UNLV

SCS HEAT PUMP UNITS REPLACEMENT

UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154

DESIGNER OF RECORD AND MECHANICAL ENGINEER

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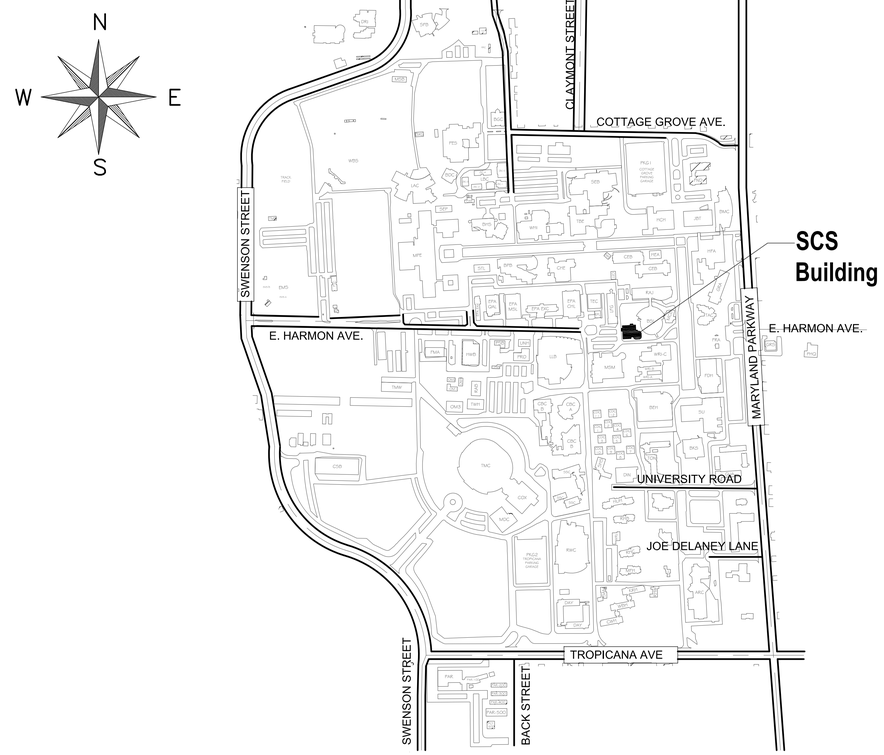
VICINITY MAP



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DATE: 10/01/13
EXP. DATE: 06/30/14

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UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154

PROJECT : SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

PROJECT COVER SHEET

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413
Consultant Project No.	-
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Drawn By	Checked By	Approved By
K.P./K.J.	F.S.	B.S.

File Name:

G1.01

CONSTRUCTION

MECHANICAL LEGEND, NOTES AND SPECIFICATIONS

SYMBOLS

Symbol	Abbreviation	Description
	(E)	EXISTING DUCTWORK OR EQUIPMENT TO REMAIN.
	(E)	EXISTING DUCTWORK, CEILING OUTLET OR EQUIPMENT TO BE REMOVED.
48x36		NEW DUCTWORK OR EQUIPMENT. DUCT SIZE NOTATION W/SIZE OF NEAREST SIDE INDICATED FIRST.
	(SL)	SOUND LINED DUCT OR PLENUM. SIZES INDICATED ON PLANS ARE NET INSIDE DIMENSIONS.
		SUPPLY AIR DUCT SECTION.
		RETURN AIR DUCT SECTION.
		EXHAUST AIR DUCT SECTION.
	AP OR AD	ACCESS PANEL OR DOOR.
	SWR	SIDEWALL REGISTER W/EXTRACTOR.
	SD	CEILING SUPPLY DIFFUSER W/THROW.
	CG OR CR	CEILING RETURN GRILLE OR REGISTER.
	EG OR ER	CEILING EXHAUST GRILLE OR REGISTER.
	FC	FLEXIBLE DUCT CONNECTION.
	TH	THROAT SIZE.
	TV	TURNING VANES.
	FD	AUTOMATIC FIRE DAMPER.
	FSD	COMBINATION FIRE/SMOKE DAMPER.
	VD	MANUAL VOLUME DAMPER.
M	PMOD	DAMPER W/PNEUMATIC MODULATING MOTOR.
M	EMOD	DAMPER W/ELECTRIC MODULATING MOTOR.
R OR D		DUCT RISE OR DROP
		BRANCH TAKEOFF
		RECTANGULAR TO ROUND DUCT
OSA	OSA,	OUTSIDE AIR DUCT.
	FLEX	FLEXIBLE DUCT.
	S OR SA	SUPPLY AIR FLOW.
	R OR RA	RETURN AIR FLOW.
	X OR EXH	EXHAUST AIR FLOW.
	OSA, OA	OUTSIDE AIR FLOW.
UC 3/4"	UC	UNDERCUT DOOR W/SLOT HEIGHT.
DL 2	DL	DOOR LOUVER W/FREE AREA SQ FT.
T S	T'STAT/SENSOR	THERMOSTAT/SENSOR
VS	VS	VARIABLE SPEED CONTROLLER.
C	CO2	CO2 SENSOR
CD	CD	CONDENSATE DRAIN
	CAP	CAP
	SOV	SHUT-OFF VALVE (GENERIC).
		CIRCUIT SETTER
		MOTOR ACTUATED SHUT-OFF VALVE.
WLR	WLR	WATER LOOP RETURN
WLS	WLS	WATER LOOP SUPPLY
HWR	HWR	HEATING HOT WATER RETURN
HWS	HWS	HEATING HOT WATER SUPPLY

EQUIPMENT IDENTIFICATION SYMBOL

XX — EQUIPMENT TYPE
XX — EQUIPMENT IDENTIFIER

AIR DEVICE IDENTIFICATION SYMBOL

XX — AIR DEVICE TAG
XX — CFM

ABBREVIATIONS

Abbreviation	Meaning
ABV.	ABOVE
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
ARCH	ARCHITECTURAL
AS	AUTOMATIC FIRE SPRINKLER PIPING
ASS'Y.	ASSEMBLY
BAS.	BUILDING AUTOMATION SYSTEM
BEL	BELOW
BHP	BRAKE HORSEPOWER
BOT	BOTTOM
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BV	BALANCING VALVE
C	CONVERTOR
CCSD	CLARK COUNTY SCHOOL DISTRICT
CFF	CAPPED FOR FUTURE
C.F.H.	CUBIC FEET PER HOUR
CLG.	CEILING
CONN	CONNECTION/ CONNECT
CFM	CUBIC FEET PER MINUTE
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CONTR.	CONTRACTOR
COTG	CLEANOUT TO GRADE
CU FT	CUBIC FEET
CU IN	CUBIC INCHES
CW	DOMESTIC COLD WATER
DIA	DIAMETER
DB	DRY BULB TEMPERATURE
DN.	DOWN
DP.	DIFFERENTIAL PRESSURE
DR	DRAIN
DWG.	DRAWING
(E)	EXISTING
EA	EACH
EA	EXHAUST AIR
EF	EXHAUST FAN
EL	ELEVATION
ELEC	ELECTRICAL
ENT	ENTERING
EQUIP.	EQUIPMENT
EWC	ELECTRIC WATER COOLER
F	FIRE MAIN PIPING
FC	FAN COIL
FCO	FLOOR CLEANOUT
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FIN.FLR.	FINISH FLOOR
FLR.	FLOOR
FPM	FEET PER MINUTE
FS	FLOOR SINK
FSD	COMB. FIRE/SMOKE DAMPER
FT	FEET
F.U.	FIXTURE UNIT
GA	GAUGE
GAL	GALLON
G.D.	GARBAGE DISPOSER
GPM	GALLON PER MINUTE
GV	GATE VALVE
H	HIGH
HB	HOSE BIBB
H.C.	HANDICAP
HP	HORSEPOWER
HW	DOMESTIC HOT WATER
HWR	DOMESTIC HOT WATER RETURN PIPING
HZ	HERTZ
I.E.	INVERT ELEVATION
IN	INCHES
INT.	INTEGRAL
IW	INDUSTRIAL WATER
KW	KILOWATT
LAV	LAVATORY
LBS	POUND
LVG	LEAVING
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MTD.	MOUNTED
(N)	NEW
NC	NORMALLY CLOSED
N.I.C.	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
OFD	OVERFLOW DRAINAGE PIPING
OPER.WT.	OPERATING WEIGHT
OPNG	OPENING
O.S&Y GV	OUTSIDE STEM AND YOKE GATE VALVE
P	PUMP
PD	PRESSURE DROP
PG	PRESSURE GAUGE
PIV	POST INDICATING VALVE
PM	PROJECT MANAGER
POC	POINT OF CONNECTION
PRV	PRESSURE REDUCING VALVE ASSEMBLY
PSI	POUNDS PER SQUARE IN.
PSIG	PSI GAUGE
QTY	QUANTITY
RAD	RETURN AIR DUCT
RD	ROOF DRAIN
R.I.&C.	ROUGH-IN & CONNECT
RL	REFRIGERANT LINE
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
S	SINK
S or W	SOIL OR WASTE PIPING
SAD	SUPPLY AIR DUCT
SD	STORM DRAIN
SL	SUCTION LINE
SP	STATIC PRESSURE
SQ.FT.	SQUARE FEET
SS	SERVICE SINK
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UR	URINAL
UTR	UP THRU ROOF
V	SANITARY VENT PIPING
V.B.	VACUUM BREAKER
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
WB	WET BULB TEMPERATURE
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WG	WATER GAGE
WH	WATER HEATER
W/	WITH

GENERAL NOTES

1. ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE APPROVED ENFORCED BUILDING, MECHANICAL AND PLUMBING CODES, AND AUTHORITIES HAVING JURISDICTIONS.
2. THE CONSTRUCTION IS WORK OF COMPLEX NATURE WHICH WILL REQUIRE ACCURATE PLANNING, CAREFUL PREPARATION AND EXECUTION TO DETAIL AND CLOSE SUPERVISION BY THE CONTRACTOR WHO WILL BE REQUIRED TO DO THIS WORK IN FULL COOPERATION WITH THE OTHER TRADES.
3. THE CONTRACTOR SHALL VERIFY ALL EQUIPMENT, DUCTWORK AND PIPING LOCATIONS, SIZE, PRESSURE AND AVAILABILITY PRIOR TO START OF ANY WORK.
4. CONTRACTOR SHALL VERIFY ALL EQUIPMENT MODEL NUMBERS, CAPACITIES, SIZES, VOLTAGES, AND ALL OTHER SCHEDULED INFORMATION WITH ALL OTHER APPLICABLE TRADES AND WITH THE MANUFACTURER PRIOR TO INSTALLATION.
5. ALL SUPPLY, AND RETURN AND EXHAUST, REGISTER CONNECTIONS TO DUCTWORK SHALL BE PROVIDED WITH ACCESSIBLE MANUAL VOLUME DAMPERS. ALTERNATIVELY, ACCESSIBLE MANUAL VOLUME DAMPERS MAY BE PROVIDED IN DUCTWORK FEEDER LINES SERVING INDIVIDUAL REGISTERS.
6. IN THE EVENT THERE IS A CONFLICT BETWEEN THE CONTRACT DRAWINGS AND THE SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN, UNLESS INSTRUCTED OTHERWISE.
7. DO NOT CUT OR NOTCH ANY STRUCTURAL MEMBERS WITHOUT STRUCTURAL ENGINEER'S APPROVAL.
8. REFER TO ARCHITECTURAL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR DETAILS OF NEW WORK.
9. THE CONTRACTOR SHALL COORDINATE FOR CLEARANCES PRIOR TO START OF ANY WORK.
10. THESE DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC AND ARE NOT INTENDED TO INDICATE ALL NECESSARY OFFSETS OF PIPING. THE CONTRACTOR SHALL INSTALL MATERIAL AND EQUIPMENT IN A MANNER AS TO CONFORM TO STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM, AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. ALL INSTALLATIONS SHALL BE CONSISTENT WITH NORMALLY ACCEPTABLE INDUSTRY STANDARDS. CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE IN WRITING OF ANY DISCREPANCIES OR CONFLICTS THAT WOULD AFFECT THE SYSTEM PERFORMANCE OR WHICH WOULD INCUR ADDITIONAL COSTS. THIS NOTIFICATION SHALL BE MADE PRIOR TO THE INSTALLATION OF THE ITEMS CONCERNED.
11. EQUIPMENT INDICATED ON THIS DRAWING IS SHOWN IN APPROXIMATE POSITION(S). CONTRACTOR SHALL VERIFYALL CONDITIONS INCLUDING EQUIPMENT LOCATIONS, P.O.C.'S, AND STRUCTURAL MEMBERS PRIOR TO INSTALLATION. IN ALL CASES, ADEQUATE ACCESS (PER MANUFACTURERS RECOMMENDATIONS AND CODE COMPLIANCE) FOR MAINTENANCE AND REPLACEMENT OF EQUIPMENT SHALL BE PROVIDED.
12. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES. NOTHING SHOWN IN THE PLANS OR STATED IN THE SPECIFICATIONS IS INTENDED TO INDICATE THAT THE INSTALLATION OR CONNECTIONS OF ANY ITEM OR DEVICE SHOULD BE DONE CONTRARY TO MANUFACTURERS INSTRUCTIONS AND ALL APPLICABLE CODES AND REGULATIONS. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THE INSTALLATIONS AND CONNECTIONS OF ALL ITEMS AND DEVICES CONFORMS TO MANUFACTURERS INSTRUCTIONS AND TO ALL APPLICABLE CODES AND REGULATIONS.
13. ALL EQUIPMENT, MATERIAL, AND ALL CONNECTIONS THERE TO SHALL BE INSTALLED COMPLETE PER MANUFACTURERS INSTRUCTIONS TO PROVIDE A COMPLETE AND FULLY OPERATIONAL SYSTEM.
14. IF THE CONTRACTORS' USE OF SUBSTITUTE MATERIALS, EQUIPMENT OR METHODS OF INSTALLATION REQUIRES ANY CHANGES IN OTHER TRADES WORK FROM THAT SHOWN ON THE DRAWINGS, THE EXTRA COST OF THE OTHER TRADES WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INITIATING THE SUBSTITUTION.
15. SUBMITTALS: APPROVAL OF SUBMITTALS DOES NOT RELEASE THE CONTRACTOR FROM OBLIGATIONS TO FULLY COMPLY WITH ALL REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS OR APPLICABLE CODE REGULATIONS.
16. BEFORE SUBMITTING BIDS FOR THE WORK THE CONTRACTOR SHALL MAKE A THOROUGH FIELD SURVEY OF THE WORK TO DETERMINE ANY INTERFERENCES THAT MAY AFFECT THE INSTALLATION OF THE WORK.
17. THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, EQUIPMENT, APPURTENANCES, AND OTHER CONTRACTUAL ITEMS REQUIRED FOR THE COMPLETE INSTALLATION OF THE PLUMBING WORK TO THE SATISFACTION OF THE OWNER AND ENGINEER.
18. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED TO COMPLETE THE MECHANICAL WORK.
19. SEISMIC NOTE: SEISMIC BRACING AND ANCHORAGE OF PIPES SHALL BE PER IBC AND SMACNA SEISMIC MANUAL, "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS".
20. MAINTENANCE LABEL SHALL BE AFFIXED TO ALL EQUIPMENT AND A MAINTENANCE MANUAL SHALL BE PROVIDED TO OWNER.

