAC or Heat Pump Thermostats	110.2(b), 110.2(c)	M0.2	M0.2	
Furnace Standby Loss Control	110.2(d)	M0.2	M0.2	
Low leakage AHUs	110.2(f)	M0.2	M0.2	
Ventilation[4]	120.1(b)	M0.2	M0.2	
Demand Control Ventilation[5]	120.1(c)4	M0.2	M0.2	
Occupant Sensor Ventilation Control[6]	120.1(c)5, 120.2(e)3	M0.2	M0.2	
Shutoff and Reset Controls[7]	120.2(e)	M0.2	M0.2	
Outdoor Air and Exhaust Damper Control	120.2(f)	M0.2	M0.2	
Isolation Zones	120.2(g)	M0.2	M0.2	
Automatic Demand Shed Controls	120.2(h)	M0.2	M0.2	
Economizer FDD	120.2(i)	M0.2	M0.2	
Duct Insulation	120.4	M0.2	M0.2	
PRESCRIPTIVE MEASURES				
Equipment is sized in conformance with 140.4 (a & b)	140.4(a & b)	Y	Y	
Supply Fan Pressure Control	140.4(c)	M0.2	M0.2	
Simultaneous Heat/Cool[8]	140.4(d)	M0.2	M0.2	
Economizer	140.4(e)	M0.2	M0.2	
Heat and Cool Air Supply Reset	140.4(f)	M0.2	M0.2	
Electric Resistance Heating[9]	140.4(g)	M0.2	M0.2	
Duct Leakage Sealing and Testing.[10]	140.4(l)	M0.2	M0.2	

Notes:
1. *Provide equipment tags (e.g. AHU 1 to 10) and system description (e.g. Single Duct VAV reheat) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
3. *The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. Where appliance standards apply (110.1), identify where equipment is required to be listed per Title 20 1601 et seq.*
4. *Identify where the ventilation requirements are documented for each central HVAC system. Include references to both central unit schedules and sequences of operation. If one or more space is naturally ventilated identify where this is documented in the plans and specifications. Multiple zone central air systems must also provide a MCH-03-E form.*
5. *If one or more space has demand controlled ventilation identify where it is specified including the sensor specifications and the sequence of operation.*
6. *If one or more space has occupant sensor ventilation control identify where it is specified including the sensor specifications and the sequence of operation*
7. *If the system is DDC identify the sequences for the system start/stop, optimal start, setback (if required) and setup (if required). For all systems identify the specification for the thermostats and time clocks (if applicable).*
8. *Identify where the heating, cooling and deadband airflows are scheduled for this system. Include a reference to the specification of the zone controls. Provide a MCH-03-E form.*
9. *Enter N/A if there is no electric heating. If the system has electric heating indicate which exception to 140.4(g) applies.*
10. *If duct leakage sealing and testing is required, a MCH-04-A form must be submitted.*

STATE OF CALIFORNIA

HVAC WET SYSTEM REQUIREMENTS

CEC-NRCC-MCH-02-E (Revised 06/13) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-02-E
HVAC Wet System Requirements	(Page 2 of 3)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

Equipment Tags and System Description[1]		Daiken		
MANDATORY MEASURES	*T-24 Sections*	*Reference to the Requirements in the Contract Documents*[2]		
Heating Hot Water Equipment Efficiency[3]	110.1	M0.2		
Cooling Chilled and Condenser Water Equipment Efficiency[3]	110.1, 140.4(i)	M0.2		
Open and Closed Circuit Cooling Towers conductivity or flow-based controls	110.2(e) 1	M0.2		
Open and Closed Circuit Cooling Towers Maximum Achievable Cycles of Concentration (LSI)[6]	110.2(e) 2	M0.2		
Open and Closed Circuit Cooling Towers Flow Meter with analog output	110.2(e) 3	M0.2		
Open and Closed Circuit Cooling Towers Overflow Alarm	110.2(e) 4	M0.2		
Open and Closed Circuit Cooling Towers Efficient Drift Eliminators	110.2(e) 5	M0.2		
Pipe Insulation	120.3	M0.2		
PRESCRIPTIVE MEASURES				
Cooling Tower Fan Controls	140.4(h)2, 140.4(h)5	Y		
Cooling Tower Flow Controls	140.4(h)3	M0.2		
Centrifugal Fan Cooling Towers[4]	140.4(h)4	M0.2		
Air-Cooled Chiller Limitation[5]	140.4(j)	M0.2		
Variable Flow System Design	140.4(k)	M0.2		
Chiller and Boiler Isolation	140.4(k)	M0.2		
CHW and HHW Reset Controls	140.4(k)	M0.2		
WLHP Isolation Valves	140.4(k)	M0.2		
VSD on CHW, CW & WLHP Pumps >5HP	140.4(k)	M0.2		
DP Sensor Location	140.4(k)	M0.2		

Notes:
1. *Provide equipment tags (e.g. CH 1 to 3) or system description (e.g. CHW loop) as appropriate. Multiple units with common requirements can be grouped together.*
2. *Provide references to plans (i.e. Drawing Sheet Numbers) and/or specifications (including Section name/number and relevant paragraphs) where each requirement is specified. Enter "N/A" if the requirement is not applicable to this system.*
3. *The referenced plans and specifications must include all of the following information: equipment tag, equipment nominal capacity, Title 24 minimum efficiency requirements, and actual rated equipment efficiencies. Where multiple efficiency requirements are applicable (e.g. full- and part-load) include all. For chillers operating at non-standard efficiencies provide the Kadj values. For chillers also note whether the efficiencies are Path A or Path B.*
4. *Identify if cooling towers have propeller fans. If towers use centrifugal fans document which exception is used.*
5. *If air-cooled chillers are used, document which exceptions have been used to comply with 140.4(j) and the total installed design capacity of the air-cooled chillers in the chilled water plant.*
6. *Identify the existence of a completed MCH-06-E \when open or closed circuit cooling towers are specified to be installed, otherwise enter "N/A".*

STATE OF CALIFORNIA

MECHANICAL VENTILATION AND REHEAT

CEC-NRCC-MCH-03-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-03-E
Mechanical Ventilation & Reheat	(Page 1 of 2)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)						AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheated Primary Air CFM			VAV Deadband Primary Air CFM		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
ZONE/ SYSTEM/ VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEAD-BAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CNTRL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDI-TIONED AREA (ft²)	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU-PANT	REQ'D VENT AIRFLOW (MAX OF I OR L) (CFM)	COM-PLIES	BASED DESIGN PRIMARY COOLING AIR (50% DDC,30% NON-DDC) (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COM-PLIES?	(20% DDC, N/A NON-DDC) (CFM)	(larger of M or R, N/A for NON-DDC) (CFM)	COM-PLIES
FC-1-1						266	0.15	40	1.3	15.0	20	40	Y						
											Total	40							
FC-1-2						736	0.50	368	28.0	15.0	420	420	Y						
											Total	420							
FC-1-3						1,293	0.15	194	12.9	15.0	194	194	Y						
											Total	194							
FC-1-4						892	0.15	134	8.9	15.0	134	134	Y						
											Total	134							
FC-1-5						136	0.38	52	14.0	15.0	210	210	Y						
											Total	210							
FC-1-6						134	0.38	51	13.8	15.0	207	207	Y						

Yellow shaded cells require user input. Remaining cells are protected and automatic
- B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
- C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
- D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
- E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
- F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Airflow (Column C).
- H. Minimum ventilation rate per Section §120.1. Table 120.1-A.
- J. Based on number of fixed seats where applicable or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.
- M. Required Ventilation Airflow (Req'd Ventilation Airflow) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column I or L)
- N. This column identifies whether or not the Design Primary Deadband Airflow complies or not. It compares the value in column M to the value in column C and column F.
- O. Design Primary Cooling Airflow * 0.50 for DDC, Design Primary Cooling Airflow * 0.30 for Non-DDC. If the Design Primary Cooling Airflow is less than 300 cfm, then this is not applicable.
- P. Maximum of Column M and Column O. If the Design Primary Cooling Airflow is 300 cfm or less, then this is not applicable.
- Q. This column identifies whether or not the Design Primary Reheat Airflow at the zone level, complies or not. It compares the value in column P to the value in column D.
- R. Design Primary Cooling Airflow * 0.20 for DDC. Not applicable for Non-DDC zones or zones where Design Primary Cooling Airflow is is 300 cfm or less.
- S. Maximum of Column M and Column R. Not applicable if the Design Primary Cooling Airflow is 300 cfm or less.
- T. This column identifies whether or not the Design Primary Deadband Airflow at the zone level, complies or not. It compares the value in column S to the value in column C.

STATE OF CALIFORNIA
MECHANICAL VENTILATION AND REHEAT
CEC-NRCC-MCH-03-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-03-E
Mechanical Ventilation & Reheat	(Page 1 of 2)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)						AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheated Primary Air CFM			VAV Deadband Primary Air CFM		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
ZONE/ SYSTEM/ VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEAD-BAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CNTRL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDI-TIONED AREA (ft²)	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU-PANT	REQ'D VENT AIRFLOW (MAX OF I OR L) (CFM)	COM-PLIES	BASED DESIGN PRIMARY COOLING AIR (50% DDC,30% NON-DDC) (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COM-PLIES?	(20% DDC, N/A NON-DDC) (CFM)	(larger of M or R, N/A for NON-DDC) (CFM)	COM-PLIES
											Total	207							
FC-1-7						200	0.38	76	16.0	15.0	240	240	Y						
											Total	240							
FC-1-8						431	0.15	65	4.3	15.0	65	65	Y						
											Total	65							
FC-1-9						900	0.15	135	9.0	15.0	135	135	Y						
											Total	135							
FC-1-1						437	0.15	66	6.0	15.0	90	90	Y						
											Total	90							
FC-1-1						482	0.15	72	4.8	15.0	72	72	Y						
											Total	72							

Yellow shaded cells require user input. Remaining cells are protected and automatic
- B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
- C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
- D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
- E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
- F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Airflow (Column C).
- H. Minimum ventilation rate per Section §120.1. Table 120.1-A.
- J. Based on number of fixed seats where applicable or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.
- M. Required Ventilation Airflow (Req'd Ventilation Airflow) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column I or L)
- N. This column identifies whether or not the Design Primary Deadband Airflow complies or not. It compares the value in column M to the value in column C and column F.
- O. Design Primary Cooling Airflow * 0.50 for DDC, Design Primary Cooling Airflow * 0.30 for Non-DDC. If the Design Primary Cooling Airflow is less than 300 cfm, then this is not applicable.
- P. Maximum of Column M and Column O. If the Design Primary Cooling Airflow is 300 cfm or less, then this is not applicable.
- Q. This column identifies whether or not the Design Primary Reheat Airflow at the zone level, complies or not. It compares the value in column P to the value in column D.
- R. Design Primary Cooling Airflow * 0.20 for DDC. Not applicable for Non-DDC zones or zones where Design Primary Cooling Airflow is is 300 cfm or less.
- S. Maximum of Column M and Column R. Not applicable if the Design Primary Cooling Airflow is 300 cfm or less.
- T. This column identifies whether or not the Design Primary Deadband Airflow at the zone level, complies or not. It compares the value in column S to the value in column C.

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03-06-15 CITY RESUBMITTAL
12-05-14 PLAN CHECK SUBMITTAL
11-11-14 CD PROGRESS
10-01-14 DESIGN DEVELOPMENT
08-20-14 SCHEMATIC DESIGN
ISSUES:

REGISTERED PROFESSIONAL ENGINEER DANIEL J. GRAMMIER M34498 Exp. 6/30/15 MECHANICAL STATE OF CALIFORNIA

5512

PROJECT NO: 5432.00
FILE NAME: \\BIM\Central\5432.00_Arch-Central.rvt
DRAWN BY: Author CHECKED BY: Checker
PLOT DATE: 3/5/2015 5:00:57 PM
TITLE:

TITLE 24 CALCULATIONS

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STATE OF CALIFORNIA
MECHANICAL VENTILATION AND REHEAT
CEC-NRCC-MCH-03-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-03-E
Mechanical Ventilation & Reheat	(Page 1 of 2)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)						AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheated Primary Air CFM			VAV Deadband Primary Air CFM		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
ZONE/ SYSTEM/ VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEAD-BAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CNTRL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDI-TIONED AREA (ft²)	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU-PANT	REQ'D VENT AIRFLOW (MAX OF I OR L) (CFM)	COM-PLIES	PRIMARY COOLING AIR (50% DDC,30% NON-DDC) (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COM-PLIES?	(20% DDC, N/A NON-DDC) (CFM)	(larger of M or R, N/A for NON-DDC) (CFM)	COM-PLIES
FC-2-1						1,172	0.15	176	23.4	15.0	352	352	Y						
											Total	352							
FC-2-2						905	0.20	181	18.1	15.0	272	272	Y						
											Total	272							
FC-2-3						456	0.15	68	4.6	15.0	68	68	Y						
											Total	68							
FC-2-4						240	0.38	91	12.0	15.0	180	180	Y						
											Total	180							
FC-2-5						712	0.38	271	14.0	15.0	210	271	Y						
											Total	271							
FC-2-6						960	0.15	144	21.8	15.0	327	327	Y						

Yellow shaded cells require user input. Remaining cells are protected and automatic
B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Airflow (Column C).
H. Minimum ventilation rate per Section §120.1. Table 120.1-A.
J. Based on number of fixed seats where applicable or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.
M. Required Ventilation Airflow (Req'd Ventilation Airflow) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column I or L)
N. This column identifies whether or not the Design Primary Deadband Airflow complies or not. It compares the value in column M to the value in column C and column F.
O. Design Primary Cooling Airflow * 0.50 for DDC, Design Primary Cooling Airflow * 0.30 for Non-DDC. If the Design Primary Cooling Airflow is less than 300 cfm, then this is not applicable.
P. Maximum of Column M and Column O. If the Design Primary Cooling Airflow is 300 cfm or less, then this is not applicable.
Q. This column identifies whether or not the Design Primary Reheat Airflow at the zone level, complies or not. It compares the value in column P to the value in column D.
R. Design Primary Cooling Airflow * 0.20 for DDC. Not applicable for Non-DDC zones or zones where Design Primary Cooling Airflow is is 300 cfm or less.
S. Maximum of Column M and Column R. Not applicable if the Design Primary Cooling Airflow is 300 cfm or less.
T. This column identifies whether or not the Design Primary Deadband Airflow at the zone level, complies or not. It compares the value in column S to the value in column C.