DEMOLITION NOTES

1. CONTRACTOR SHALL VISIT THE SITE AND MAKE HIMSELF THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS AND VERIFY THE EXISTING SITE CONDITIONS PRIOR TO BIDDING.
2. ALL WORK REQUIRED TO CHANGE THE EXISTING HVAC INSTALLATION AS INDICATED SHALL BE PROVIDED.
3. REMOVE ALL DUCT WORK, MISCELLANEOUS ITEMS AND PIPING THAT INTERFERES WITH NEW CONSTRUCTION. EXTEND AND RECONNECT ANY INTERRUPTED SYSTEM TO OTHER EXISTING SYSTEMS WHICH REMAIN.
4. EXCEPT AS MAY BE SPECIFICALLY INDICATED OTHERWISE, ALL MATERIALS AND EQUIPMENT REMOVED FROM THE EXISTING INSTALLATION IN THE COURSE OF PERFORMING THE INDICATED WORK (AND NOT INDICATED TO BE REUSED) SHALL BE TREATED AS FOLLOWS:
   A. ALL ABANDONED DUCTS, PIPES, BOXES, FITTINGS AND DIFFUSERS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
   B. ALL OTHER ITEMS REMOVED SHALL BE TURNED OVER TO THE OWNER, OR DISPOSED OF AS DIRECTED BY OWNER.
5. CONTRACTOR SHALL CLEAN ALL REMAINING ITEMS THAT ARE TO BE REUSED OR ARE TO REMAIN.
6. CONTRACTOR SHALL REMOVE ALL DUCT-WORKS AND EXPOSED PIPES THAT ARE NOT IN USE.
7. CONTRACTOR SHALL PROVIDE ALL NECESSARY WORK AND MATERIALS TO MAINTAIN ALL EXISTING HVAC SYSTEMS IN OPERATION DURING AND AFTER CONSTRUCTION.
8. ALL EXISTING SYSTEMS INCLUDING EQUIPMENT, DUCTS, PIPES, AND OTHER ITEMS WHICH ARE NOT TO BE DEMOLISHED SHALL REMAIN IN SERVICE THROUGHOUT THE CONSTRUCTION PERIOD.
9. UNLESS OTHERWISE NOTED ON DRAWINGS, ALL EXISTING DUCTS, PIPES, BOXES, AND OTHER HVAC SYSTEMS IN AREAS WHERE NEW WORK OCCURS SHALL BE REMOVED, EXCEPT WHEN SUCH ITEMS ARE REQUIRED TO MAINTAIN SERVICES TO OTHER AREAS. IN SUCH CASES, CONTRACTOR SHALL RELOCATE THESE ITEMS AND PROVIDE DUCTS, PIPES, DAMPER, BOXES, AND CONTROL WHERE REQUIRED TO ACCOMMODATE THE NEW WORK. CONTRACTOR SHALL REMOVE ANY EXISTING ITEM, WHEN SUCH ITEM IS CONCEALED AND DOES NOT INTERFERE WITH NEW WORK.
10. ALL ABANDONED DUCTS, PIPES, BOXES, DIFFUSER SHALL BE REMOVED COMPLETELY BACK TO THE SOURCE; CAPPING OFF STUBS THAT MAY REMAIN.
11. INFORMATION GIVEN ON THE DRAWINGS ABOUT EXISTING INSTALLATIONS HAS BEEN OBTAINED FROM THE EXISTING CONDITION, BUT CANNOT BE GUARANTEED ACCURATE IN ALL RESPECTS. VERIFY ALL SUCH INFORMATION BEFORE PROCEEDING WITH ANY NEW WORK THAT MAY BE AFFECTED. INCLUDE AS PART OF THE CONTRACT ALL WORK REQUIRED TO PRODUCE THE INDICATED RESULT. THE CONTRACTOR SHALL OBTAIN ANY "AS-BUILT" DRAWINGS DIRECTLY FROM THE OWNER.
12. THESE DEMOLITION NOTES REFER TO ALL MECHANICAL SHEETS WHERE DEMOLITION WORK IS BEING CARRIED OUT.
13. NEW AND/OR EXISTING EQUIPMENT INDICATED ON THIS DRAWING IS SHOWN IN APPROXIMATE POSITION(S). CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING EQUIPMENT LOCATIONS, P.O.C.'S, AND STRUCTURAL MEMBERS PRIOR TO INSTALLATION. IN ALL CASES, ADEQUATE ACCESS (PER MANUFACTURERS RECOMMENDATIONS AND CODE COMPLIANCE) FOR MAINTENANCE AND REPLACEMENT OF EQUIPMENT SHALL BE PROVIDED.
14. CONTRACTOR SHALL VERIFY ALL LOCATIONS, SIZES, P.O.C.'S, AND AVAILABILITY OF ALL EXISTING ITEMS (I.E. DUCTWORK ETC.) PRIOR TO INSTALLATION OF ANY MATERIAL OR EQUIPMENT.

AIR AND WATER BALANCE NOTES

THE SERVICES DESCRIBED HEREIN SHALL BE PERFORMED BY THE AABC CERTIFIED TEST AND BALANCE AGENCY (TABA). TABA SHALL BE CONTRACTED SEPARATELY AND DIRECTLY BY THE OWNER (UNLV). THIS AGENCY SHALL BE A COMPANY SPECIALIZING IN THE ADJUSTING AND BALANCING OF SYSTEMS SPECIFIED IN THIS SECTION WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE CERTIFIED BY AABC. WORK SHALL BE PERFORMED UNDER SUPERVISION OF AABC CERTIFIED TEST AND BALANCE ENGINEER AND REGISTERED ENGINEER. THE REPORT SHALL BE PRESENTED TO UNLV IN BOTH DIGITAL AND HARD COPY FORMATS.

1. WATER LOOP WATER FLOW, IN AND OUT OF THE EXISTING AND NEW HEAT PUMP UNITS SHALL BE BALANCED PER GPM INDICATED IN SCHEDULES.
2. AIR FLOW AND ITS CORRESPONDING TEMPERATURES THRU EACH NEW HEAT PUMP UNIT SECTION SHALL BE BALANCED PER VALUES INDICATED IN THE PLANS AND SCHEDULES, FOR BOTH HEATING AND COOLING DATA.
3. CONTRACTOR SHALL VERIFY THE AIR FLOW IN NEW HP-5 AND IN EXISTING HP-25 AND ENSURE THAT AIR FLOW IN ALL SPACES SERVED BY THESE UNITS ARE BALANCED AS STATED IN THESE DRAWINGS.
4. CONTRACTOR SHALL ALSO TEST AND DOCUMENT FLOW IN WATER LOOP, EXISTING CP-1&2 PUMPS DATA.
5. TABA TO CHECK THE UNIT INSTALLATION & REPORT ANY DEFICIENCY (AIR LEAK, PROPER SLOPING OF CONDENSATE DRAIN PIPING, ETC.) TO OWNER.

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OTHER WORKS

CONTRACTOR SHALL PERFORM ALL ELECTRICAL WORK TO MAKE A COMPLETE INSTALLATION FOR THIS PROJECT. REFER TO RELATED DRAWINGS FOR THE PROPOSED SCOPE OF WORK.

CONTRACTOR SHALL PERFORM ALL ARCHITECTURAL AND STRUCTURAL WORK TO MAKE A COMPLETE INSTALLATION FOR THIS PROJECT. INSTALLATION OF THE NEW UNITS ALONG WITH ALL ACCESSORIES SHALL MEET ALL ENFORCED BUILDING AND STRUCTURAL CODES.

FILED VERIFY EXISTING CONDITIONS, CAPACITIES AND CONSULT WITH PLANNING & CONSTRUCTION DEPARTMENT AND THEIR REQUIREMENTS PRIOR TO BID.

SPECIFIC NOTES

1. THE EXISTING BUILDING FIRE AND SMOKE ALARM SYSTEM IS CURRENTLY UPGRADED & CONTRACTOR SHALL RE-INSTALL SMOKE DETECTOR DEVICES ON NEW AND EXISTING HP UNITS AS NOTED IN THESE DRAWINGS.
2. ALL PENETRATIONS THRU ROOF SHALL BE SEALED AIR, WATER AND SOUND TIGHT WITH PROPER MATERIALS AND METHODS. DO NOT LEAVE ANY PORTION OF THE DEMOLISHED PIPING AND ACCESSORIES IN PLACE, EXPOSED OR VISIBLE IN ANY LOCATION. PATCH AND PAINT THE SURFACE TO MATCH EXISTING CONDITION. TYPICAL FOR EVERY AND ALL PENETRATIONS.
3. SEAL ALL PIPING PENETRATIONS THRU RATED WALLS, FLOORS AND CEILINGS TO MAINTAIN FIREPROOF RATINGS, AS APPLICABLE.

SCOPE OF WORK

A. AS PART OF BASE BID:

1. DISCONNECT AND REMOVE EXISTING HEAT PUMP UNITS (TOTAL OF 14) AS INDICATED IN THESE DRAWINGS. SEE ELECTRICAL DRAWINGS FOR EXTENT OF DEMO WORK.
2. REMOVE DUCTWORK AND PIPING ON NOTED HEAT PUMP UNITS AS INDICATED ON THE DEMOLITION DRAWINGS.
3. DISCONNECT AND REMOVE EXISTING ROOM SENSORS AND THERMOSTATS FOR DEMOLISHED HEAT PUMPS.
4. ORDER NEW HEAT PUMP UNITS BASED ON THEIR ORIENTATION AND THEIR CONNECTION POINTS SHOWN ON THESE DRAWINGS. FIELD VERIFY BEFORE ORDERING.
5. INSTALL NEW HEAT PUMP UNITS (TOTAL OF 14) WITH ALL COMPONENTS AND ACCESSORIES (SUPPLY AND RETURN DUCTWORK TRANSITION TO EXISTING DUCTWORK, WATER LOOP SUPPLY AND RETURN PIPING, CONDENSATE DRAIN PIPING, CONTROLS, ELECTRICAL, ETC.) ABOVE CEILING, AS SHOWN IN THESE DRAWINGS. PROVIDE NEW UNITS WITH ALL INTERNAL FEATURES AS SPECIFIED IN THE SCHEDULES, SPECIFICATIONS AND SEQUENCE OF CONTROLS/OPERATION. NOTE THAT FEW UNITS WILL BE RELOCATED FROM THEIR CURRENT LOCATION.
6. INSTALL NEW TWO WAY CONTROL ISOLATION VALVES AT ALL NEW UNITS. THESE VALVES SHALL BE INSTALLED ON ALL CEILING MOUNTED HEAT PUMPS, AND SHALL OPERATE AS INDICATED IN THE SCHEDULES AND SEQUENCE OF OPERATION/CONTROLS.
7. INSTALL NEW THERMOSTAT FOR EACH NEW UNIT. THESE THERMOSTATS SHALL BE INSTALLED ON ALL NEW CEILING MOUNTED HEAT PUMPS, AS INDICATED IN THE SCHEDULES AND SEQUENCE OF OPERATION/CONTROLS.
8. PERFORM DUCTWORK AND PIPING ARRANGEMENT CHANGES AND MODIFICATIONS FOR FEW HEAT PUMP UNITS, AS SHOWN IN THESE DRAWINGS.
9. INSTALL NEW SMOKE DETECTORS ON NEW AND EXISTING HEAT PUMP UNITS (ALL UNITS THROUGHOUT THE BUILDING), AS SHOWN IN THESE DRAWINGS. SMOKE DETECTORS SHALL BE PROVIDED TO THE CONTRACTOR BY UNLV.

B. GENERAL SCOPE:

1. PROVIDE SUPPORTS FOR EQUIPMENT AND ACCESSORIES AS REQUIRED.
2. PERFORM AIR AND WATER BALANCE AS NOTED IN THIS SHEET (UNDER A SEPARATE CONTRACT BY UNLV).
3. THE FOLLOWING INFORMATION ARE SHOWN IN THESE PLANS, BUT ARE NOT AS PART OF SCOPE OF WORK FOR THIS PROJECT. DO NOT INCLUDE THE FOLLOWINGS IN YOUR BID.
   a. ANY DEMOLITION AND NEW WORK ON EXISTING HEAT PUMP UNITS EXCEPT AS INDICATED IN THESE DRAWINGS FOR INSTALLATION OF SMOKE DETECTORS AND PARTIAL DUCTWORK MODIFICATIONS.
   b. ANY DEMOLITION AND NEW WORK ON EXISTING BUILDING PUMPS (EXISTING CP-1&2), INSTALLATION OF PREMIUM EFFICIENCY MOTORS AND VFD. INSTALLATION OF DP SENSORS AND SWITCHES AND CONTROLS UPGRADE IN THE ENTIRE BUILDING.

MECHANICAL SPECIFICATIONS

PART 1 – GENERAL:

1.THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, EQUIPMENT, APPURTENANCES, AND OTHER CONTRACTUAL EXPENSES REQUIRED FOR THE COMPLETE INSTALLATION OF THE MECHANICAL WORK TO THE SATISFACTION OF THE OWNER AND ENGINEER.

2.THE MECHANICAL WORK SHALL COMPLY WITH AND BE INSTALLED IN ACCORDANCE WITH ALL LEGALLY CONSTITUTED AUTHORITIES AND CODES HAVING JURISDICTION. NO WORK INDICATED ON DRAWINGS OR SPECIFICATIONS SHALL BE PERFORMED WITHOUT PLAN CHECK APPROVAL AND VALID PERMITS.

3.THE CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, APPARATUS, ACCESSORIES (I.E., THE ENTIRE INSTALLATION) AS FURNISHED BY HIM FOR A PERIOD OF ONE YEAR. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY ITEM WHICH MAY PROVE DEFECTIVE WITHIN ONE (1) YEAR FROM THE DATE THE APPARATUS IS ACCEPTED AND PLACED IN OPERATION WITHOUT ANY ADDITIONAL COST TO THE OWNER.

4.THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES, AND INSPECTIONS REQUIRED TO COMPLETE THE MECHANICAL WORK.

5.THE DRAWING INDICATES IN DIAGRAMMATIC FORM ARRANGEMENTS DESIRED FOR PRINCIPAL APPARATUS, PIPING CONDUIT, ETC., AND SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. SCALED AND FIGURED DIMENSIONS ARE APPROXIMATE AND ARE GIVEN FOR ESTIMATE PURPOSES ONLY. BEFORE PROCEEDING WITH ANY WORK, CHECK AND VERIFY EXISTING CONDITIONS, DIMENSIONS, SIZES AND ASSUME FULL RESPONSIBILITY FOR FITTING-IN OF EQUIPMENT, MATERIALS, AND ADJUSTMENT OF ANY EXISTING DUCTWORK AND PIPING (INCLUDING PROVISION FOR OFFSETS, BENDS, ELBOWS, ETC.).

6.THE CONTRACTOR SHALL MAKE A THOROUGH FIELD SURVEY TO DETERMINE ANY EXISTING CONDITION THAT MAY AFFECT THE INSTALLATION OF THE WORK. BY THE ACT OF SUBMITTING A BID, THE CONTRACTOR IS DEEMED TO HAVE MADE FIELD SURVEY AND HAS ACCEPTED THE EXISTING CONDITIONS THAT MAY AFFECT HIS WORK. APPOINTMENTS FOR FIELD SURVEY SHALL BE MADE THROUGH THE OWNER REPRESENTATIVE.

7.THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING, AND PATCHING TO COMPLETE THE INSTALLATION OF THE MECHANICAL WORK. ALL EXPOSED FINISHED AREAS THAT ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED TO MATCH THE EXISTING CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.

8.ALL CONSTRUCTION SITES SHALL BE PROPERLY PROTECTED WITH BARRICADES, WARNING FLAGS, FENCING, AND LIGHTS AS REQUIRED BY CODE AND THE OWNER'S SECURITY DEPARTMENT. PROVIDE SHORING, BRACING, AND ACCESS LADDERS AS REQUIRED BY CODE. TAKE EXTRA CARE TO INSTRUCT ALL PERSONNEL ON SAFETY PROCEDURES. TAKE CARE TO AVOID DAMAGE TO ADJACENT DUCTWORK, PIPING AND ELECTRIC SERVICES.

9.ALL UTILITY SHUT-DOWNS SHALL BE SCHEDULED AT LEAST TWO (2) DAYS IN ADVANCE THROUGH THE OWNER. PROVIDE CONTINUOUS "FIRE WATCH GUARD" TO ALL AREAS AFFECTED BY SHUT-DOWN OF ANY FIRE PROTECTION WATER SERVICE. THE CONTRACTOR'S OPERATION SHALL CAUSE NO UNNECESSARY INCONVENIENCE TO THE BUILDING'S PREMISES. THE ACCESS RIGHTS TO THE PUBLIC SHALL BE CONSIDERED AT ALL TIMES.

10.SHOP DRAWINGS AND MATERIAL LISTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST THIRTY (30) DAYS PRIOR TO THE START OF ANY WORK. NO WORK INDICATED ON ANY OF THE PLANS OR SHOP DRAWINGS SHALL BE PERFORMED, UNTIL THE SHOP DRAWINGS HAVE BEEN REVIEWED BY THE ENGINEER.