STATE OF CALIFORNIA
MECHANICAL VENTILATION AND REHEAT
CEC-NRCC-MCH-03-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION
CERTIFICATE OF COMPLIANCE NRCC-MCH-03-E
Mechanical Ventilation & Reheat (Page 1 of 2)
Project Name: Airborne San Diego Date Prepared: 3/5/2015

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)						AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheated Primary Air CFM			VAV Deadband Primary Air CFM		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
ZONE/ SYSTEM/ VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEAD-BAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CNTRL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDI-TIONED AREA (ft²)	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU-PANT	REQ'D VENT AIRFLOW (MAX OF I OR L) (CFM)	COM-PLIES	PRIMARY COOLING AIR (50% DDC,30% NON-DDC) (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COM-PLIES?	(20% DDC, N/A NON-DDC) (CFM)	(larger of M or R, N/A for NON-DDC) (CFM)	COM-PLIES
											Total	327							
FC-2-7						451	0.50	226	16.0	15.0	240	240	Y						
											Total	240							
FC-2-8						500	0.50	250	16.0	15.0	240	250	Y						
											Total	250							
FC-2-9						960	0.15	144	18.0	15.0	270	270	Y						
											Total	270							
FC-2-1						130	0.15	20	4.6	15.0	68	68	Y						
											Total	68							
FC-2-1						228	0.15	34	8.0	15.0	120	120	Y						
											Total	120							

Yellow shaded cells require user input. Remaining cells are protected and automatic
B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Airflow (Column C).
H. Minimum ventilation rate per Section §120.1. Table 120.1-A.
J. Based on number of fixed seats where applicable or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.
M. Required Ventilation Airflow (Req'd Ventilation Airflow) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column I or L)
N. This column identifies whether or not the Design Primary Deadband Airflow complies or not. It compares the value in column M to the value in column C and column F.
O. Design Primary Cooling Airflow * 0.50 for DDC, Design Primary Cooling Airflow * 0.30 for Non-DDC. If the Design Primary Cooling Airflow is less than 300 cfm, then this is not applicable.
P. Maximum of Column M and Column O. If the Design Primary Cooling Airflow is 300 cfm or less, then this is not applicable.
Q. This column identifies whether or not the Design Primary Reheat Airflow at the zone level, complies or not. It compares the value in column P to the value in column D.
R. Design Primary Cooling Airflow * 0.20 for DDC. Not applicable for Non-DDC zones or zones where Design Primary Cooling Airflow is is 300 cfm or less.
S. Maximum of Column M and Column R. Not applicable if the Design Primary Cooling Airflow is 300 cfm or less.
T. This column identifies whether or not the Design Primary Deadband Airflow at the zone level, complies or not. It compares the value in column S to the value in column C.

STATE OF CALIFORNIA
MECHANICAL VENTILATION AND REHEAT
CEC-NRCC-MCH-03-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION
CERTIFICATE OF COMPLIANCE NRCC-MCH-03-E
Mechanical Ventilation & Reheat (Page 1 of 2)
Project Name: Airborne San Diego Date Prepared: 3/5/2015

ACTUAL DESIGN INFO (FROM EQUIPMENT SCHEDULES, ETC)						AREA BASIS			OCCUPANCY BASIS			MINIMUM		VAV Reheated Primary Air CFM			VAV Deadband Primary Air CFM		
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
ZONE/ SYSTEM/ VAV BOX TAG	DESIGN PRIMARY COOLING AIRFLOW (CFM)	DESIGN PRIMARY DEAD-BAND AIRFLOW (CFM)	DESIGN PRIMARY HEATING AIRFLOW (CFM)	CNTRL TYPE DDC (Y/N)	TRANSFER AIRFLOW (CFM)	CONDI-TIONED AREA (ft²)	MIN CFM PER AREA	MIN CFM BY AREA	NUM. OF PEOPLE	CFM PER PERSON	MIN CFM BY OCCU-PANT	REQ'D VENT AIRFLOW (MAX OF I OR L) (CFM)	COM-PLIES	PRIMARY COOLING AIR (50% DDC,30% NON-DDC) (CFM)	MAXIMUM REHEAT CFM (MAX OF M OR O)	COM-PLIES?	(20% DDC, N/A NON-DDC) (CFM)	(larger of M or R, N/A for NON-DDC) (CFM)	COM-PLIES
FC-2-1						335	0.38	127	30.2	15.0	453	453	Y						
											Total	453							
CU-2-1						53	0.15	8	0.2	50.0	8	8	Y						
											Total	8							
CU-3-1						245	0.15	37	0.7	50.0	37	37	Y						
											Total	37							
Proces						1,460	0.15	219	0.1	0.0	0	219	Y						
											Total	219							

Yellow shaded cells require user input. Remaining cells are protected and automatic
B. The largest amount of primary air supplied by the terminal unit when it's operating in the cooling mode.
C. The smallest amount of primary air supplied by the terminal unit in the deadband mode.
D. The largest amount of primary air supplied by the terminal unit when it's operating in the heating mode.
E. A terminal unit can be controlled with DDC controls, or non-DDC controls. Each control category has different reheat limitations in code.
F. Transfer Air must be provided where Required Ventilation Airflow (Column M) is greater than the Design Primary Deadband Airflow (Column C).
H. Minimum ventilation rate per Section §120.1. Table 120.1-A.
J. Based on number of fixed seats where applicable or the greater of the expected number of occupants and 50% of the CBC occupant load for egress purposes for spaces without fixed seating.
M. Required Ventilation Airflow (Req'd Ventilation Airflow) is the larger of the ventilation rates calculated on an AREA BASIS or OCCUPANCY BASIS (Column I or L)
N. This column identifies whether or not the Design Primary Deadband Airflow complies or not. It compares the value in column M to the value in column C and column F.
O. Design Primary Cooling Airflow * 0.50 for DDC, Design Primary Cooling Airflow * 0.30 for Non-DDC. If the Design Primary Cooling Airflow is less than 300 cfm, then this is not applicable.
P. Maximum of Column M and Column O. If the Design Primary Cooling Airflow is 300 cfm or less, then this is not applicable.
Q. This column identifies whether or not the Design Primary Reheat Airflow at the zone level, complies or not. It compares the value in column P to the value in column D.
R. Design Primary Cooling Airflow * 0.20 for DDC. Not applicable for Non-DDC zones or zones where Design Primary Cooling Airflow is is 300 cfm or less.
S. Maximum of Column M and Column R. Not applicable if the Design Primary Cooling Airflow is 300 cfm or less.
T. This column identifies whether or not the Design Primary Deadband Airflow at the zone level, complies or not. It compares the value in column S to the value in column C.

STATE OF CALIFORNIA
WATER HEATING SYSTEM GENERAL INFORMATION
CEC-NRCC-PLB-01-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-PLB-01-E
Water Heating System General Information	(Page 1 of 2)
Project Name: *Airborne San Diego*	Date Prepared: *3/5/2015*

A. GENERAL INFORMATION/SYSTEM INFORMATION		
1.	Water Heater System Name:	*50 Gallon Electric*
2.	Water Heater System Configuration:	*Non-Central*
3.	Water Heater System Type:	
4.	Building Type:	
5.	Total Number of Water Heaters in Systems:	*1*
6.	Central DHW Distribution Type:	*n/a*
7.	Dwelling Unit DHW Distribution Type:	*Standard*

B. WATER HEATER INFORMATION
Each water heater type requires a separate form.

1.	Water Heater Type:	*Large Srorage Electric*
2.	Fuel Type	*Electric Res*
3.	Number of Identical Water Heaters:	*1*
4.	Efficiency:	*1.00*
5.	Required Minimum Efficiency:	*1.00*
6.	Standby loss percent or Standby loss total:	*0.000*
7.	Rated Input	*153,585*
8.	Pilot Energy:	
9.	Water Heater Tank Storage Volume:	*50*
10.	Exterior Insulation On Water Heater:	*0*
11.	Volume of Supplemental Storage:	
12.	Internal Insulation on Supplemental Storage:	
13.	Exterior Insulation on Supplemental Storage:	

PLUMBING COMPLIANCE FORMS & WORKSHEETS (check box if worksheet is included)

For detailed instructions on the use of this and all Energy Efficiency Standards compliance forms, refer to the 2013 Nonresidential Manual

Note: The Enforcement Agency may require all forms to be incorporated onto the building plans.

YES	NO	Form/Worksheet #	Title
☑	☐	NRCC-PLB-01-E	Certificate of Compliance, Declaration. Required on plans for all submittals.
☐	☐	NRCI-PLB-01-E	Certificate of Installation. Required on plans for all submittals.
☐	☐	NRCI-PLB-02-E	Certificate of Installation, required on central systems in high-rise residential, hotel/motel application.
☐	☐	NRCI-PLB-03-E	Certificate of Installation, required on single dwelling unit systems in high-rise residential, hotel/motel application.
☐	☐	NRCI-PLB-21-H	Certificate of Installation, required on HERS verified central systems in high-rise residential, hotel/motel application.
☐	☐	NRCI-PLB-22-H	Certificate of Installation, required on HERS verified single dwelling unit systems in high-rise residential, hotel/motel application.
☐	☐	NRCI-STH-01-E	Certificate of Installation, required on any solar water heating

STATE OF CALIFORNIA
WATER HEATING SYSTEM GENERAL INFORMATION
CEC-NRCC-PLB-01-E (Revised 06/14) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-PLB-01-E
Water Heating System General Information	(Page 2 of 2)
Project Name: Airborne San Diego	Date Prepared: 3/5/2015

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT
1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Daniel Grammier	Documentation Author Signature:
Company: MA Engineers	Signature Date: 3/5/2015
Address: 5160 Carrol Canyon Rd. Suite 200	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: San Diego, CA 92121	Phone: 858.200.0030

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:
1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Daniel Grammier	Responsible Designer Signature:
Company : MA Engineers	Date Signed: 03-05-2015
Address: 5160 Carroll Canyon Rd. Suite 200	License: M34498
City/State/Zip: San Diego, CA 92121	Phone: 858-200-0030

ENVELOPE MANDATORY MEASURES: NONRESIDENTIAL — ENV-MM

Project Name	Date
Airborne San Diego	*3/5/2015*

DESCRIPTION

Building Envelope Measures:

§110.8(a):	Installed insulating material shall have been certified by the manufacturer to comply with the California Quality Standards for insulating material, Title 20 Chapter 4, Article 3.
§110.8(c):	All Insulating Materials shall be installed in compliance with the flame spread rating and smoke density requirements of Sections 2602 and 707 of Title 24, Part 2.
§110.8(f):	The opaque portions of framed demising walls in nonresidential buildings shall have insulation with an installed R-value of no less than R-13 between framing members.
§110.7(a):	All Exterior Joints and openings in the building that are observable sources of air leakage shall be caulked, gasketed, weatherstripped or otherwise sealed.
§110.6(a):	Manufactured fenestration products and exterior doors shall have air infiltration rates not exceeding 0.3 cfm/ft.² of window area, 0.3 cfm/ft.² of door area for residential doors, 0.3 cfm/ft.² of door area for nonresidential single doors (swinging and sliding), and 1.0 cfm/ft.² for nonresidential double doors (swinging).
§110.6(a):	Fenestration U-factor shall be rated in accordance with NFRC 100, or the applicable default U-factor.
§110.6(a) :	Fenestration SHGC shall be rated in accordance with NFRC 200, or NFRC 100 for site-built fenestration, or the applicable default SHGC.
§110.6(b):	Site Constructed Doors, Windows and Skylights shall be caulked between the unit and the building, and shall be weatherstripped (except for unframed glass doors and fire doors).

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12-05-14	PLAN CHECK SUBMITTAL
11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN
ISSUES:	

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMMIER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

5512

PROJECT NO:
5432.00

FILE NAME:
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TITLE 24 CALCULATIONS

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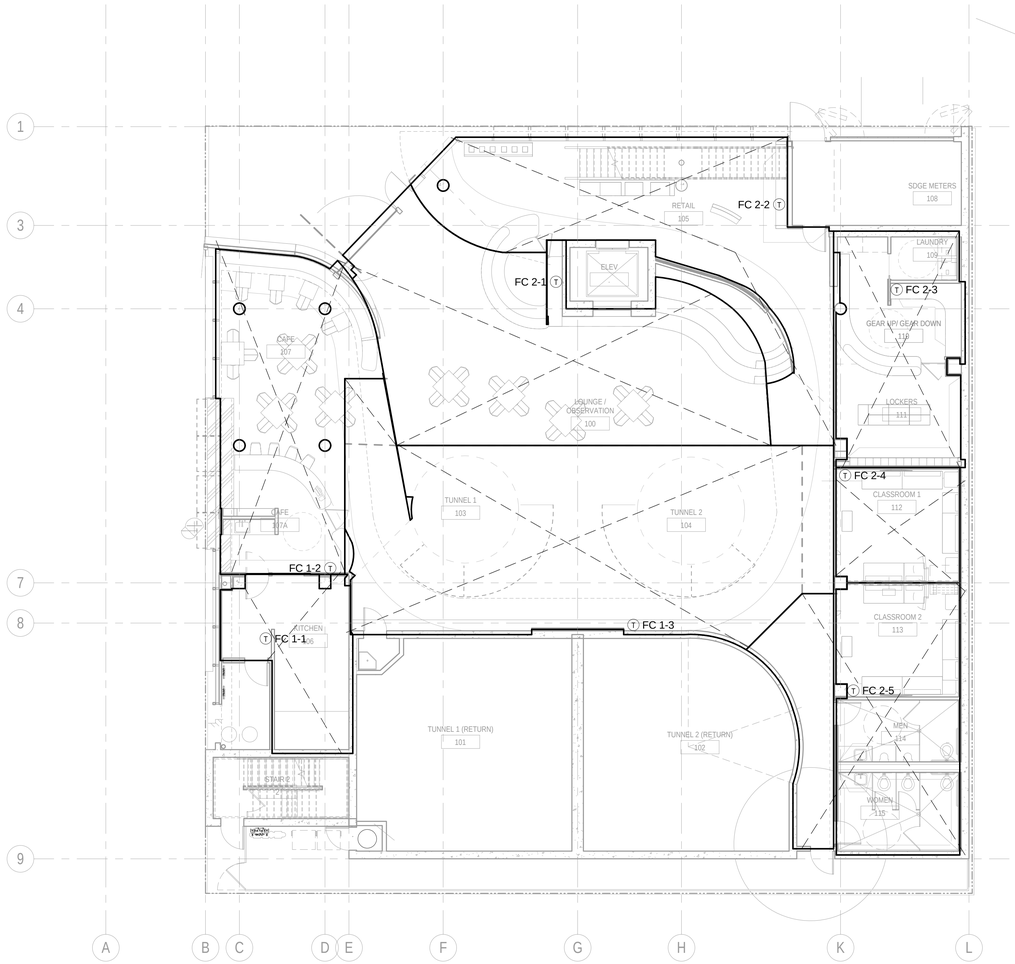

1 MECHANICAL ZONING PLAN - LEVEL 1

SCALE: 1/8" = 1'-0"

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08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMMER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

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MECHANICAL ZONING PLAN - LEVEL 1

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M1.1

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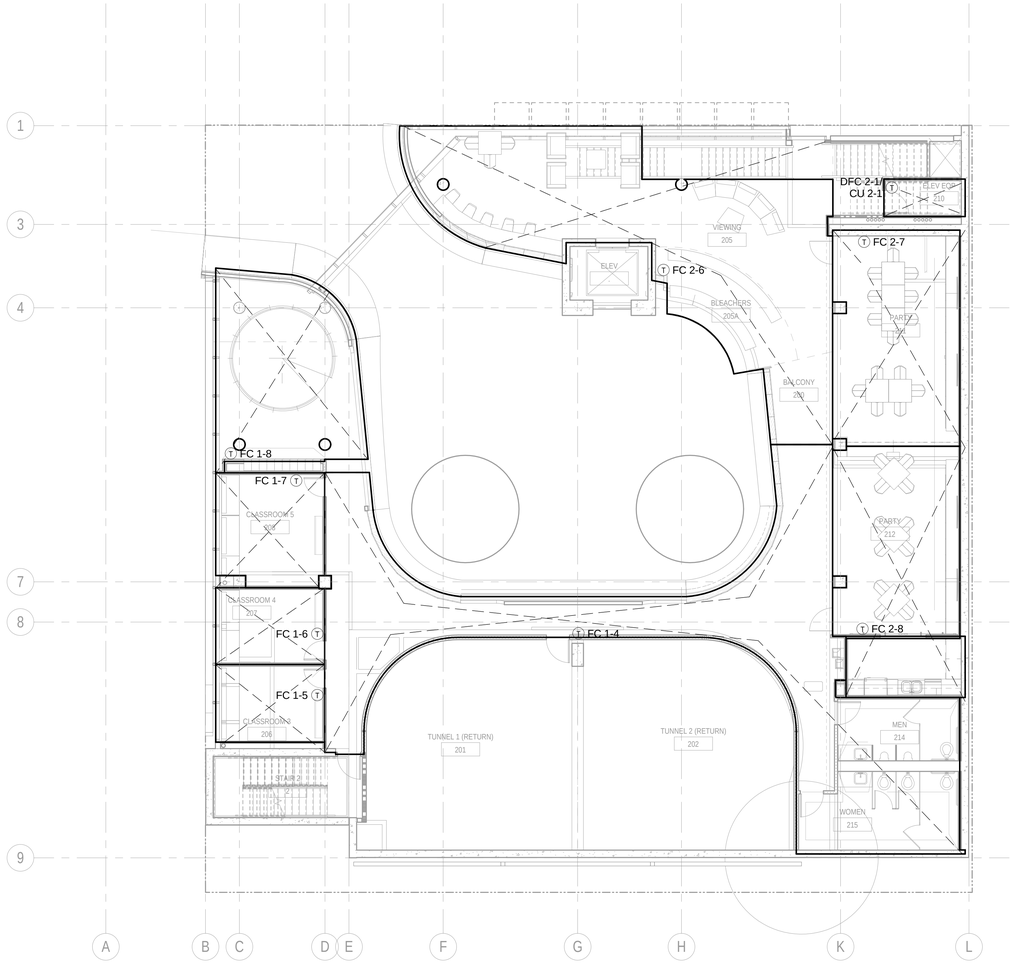

1 MECHANICAL ZONING PLAN - LEVEL 2

SCALE: 1/8" = 1'-0"

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08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER
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M34498
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STATE OF CALIFORNIA

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MECHANICAL ZONING PLAN - LEVEL 2

DRAWING NO:

M1.2

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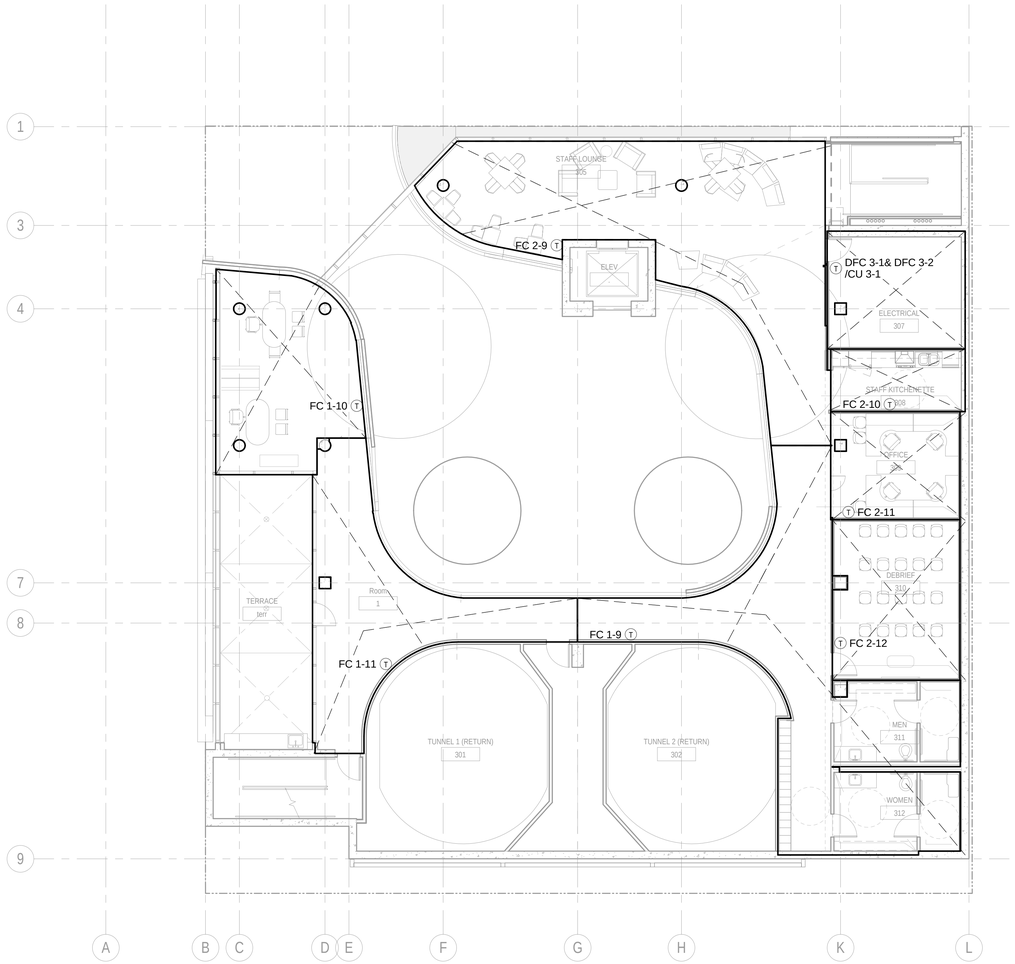

1 MECHANICAL ZONING PLAN - LEVEL 3

SCALE: 1/8" = 1'-0"

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08-20-14	SCHEMATIC DESIGN

ISSUES:

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MECHANICAL ZONING PLAN - LEVEL 3

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M1.3

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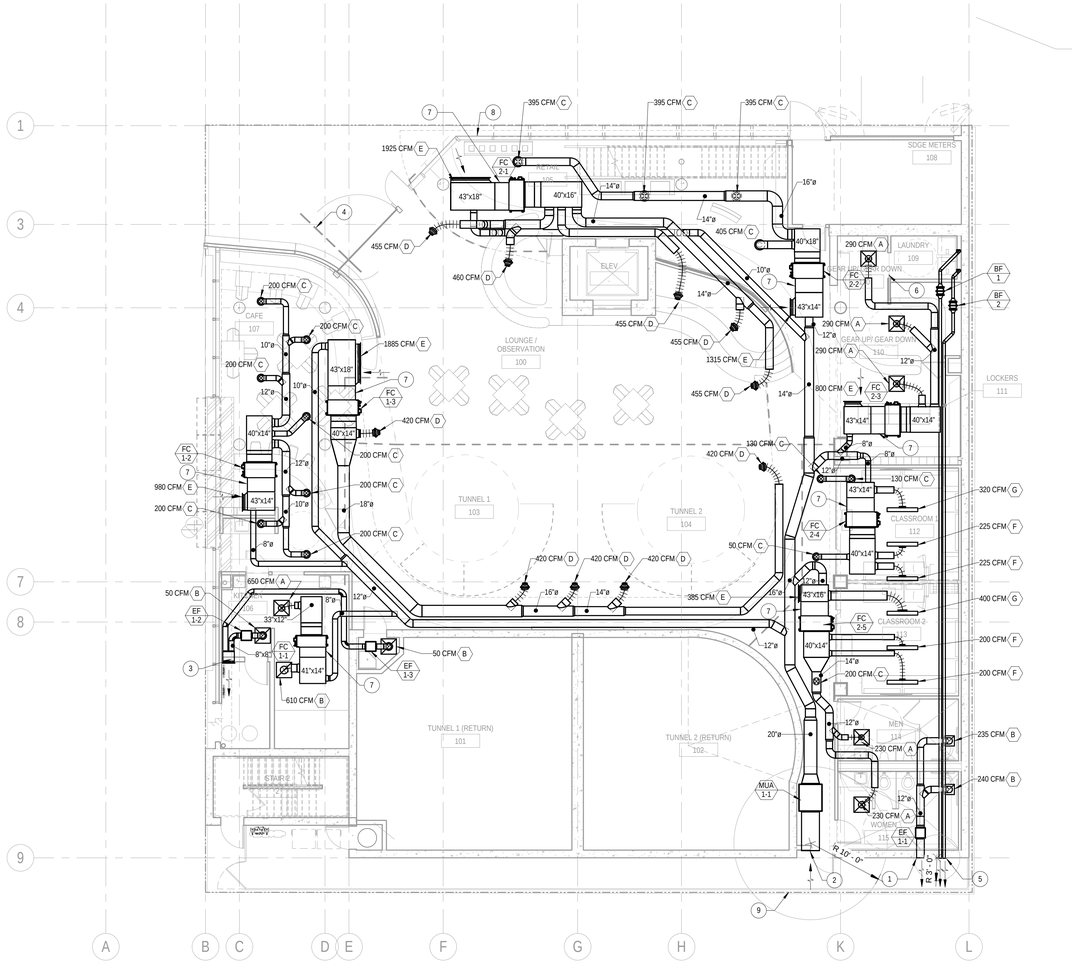

1 MECHANICAL FLOOR PLAN - LEVEL 1

SCALE: 1/8" = 1'-0"

KEY NOTES

#	
1	1.5 SF FREE AREA EA LOUVER.
2	3 SF FREE AREA OA INTAKE LOUVER.
3	0.5 SF FREE AREA EA LOUVER
4	MOTOR OPERATED PIVOT DOOR, 90 SF FREE AREA. INTERLOCK WITH SCF-1 AND SCF-2.
5	4"ø DRYER DUCT TERMINATION AT EXTERIOR WALL PER CMC 504.5, ENVIRONMENTAL AIR DUCTS SHALL TERMINATE NOT LESS THAN 3' FT. FROM OPENINGS INTO THE BUILDING.
6	PROVIDE A MINIMUM 100 SQUARE INCH FREE AREA OPENING FOR DRYER MAKE-UP.
7	MANUFACTURER'S HIGH EFFICIENCY FILTER BOX WITH MERV 8 FILTER.
8	MOTOR OPERATED AWNING WINDOWS, 60 SF FREE AREA OPENING. INTERLOCK WITH SCF-1 AND SCF-2.
9	PROPERTY LINE.