11.IF THE CONTRACTORS' USE OF SUBSTITUTE MATERIALS, EQUIPMENT OR METHODS OF INSTALLATION REQUIRES ANY CHANGES IN OTHER TRADES WORK FROM THAT SHOWN ON THE DRAWINGS, THE EXTRA COST OF THE OTHER TRADES WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INITIATING THE SUBSTITUTION.

12.APPROVAL OF THE SUBMITTALS DOES NOT RELEASE THE CONTRACTOR FROM OBLIGATIONS TO FULLY COMPLY WITH ALL REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS OR APPLICABLE CODES.

13.THE CONTRACTOR SHALL SUBMIT TWO (2) COMPLETE SETS OF AS-BUILT DRAWINGS, ONE SET OF ELECTRONIC (PDF) FORMAT, OPERATIONAL AND MAINTENANCE MANUALS TO THE OWNER AS PERMANENT RECORDS AT SUCCESSFUL COMPLETION OF WORK, BEFORE FINAL PAYMENT CAN BE APPROVED BY THE OWNER REPRESENTATIVE.

PART 2 – MATERIALS:

1. NEW HP UNITS SHALL BE "CLIMATE MASTER". NEW VFDS SHALL BE "ABB". NO SUBSTITUTIONS WILL BE ALLOWED IN THIS PROJECT. SEE SHEET M0.02 FOR MORE INFORMATION.

2. DUCTWORK SHALL BE PROVIDED AS FOLLOWS:
A. ALL SHEET METAL DUCTWORK, EXCEPT WHERE EXISTING DUCTWORK IS INDICATED TO BE REUSED, SHALL BE NEW GALVANIZED SHEET METAL. DUCT GAUGES, CONSTRUCTION, SUPPORT, SEISMIC RESTRAINT, AND INSTALLATION SHALL BE FOR MEDIUM PRESSURE DUCTWORK AND IN ACCORDANCE WITH THE MECHANICAL CODE, IBC, AND SMACNA DUCTWORK CONSTRUCTION HANDBOOKS. DUCTWORK MATERIALS AND JOINTS SHALL MEET STANDARDS FOR MEDIUM PRESSURE DUCTWORK AND SHALL MEET, AS A MINIMUM THE QUALITY OF THE EXISTING INSTALLATION IN THIS BUILDING.
B. ALL TRANSVERSE JOINTS ON NEW AND EXISTING DUCTWORK SHALL BE SEALED AIRTIGHT WITH HARDCAST DT FIBERGLASS TAPE SATURATED WITH HARDCAST RTA-50. THE TAPE SHALL EXTEND 1-INCH ON BOTH SIDES OF THE SEAM OR JOINT.

3. PIPING SHALL BE PROVIDED AS FOLLOWS:
A. ALL WLS&R PIPING, EXCEPT WHERE EXISTING PIPING IS INDICATED TO BE REUSED, SHALL BE NEW PIPING MATERIALS. PIPING SCHEDULE, MATERIALS, CONSTRUCTION, SUPPORT, SEISMIC RESTRAINT, AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE MECHANICAL CODE, IBC, AND SMACNA "GUIDELINES FOR THE RESTRAINT OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS". PIPING AND FITTINGS MATERIALS AND METHODS SHALL BE ONE OF THE FOLLOWINGS, AS APPLICABLE THAT MATCH EXISTING INSTALLATION IN THE BUILDING:
A.1. COPPER TUBING, ASTM B88, TYPE "K" OR "L", HARD DRAWN; WITH CAST BRASS OR SOLDER WROUGHT COPPER FITTINGS; AND WITH ASTM B32, SOLDER, GRADE 95TA JOINTS.
A.2. STEEL PIPE, ASTM A53 OR A106, SCHEDULE 40 BLACK STEEL PIPING; WITH ANSI/ASTM B16.3, MALLEABLE IRON OR ASTM A234, FORGED STEEL WELDING TYPE FITTINGS; AND WITH SCREWED, OR WELDED JOINTS.
B. CONDENSATE DRAIN PIPING SHALL BE TYPE "L" COPPER WITH WROUGHT COPPER FITTINGS FOR 95-5 SOLDER. PLASTIC PIPING IS NOT ACCEPTABLE FOR CONDENSATE DRAIN PIPING.
C. FIRE RATED PENETRATION SEALS FOR FLOORS, CEILING AND WALLS SHALL BE PROSET SYSTEM "A" FOR COPPER AND STEEL PIPING.
D. PROVIDE PIPE SLEEVES AND ESCUTCHEON PLATES FOR PIPES RUNNING THROUGH WALLS, PARTITIONS, CEILING AND FLOORS EXPOSED TO VIEW. ESCUTCHEON PLATES SHALL BE CHROME PLATED BRASS OR STAINLESS STEEL.

4.VALVES AND PIPING SPECIALTIES SHALL BE MANUFACTURED IN USA AND PROVIDED AS FOLLOWS:
A. BALL VALVES 2" AND SMALLER SHALL BE 2-PIECE BRONZE WITH STAINLESS STEEL BALL, TFE SEAT, AND LEVER OPERATOR FOR SCREWED, OR SOLDERED CONNECTION BY NIBCO OR STOCKHAM. PROVIDE LEVER ARM EXTENSION TO CLEAR INSULATION ON ALL CHILLED WATER SERVICE VALVES.
B. BALANCING COCKS 2" AND SMALLER SHALL BE BRONZE BODY, CLASS 150 BY NIBCO OR ARMSTRONG.
C. STRAINERS 2" AND SMALLER SHALL BE "Y" PATTERN, CLASS 150, BRONZE BODY, STAINLESS STEEL PLUG, SCREWED BY NIBCO OR ARMSTRONG.
D. FLOW CONTROL VALVES SHALL BE 2 PSI MAXIMUM PRESSURE DROP, THREADED OR THREADED FLANGE.
E. PRESSURE AND TEMPERATURE TAPS (PETE'S PLUG II) SHALL BE BRASS BODY AND CAP, 1/4" NPT BY PETERSON EQUIPMENT.
F. DIELECTRIC UNIONS SHALL BE PROVIDED TO JOIN DISSIMILAR MATERIALS TO PREVENT GALVANIC CORROSION BY NIBCO OR WATTS.

5.THERMAL INSULATION FOR PIPING SHALL BE PROVIDED AS FOLLOWS:
A. PIPE INSULATION: PIPE INSULATION SHALL BE MULTISERVICE-TYPE SUITABLE FOR ALL LINES OPERATING FROM -20° TO 500° F. INSULATION SHALL BE RIGID, TYPE A, CLOSED CELL FOAM INSULATION, TRYMER 1800 OR APPROVED EQUAL, 0.19 180 DAY AGED K-FACTOR AT 75 DEG. F MEAN.
B. THERMAL CONDUCTIVITY (BTU/HOUR SQUARE FOOT DEGREES F./INCH) SHALL NOT EXCEED:
AT 75° F. MEAN TEMPERATURE 0.22
AT 100° F. MEAN TEMPERATURE 0.23
AT 200° F. MEAN TEMPERATURE 0.25
C. VAPOR BARRIER JACKET SHALL BE HEAVY DUTY ALL SERVICE JACKET (ASJ) CONSISTING OF LAMINATED ALUMINUM FOIL, GLASS REINFORCING AND WHITE BUILDING PAPER. PERM RATING SHALL BE 0.01. VAPOR BARRIER TO FORM A VAPOR TIGHT SYSTEM.
D. PREMOLDED PIPE FITTING COVERS: INTERIOR USED COVERS SHALL BE FACTORY-PREMOLDED ONE-PIECE POLYVINYL CHLORIDE (PVC-FR). COVERS SHALL HAVE A SNOW-WHITE FINISH AND SHALL WITHSTAND SURFACE OPERATING TEMPERATURES FROM 35 TO 150 DEGREES F. CONTINUOUS USAGE. ALL COVERS SHALL CONFORM TO FEDERAL SPECIFICATION L-P-535, COMPOSITION A, TYPE II, AND SHALL BE CEEL-CO. SERIES 100, CERTAINTEED "SNAP-FORM," ZESTON.

6. PIPES AND/OR CONDUITS PASSING THROUGH WALL, FLOORS, ROOF AND PARTITIONS SHALL BE PROVIDED WITH SLEEVES. SLEEVES PASSING THROUGH WATER PROOFING OF DAMP PROOFING SHALL BE WATER TIGHT. SLEEVES PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH MATERIAL APPROVED FOR THE RATING OF THE STRUCTURE AND U.L. LISTED.

PART 3 – EXECUTION:

1. THE DRAWING INDICATES IN DIAGRAMMATIC FORM ARRANGEMENTS DESIRED FOR PRINCIPAL APPARATUS, PIPING CONDUIT, ETC., AND SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. SCALED AND FIGURED DIMENSIONS ARE APPROXIMATE AND ARE GIVEN FOR ESTIMATE PURPOSES ONLY. OFFSET AND TRANSITION TO AVOID OBSTRUCTIONS IN PATH OF DUCTWORK AND PIPING INDICATED ON PLANS. BEFORE PROCEEDING WITH ANY WORK, CHECK AND VERIFY EXISTING CONDITIONS, DIMENSIONS, SIZES AND ASSUME FULL RESPONSIBILITY FOR FITTING-IN OF EQUIPMENT AND MATERIALS, (INCLUDING PROVISION FOR OFFSETS, BENDS, ELBOWS, ETC.).

2. EQUIPMENT, AND PIPING SHALL BE INSTALLED TO RUN PARALLEL OR PERPENDICULAR TO THE BUILDING STRUCTURE AND SHALL BE ARRANGED TO FORM NEAT SYMMETRICAL PATTERNS TO ASSURE THE BEST POSSIBLE APPEARANCE. HANGERS ON PARALLEL ADJACENT PIPING SHALL BE IN LINE WITH EACH OTHER AND PARALLEL TO THE LINES OF THE BUILDING STRUCTURE. ALL PIPING SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE ONLY, NO PIPING SHALL BE SUPPORTED FROM OTHER PIPING OR AIR CONDITIONING DUCTWORK.

3. HOLD PIPING TIGHT TO UNDERSIDE OF STRUCTURE ABOVE TO MAXIMIZE FREE SPACE IN CEILING. COORDINATE LOCATION OF PIPING TO AVOID CREATING INTERFERENCES WITH OTHER TRADES SUCH AS PLUMBING, ELECTRICAL, LIGHTING, ETC.

4. PROVIDE HANGERS TO SUPPORT PIPING AND EQUIPMENT. PIPE HANGER CONSTRUCTION, MATERIALS, ATTACHMENT TO THE STRUCTURE, AND OVERALL INSTALLATION SHALL BE IN ACCORDANCE WITH THE MECHANICAL CODE, PLUMBING CODE, AND SMACNA "GUIDELINES FOR THE RESTRAINT OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS".

5. INSTALL NEW LABELS ON PIPING AND EQUIPMENT TO MATCH THE DESIGNATORS INDICATED IN THESE DRAWINGS.

6. PIPING AND COMPONENTS SHALL BE SPACED SO THAT A THREADED PIPE FITTING MAY BE REMOVED BETWEEN ADJACENT PIPES. NOT LESS THAN 1/2-INCH OF CLEAR SPACE SHALL EXIST BETWEEN THE FINISHED SURFACE AND OTHER WORK, AND BETWEEN FINISHED SURFACE OF PARALLEL ADJACENT PIPING.

7. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT AND PULL WIRING FOR CONTROLS. FINAL CONNECTION TO CONTROLS SHALL BE BY MECHANICAL CONTRACTOR.

8. FIRE RATED SEALS SHALL BE PROVIDED AT ALL PENETRATIONS THROUGH FIRE RATED AREAS.

9.TEST ALL NEW WLS&R PIPING HYDROSTATICALLY AT 125 PSI FOR 8-HOURS WITH NO CIRCULATING LOSS OF PRESSURE. RESEAL AND RETEST UNTIL THE ENTIRE PIPING SYSTEM PASSES.

10. BALANCE AND ADJUST ALL FANS, FOR SPECIFIED AIR DISTRIBUTION RATES. SUBMIT A QUALIFIED AIR BALANCE REPORT BY INDEPENDENT AABC REGISTERED AIR BALANCE CONTRACTOR TO THE ENGINEER FOR REVIEW.

11. AT THE COMPLETION OF THE WORK, ALL PARTS OF THE INSTALLATION SHALL BE THOROUGHLY CLEANED. ALL FIXTURES, VALVES, PIPES, AND FITTINGS SHALL BE CLEANED OF GREASE, METAL CUTTINGS, SLUDGE, AND OTHER DEBRIS THAT MAY HAVE ACCUMULATED DURING INSTALLATION.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LEGAL REMOVAL AND OR ABATEMENT OF ASBESTOS INSULATION. FIELD VERIFY PRIOR TO BID, AND VERIFY IF SUCH MATERIALS ENCOUNTERED IN THE WORK AREA.

SEQUENCE OF OPERATION/CONTROLS

THE CURRENT CONTROL SYSTEM IN THIS BUILDING IS "SCHNEIDER TAC VISTA". ALL CONTROLS AS PART OF THIS PROJECT SHALL BE FURNISHED, ENGINEERED AND INSTALLED BY SAME MANUFACTURER. NO SUBSTITUTION SHALL BE PERMITTED.

THE INSTALLATION OF NEW HP UNITS (TOTAL OF 14 UNITS) WITH RELATED DUCTWORK, PIPING AND CONTROLS SHALL BE FOR STAND ALONE OPERATION WITH COMPATIBILITY FOR FUTURE CONNECTION TO BAS. CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING INSTALLATION (MATERIALS AND HARDWARE) SUCH THAT THE NEW HP UNITS COULD BE CONNECTED TO BAS AT FUTURE TIME WITHOUT ANY REMOVAL OR REPLACEMENT OF ANY CONTROL DEVICES (WIRELESS THERMOSTATS, SENSORS, ETC.) THAT ARE INSTALLED AS PART OF THIS PROJECT.

PROVIDE CONTROLS FOR NEW 2-WAY CONTROL (ISOLATION/ON-OFF) VALVES AT NEW CEILING MOUNTED HEAT PUMP UNITS (TOTAL OF 14). THESE VALVES SHALL BE CONTROLLED VIA CONTROLLERS WITHIN THE WIRELESS THERMOSTATS. THESE VALVES SHALL CLOSE WITH PROPER TIME DELAY, WHEN THE UNIT COMPRESSOR IS IDLE. VALVE SHALL OPEN AS THE FIRST PRIORITY, WHEN THE UNIT OPERATION IS INITIATED.

BAS CONTRACTOR SHALL PROVIDE AND INSTALL NEW "SCHNEIDER" SMART THERMOSTATS THAT CONTAIN THE CONTROLLER AND PROVIDE CONTROLS FOR "COOL", "HEAT", "FAN" OPERATION AND "AUTO CONTROL" FOR ALL NEW CEILING MOUNTED HEAT PUMP UNITS (TOTAL OF 14). THESE THERMOSTATS SHALL ALSO BE EQUIPPED WITH OCCUPANCY SENSORS TO AUTOMATICALLY SWITCH THE NEW HP UNIT TO UNOCCUPIED MODE WHEN THE SPACE IS NOT OCCUPIED FOR A CERTAIN AMOUNT OF TIME (OPERATOR ADJUSTABLE). THESE THERMOSTATS SHALL HAVE THE CAPABILITY AND ALL NECESSARY FEATURES TO TRANSFER WIRELESS SIGNAL VIA ROUTERS/REPEATERS AS REQUIRED TO BAS, AT FUTURE TIME AND UNDER A SEPARATE PROJECT.

EXISTING "TAC VISTA" CONTROLLER, SOFTWARE AND GRAPHICS SHALL REMAIN AND OPERATE AS-IS. NO UPGRADE SHALL BE REQUIRED FOR THIS CONTROLLER IN THIS PROJECT.