GENERAL NOTES

A. ALL EXPOSED DUCT WILL HAVE 1" LINER (SEE METAL DUCTS SPECIFICATION 233113 FOR REQUIREMENTS.

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08-20-14	SCHEMATIC DESIGN

ISSUES:

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TITLE:

MECHANICAL FLOOR PLAN - LEVEL 1

DRAWING NO:

M2.1

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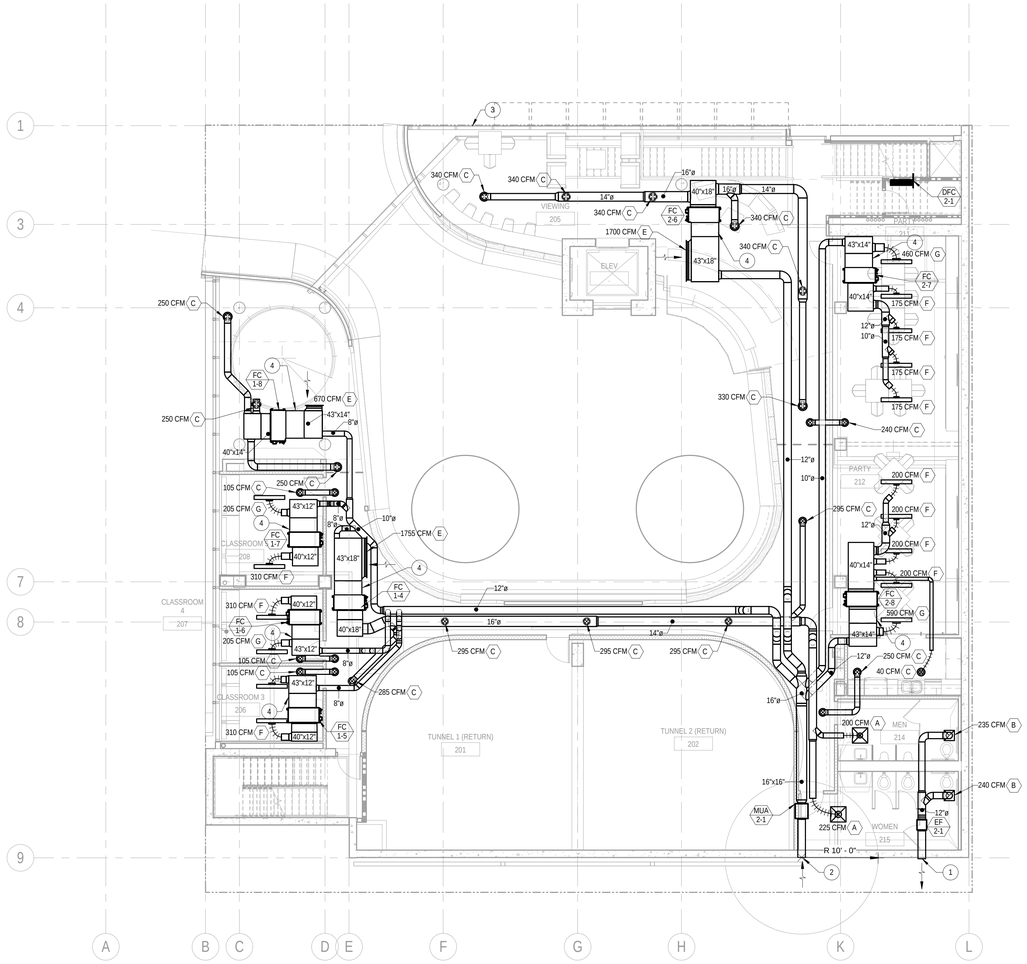

1 MECHANICAL FLOOR PLAN - LEVEL 2
SCALE: 1/8" = 1'-0"

KEY NOTES

#	
1	1.5 SF FREE AREA EA LOUVER.
2	3 SF FREE AREA OA INTAKE LOUVER.
3	MOTOR OPERATED HOPPER WINDOWS, 120 SF FREE OPENING. INTERLOCK WITH SCF-1 AND SCF-2.
4	MANUFACTURER'S HIGH EFFICIENCY FILTER BOX WITH MERV 8 FILTER.

GENERAL NOTES

A. ALL EXPOSED DUCT WILL HAVE 1" LINER (SEE METAL DUCTS SPECIFICATION 233113 FOR REQUIREMENTS.

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ISSUES:

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MECHANICAL FLOOR PLAN - LEVEL 2

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M2.2

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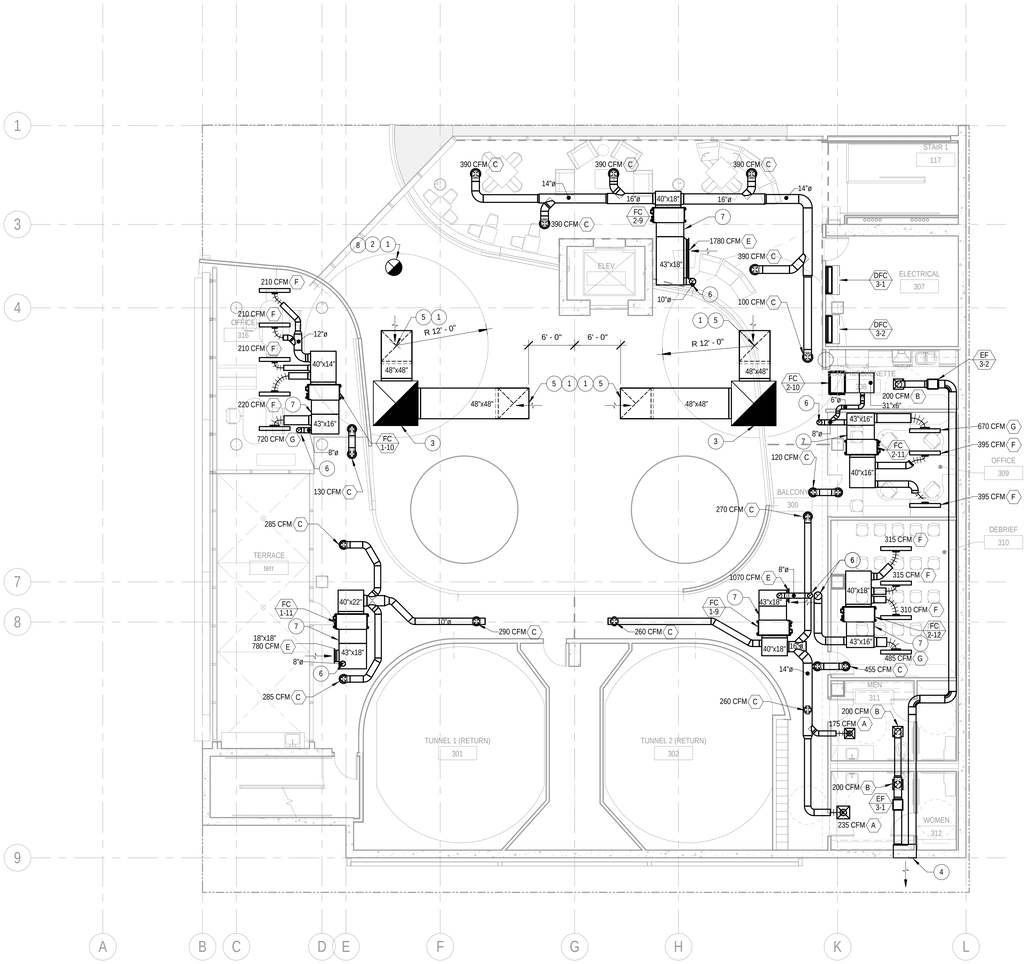

1 MECHANICAL FLOOR PLAN - LEVEL 3

SCALE: 1/8" = 1'-0"

KEY NOTES

#	
1	TERMINATE DUCT AT 18" BELOW ROOF.
2	26"ø RELIEF EA UP.
3	70"x70" SMOKE CONTROL EA UP.
4	1.5 SF FREE AREA EA LOUVER.
5	TERMINATE DUCT WITH 1/4" BIRDSCREEN.
6	OA DUCT UP THRU ROOF. TERMINATE WITH VENT CAP.
7	MANUFACTURER'S HIGH EFFICIENCY FILTER BOX WITH MERV 8 FILTER.
8	SEE 4/M6.2 FOR CONTROL DETAIL.

GENERAL NOTES

A. ALL EXPOSED DUCT WILL HAVE 1" LINER (SEE METAL DUCTS SPECIFICATION 233113 FOR REQUIREMENTS.

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11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN

ISSUES:

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMMER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

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PROJECT NO:
5432.00

FILE NAME:
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TITLE:

MECHANICAL FLOOR PLAN - LEVEL 3

DRAWING NO:

M2.3

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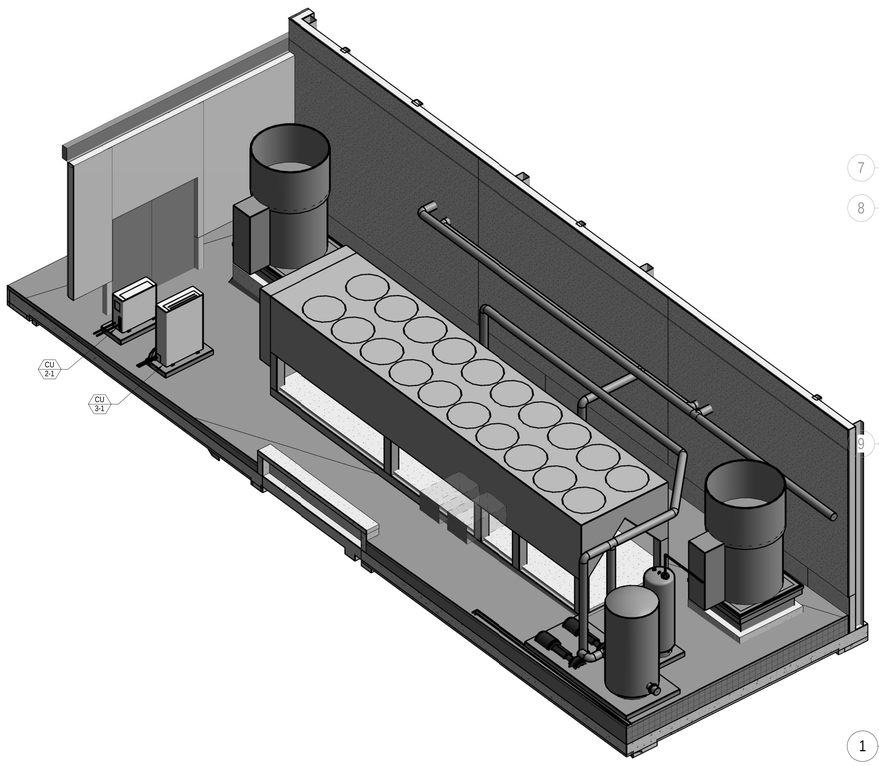
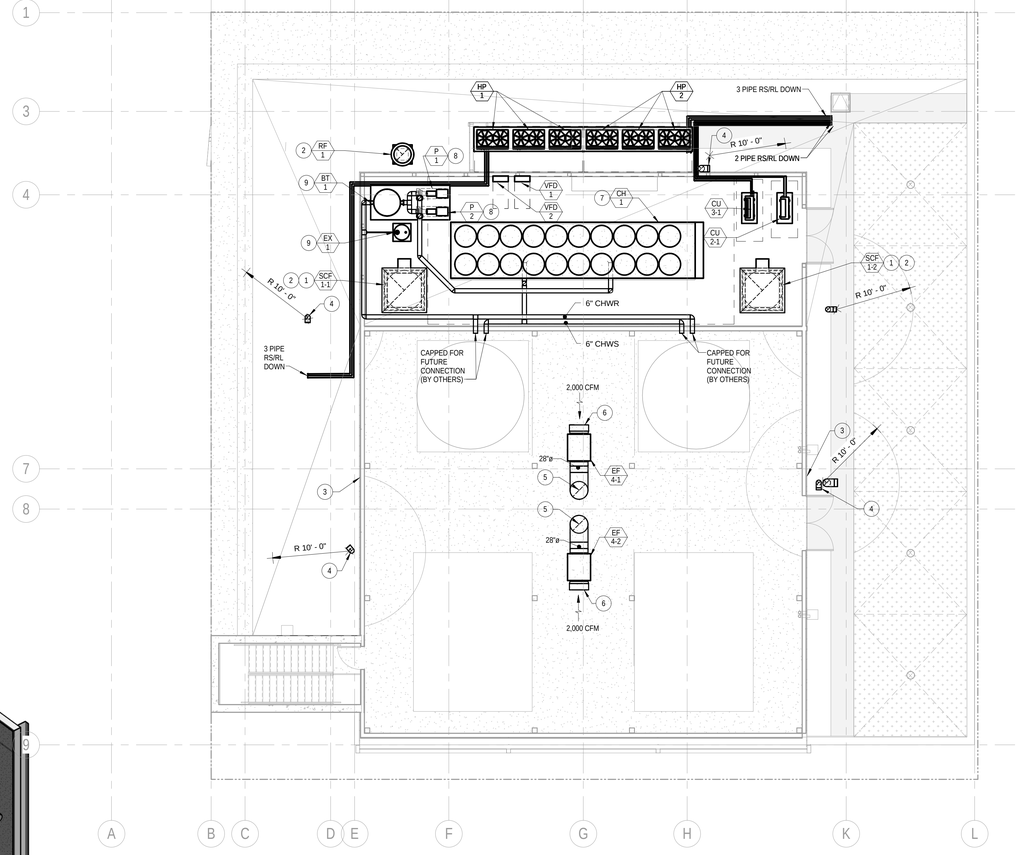


2 ROOF PLAN - 3D VIEW
SCALE:



1 MECHANICAL ROOF PLAN - LOWER ROOF
SCALE: 1/8" = 1'-0"

KEY NOTES

#	
1	SMOKE CONTROL FANS WITH VFD'S.
2	PROVIDE MANUFACTURED CURB FOR ROOF MOUNTING.
3	MINIMUM 4.0 SF FREE AREA LOUVER LOCATED AT MAXIMUM 18" ABOVE FINISHED LOWER ROOF.
4	OUTSIDE AIR INTAKE TO FAN COIL UNITS. (TYPICAL) SEE PLANS FOR SIZES.
5	TERMINATE EXHAUST DUCT A MINIMUM OF 12" ABOVE ROOF. TERMINATE TERMINATE AS SHOWN IN DETAIL 1/M5.2.
6	TERMINATE WITH 1/4" BIRD SCREEN.
7	SEE DETAIL 9/M5.2 FOR MOUNTING.
8	SEE DETAIL 6/M5.2 FOR MOUNTING.
9	MOUNT ON MINIMUM 4" HIGH CONCRETE HOUSEKEEPING PAD.

GENERAL NOTES

A. ALL MECHANICAL REFRIGERANT PIPING IS DIAGRAMMATICAL AND FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO ENSURE THAT ALL PIPING IS INSTALLED PER MANUFACTURER'S REQUIREMENTS AND SIZES.