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SEAL:

STATE OF NEVADA — BIJAN SALIMI — MECHANICAL — NO. 13897 — PROFESSIONAL ENGINEER

DATE: 10/01/13
EXP. DATE: 06/30/14

CONSULTANT:

UNLV
UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154

PROJECT : SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

MECHANICAL LEGEND, NOTES AND SPECIFICATIONS

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413
Consultant Project No.	-
Date:	04.28.2014 ~~10.02.2013~~

Drawn By	Checked By	Approved By
K.P./K.J.	F.S.	B.S.

File Name:

M0.01

CONSTRUCTION

MECHANICAL SCHEDULES

WATER SOURCE HEAT PUMP SCHEDULE (2,100 FEET ELEVATION)

ITEM	MANUFACTURER & MODEL NO.	LOCATION	AREA SERVED	SUPPLY FAN			COOLING CAPACITY					HEATING			WATER FLOW RATE GPM	EWT DEG. F COOLING/ HEATING	ΔP FT. WATER	ELECTRICAL DATA					OPER. WT. (LB.)	REMARKS
				CFM	MAX. E.S.P IN. WG	MOTOR HP	TOTAL MBH	SENSIBLE MBH	ENT. AIR DEG.F DB	ENT. AIR DEG.F WB	EER	TOTAL MBH	ENT. AIR DEG.F	COP				UNIT FLA	UNIT MCA	MAX FUSE AMPS	VOLT/PH/HZ	SMOKE DETECTOR REQUIREMENT (SAD ONLY)		
HP 1	CLIMATE MASTER TCH060	FIRST FLR.	ELE.RM 123	1,950	.5	1	59.5	41.6	80	67	13.1	91	70	4.66	15	85	22.6	20.5	24.4	40	208/3/60	NO	278	NEW HP UNIT. SEE NOTES: 1 THRU 10.
(E)HP-2	CLIMATE MASTER GCH048	FIRST FLR.	UPS #2	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/3/N.A.	NO	325	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
HP 3	CLIMATE MASTER TCH048	FIRST FLR.	RM113B, NTWKING	1,400	.4	.75	49	35.1	80	67	13.2	67.5	70	5.09	12	85	11.3	17.1	20.5	30.0	208/3/60	NO	263	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 4	CLIMATE MASTER TCH036	FIRST FLR.	RM114T, TERUYA	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	18.5	22.7	35.0	208/1/60	YES	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 5	CLIMATE MASTER TCH018	FIRST FLR.	OPERATOR RM.	500	.34	.17	18	13.8	80	67	14.3	25.6	70	5.5	4.5	85	8.1	8.4	10.2	15.0	208/3/60	NO	163	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 6	CLIMATE MASTER TCH024	FIRST FLR.	BATTERY RM#1	650	.34	.24	23.2	15.7	75	63	12.9	33.4	70	4.34	6	85	8.1	14.3	17.5	30.0	208/1/60	NO	375	NEW HP UNIT. SEE NOTES: 1 THRU 10.
(E)HP-7	CLIMATE MASTER GCH060	FIRST FLR	UPS #1	2,000	.50	1	N.A.	51	80	63.5	11.5	64	N.A.	3.9	16	87	12.5	N.A.	N.A.	N.A.	208/3/N.A.	YES	400	EXISTING HP UNIT. SEE NOTES: 7 THRU 10.
HP 8	CLIMATE MASTER TCH036	FIRST FLR	RM117B, ELEVATOR	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	18.5	22.7	35.0	208/1/60	NO	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 9	CLIMATE MASTER TCH036	FIRST FLR.	LOBBY PATIO	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	18.5	22.7	35.0	208/1/60	YES	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 10	CLIMATE MASTE TCH036	FIRST FLR	LOBBY VESTIBULE	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	12.2	14.8	25.0	208/3/60	NO	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
(E)HP-11	CLIMATE MASTER GCH042	FIRST FLR	RM102, CONF.RM	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/30/N.A.	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
(E)HP-12	CLIMATE MASTER GCH042	FIRST FLR	RM104, CLSRM	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/30/N.A.	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
(E)HP-13	CLIMATE MASTER GCH048	FIRST FLR	RM108 JAN.CLOSET	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/1/N.A.	NO	325	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
HP 14	CLIMATE MASTER TCH036	SECOND FLR.	MEZZANINE EAST	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	12.2	14.8	25.0	208/3/60	YES	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 15	CLIMATE MASTER TCH048	SECOND FLR	MEZZANINE WEST,ELEV	1,400	.4	.75	49	35.1	80	67	13.2	67.5	70	5.09	12	85	11.3	17.1	20.5	30.0	208/3/60	YES	263	NEW HP UNIT. SEE NOTES: 1 THRU 10.
(E)HP-16	McQUAY W.CRH.1.030	SECOND FLR	EMP. LOUNGE	1,000	.3	.33	N.A.	26	80	63.5	10.7	33	N.A.	3.8	8	87	16.0	N.A.	N.A.	N.A.	460/3/60	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
HP 17	CLIMATE MASTER TCH060	SECOND FLR	RM210 SYSTEMS	1,950	.5	1	59.5	41.6	80	67	13.1	91	70	4.66	15	85	22.6	20.5	24.4	40.0	208/3/60	NO	278	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 18	CLIMATE MASTER GCH036	SECOND FLR	RM212B	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	12.2	14.8	25.0	208/3/60	NO	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
(E)HP-19	CLIMATE MASTER GCH042	SECOND FLR	RM220	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/30/N.A.	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
(E)HP-20	CLIMATE MASTER GCH060	SECOND FLR	OPEN AREA O/S RMS 202/204	2,000	.50	1	N.A.	51	80	63.5	11.5	64	N.A.	3.9	16	87	12.5	N.A.	N.A.	N.A.	208/30/N.A.	YES	400	EXISTING HP UNIT. SEE NOTES: 7 THRU 10.
(E)HP-21	CLIMATE MASTER GCH042	SECOND FLR	RM204 CONF.RM.	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/30/N.A.	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
(E)HP-22	CLIMATE MASTER GCH024	SECOND FLR	J.LOWE	700	.3	.12	N.A.	16.2	82	64.7	10.5	20	N.A.	3.7	5	87	24	N.A.	N.A.	N.A.	208/1/N.A.	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
HP 23	CLIMATE MASTER GCH060	THIRD FLR	RMS 304/306	1,950	.5	1	59.5	41.6	80	67	13.1	91	70	4.66	15	85	22.6	20.5	24.4	40.0	208/3/60	NO	278	NEW HP UNIT. SEE NOTES: 1 THRU 10.
HP 24	CLIMATE MASTER GCH036	THIRD FLR	LOBBY	1,000	.34	.50	34.7	25	80	67	12.8	53.2	70	4.62	9	85	8.1	12.2	14.8	25.0	208/3/60	NO	203	NEW HP UNIT. SEE NOTES: 1 THRU 10.
(E)HP-25	CLIMATE MASTER GCH060	THIRD FLR	RM311	2,000	.34	.75	77	61.0	75	63	17.83	83	70	4.71	15.2	87	18.79	N.A.	N.A.	N.A.	208/3/N.A.	YES	400	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.
(E)HP-26	McQUAY W.CRH.1.042	THIRD FLR	AVC OFFICE	1,400	.4	.50	N.A.	38	83	64.7	11.8	39	N.A.	3.9	10	87	22	N.A.	N.A.	N.A.	208/3/N.A.	NO	250	EXISTING HP UNIT. SEE NOTES: 7 THRU 9.

NOTES

1. SEE FLOOR PLANS FOR ORIENTATION OF THE UNIT. VERIFY UNIT'S CONNECTION SIDES FOR ITS PIPING, SUPPLY AIR AND RETURN AIR DUCTWORK, PRIOR TO ORDERING THE NEW HEAT PUMP UNITS.
2. PROVIDE WITH "SOLID STATE" ELECTRONIC CONDENSATE DRAIN OVERFLOW PROTECTION FOR NEW HEAT PUMP UNITS. SWITCH SHALL SHUT DOWN THE UNIT AND SEND ALARM SIGNAL, IN THE EVENT THAT CONDENSATE FLOODS THE PRIMARY PAN.
3. PROVIDE WITH SINGLE POINT OF ELECTRICAL CONNECTION INCLUDING SERVICE FOR UNIT CONTROL AND BAS CONTROL, AS APPLICABLE.
4. PROVIDE WITH DISCONNECT SWITCH, MOUNTED ON UNIT.
5. PROVIDE WITH MERV-8 FILTERS, (2" FILTER ON RETURN AIR DUCT).
6. PROVIDE AND INSTALL WITH MANUFACTURE STANDARD UNIT CONTROLLER. UNIT CONTROLLER SHALL INTERFACE WITH NEW 2-WAY CONTROL VALVE. BAS CONTRACTOR TO PROVIDE INTERFACE WITH WIRELESS THERMOSTAT AS REQUIRED AND DESCRIBED IN SEQUENCE OF OPERATION.
7. PROVIDE AND INSTALL NEW 2-WAY CONTROL VALVE (ISOLATION). SEE B/M0.03 FOR DETAILS.
8. PROVIDE WITH NEW ROOM WIRELESS THERMOSTAT. NEW THERMOSTAT SHALL BE SUPPLIED AND INSTALLED BY BAS CONTRACTOR. SEE "SEQUENCE OF OPERATION" SHEET M0.01 FOR MORE DETAILS.
9. SEE SHEET M0.01 FOR SEQUENCE OF OPERATION.
10. INSTALL NEW SMOKE DETECTOR ON SUPPLY AIR DUCTWORK FOR NEW AND EXISTING UNITS, AS INDICATED IN THE SCHEDULE. DUCT SMOKE DETECTORS SHALL BE PROVIDED BY UNLV (BUILDING FIRE ALARM CONTRACTOR) FOR MECHANICAL CONTRACTOR'S INSTALLATION. CONNECTION AND WIRING OF SMOKE DETECTORS TO EXISTING FIRE ALARM PANEL IS NOT INCLUDED IN THIS CONTRACT (BY OTHERS).

SMOKE DETECTOR INSTALLATION/OPERATION NOTES (BY OTHERS):

1. THE AIR MOVING DEVICE SHALL COMPLETELY AND AUTOMATICALLY SHUT DOWN ONCE SMOKE IS DETECTED BY SMOKE DETECTOR INSTALLED ON THAT AIR MOVING DEVICE. THE FIRE ALARM SYSTEM SHALL MONITOR THE SMOKE DETECTOR AT EACH UNIT VIA AN AUXILIARY CONTACT ON THE SMOKE DETECTOR. THE GENERAL FIRE ALARM SHUTDOWN SHALL BE HARD WIRED TO THE UNIT.
2. ACTIVATION OF SMOKE DETECTOR IN ANY OF THE HEAT PUMP UNITS SHALL SHUT DOWN THE OTHER UNITS, THAT SERVE (FULLY OR PARTIALLY) THE SAME SPACE (SUPPLY OR RETURN).
3. SMOKE DETECTOR SHALL BE WIRED IN A MANNER THAT SHUTS DOWN THE POWER TO AIR MOVING DEVICES, SUPPLY FANS, ONLY. THE POWER SHALL NOT SHUT DOWN AND DISABLE THE ENTIRE HP UNIT AND ITS CONTROL MODULE.

AIR DEVICE SCHEDULE

TAG	SERVICE/ LOCATION	MANUFACTURE & MODEL NUMBER	TYPE – FACE SIZE	TYPE OF INSTALLATION	DAMPERS	SIZE NECK (IN)	SIZE MAX. CFM	MAX. N.C.	MAX.PRESS. LOSS ("WC)	REMARKS
S-1	SUPPLY AIR DIFFUSER GENERAL, THIRD FLOOR OFFICE 309. SEE PLAN.	"TITUS" MODEL PMC	24"X24" LAY-IN 4-WAY	T-BAR	NO	6x6 – 6"ø 8x8 – 8"ø 10x10–10"ø 12x12–12"ø 16x16–16"ø 18x18–18"ø	100 178 278 400 625 900	24	0.1	FOUR WAY PATTERN, SQUARE TO ROUND ADAPTER. ALUMINUM. MATCH EXISTING DIFFUSERS IN THE AREA OF WORK.

1. INSIDE PORTION OF THE DIFFUSERS THAT ARE VISIBLE SHALL BE PAINTED FLAT BLACK.

PUMP SCHEDULE – EXISTING (SEE REMARKS)

ITEM	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	GPM	HEAD (FT)	PUMP MOTOR HP	PUMP MOTOR VOLT	PUMP MOTOR ø	PUMP MOTOR RPM	OPER. WEIGHT (LBS.)	REMARKS
(E)CP-1	B&G "1510-8F-9.875"	MECHANICAL ROOM	BUILDING LOOP	375	85	10	208	3	1,800	–	1. REPLACE EXISTING MOTORS WITH PREMIUM EFFICIENCY MOTORS (INVERTER DUTY) COMPATIBLE W/NEW VFDS. 2. PROVIDE AND INSTALL VFDS ON EXISTING PUMPS. VFDS SHALL BE "ABB" ONLY.
(E)CP-2	B&G "1510-8F-9.875"	MECHANICAL ROOM	BUILDING LOOP	375	85	10	208	3	1,800	–	

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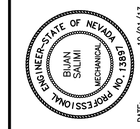

DATE: 10/01/13
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CONSULTANT:

UNLV
UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154

PROJECT : SCS HEAT PUMP UNITS REPLACEMENT

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MECHANICAL SCHEDULES

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413
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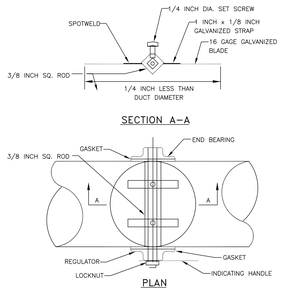
File Name:

M0.02

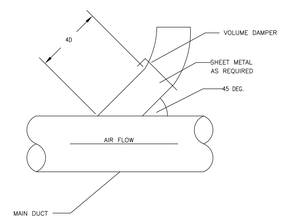
CONSTRUCTION

MECHANICAL DETAILS

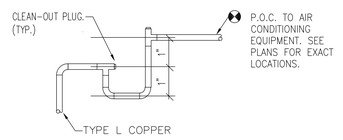


PAINT POSITION OF INDICATOR HANDLE AFTER THE AIR BALANCE.

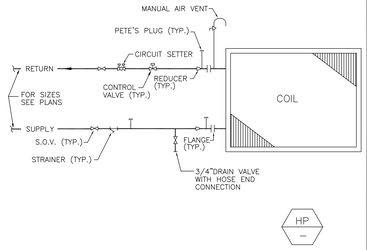
F M0.03 ROUND VOLUME DAMPER DETAIL (UP TO 14 IN. DIAMETER) N.T.S.



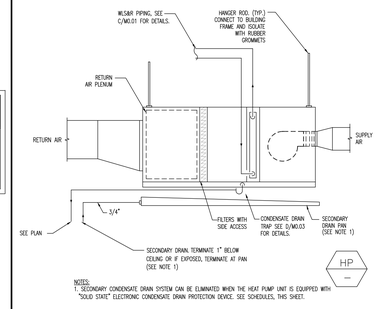
E M0.03 ROUND DUCT BRANCH CONNECTION DETAIL N.T.S.



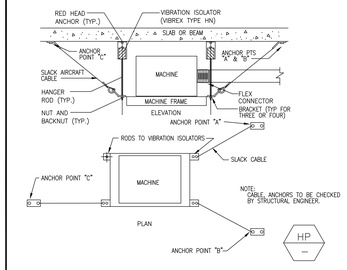
D M0.03 CONDENSATE DRAIN TRAP DETAIL N.T.S.



C M0.03 WATER LOOP COIL PIPING DETAIL – "WLS & WLR" N.T.S.



B M0.03 HEAT PUMP UNIT DETAIL N.T.S.



A M0.03 SUSPENDED EQUIPMENT INSTALLATION AND LATERAL RESTRAINT DETAILS. N.T.S.

L M0.03 NOT USED DETAIL N.T.S.

K M0.03 NOT USED DETAIL N.T.S.

J M0.03 NOT USED DETAIL N.T.S.

I M0.03 NOT USED DETAIL N.T.S.

H M0.03 CEILING DIFFUSER INSTALLATION DETAIL N.T.S.

G M0.03 ROUND SUPPLY DUCT BRANCH CONNECTION DETAIL N.T.S.