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12-05-14	PLAN CHECK SUBMITTAL
11-11-14	CD PROGRESS
10-01-14	DESIGN DEVELOPMENT
08-20-14	SCHEMATIC DESIGN
ISSUES:	

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMMER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

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MECHANICAL ROOF PLAN - LOWER ROOF

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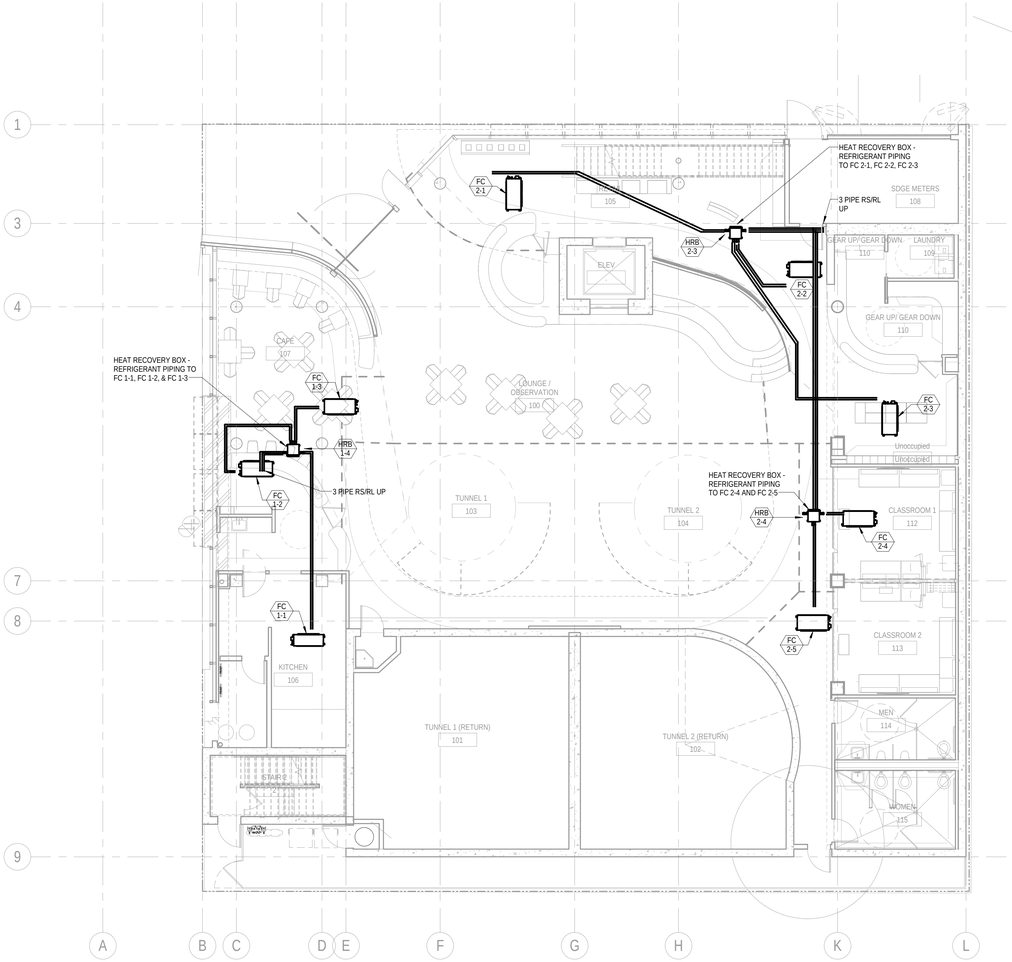

1 MECHANICAL PIPING PLAN - LEVEL 1
1/8" = 1'-0"

GENERAL NOTES

A. ALL MECHANICAL REFRIGERANT PIPING IS DIAGRAMMATICAL AND FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO ENSURE THAT ALL PIPING IS INSTALLED PER MANUFACTURER'S REQUIREMENTS AND SIZES.

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08-20-14	SCHEMATIC DESIGN

ISSUES:

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MECHANICAL PIPING PLAN - LEVEL 1

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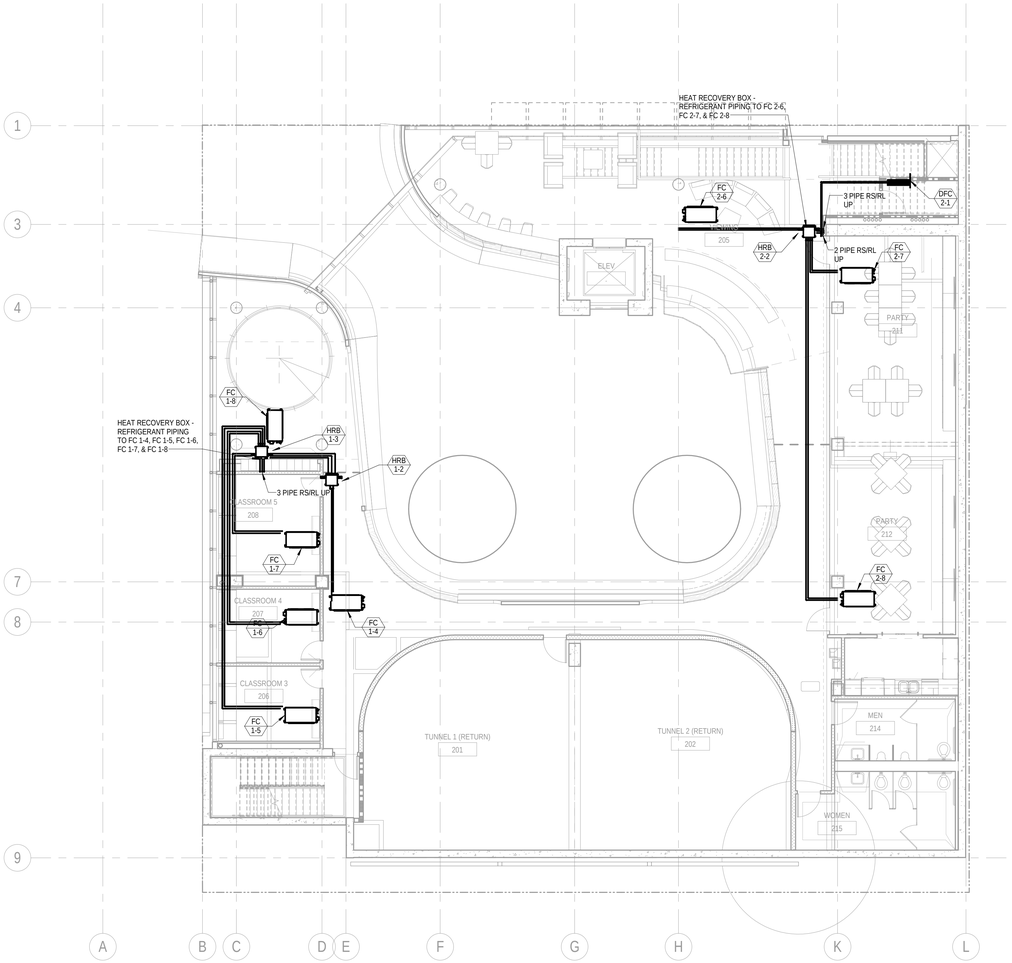

1 MECHANICAL PIPING PLAN - LEVEL 2
1/8" = 1'-0"

GENERAL NOTES

A. ALL MECHANICAL REFRIGERANT PIPING IS DIAGRAMMATICAL AND FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO ENSURE THAT ALL PIPING IS INSTALLED PER MANUFACTURER'S REQUIREMENTS AND SIZES.

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MECHANICAL PIPING PLAN - LEVEL 2

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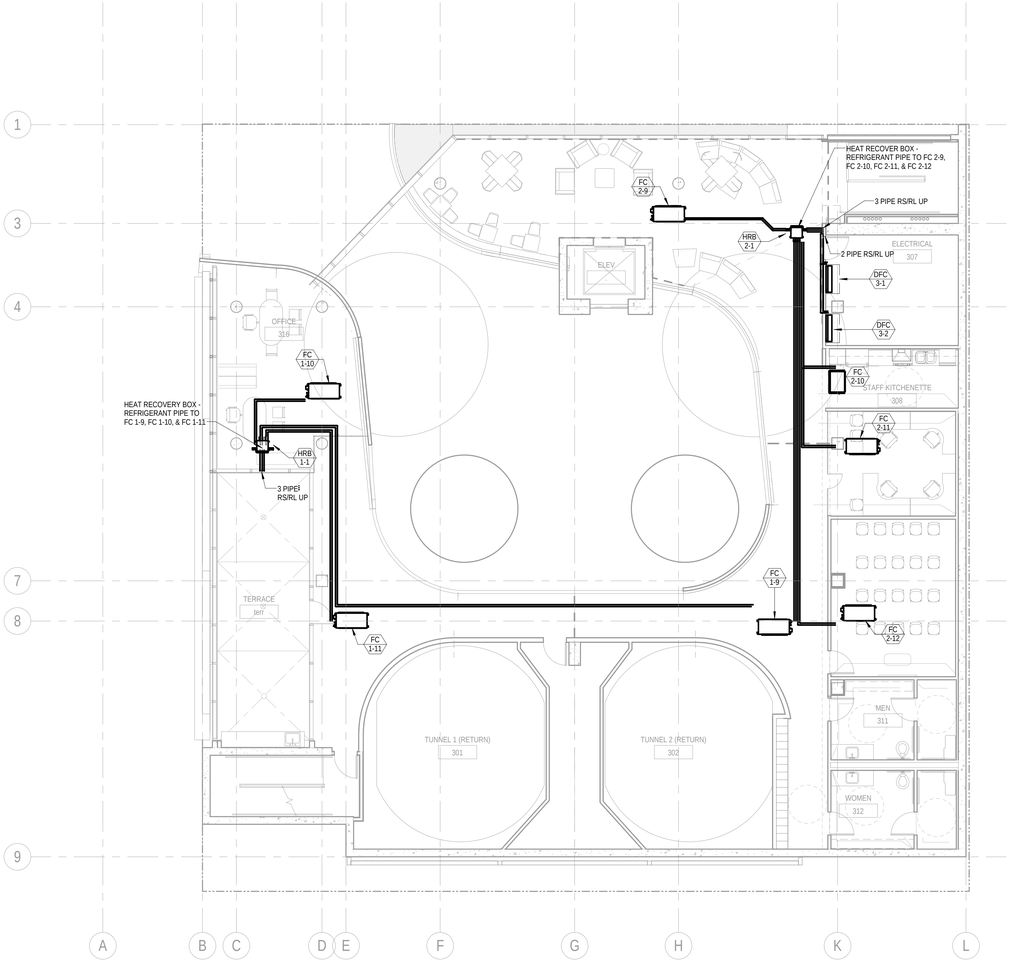

1 MECHANICAL PIPING PLAN - LEVEL 3
1/8" = 1'-0"

GENERAL NOTES

A. ALL MECHANICAL REFRIGERANT PIPING IS DIAGRAMMATICAL AND FOR COORDINATION PURPOSES ONLY. CONTRACTOR TO ENSURE THAT ALL PIPING IS INSTALLED PER MANUFACTURER'S REQUIREMENTS AND SIZES.

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ISSUES:

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MECHANICAL PIPING PLAN - LEVEL 3

DRAWING NO:

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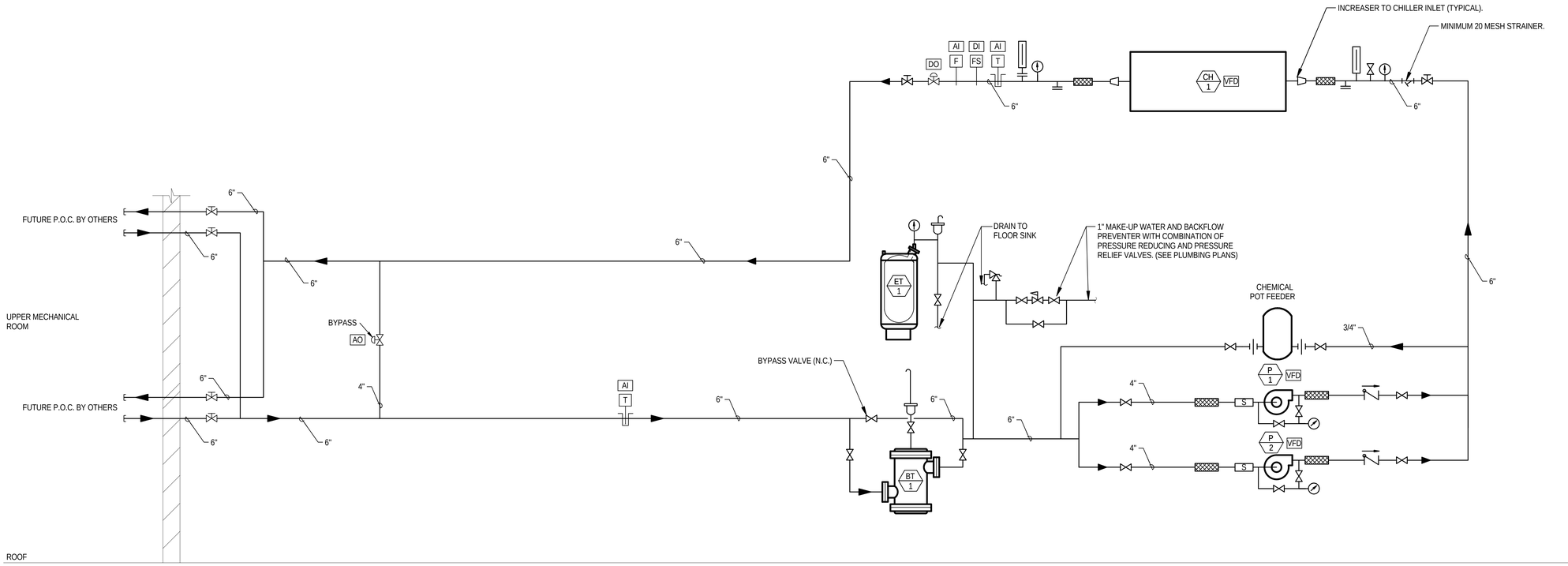

MECHANICAL CHILLED WATER PIPING / CONTROL DIAGRAM

NO SCALE

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MECHANICAL CHW FLOW/ CONTROL DIAGRAM

DRAWING NO:

M4.1

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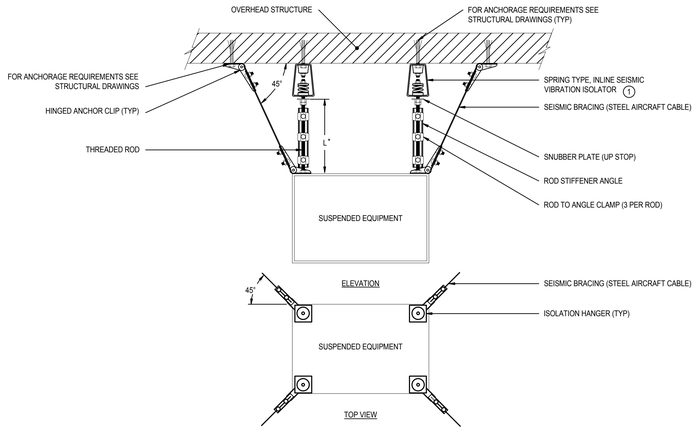


NOTES:

* IF 'L' EXCEEDS 50 TIMES THE DIAMETER OF THE ROD, A VERTICAL STIFFENER IS REQUIRED.