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MECHANICAL DETAILS

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File Name:

M0.03

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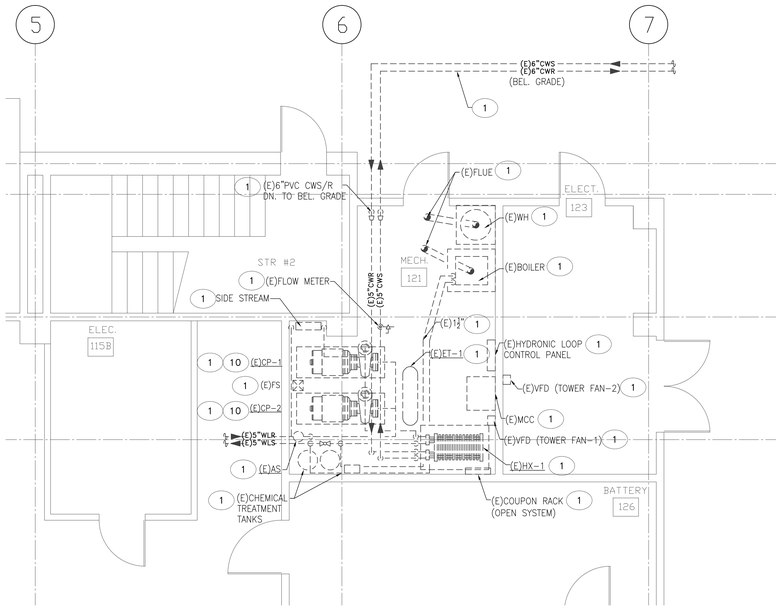

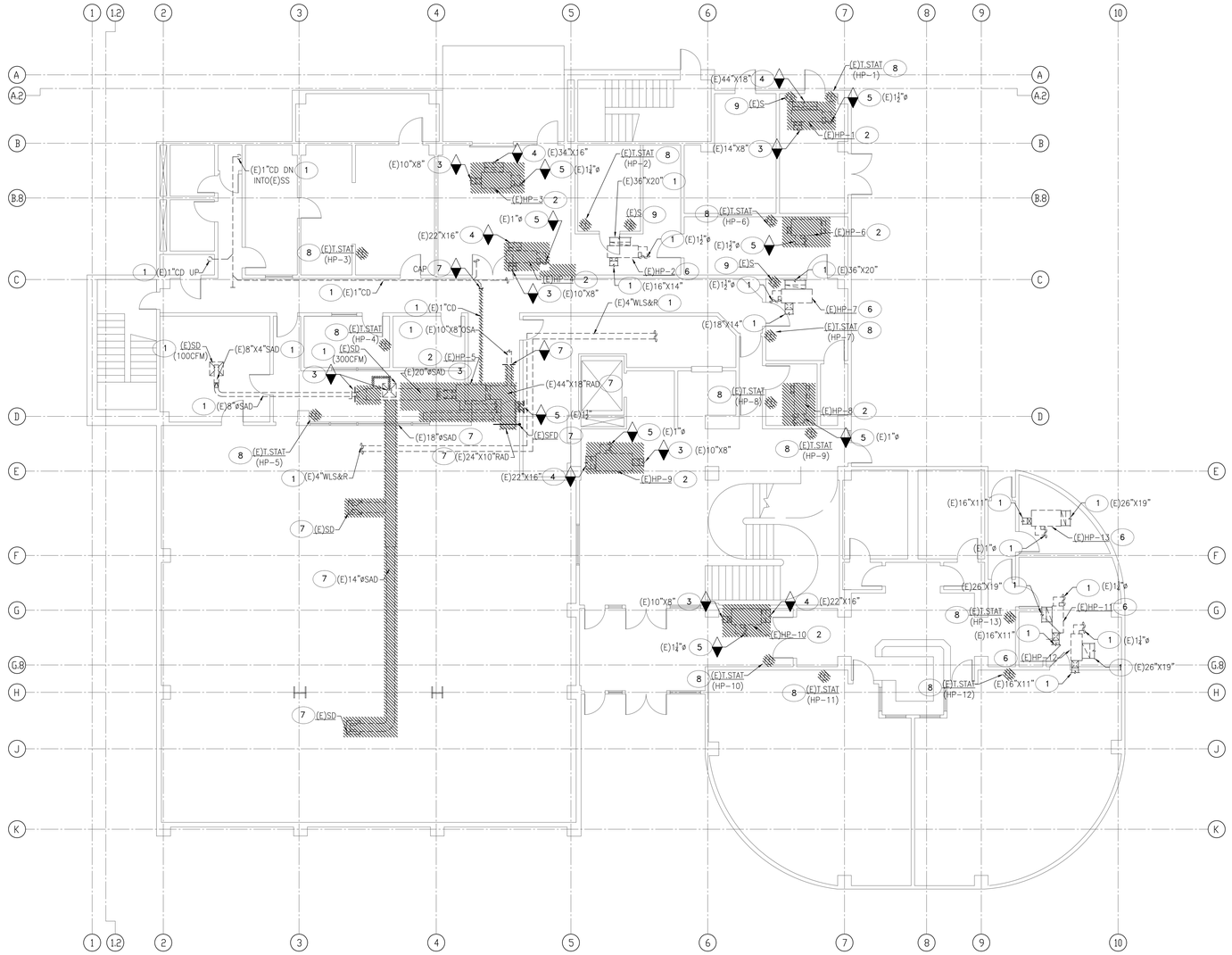

2 M1.01 MECHANICAL PARTIAL DEMO PLAN
MECHANICAL ROOM–1ST FLR.

SCALE: 1/4" = 1'-0"

NORTH

1 M1.01 MECHANICAL DEMOLITION PLAN
"1ST FLOOR"

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

NORTH

GENERAL DEMOLITION NOTES:

A. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL DEMOLITION WORK.

MECHANICAL DEMOLITION NOTES: (#)

1. (E)MECHANICAL EQUIPMENT, (E)DUCTWORK, AND PIPING TO REMAIN.
2. DISCONNECT AND COMPLETELY REMOVE (E)HP UNIT. MAKE READY FOR NEW INSTALLATION. CUT CD PIPING AND MAKE READY FOR CONNECTION TO NEW UNIT.
3. P.O.D., DISCONNECT AND REMOVE EXISTING SUPPLY AIR DUCT. MAKE READY FOR CONNECTION TO NEW UNIT.
4. P.O.D., DISCONNECT AND REMOVE EXISTING RETURN AIR DUCT. MAKE READY FOR CONNECTION TO NEW UNIT.
5. P.O.D., DISCONNECT AND REMOVE EXISTING WATER LOOP SUPPLY AND RETURN PIPING (WLS&R) FOR (E)HP UNIT. MAKE READY FOR CONNECTION TO NEW UNIT.
6. (E)HP UNIT TO REMAIN. DISCONNECT (E)WLS&R PIPING AT (E)HP UNIT. MAKE READY FOR INSTALLATION OF NEW CONTROL ISOLATION VALVE.
7. P.O.D., DISCONNECT AND REMOVE (E)SAD, (E)RAD, (E)OSA DUCT, (E)SUPPLY DIFFUSER, (E)SMOKE FIRE DAMPER, AND (E)CD, CAP (E)CD AS SHOWN. MAKE (E)SAD AND (E)OSA DUCT READY FOR CONNECTION TO NEW UNIT. NEW UNIT SHALL BE RELOCATED AS SHOWN IN 1/M2.01. PATCH FIRE PROOF (E)SUPPLY & (E)RETURN AIR OPENINGS ABOVE CEILING.
8. DISCONNECT AND REMOVE (E)THERMOSTAT. MAKE READY FOR INSTALLATION OF NEW.
9. DISCONNECT AND REMOVE (E)SENSOR.
10. CONTRACTOR SHALL REMOVE EXISTING MOTORS. MAKE READY FOR INSTALLATION OF NEW INVERTER DUTY MOTORS.

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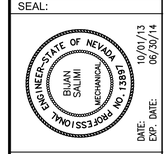

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PROJECT : SCS HEAT PUMP UNITS REPLACEMENT

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MECHANICAL DEMO PLANS, 1ST FLOOR

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

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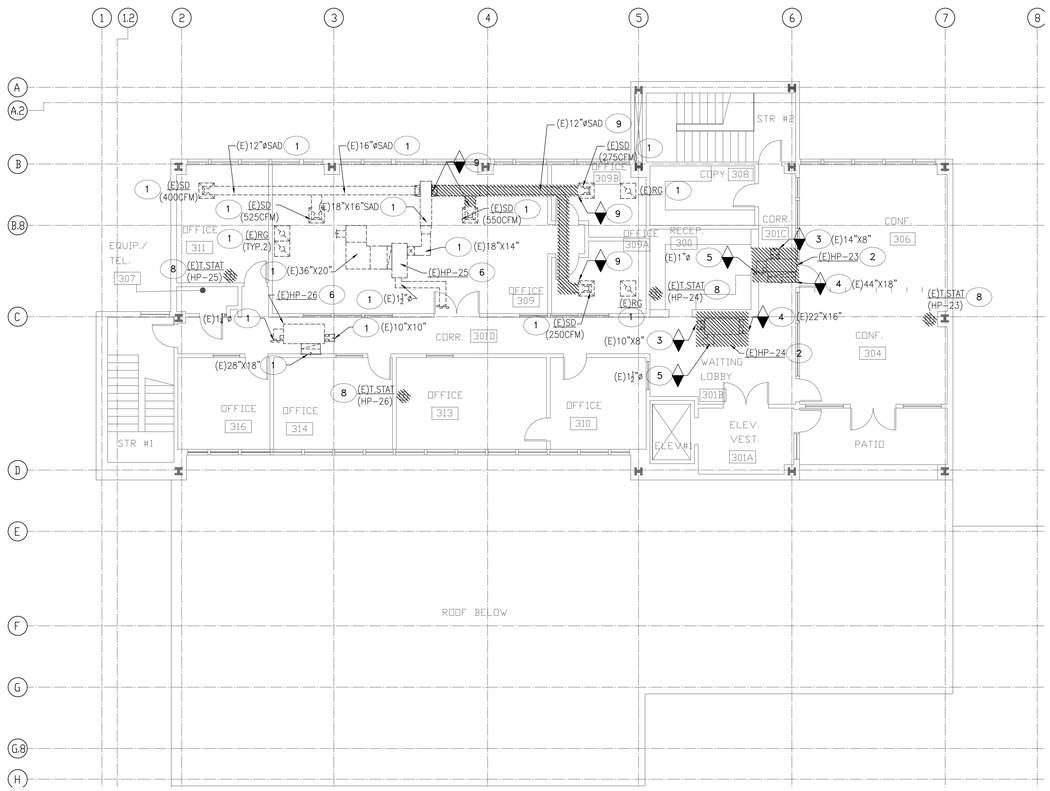
Date:	10.02.2013

Drawn By	Checked By	Approved By
K.P./K.J.	F.S.	B.S.

File Name:

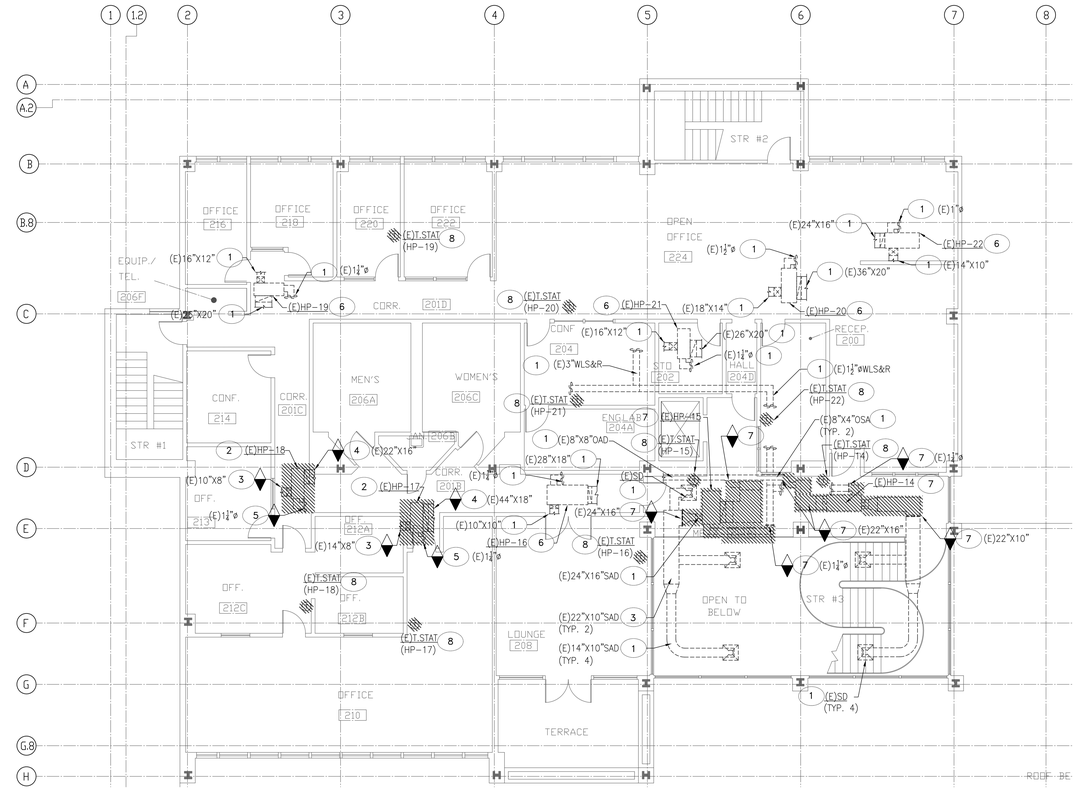
M1.01

CONSTRUCTION



2 M1.02 MECHANICAL DEMOLITION PLAN "3RD FLOOR"

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



1 M1.02 MECHANICAL DEMOLITION PLAN "2ND FLOOR"

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

NORTH

GENERAL DEMOLITION NOTES:

A. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL DEMOLITION WORK.

MECHANICAL DEMOLITION NOTES: (#)

1. (E)MECHANICAL EQUIPMENT, (E)DUCTWORK, AND PIPING TO REMAIN.
2. DISCONNECT AND COMPLETELY REMOVE (E)HP UNIT. MAKE READY FOR NEW INSTALLATION. CUT CD PIPING AND MAKE READY FOR CONNECTION TO NEW UNIT.
3. P.O.D., DISCONNECT AND REMOVE EXISTING SUPPLY AIR DUCT. MAKE READY FOR CONNECTION TO NEW UNIT.
4. P.O.D., DISCONNECT AND REMOVE EXISTING RETURN AIR DUCT. MAKE READY FOR CONNECTION TO NEW UNIT.
5. P.O.D., DISCONNECT AND REMOVE EXISTING WATER LOOP SUPPLY AND RETURN PIPING (WLS&R) FOR (E)HP UNIT. MAKE READY FOR CONNECTION TO NEW UNIT.
6. (E)HP UNIT TO REMAIN. DISCONNECT (E)WLS&R PIPING AT (E)HP UNIT. MAKE READY FOR INSTALLATION OF NEW CONTROL ISOLATION VALVE.
7. P.O.D., DISCONNECT AND REMOVE (E)SAD, (E)RAD, (E)OSA DUCT AND (E)CD. MAKE (E)SAD, (E)RAD, (E)OSA AND (E)CD READY FOR CONNECTION TO NEW UNIT. NEW UNIT SHALL BE RELOCATED AS SHOWN IN 1/M2.02. PATCH CEILING T MATCH EXISTING.
8. DISCONNECT AND REMOVE (E)THERMOSTAT. MAKE READY FOR INSTALLATION OF NEW.
9. P.O.D. DISCONNECT AND REMOVE EXISTING DUCTWORK AS SHOWN. MAKE READY FOR INSTALLATION OF NEW. SEE 2/M2.02 FOR NEW WORK.