PROVIDE FLEXIBLE DUCT AND PIPE CONNECTORS TO EQUIPMENT.

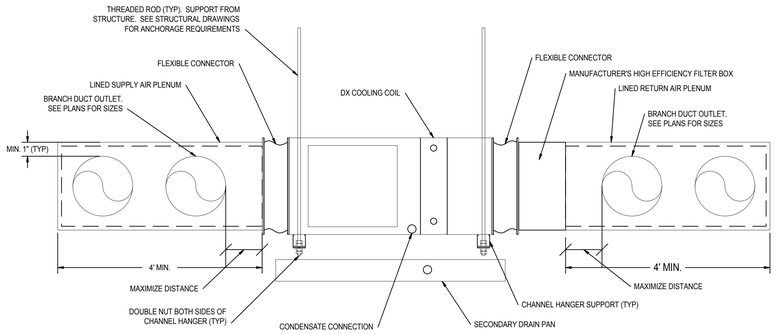
KEYED NOTE:

1 INSTALL UNDER STRICT INSTRUCTION OF VIBRATION ISOLATOR MFGR.

SUSPENDED EQUIPMENT MOUNTING DETAIL

NO SCALE

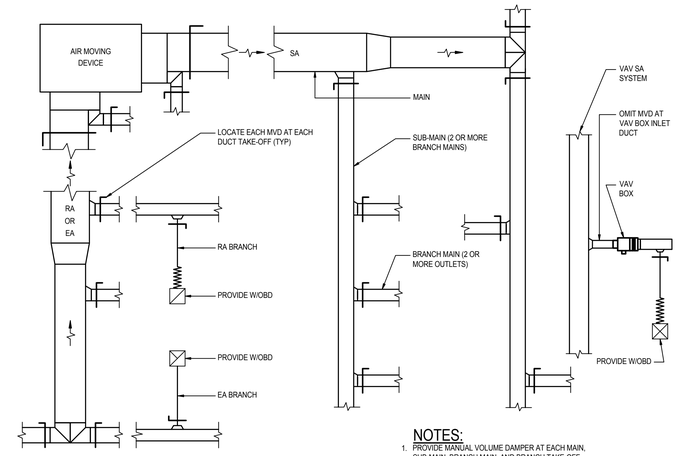
7 / M5.1



TYPICAL FC UNIT DETAIL

NO SCALE

4 / M5.1



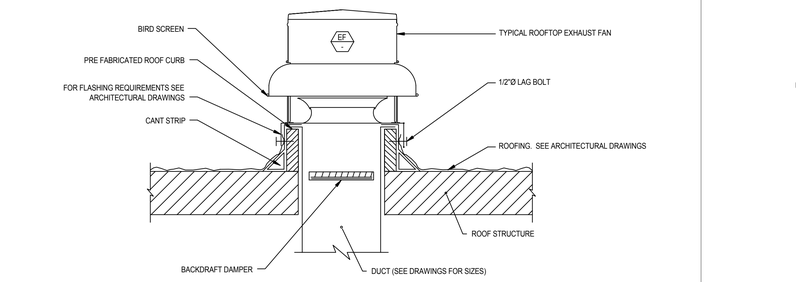
NOTES:

1. PROVIDE MANUAL VOLUME DAMPER AT EACH MAIN, SUB-MAIN, BRANCH MAIN, AND BRANCH TAKE-OFF. BRANCH DAMPER SHALL NOT SUBSTITUTE FOR OBD AT TERMINAL.
2. PROVIDE CEILING ACCESS TO ALL DAMPERS

TYPICAL MANUAL VOLUME DAMPER LOCATION DIAGRAM

NO SCALE

1 / M5.1



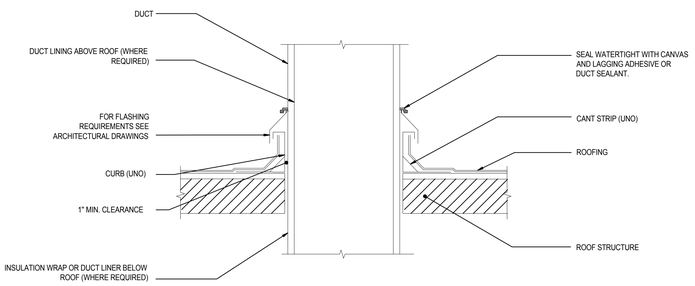
NOTE:

1. FAN & PRE-FAB CURB SHALL SIT LEVEL. PROVIDE LEVEL BASE IF ROOF IS PITCHED.

ROOF MOUNTED EXHAUST FAN DETAIL

NO SCALE

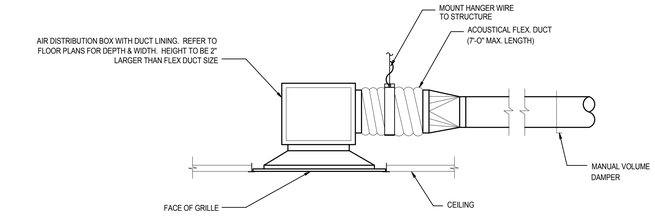
8 / M5.1



DUCT THRU ROOF DETAIL

NO SCALE

5 / M5.1



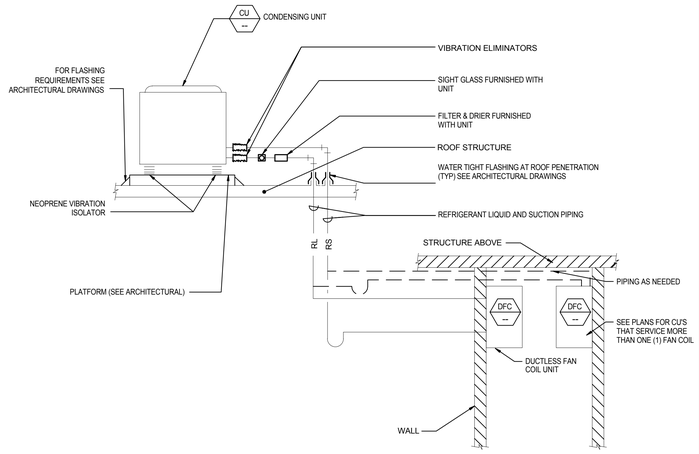
BRANCH DUCT SIZES SUPPLY AIR	
MAX. CFM	SIZE
0-95	6"□
95-210	8"□
210-370	10"□
370-600	12"□
600-900	14"□
900-1290	16"□
1290-1750	18"□
1750-2300	20"□

BRANCH DUCT SIZES RETURN / EXHAUST AIR	
MAX. CFM	SIZE
0-190	8"□
190-340	10"□
340-560	12"□
560-840	14"□
840-1190	16"□
1190-1610	18"□
1610-2150	20"□
2150-2750	22"□

AIR DISTRIBUTION CONNECTION DETAIL

NO SCALE

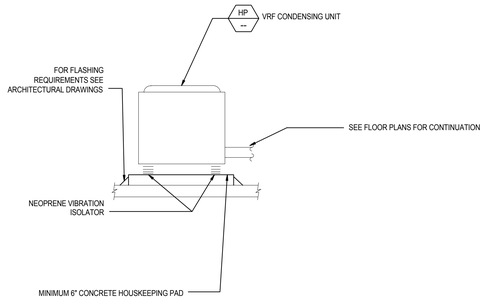
2 / M5.1



DUCTLESS SPLIT- SYSTEM DETAIL

NO SCALE

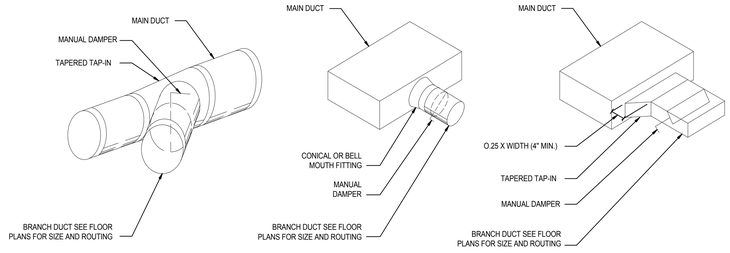
9 / M5.1



VRF CONDENSING UNIT MOUNTING DETAIL

NO SCALE

6 / M5.1



BRANCH DUCT TAKE OFF DETAIL

NO SCALE

3 / M5.1

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ISSUES:

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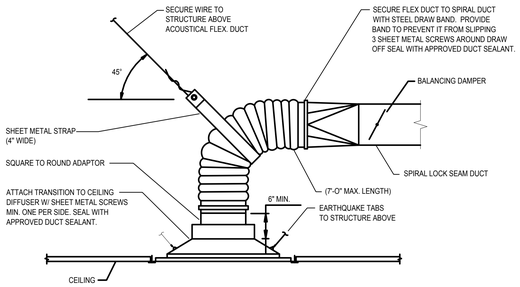
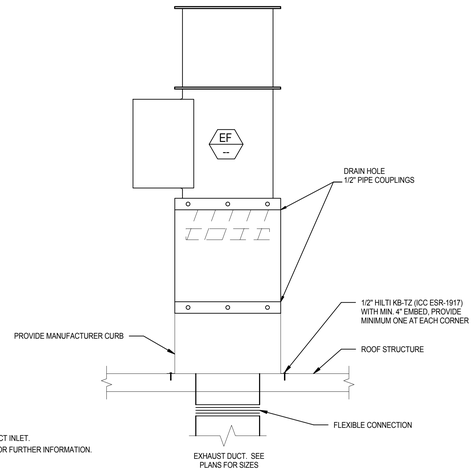


CEILING DIFFUSER CONNECTION

NO SCALE

7 / M5.2



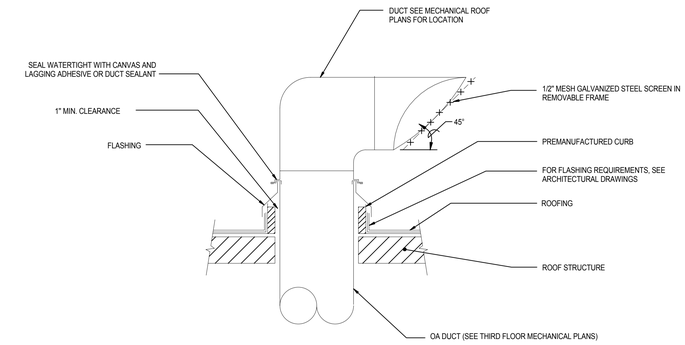
NOTES:

1. PROVIDE FLEX CONNECTION AT DUCT INLET.
2. REFER TO STRUCTURAL DETAILS FOR FURTHER INFORMATION.

AXIAL FAN ROOF MOUNTING DETAIL

NO SCALE

4 / M5.2



OUTSIDE AIR DUCT THRU ROOF INSTALLATION DETAIL

NO SCALE

1 / M5-2

LINEAR DIFFUSER CONNECTION

NO SCALE

8 / M5.2

SEISMIC RESTRAINT DETAIL FOR SUSPENDED EQUIPMENT

MAXIMUM LATERAL SEISMIC LOAD FOR CABLE AND ANCHOR RESTRAINTS			
CABLE DIAMETER (IN)	DRILL IN ANCHOR DIAMETER (IN)	ANCHOR EMBEDMENT	MAXIMUM LATERAL LOAD (LBS)*
1/8"	3/8"	2-1/2"	390
3/16"	5/8"	4"	935
1/4"	1"	4-1/2"	1500

*MAXIMUM LOADS BASED ON HILTI KWIK BOLT II DRILL IN ANCHORS FOR SUSPENDED EQUIPMENT SUBJECT TO 1 "G" ACCELERATION. THIS MAXIMUM LOAD REPRESENTS THE MAXIMUM EQUIPMENT WEIGHT REQUIREING FOUR CABLES. (FOR 0.5 "G" ACCELERATION, WEIGHT CAN BE DOUBLED.)

FAN COIL MOUNTING DETAIL

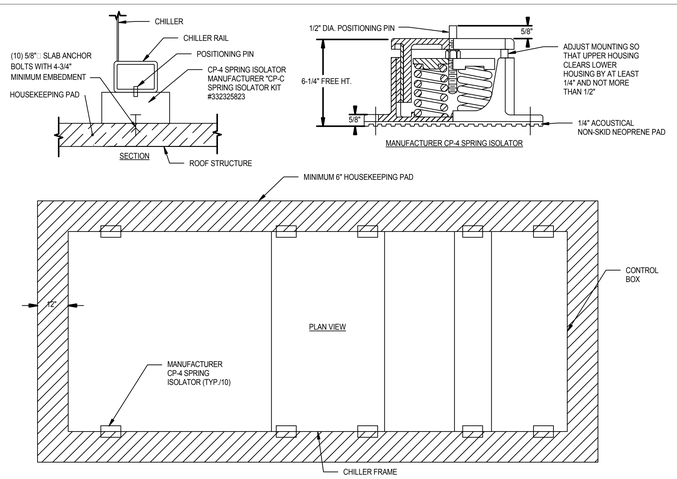
NO SCALE

5 / M5.2

DUCT CONNECTION TO LOUVER DETAIL

NO SCALE

2 / M5-2



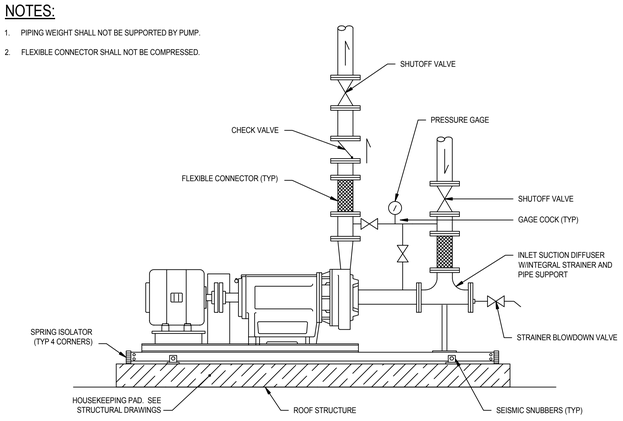
CHILLER MOUNTING DETAIL

NO SCALE

9 / M5.2

NOTES:

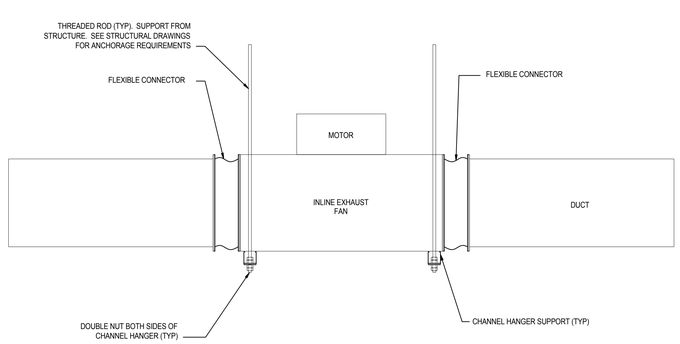
1. PIPING WEIGHT SHALL NOT BE SUPPORTED BY PUMP.
2. FLEXIBLE CONNECTOR SHALL NOT BE COMPRESSED.