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SEAL:

MECHANICAL ENGINEER - STATE OF NEVADA - PROFESSIONAL ENGINEER - NO. 13897 - BIJAN SALIMI

DATE: 10/01/13
EXP. DATE: 06/30/14

CONSULTANT:

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PROJECT: SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

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MECHANICAL DEMO PLANS, 2ND AND 3RD FLOORS

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Consultant Project No.	-
Date:	10.02.2013

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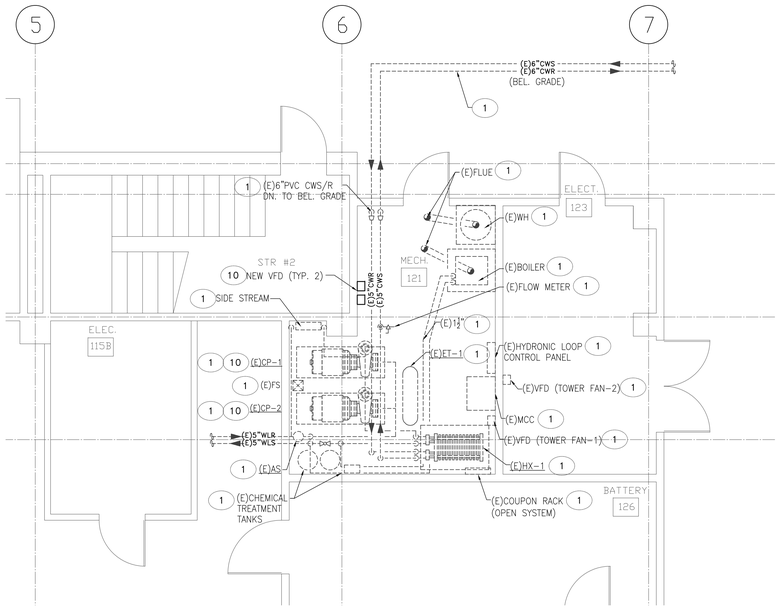
K.P./K.J.	F.S.	B.S.

File Name:

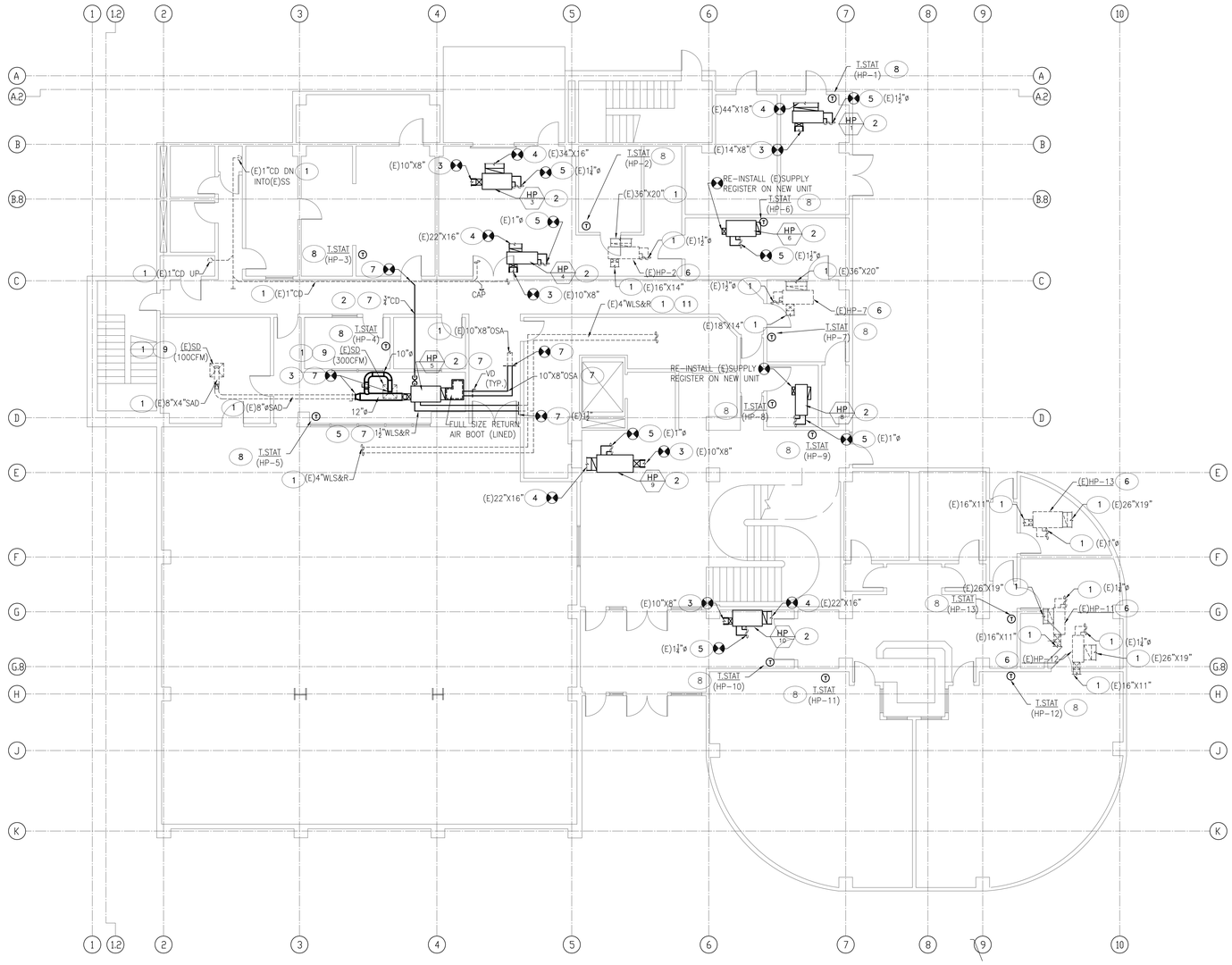
M1.02

CONSTRUCTION



2 M2.01 MECHANICAL PARTIAL FLOOR PLAN
MECHANICAL ROOM–1ST FLR.

SCALE: 1/4" = 1'-0"



1 M2.01 MECHANICAL FLOOR PLAN
"1ST FLOOR"

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

GENERAL NOTES:

A. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL DEMOLITION WORK.

B. CONNECTIONS TO EXISTING DUCTWORK AND PIPING IS SHOWN IN THESE DRAWINGS TO ASSIST CONTRACTOR IN PROPER ORDERING OF THE EQUIPMENT. CONTRACTOR SHALL ORDER THE NEW HEAT PUMP UNITS BASED ON THE ORIENTATION SHOWN IN THESE DRAWINGS.

MECHANICAL NOTES: (#)

1. EXISTING MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING.
2. INSTALL NEW HP UNIT AS SHOWN. RUN NEW CD PIPING AND CONNECT TO (E)CD ABOVE CEILING. SEE DETAILS A/M0.03 THRU D/M0.03.
3. P.O.C., RECONNECT EXISTING SUPPLY AIR DUCT TO NEW UNIT WHERE NOTED. MAKE TRANSITION TO NEW UNIT'S DISCHARGE OPENING.
4. P.O.C., RECONNECT EXISTING RETURN AIR DUCT TO NEW UNIT WHERE NOTED. MAKE TRANSITION TO NEW UNIT'S RETURN OPENING.
5. P.O.C., RECONNECT EXISTING WATER LOOP SUPPLY AND RETURN PIPING (WLS&R) TO NEW HP UNIT. SEE C/M0.03 FOR PIPING ARRANGEMENT.
6. EXISTING HP UNIT. INSTALL NEW CONTROL ISOLATION VALVE AND OTHER ACCESSORIES ON (E)WLS&R PIPING AS SHOWN IN DETAIL C/M0.03. CONNECT NEW 2 WAY VALVE TO (E)HP UNIT CONTROLLER.
7. INSTALL NEW HP UNIT AT NEW LOCATION. RUN NEW SUPPLY DUCTWORK AND CONNECT TO EXISTING DUCTWORK AND DIFFUSER AS SHOWN. CONNECT (E)OSA DUCT TO NEW RETURN AIR BOOT AS SHOWN. INSTALL VOLUME DAMPERS, AS REQUIRED. INSTALL NEW WLS&R AND CD PIPING AND CONNECT TO EXISTING AS SHOWN. PATCH FIRE PROOF (E)SUPPLY & (E)RETURN AIR OPENINGS ABOVE CEILING INTO THE MAIN COMPUTER ROOM. BALANCE AIR FLOW FOR SCHEDULED AIR FLOW.
8. INSTALL NEW THERMOSTAT AS SHOWN. SEE "SEQUENCE OF CONTROLS" SHEET M0.01.
9. BALANCE EXISTING DIFFUSERS FOR CFM INDICATED.
10. INSTALL NEW INVERTER DUTY MOTORS ON PUMPS AND NEW VFD (TOTAL OF TWO, EACH) FOR EXISTING CP–1&2. VFD'S SHALL BE MANUFACTURED BY "ABB" ONLY.
11. INSTALL DP SENSOR AND SWITCH ON EXISTING WLS&R PIPING ABOVE CEILING WHERE SHOWN. SEE CONTROLS NOTES FOR SEQUENCE OF OPERATION.

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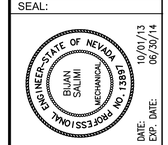

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4505 S. MARYLAND PKWY.
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PROJECT: SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

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MECHANICAL FLOOR PLANS, 1ST FLOOR

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SIGMA'S Project No.	361DC1413
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Date:	10.02.2013

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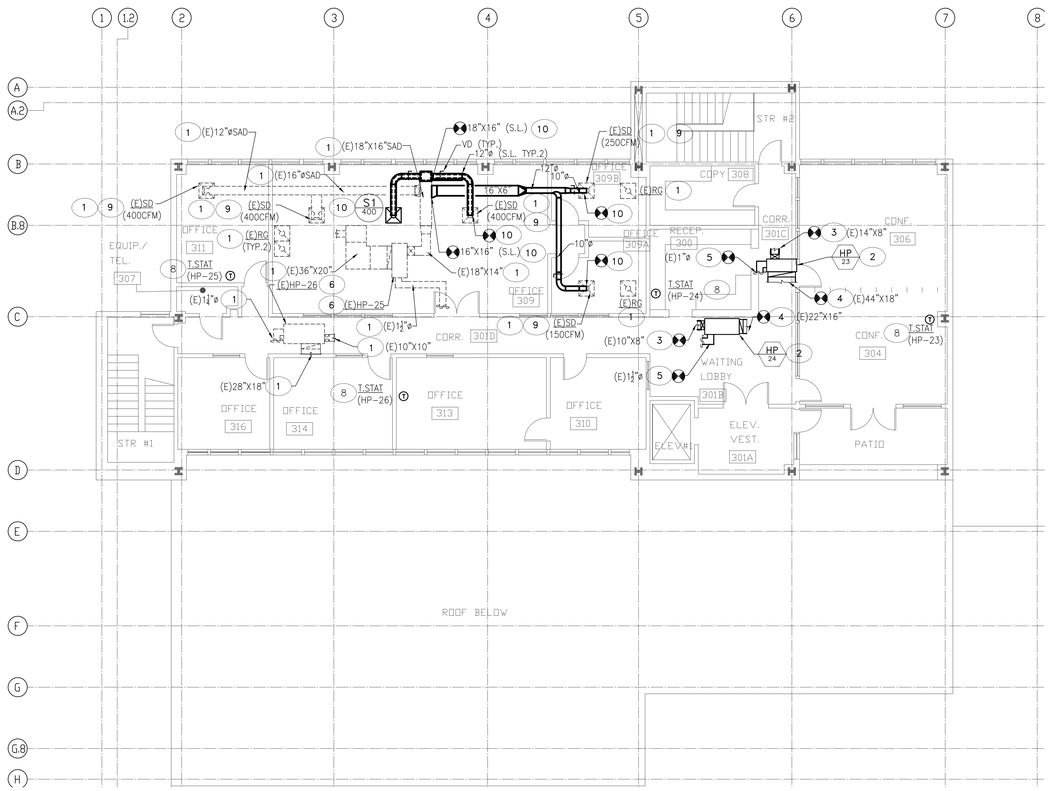
K.P./K.J.	F.S.	B.S.

File Name:

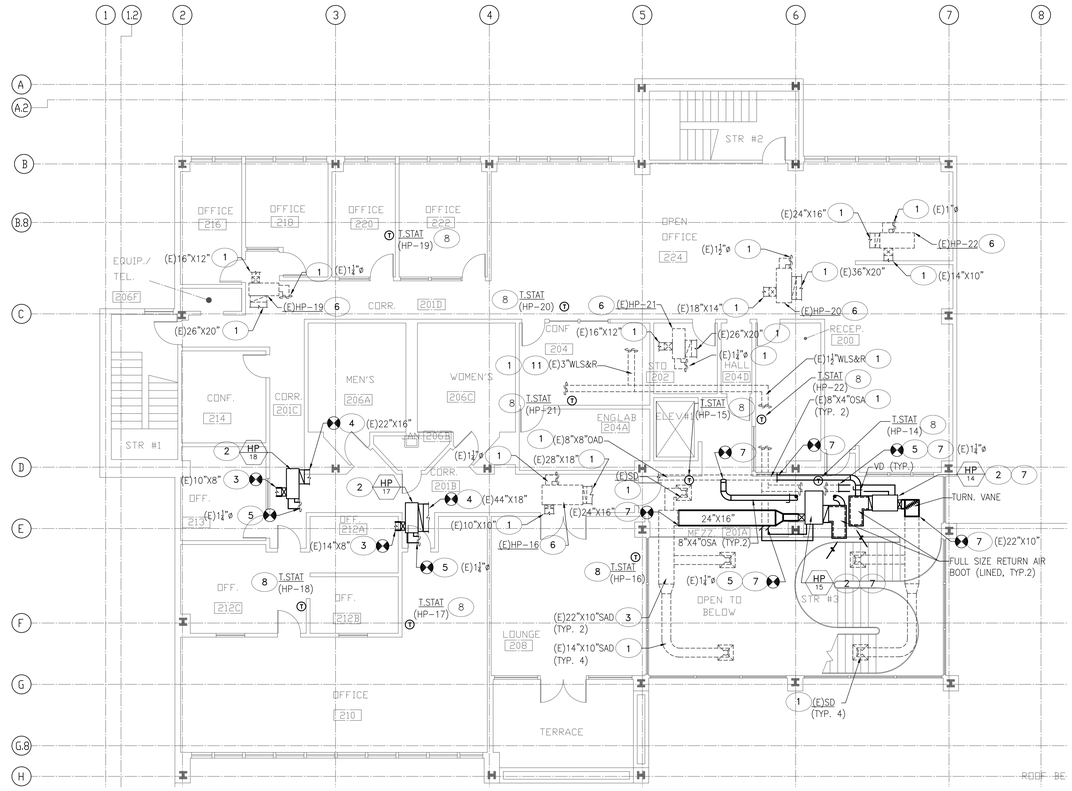
M2.01

CONSTRUCTION



2 M2.02 MECHANICAL FLOOR PLAN
"3RD FLOOR"

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



1 M2.02 MECHANICAL FLOOR PLAN
"2ND FLOOR"

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

NORTH

GENERAL NOTES:

A. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL DEMOLITION WORK.

B. CONNECTIONS TO EXISTING DUCTWORK AND PIPING IS SHOWN IN THESE DRAWINGS TO ASSIST CONTRACTOR IN PROPER ORDERING OF THE EQUIPMENT. CONTRACTOR SHALL ORDER THE NEW HEAT PUMP UNITS BASED ON THE ORIENTATION SHOWN IN THESE DRAWINGS.

MECHANICAL NOTES: (#)

1. EXISTING MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING.
2. INSTALL NEW HP UNIT AS SHOWN. RUN NEW CD PIPING AND CONNECT TO (E)CD ABOVE CEILING. SEE DETAILS A/M0.03 THRU D/M0.03.
3. P.O.C., RECONNECT EXISTING SUPPLY AIR DUCT TO NEW UNIT WHERE NOTED. MAKE TRANSITION TO NEW UNIT'S DISCHARGE OPENING.
4. P.O.C., RECONNECT EXISTING RETURN AIR DUCT TO NEW UNIT WHERE NOTED. MAKE TRANSITION TO NEW UNIT'S RETURN OPENING.
5. P.O.C., RECONNECT EXISTING WATER LOOP SUPPLY AND RETURN PIPING (WLS&R) TO NEW HP UNIT. SEE C/M0.03 FOR PIPING ARRANGEMENT.
6. EXISTING HP UNIT. INSTALL NEW CONTROL ISOLATION VALVE AND OTHER ACCESSORIES ON (E)WLS&R PIPING AS SHOWN IN DETAIL C/M0.03. CONNECT NEW 2 WAY VALVE TO (E)HP UNIT CONTROLLER.
7. INSTALL NEW HP UNIT AT NEW LOCATION. RUN NEW SUPPLY DUCTWORK AND CONNECT TO EXISTING DUCTWORK AS SHOWN. PROVIDE AND INSTALL TURNING VANE AS SHOWN. CONNECT (E)OSA DUCT TO NEW RETURN AIR BOOT AS SHOWN. INSTALL VOLUME DAMPERS, AS REQUIRED. INSTALL NEW WLS&R AND CD PIPING AND CONNECT TO EXISTING AS SHOWN. BALANCE AIR FLOW FOR SCHEDULED AIR FLOW.
8. INSTALL NEW THERMOSTAT AS SHOWN. SEE "SEQUENCE OF CONTROLS" SHEET M0.01.
9. BALANCE EXISTING DIFFUSERS FOR CFM INDICATED.
10. INSTALL NEW SUPPLY AIR PLENUM/DUCTWORK AND ACCESSORIES(VD, ETC.) AS SHOWN. AND CONNECT TO EXISTING AND NEW DIFFUSERS AS SHOWN. BALANCE PER NEW CFM.
11. INSTALL DP SENSOR AND SWITCH ON EXISTING WLS&R PIPING ABOVE CEILING WHERE SHOWN. SEE CONTROLS NOTES FOR SEQUENCE OF OPERATION.

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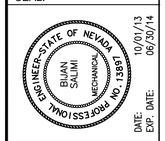

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Consultant Project No.	-
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K.P./K.J.	F.S.	B.S.

File Name:

M2.02

CONSTRUCTION

ELECTRICAL LEGEND

- COMBINATION EXIT SIGN/EMERGENCY LIGHTING UNIT WITH TWIN HEADS
- EMERGENCY LIGHTING UNIT WITH TWIN HEADS
- TELEPHONE OUTLET @ +18"
- COMPUTER/DATA OUTLET @ +18"
- COMBINATION VOICE/DATA OUTLET @ +18"
- BOX AROUND SYMBOL INDICATES FLUSH FLOOR OUTLET
- JUNCTION BOX WALL MOUNTED, SIZE PER NEC.
- JUNCTION BOX, MOUNTING AS REQUIRED, SIZE PER NEC.
- SAFETY SWITCH, F SCRIBED INSIDE INDICATES FUSIBLE
- CONTACTOR, DESCRIPTION AS NOTED ON PLANS
- COMBINATION MOTOR STARTER AS NOTED ON PLANS.
- VARIABLE FREQUENCY DRIVE
- FUSIBLE SWITCH
- MOTOR STARTER
- PANEL BOARD OR CABINET
- SWITCHBOARD OR MOTOR CONTROL CENTER
- METER
- SHUNT TRIP ELEMENT
- TIME CLOCK
- SELF CONTAINED SMOKE DETECTOR
- DUCT SMOKE DETECTOR
- THERMOSTAT
- PHOTOCELL
- CHIME
- TRANSFORMER (IN PLAN)
- ELECTRIC MOTOR, HP SCRIBED INSIDE
- MECHANICAL EQUIPMENT DESIGNATION
- WIRING CONCEALED IN WALL OR CEILING
- WIRING IN FLOOR SLAB OR UNDERGROUND
- CIRCUIT HOMERUN
- RACEWAY CONCEALED IN CEILING OR WALL. HASH MARKS INDICATE NUMBER OF WIRES. #12 AWG WIRE UNLESS OTHERWISE NOTED. TWO WIRES PLUS GROUND IF NO HASH MARKS SHOWN. LONG HASH DENOTES NEUTRAL. SLANTED HASH DENOTES GROUND WIRE.

NOTES:

1. DIMENSIONS INDICATED ARE TO CENTERLINE OF DEVICE OR OUTLET FROM FINISHED FLOOR OR FINISHED GRADE.
2. ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT.

ABBREVIATIONS

A	AMPERE(S)
ABV	ABOVE
A/C	AIR CONDITIONING
AL	ALUMINUM
AMP	AMPERE
ANN	ANNUNCIATOR
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BC	BARE COPPER
BKBD	BACKBOARD
BLDG	BUILDING
CAB	CABINET
CKT BKR	CIRCUIT BREAKER
CLG	CEILING
C	CONDUIT
CU	COPPER
CW	COLD WATER
DN	DOWN
DPDT	DOUBLE POLE DOUBLE THROW
(E)	EXISTING
EF	EXHAUST FAN
ELEC	ELECTRIC
EM	EMERGENCY
EQUIP	EQUIPMENT
EXIST	EXISTING
4W	FOUR WIRE
F	FUSE
FUT	FUTURE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GRD	GROUND
HP	HORSEPOWER
J-BOX	JUNCTION BOX
LTG	LIGHTING
MTR	MOTOR
(N)	NEW
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NO	NORMALLY OPEN
PNL	PANEL
(R)	RELOCATED
RECEPT	RECEPTACLE
RM	ROOM
SPDT	SINGLE POLE DOUBLE THROW
STR	STARTER
SWBD	SWITCHBOARD
TEL	TELEPHONE
T-STAT	THERMOSTAT
XFMR	TRANSFORMER
V	VOLT(S)
W	WATT(S)
WP	WEATHERPROOF

ELECTRICAL SPECIFICATIONS

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

1.1 SUMMARY
A. Section Includes:
1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS
A. Field quality-control reports.

1.4 CONDUCTORS AND CABLES
A. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THW-2, Type THHN-2-THWN-2, Type XHHW-2, Type UF, Type USE, and Type SO.

1.5 CONNECTORS AND SPLICES
A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

1.6 SYSTEM DESCRIPTION
A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Comply with NFPA 70.

1.7 CONDUCTOR MATERIAL APPLICATIONS
A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

1.8 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
A. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway, Type XHHW-2, single conductors in raceway.
B. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway, Type XHHW-2, single conductors in raceway.

1.9 INSTALLATION OF CONDUCTORS AND CABLES
A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

1.1 SUMMARY
A. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.

1.3 MANUFACTURERS
A. Manufacturers: Subject to compliance with requirements, provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Burndy; Part of Hubbell Electrical Systems.
2. Dossert; AFL Telecommunications LLC.
3. ERICO International Corporation.
4. Fushi Copperweld Inc.
5. Galvan Industries, Inc.; Electrical Products Division, LLC.
6. Harger Lightning and Grounding.
7. ILSCO.
8. O-Z/Gedney; A Brand of the EGS Electrical Group.
9. Robbins Lightning, Inc.
10. Siemens Power Transmission & Distribution, Inc.

1.4 SYSTEM DESCRIPTION
A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Comply with UL 467 for grounding and bonding materials and equipment.

1.5 CONDUCTORS
A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
B. Bare Copper Conductors:
1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

1.6 CONNECTORS
A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.
C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solder-less compression wire terminals, and long-barrel, two-bolt connection to ground bus bar.

1.7 GROUNDING ELECTRODES
A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

1.8 APPLICATIONS
A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.
1. Bury at least 24 inches below grade.
C. Conductor Terminations and Connections:
1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

1.9 EQUIPMENT GROUNDING
A. Install insulated equipment grounding conductors with all feeders and branch circuits.
B. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
4. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

1.10 FIELD QUALITY CONTROL
A. Perform tests and inspections. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

1.1 SUMMARY
A. Section includes:
1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS
A. rengineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.3 ACTION SUBMITTALS
A. Product Data: For steel slotted support systems.

1.4 QUALITY ASSURANCE
A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Comply with NFPA 70.

1.5 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS
A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Atkore International.
g. Wesanco, Inc.
3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.
B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1) Hilti, Inc.
2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
3) MKT Fastening, LLC.
4) Simpson Strong-Tie Co., Inc.
2. Mechanical-Expansion Anchors: Insert-wedge-type, steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1) Cooper B-Line, Inc.
2) Empire Tool and Manufacturing Co., Inc.
3) Hilti, Inc.
4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

1.6 APPLICATION
A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
1. Secure raceways and cables to these supports with two-bolt conduit clamps using spring friction action for retention in support channel.
D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

1.7 SUPPORT INSTALLATION
A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Light Steel: Sheet metal screws.
D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

1.8 CONCRETE BASES
A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in sheet A0.01.
C. Anchor equipment to concrete base.
1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

1.1 SUMMARY
A. Section Includes:
1. Metal conduits tubing and fittings.
2. Nonmetal conduits tubing and fittings.
3. Metal wireways and auxiliary gutters.
4. Nonmetal wireways and auxiliary gutters.
5. Surface raceways.
6. Boxes enclosures and cabinets.
7. Handholes and boxes for exterior underground cabling.
B. Related Requirements:
1. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks manholes and underground utility construction.

1.2 ACTION SUBMITTALS
A. Product Data: For surface raceways wireways and fittings floor boxes hinged-cover enclosures and cabinets.

1.3 METAL CONDUITS TUBING AND FITTINGS
A. Listing and Labeling: Metal conduits tubing and fittings shall be listed and labeled as defined in NFPA 70 by a qualified testing agency and marked for intended location and application.
B. GRC: Comply with ANSI C80.1 and UL 6.
C. ARC: Comply with ANSI C80.5 and UL 6A.
D. IMC: Comply with ANSI C80.6 and UL 1242.
E. PVC-Coated Steel Conduit: PVC-coated.
1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch minimum.
F. EMT: Comply with ANSI C80.3 and UL 797.
G. FMC: Comply with UL 1;
H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
2. Fittings for EMT:
a. Material: Steel.
b. Type: Setscrew.
3. Expansion Fittings: PVC or steel to match conduit type complying with UL 651 rated for environmental conditions where installed and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch with overlapping sleeves protecting threaded joints.
J. Joint Compound for IMC GRC or ARC: Approved as defined in NFPA 70 by authorities having jurisdiction for use in conduit assemblies and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

1.4 NONMETALLIC CONDUITS AND FITTINGS
A. Listing and Labeling: Nonmetallic conduits tubing and fittings shall be listed and labeled as defined in NFPA 70 by a qualified testing agency and marked for intended location and application.
B. RNC: Type EPC-40-PVC complying with NEMA TC 2 and UL 651 unless otherwise indicated.
C. LFNC: Comply with UL 1660.
D. Continuous HDPE: Comply with UL 651B.
E. Coilable HDPE: Preassembled with conductors or cables and complying with ASTM D 3485.
F. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
G. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less respectively when calculated according to 40 CFR 59 Subpart D (EPA Method 24).
H. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

1.5 METAL WIREWAYS AND AUXILIARY GUTTERS
A. Description: Sheet metal complying with UL 870 and NEMA 250 Type 3R unless otherwise indicated and sized according to NFPA 70.
1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70 by a qualified testing agency and marked for intended location and application.
B. Fittings and Accessories: Include covers couplings offsets elbows expansion joints adapters hold-down straps end caps and other fittings to match and mate with wireways as required for complete system.

1.6 BOXES ENCLOSURES AND CABINETS
A. General Requirements for Boxes Enclosures and Cabinets: Boxes enclosures and cabinets installed in wet locations shall be listed for use in wet locations.
B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1 Type FD with gasketed cover.
D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
E. Metal Floor Boxes:
1. Material: sheet metal.
2. Type: Fully adjustable.
3. Shape: Rectangular.
4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70 by a qualified testing agency and marked for intended location and application.

1.7 RACEWAY APPLICATION
A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC .
2. Concealed Conduit Aboveground: GRC, IMC, and EMT.
3. Underground Conduit: RNC Type EPC-40-PVC
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic Pneumatic Electric Solenoid or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures Aboveground: NEMA 250 Type 3R.
B. Indoors: Apply raceway products as specified below unless otherwise indicated.
1. Exposed Not Subject to Physical Damage: EMT .
2. Exposed Not Subject to Severe Physical Damage: IMC.
3. Exposed and Subject to Severe Physical Damage: GRC, IMC. Raceway locations include the following:
a. Loading dock.
b. Corridors used for traffic of mechanized carts forklifts and pallet-handling units.
c. Mechanical rooms.
d. Gymnasiums.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT .
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic Pneumatic Electric Solenoid or Motor-Driven Equipment): FMC except use LFMC in damp or wet locations.
6. Damp or Wet Locations: IMC.
7. Boxes and Enclosures: NEMA 250 Type 1 except use NEMA 250 Type 4 in institutional and commercial kitchens and damp or wet locations.
C. Minimum Raceway Size: 3/4-inch trade size.
D. Raceway Fittings: Compatible with raceways and suitable for use and location.
4. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
5. PVC Externally Coated Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints nicks and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
6. EMT: Use setscrew steel fittings. Comply with NEMA FB 2.10.
7. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
E. Do not install aluminum conduits boxes or fittings in contact with concrete or earth.
F. Install surface raceways only where indicated on Drawings.
G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

1.8 INSTALLATION
A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
E. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits for which fewer bends are allowed. Support within 12 inches of changes in direction.
F. Conceal conduit and EMT within finished walls ceilings and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
G. Support conduit within 12 inches of enclosures to which attached.
H. Raceways Embedded in Slabs:
4. Run conduit larger than 1-inch trade size parallel or at right angles to main reinforcement. Where at right angles to reinforcement place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
5. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
6. Arrange raceways to keep a minimum of 2 inch of concrete cover in all directions.
7. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
I. Threaded Conduit Joints Exposed to Wet Damp Corrosive or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
J. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
K. Raceway Terminations: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
M. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
N. Surface Raceways:
1. Install surface raceway with a minimum 2-inch radius control at bend points.
2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
O. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
Q. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
R. Locate boxes so that cover or plate will not span different building finishes.
S. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
T. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
U. Set metal floor boxes level and flush with finished floor surface.
V. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

1.9 INSTALLATION OF UNDERGROUND CONDUIT
A. Direct-Buried Conduit:
1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit backfill and compact. Start at tie-in point and work toward end of conduit run leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-up at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

1.10 PROTECTION
A. Protect coatings finishes and cabinets from damage and deterioration.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

1.1 SUMMARY
A. Section Includes:
1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Equipment identification labels.

1.2 ACTION SUBMITTALS
A. Product Data: For each electrical identification product indicated.

1.3 QUALITY ASSURANCE
A. Comply with ANSI A13.1.
B. Comply with NFPA 70.
C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
D. Comply with ANSI Z535.4 for safety signs and labels.
E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.4 POWER RACEWAY IDENTIFICATION MATERIALS
A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
B. Colors for Raceways Carrying Circuits at 600 V or Less:
1. Black letters on white field.
2. Legend: Indicate voltage.
C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

1.5 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS
A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

1.6 CONDUCTOR IDENTIFICATION MATERIALS
A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

1.7 UNDERGROUND-LINE WARNING TAPE
A. Tape:
1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
B. Color and Printing:
1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE,.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

1.8 WARNING LABELS AND SIGNS
A. Comply with NFPA 70 and 29 CFR 1910.145.
B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
C. Baked-Enamel Warning Signs:
1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.
D. Metal-Backed, Butyrate Warning Signs:
1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.
E. Warning label and sign shall include, but are not limited to, the following legends:
1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

1.9 INSTRUCTION SIGNS
A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

1.10 EQUIPMENT IDENTIFICATION LABELS
A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

1.11 INSTALLATION
A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
B. Apply identification devices to surfaces that require finish after completing finish work.
C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.
G. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

1.12 IDENTIFICATION SCHEDULE
A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Install labels at 10-foot maximum intervals.
B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
2. Emergency Power.
3. Power.
4. UPS.
C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded conductors.
a. Colors for 208/120-V Circuits:
1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
b. Colors for 480/277-V Circuits:
1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.
c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
E. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
F. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

ELECTRICAL SHEET INDEX:

E0.01	ELECTRICAL LEGEND AND SPECIFICATIONS
E0.02	ELECTRICAL PANEL SCHEDULES
E1.01	ELECTRICAL DEMOLITION PLANS - 1ST FLOOR
E1.02	ELECTRICAL DEMOLITION PLANS - 2ND & 3RD FLOOR
E2.01	ELECTRICAL PLANS - 1ST FLOOR
E2.02	ELECTRICAL PLANS - 2ND & 3RD FLOOR