BASE MOUNTED END SUCTION PUMP INSTALLATION

NO SCALE

6 / M5.2



INLINE EXHAUST FAN MOUNTING DETAIL

NO SCALE

3 / M5.2

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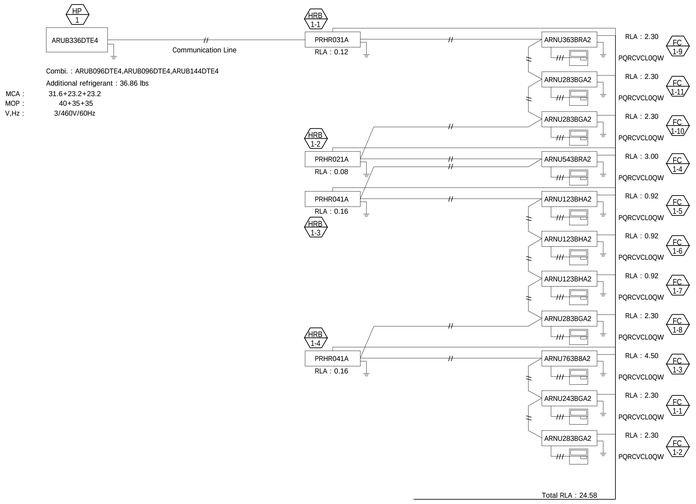
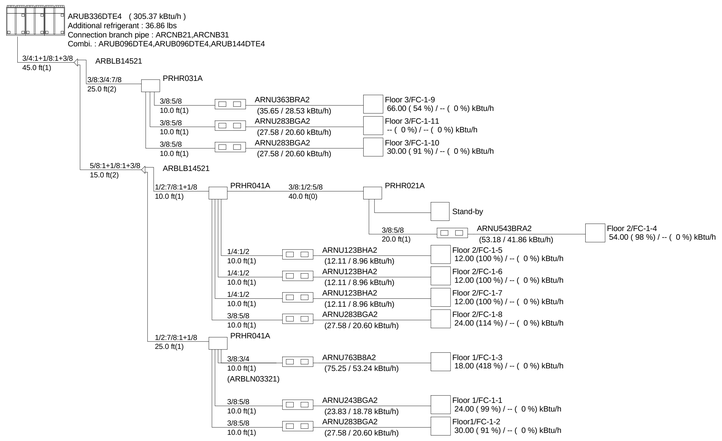


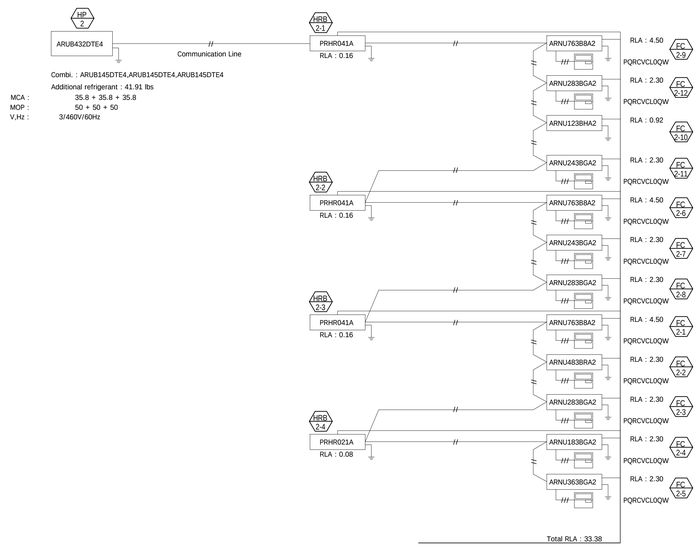
HP-1 WIRING DIAGRAM

2
M6.1



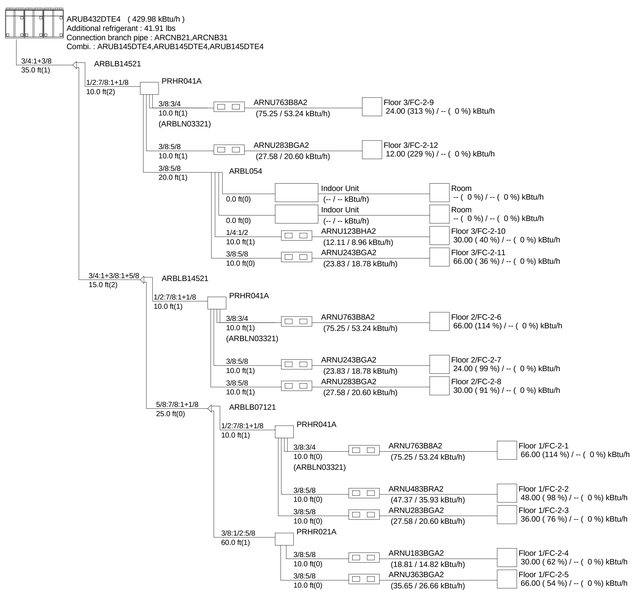
HP-1 PIPING DIAGRAM

1
M6.1



HP-2 WIRING DIAGRAM

2
M6.1



HP-2 PIPING DIAGRAM

1
M6.1

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MECHANICAL VRF PIPING/CONTROLS

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SEQUENCE OF OPERATION

DURING NORMAL OPERATION, ALL EQUIPMENT CONTROLLED BY THE BMS SHALL BE SET UP TO OPERATE BASED ON THE OWNER PROVIDED SCHEDULE. FROM THE BMS WORKSTATION, THE OPERATOR HAS THE ABILITY TO OVERRIDE ANY NORMAL OPERATION. ANY ALARMS GENERATED AT THE BMS SHALL PROVIDE A VISUAL ALARM. NOTE: ALL SETPOINTS AND TIMERS ARE INITIAL VALUES, AND THEIR FINAL VALUES SHALL BE DETERMINED DURING COMMISSIONING.

OUTSIDE AIR MUA SUPPLY FANS (MUA-1-1 & MUA-2-1) :

1. SUPPLY AIR CONTROL:
THE SUPPLY FAN SHALL BE ENABLED UPON SIGNAL FROM THE BMS THAT THE BUILDING IS IN OCCUPIED MODE. THE SUPPLY FAN SHALL RUN IF ANY ONE OF THE INDOOR FAN COILS OR EXHAUST FANS ARE ENERGIZED.

2. ALARMS:
MOTOR RUN STATUS SHALL BE MONITORED AND SHALL SIGNAL AN ALARM TO THE BMS SHOULD THE MOTOR NOT BE RUNNING WHEN IT IS ENABLED.

VRF CONTROL (HP-1 & HP-2):

1. THE MAIN BMS SYSTEM SHALL CONTROL THE LG VRF CONTROL SYSTEM THRU THE LG BACNET INTERFACE GATEWAY MODEL "PQNFB17C1".

VRF - HEATING MODE (INDOOR UNITS - FC'S) :

1. WITH THE INDOOR UNIT FAN OFF, UPON SENSING BY THE LG "PQRCVCLOQW" THERMOSTAT THAT THE ROOM TEMPERATURE HAS FALLEN BELOW THE HEATING ROOM TEMPERATURE SETPOINT (72 F DEGREES ADJUSTABLE), THE INDOOR UNIT, THE ASSOCIATED HEAT RECOVERY UNIT AND ASSOCIATED OUTDOOR UNIT ARE SIGNALED THAT HEAT IS REQUIRED.

2. THE INDOOR UNIT FAN IS ENERGIZED TO LOW SPEED AFTER INDOOR UNIT PIPE TEMPERATURE REACHES HOT START OFF TEMPERATURE (72 F DEGREES FOR DUCTED INDOOR UNITS).

3. THE INDOOR UNIT FAN SPEED INCREASES TO USER SELECTED FAN SPEED WHEN THE INDOOR UNIT PIPE TEMPERATURE REACHES SETTING TEMPERATURE (80 F DEGREES FOR DUCTED INDOOR UNITS).

4. THE INDOOR UNIT FAN SPEED DECREASES TO LOW SPEED WHEN THE INDOOR UNIT PIPE TEMPERATURE DROPS BELOW LOW TEMPERATURE SETTING (76 F DEGREES FOR DUCTED INDOOR UNITS) DUE TO AIRFLOW ACROSS THE INDOOR UNIT COIL.

5. THE INDOOR UNIT FAN SPEED INCREASES TO USER SELECTED FAN SPEED WHEN THE INDOOR UNIT PIPE TEMPERATURE RISES ABOVE SETTING TEMPERATURE (80 F DEGREES FOR DUCTED INDOOR UNITS).

6. THE INDOOR UNIT FAN TURNS OFF AFTER THE INDOOR UNIT PIPE TEMPERATURE FALLS BELOW LOW TEMPERATURE SETTING (76 F DEGREES FOR DUCTED INDOOR UNITS.

VRF - COOLING MODE (INDOOR UNITS - FC'S) :

1. WITH COOLING COOLING MODE SELECTED, UPON SENSING BY THE LG "PQRCVCLOQW" THERMOSTAT THAT THE ROOM TEMPERATURE HAS RISEN ABOVE THE COOLING ROOM TEMPERATURE SETPOINT (75 F DEGREES ADJUSTABLE), THE INDOOR UNIT, THE ASSOCIATED HEAT RECOVERY UNIT AND ASSOCIATED OUTDOOR UNIT ARE SIGNALED THAT COOLING IS REQUIRED. THERMO "ON" TEMPERATURE IS COOLING SETPOINT + 2 F (ADJUSTABLE).

2. THE INDOOR UNIT FAN IS ENERGIZED TO USER SELECTED FAN SPEED.

3. THE INDOOR UNIT FAN SPEED DECREASES TO LOW FAN SPEED WHEN THERMO "OFF" TEMPERATURE IS REACHED. THERMO "OFF" TEMPERATURE IS COOLING SETPOINT -2 F (ADJUSTABLE).

SMOKE CONTROL FANS (SCF-1-1 & SCF-1-2):

1. OPERATION TO BE DETERMINED BY RATIONAL ANALYSIS.

RELIEF FANS (RF-1):

1. RF-1 WILL OPERATE ON THE SAME SCHEDULE AS THE VRF SYSTEM. THE RELIEF FAN WILL BE ENERGIZED AND BE COMMANDED TO A SETPOINT BASED ON THE BUILDING POSITIVE PRESSURE REQUIRED IN THE BUILDING. RF-1 WILL OPERATE TO MAINTAIN A FIXED POSITIVE PRESSURE DIFFERENTIAL. THE PRESSURE DIFFERENTIAL BETWEEN THE BUILDING AND THE EXTERIOR SHALL BE + 0.02" W.G. AVERAGE.

TOWER VFD ROOM (ON ROOF - EF-4-1 & EF-4-2):

1. THE EXHAUST FANS THAT SERVE THIS SPACE WILL RUN ON A THERMOSTAT TO MAINTAIN A MINIMUM TEMPERATURE LESS THAN 90°F.

GENERAL EXHAUST FANS (EF-1-1, 1-2, 1-3, 2-1, 3-1, 3-2):

1. THE EXHAUST FANS SHALL RUN ON OPERATOR OCCUPANCY SCHEDULE AS DEFINED BY OWNER.

CHILLER PLANT SEQUENCE OF OPERATIONS :

1. OCCUPANCY CONTROL:

THE CHILLED WATER SYSTEM SHALL BE CONSIDERED OCCUPIED IF AT LEAST ONE (1) COOLING COIL VALVE IS OPEN 5% OR MORE.

2. LEAD/LAG PUMP SELECTION:

THE PUMP WITH THE LEAST AMOUNT OF RUNTIME SHALL BE THE LEAD PUMP. THE LEAD PUMP SHALL ALSO BE TOGGLED MONTHLY TO ENSURE BOTH PUMPS GET RUNTIME DURING OPERATION. IN THE EVENT THE LEAD PUMP FAILS, THE LAG PUMP SHALL BE ENABLED AND OPERATE UNTIL THE ALARM IS CLEARED.

3. CHILLER ISOLATION VALVE CONTROL:

WHEN THE CHILLED WATER SYSTEM ENTERS OCCUPIED MODE, THE CHW ISOLATION VALVES OF THE CHILLER SHALL BE OPENED.

2. CHILLED WATER PUMP START/STOP AND SPEED CONTROL:

UPON PROOF OF STATUS OF THE CHW ISOLATION VALVE & AT LEAST (1) TOWER COIL CHW VALVE, THE LEAD CHW PUMP SHALL START AND RUN UP TO 50% AS NEEDED . ONCE THE LEAD PUMP REACHES 50% THE LAG PUMP WILL START AND RUN UP TO 50% AS NEEDED. WHEN THE LAG PUMP RUNS UP TO 50%, THE LEAD PUMP WILL THEN MODULATE BETWEEN 50% AND 100%. SHOULD THE REQUIRED COOLING LOAD EXCEED 100% FLOW ON THE LEAD PUMP AND 50% FLOW ON THE LAG PUMP, THE LEAD PUMP WILL BE SET TO RUN AT 100% AND THE LAG PUMP WILL BE ALLOWED TO MODULATE BETWEEN 50% AND 100% UNTIL 100% CHW FLOW IS REACHED. THE CHW PUMPS SHALL HAVE A MINIMUM SPEED OF 25%. THE CHW PUMP VFD SPEED SHALL MODULATE TO MAINTAIN THE REQUIRED RETURN TEMPERATURE INTO THE CHILLER. AS THE SYSTEM LOAD DECREASES, THE PUMPS SHOULD SHUTDOWN IN THE REVERSE ORDER OF START-UP. THE CHW PUMPS SHALL HAVE A MINIMUM ON AND OFF TIME OF 15 MINUTES.

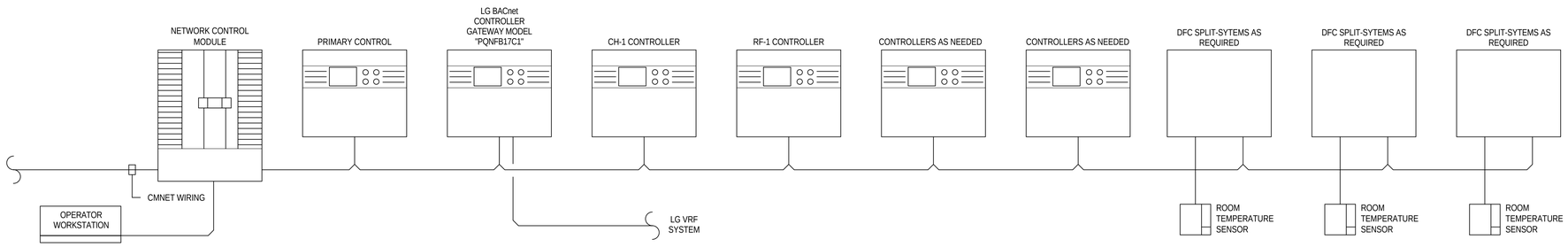
3. CHILLED WATER BYPASS CONTROL:

MODULATE THE CHILLED WATER BYPASS CONTROL VALVE TO MAINTAIN MINIMUM CHW FLOW (BASED ON MANUFACTURER'S RECOMMENDATIONS) AS MEASURED BY THE CHW FLOW METER.

4. CHILLER START/STOP:

UPON PROOF OF FLOW, THE CHILLER SHALL BE ENABLED. THE CHILLER SHALL CYCLE ON & OFF BASED ON IT'S OWN INTERNAL CONTROLS TO MAINTAIN THE CHILLED WATER SUPPLY SETPOINTS.

COMMUNICATIONS RISER CONTROL DIAGRAM



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ISSUES:

REGISTERED PROFESSIONAL ENGINEER
DANIEL J. GRAMMER
M34498
Exp. 6/30/15
MECHANICAL
STATE OF CALIFORNIA

5512

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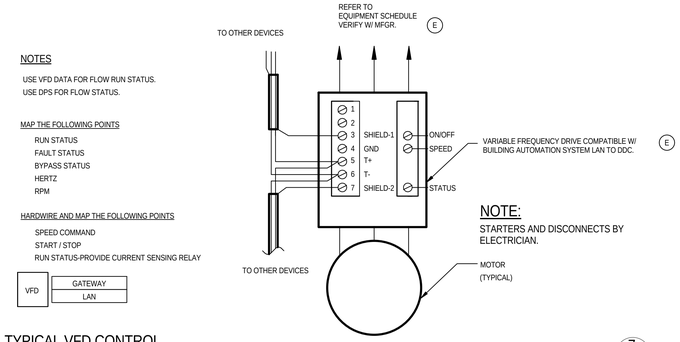


NOTES

USE VFD DATA FOR FLOW RUN STATUS.
USE DPS FOR FLOW STATUS.

MAP THE FOLLOWING POINTS

RUN STATUS
FAULT STATUS
BYPASS STATUS
HERTZ
RPM

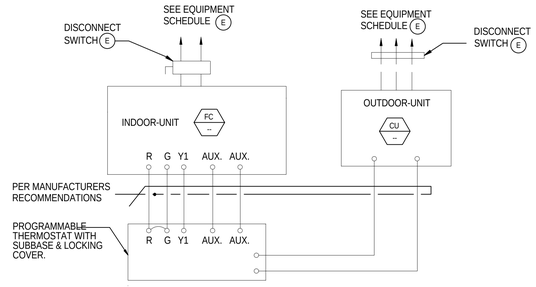
HARDWIRE AND MAP THE FOLLOWING POINTS

SPEED COMMAND
START / STOP
RUN STATUS-PROVIDE CURRENT SENSING RELAY

NOTE:
STARTERS AND DISCONNECTS BY ELECTRICIAN.

TYPICAL VFD CONTROL

7 M6.3



NOTE:
STARTERS AND DISCONNECTS BY ELECTRICIAN.

SEQUENCE OF OPERATION

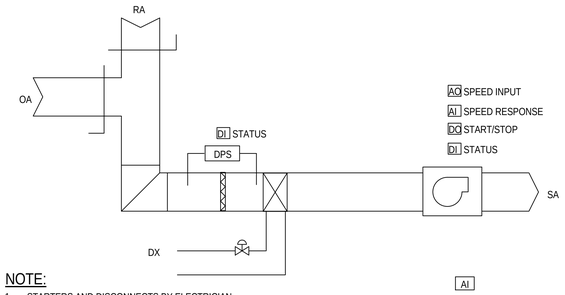
START-STOP: SYSTEM'S START-STOP TIMES SHALL BE CONTROLLED BY THE PROGRAMMABLE THERMOSTAT

COOLING: ON A CALL FROM THE THERMOSTAT, THE UNIT SHALL ENABLE COOLING TO SATISFY THE THERMOSTAT SET POINT.

FAN: THE FAN SHALL CYCLE WITH COOLING MODE.

SPLIT SYSTEM AC CONTROL

8 M6.3



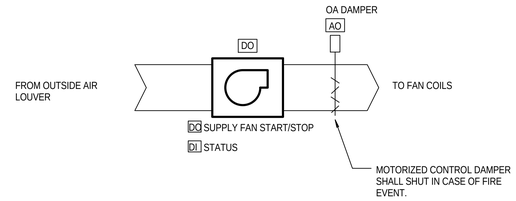
NOTE:

1. STARTERS AND DISCONNECTS BY ELECTRICIAN.
2. ALL CONTROL POINTS ARE INTEGRAL TO VRF MANUFACTURER'S CONTROLS. THIS DIAGRAM IS SHOWN FOR REFERENCE ONLY.

LG THERMOSTAT "PQRCVCLOQW" LOCATE MAX. 48" A.F.F.

(VRF) FAN COIL CONTROL DIAGRAM

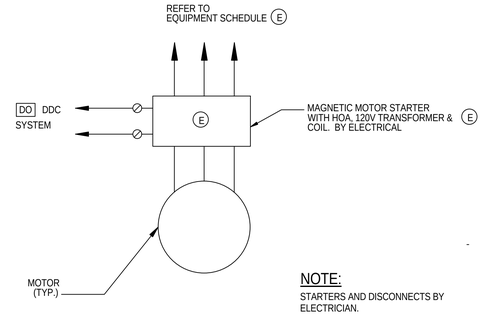
9 M6.3



NOTE:
PROVIDE CURRENT SENSOR RELAY DIGITAL INPUT & OUTPUT SIGNAL FOR ALL FANS.
STARTERS AND DISCONNECTS BY ELECTRICIAN.

MAKE UP AIR FAN CONTROL DIAGRAM

10 M6.3

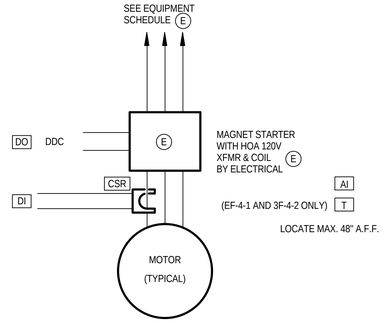


NOTE:
STARTERS AND DISCONNECTS BY ELECTRICIAN.

TYPICAL MAGNETIC MOTOR STARTER CONTROL

NO SCALE

3 M6.3

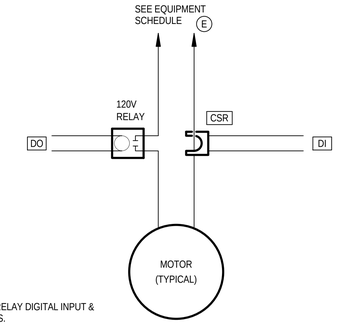


NOTE:
PROVIDE CURRENT SENSOR RELAY DIGITAL INPUT & OUTPUT SIGNAL FOR ALL FANS.
STARTERS AND DISCONNECTS BY ELECTRICIAN.

3-PHASE FAN MOTOR CONTROL

NO SCALE

4 M6.3

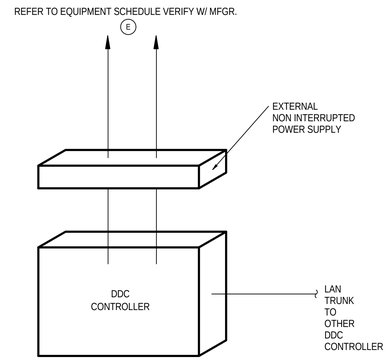


NOTE:
PROVIDE CURRENT SENSOR RELAY DIGITAL INPUT & OUTPUT SIGNAL FOR ALL FANS.
STARTERS AND DISCONNECTS BY ELECTRICIAN.

1-PHASE FAN MOTOR CONTROL

NO SCALE

5 M6.3



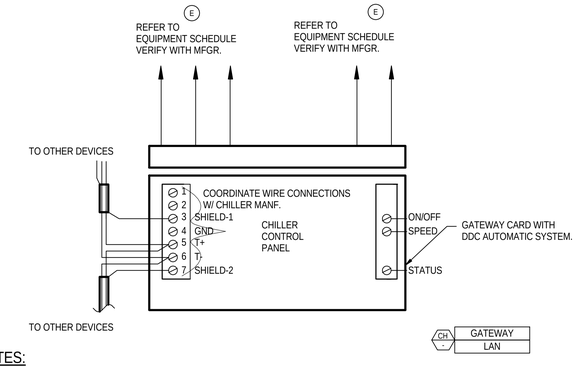
TYPICAL DDC CONTROLLER

NO SCALE

6 M6.3

CONTROLS LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
AI	DDC ANALOG INPUT POINT W/ ADJUSTABLE PID GAIN CONTROL	SP	STATIC PRESSURE SENSOR
AO	DDC ANALOG OUTPUT POINT W/ ADJUSTABLE PID GAIN CONTROL	AF	AIR FLOW SENSOR - PARAGON MODEL NO. FE-1050 WITH FIT-1001M OR EQUAL
DI	DDC DIGITAL INPUT POINT W/ INDICATING LIGHT ON DDC PANEL		TWO-WAY CONTROL VALVE - VERIFY & PROVIDE A VALVE SCHEDULE
DO	DDC DIGITAL OUTPUT POINT W/ MANUAL OVERIDE AND INDICATING LIGHT ON DDC PANEL		THREE-WAY CONTROL VALVE - VERIFY & PROVIDE A VALVE SCHEDULE
F	ULTRASONIC FLOW METER	VPS	VELOCITY PRESSURE SENSOR
FS	FLOW SWITCH - PROVIDE DIRECT HARDWARE CONNECTION TO BOILER, CHILLER OR ASSOCIATED EQUIPMENT	LAN	LOCAL AREA NETWORK
P	PRESSURE SENSOR	DDC	DIRECT DIGITAL CONTROL
DPS	DIFFERENTIAL PRESSURE SENSOR	DP	DIFFERENTIAL PRESSURE
CSR	CURRENT SENSING RELAY	E	COORDINATE WITH ELECTRICAL
S.D.	DUCT SMOKE DETECTOR - COORDINATE WITH ELECTRICAL CONTRACTOR FOR POWER SUPPLY	M	COORDINATE WITH MECHANICAL
	DAMPER ACTUATOR	CFM	AIR FLOW SENSOR
HPS	HIGH LIMIT STATIC PRESSURE SWITCH WITH MANUAL RESET HARD WIRE DIRECTLY TO VFD SAFETY CIRCUIT AND PROVIDE DI POINT	VFD	VARIABLE FREQUENCY DRIVE
LPS	LOW LIMIT STATIC PRESSURE SWITCH WITH MANUAL RESET HARD WIRE DIRECTLY TO VFD SAFETY CIRCUIT AND PROVIDE DI POINT	CFM	CUBIC FEET PER MINUTE
T	TEMPERATURE SENSOR		



NOTES:

HARDWIRE AND MAP THE FOLLOWING POINTS

START / STOP
RUN STATUS - PROVIDE A CURRENT SENSING RELAY

STARTERS AND DISCONNECTS BY ELECTRICIAN.

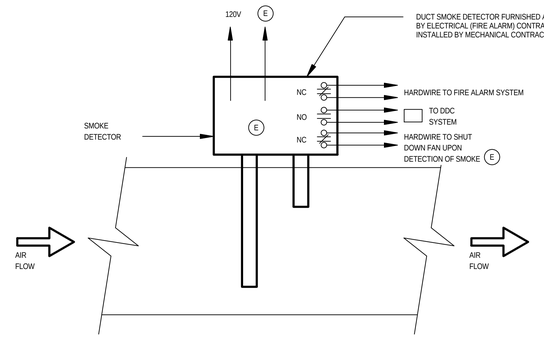
MAP THE FOLLOWING POINTS

RUN STATUS FAULT STATUS BYPASS STATUS
HERTZ
RPM
CHW TEMP
CW TEMP
ALARM STATUS % LOADED F.L.A. DEMAND UNIT
SETPOINT SETPOINT RESET

TYPICAL CHILLER CONTROL DIAGRAM

NO SCALE

1 M6.3



DUCT SMOKE DETECTOR DETAIL

NO SCALE

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