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SEAL:

STATE OF NEVADA — NOSRAT ROUHANI — EXP. 12/31/13 — ELECTRICAL — NO. 9915 — PROFESSIONAL ENGINEER — 10/02/13

CONSULTANT:

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PROJECT : SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

ELECTRICAL LEGEND AND SPECIFICATIONS

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413	
Consultant Project No.	SIGMA1303	
Date:	10.02.2013	
Drawn By RE	Checked By NR	Approved By NR
File Name:		

E0.01

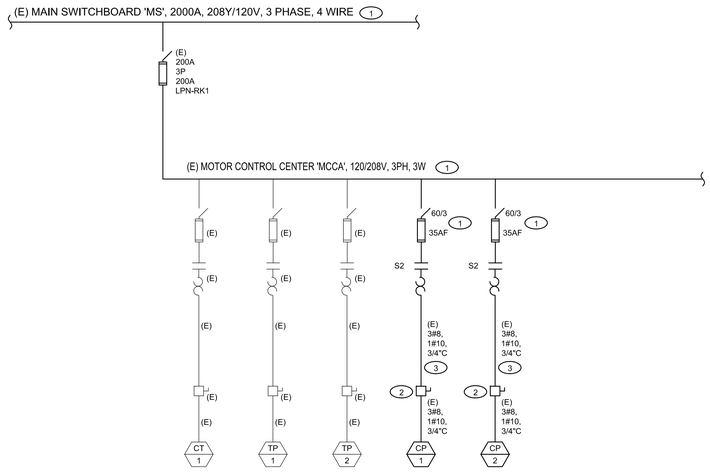
CONSTRUCTION

PANEL: **HP2 (EXISTING)**		208Y/120V., 3PH, 4 WIRE			225 AMP MAIN: LO	MOUNTING: REC	
INTERRUPTING RATING: 22K RMS SYM. AMPERES			LOCATION: SEE PLANS		NEMA 1 ENCLOSURE		
POLE SPC. NO.	CIRCUIT DESCRIPTION	CKT. BKR. RATING	CONNECTED LOAD VA PH A	PH B	PH C	CKT. BKR. RATING	CIRCUIT DESCRIPTION	POLE SPC. NO.
1	HP-19	25/3	1765 2461			(N) 30/3	HP-15	2
3	X	X		1765 2461		X	X	4
5	X	X			1765 2461	X	X	6
7	HP-21	40/3	2630 1777			25/3	HP-14	8
9	X	X		2630 1777		X	X	10
11	X	X			2630 1777	X	X	12
13	HP-22	20/2	980 2930			(N) 40/3	HP-17	14
15	X	X		980 2930		X	X	16
17	HP-16	25/3			1540 2930	X	X	18
19	X	X	1540 1777			25/3	HP-18	20
21	X	X		1540 1777		X	X	22
23	HP-20	25/3			1765 1777	X	X	24
25	X	X	1765 960			20	RECEPTS ROOM 210	26
27	X	X		1765			SPARE	28
29	SPARE	20					SPARE	30
31	SPARE	20					SPARE	32
33	SPARE	20					SPARE	34
35	SPARE	20					SPARE	36
37	SPARE	20					SPARE	38
39	SPARE	20					SPARE	40
41	SPARE	20					SPARE	42
TOTAL VA/PHASE =			18585	17625	16645			
TOTAL KVA/PHASE =			19	18	17			
AMPERES/PHASE =			67	64	60			

NOTES:
1. ALL CIRCUIT BREAKERS ARE EXISTING UNLESS NOTED (N) NEW.
2. ALL NEW CIRCUIT BREAKERS SHALL MATCH EXISTING DEVICES.
3. PROVIDE NEW TYPED WRITTEN PANEL DIRECTORY ON CARD STOCK. USE NEMA STANDARD.
4. CONTRACTOR SHALL VERIFY ALL CIRCUIT DESIGNATIONS BEFORE UPDATING PANEL DIRECTORY.

PANEL: **EL1 (EXISTING)**		208Y/120V., 3PH, 4 WIRE			225 AMP MAIN: LO	MOUNTING: REC	
INTERRUPTING RATING: 22K RMS SYM. AMPERES			LOCATION: SEE PLANS		NEMA 1 ENCLOSURE		
POLE SPC. NO.	CIRCUIT DESCRIPTION	CKT. BKR. RATING	CONNECTED LOAD VA PH A	PH B	PH C	CKT. BKR. RATING	CIRCUIT DESCRIPTION	POLE SPC. NO.
1	1ST LEVEL VESTIBULE	20	1430 1525			20	1ST LEVEL OFFICE	2
3	1ST LEVEL VESTIBULE	20		1250 1525		20	1ST LEVEL OFFICE	4
5	2ND LEVEL VESTIBULE	20			1600 810	20	3RD LEVEL OFFICE	6
7	2ND LEVEL VESTIBULE	20	1105 500			20	FIRE ALARM PANEL	8
9	ELEVATOR PIT	20		800 500		20	ELECT BOXES	10
11	ELEVATOR CAB	20			800	20	SPARE	12
13	1ST WL LOBBY	20	850			20	SPARE	14
15	1ST WL LOBBY	20		850 500		20	OIL HEATER	16
17	SPACE				500	20	OIL PUMP	18
19	HP-6	(N) 30/2	1487 2630			40/3	HP-7	20
21	X	X		1487 2630		X	X	22
23	FOLDER	20			500 2630	X	X	24
25	SHREDDER	20	500 2000			60/2	BACK UP A/C UNIT 5 TON	26
27	SEALER	20		2000		X	X	28
29	SPACE					15/3	POWER METER CTS	30
31	COPIER, LOBBY	20	1000			X	X	32
33	BLOCK HEATER	50/2		500		X	X	34
35	X	X			500		SPACE	36
37	SPACE						SPACE	38
39	SPACE						SPACE	40
41	SPACE						SPACE	42
TOTAL VA/PHASE =			13027	12042	7340			
TOTAL KVA/PHASE =			13	12	7			
AMPERES/PHASE =			47	43	26			

NOTES:
1. ALL CIRCUIT BREAKERS ARE EXISTING UNLESS NOTED (N) NEW.
2. ALL NEW CIRCUIT BREAKERS SHALL MATCH EXISTING DEVICES.
3. PROVIDE NEW TYPED WRITTEN UPDATED PANEL DIRECTORY ON CARD STOCK. USE NEMA STANDARD.
4. CONTRACTOR SHALL VERIFY ALL CIRCUIT DESIGNATIONS BEFORE UPDATING PANEL DIRECTORY.



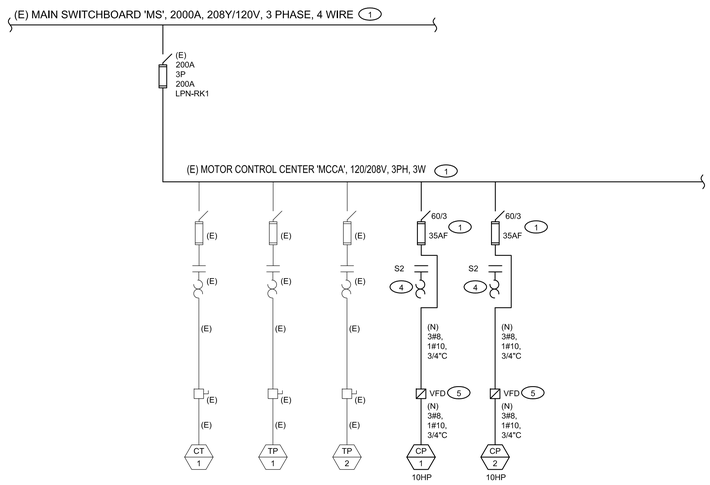
1 E0.02 PARTIAL ONE-LINE DIAGRAM-DEMOLITION

PANEL: **HP3 (EXISTING)**		208Y/120V., 3PH, 4 WIRE			225 AMP MAIN: LO	MOUNTING: REC	
INTERRUPTING RATING: 22K RMS SYM. AMPERES			LOCATION: SEE PLANS		NEMA 1 ENCLOSURE		
POLE SPC. NO.	CIRCUIT DESCRIPTION	CKT. BKR. RATING	CONNECTED LOAD VA PH A	PH B	PH C	CKT. BKR. RATING	CIRCUIT DESCRIPTION	POLE SPC. NO.
1	HP-26	25/3	1765 1465			25/3	HP-24	2
3	X	X		1765 1465		X	X	4
5	X	X			1765 1465	X	X	6
7	HP-25	40/3	2630 2461			(N) 40/3	HP-23	8
9	X	X		2630 2461		X	X	10
11	X	X			2630 2461	X	X	12
13	SPARE	20				20	SPARE	14
15	SPARE	20				20	SPARE	16
17	SPARE	20				20	SPARE	18
19	SPACE						SPACE	20
21	SPACE						SPACE	22
23	SPACE						SPACE	24
25	SPACE						SPACE	26
27	SPACE						SPACE	28
29	SPACE						SPACE	30
31	SPACE						SPACE	32
33	SPACE						SPACE	34
35	SPACE						SPACE	36
37	SPACE						SPACE	38
39	SPACE						SPACE	40
41	SPACE						SPACE	42
TOTAL VA/PHASE =			8321	8321	8321			
TOTAL KVA/PHASE =			8	8	8			
AMPERES/PHASE =			30	30	30			

NOTES:
1. ALL CIRCUIT BREAKERS ARE EXISTING UNLESS NOTED (N) NEW.
2. ALL NEW CIRCUIT BREAKERS SHALL MATCH EXISTING DEVICES.
3. PROVIDE NEW TYPED WRITTEN UPDATED PANEL DIRECTORY ON CARD STOCK. USE NEMA STANDARD.
4. CONTRACTOR SHALL VERIFY ALL CIRCUIT DESIGNATIONS BEFORE UPDATING PANEL DIRECTORY.

PANEL: **HP1 (EXISTING)**		208Y/120V., 3PH, 4 WIRE			225 AMP MAIN: LO	MOUNTING: SURF	
INTERRUPTING RATING: 22K RMS SYM. AMPERES			LOCATION: SEE PLANS		NEMA 1 ENCLOSURE		
POLE SPC. NO.	CIRCUIT DESCRIPTION	CKT. BKR. RATING	CONNECTED LOAD VA PH A	PH B	PH C	CKT. BKR. RATING	CIRCUIT DESCRIPTION	POLE SPC. NO.
1	HP-11	25/3	1765 1924			(N) 35/2	HP-8	2
3	X	X		1765 1924		X	X	4
5	X	X			1765 2630	20/3	HP-7	6
7	HP-12	25/3	1765 2630			X	X	8
9	X			1765 2630		X	X	10
11	X				1765 1487	(N) 35/2	HP-9	12
13	HP-13	20/2	1365 1487			X	X	14
15	X	X		1365 1008		(N) 15/3	HP-5	16
17	SPARE	20			1008	X	X	18
19	HP-10	25/3	1465 1008			X	X	20
21	X	X		1465 2053		(N) 35/2	HP-4	22
23	X	X			1465 2053	X	X	24
25	HP-3	30/3	2051 2459			40/3	HP-1	26
27	X	X		2051 2459		X	X	28
29	X	X			2051 2459	X	X	30
31	ONICON #1, BUILDING	20	1000			15/3	POWER METER	32
33	SPACE					X	X	34
35	SPARE	20				X	X	36
37	SPARE	20					SPACE	38
39	SPACE						SPACE	40
41	ONICON #2, TOWER	20					SPACE	42
TOTAL VA/PHASE =			18919	13485	16683			
TOTAL KVA/PHASE =			19	18	17			
AMPERES/PHASE =			68	67	60			

NOTES:
1. ALL CIRCUIT BREAKERS ARE EXISTING UNLESS NOTED (N) NEW.
2. ALL NEW CIRCUIT BREAKERS SHALL MATCH EXISTING DEVICES.
3. PROVIDE NEW TYPED WRITTEN PANEL DIRECTORY ON CARD STOCK. USE NEMA STANDARD.
4. CONTRACTOR SHALL VERIFY ALL CIRCUIT DESIGNATIONS BEFORE UPDATING PANEL DIRECTORY.



2 E0.02 PARTIAL ONE-LINE DIAGRAM-MODIFIED

KEYNOTES

1. EXISTING EQUIPMENT TO REMAIN.
2. REMOVE REMOVE DISCONNECT SWITCH AND ELECTRICAL CONNECTIONS TO EQUIPMENT.
3. REMOVE CONDUIT AND WIRING COMPLETE BACK TO SOURCE.
4. EXISTING MOTOR STARTER SHALL BE DISCONNECTED BUT REMAIN IN PLACE. PROVIDE PLAQUE READING "MOTOR STARTER IS DISABLED".
5. VFD'S SHALL BE PROVIDED BY MECHANICAL CONTRACTOR AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR. CONTROL WIRING SHALL BE BY CONTROLS CONTRACTOR.

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LAS VEGAS, NEVADA 89154

PROJECT: SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

ELECTRICAL PANEL SCHEDULES

All dimensions, leads, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413
Consultant Project No.	SIGMA1303
Date:	10.02.2013

Drawn By	Checked By	Approved By
RE	NR	NR

File Name:

E0.02

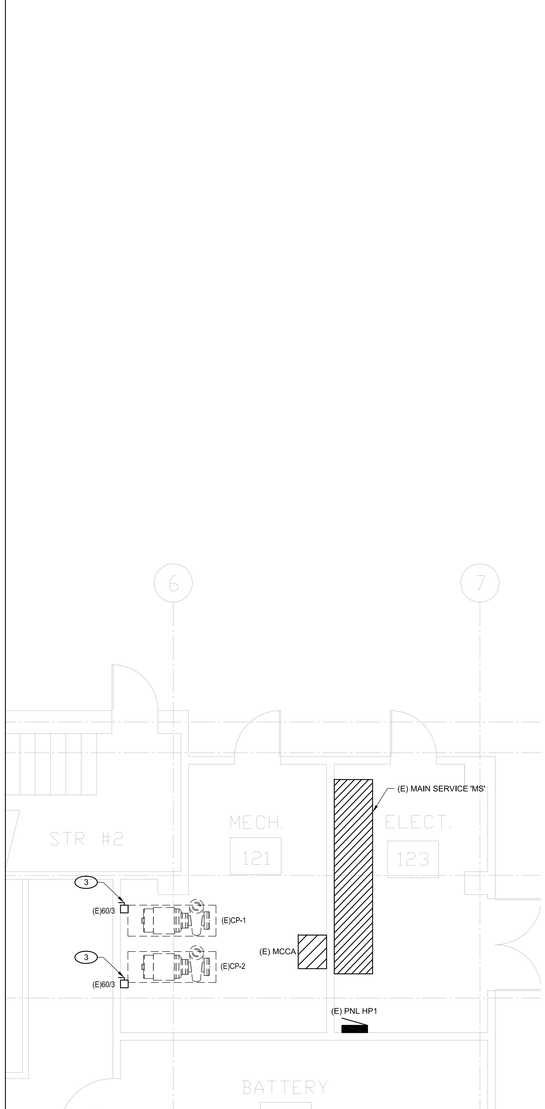
CONSTRUCTION

KEY NOTES: (#)

1. EXISTING EQUIPMENT TO BE REMOVED. REMOVE ELECTRICAL CONNECTION TO HEAT PUMP. REMOVE ALL HAND WRITTEN CIRCUIT IDENTIFICATION. PREPARE DISCONNECT SWITCH TO CONNECT NEW HEAT PUMP AND INSTALLATION OF NEW IDENTIFICATIONS.
2. EXISTING EQUIPMENT TO REMAIN. REMOVE HAND WRITTEN CIRCUIT IDENTIFICATION AND PREPARE TO INSTALL NEW IDENTIFICATIONS.
3. REMOVE EXISTING DISCONNECT SWITCH. INTERCEPT CONDUIT AND WIRING AND PREPARE TO CONNECT NEW CT'S PUMPS THRU NEW VFD'S. SEE SHEET E0.02 FOR MORE INFORMATION.
4. REMOVE EXISTING WIRING BACK TO SOURCE AND PREPARE CONDUIT TO INSTALL NEW WIRING.

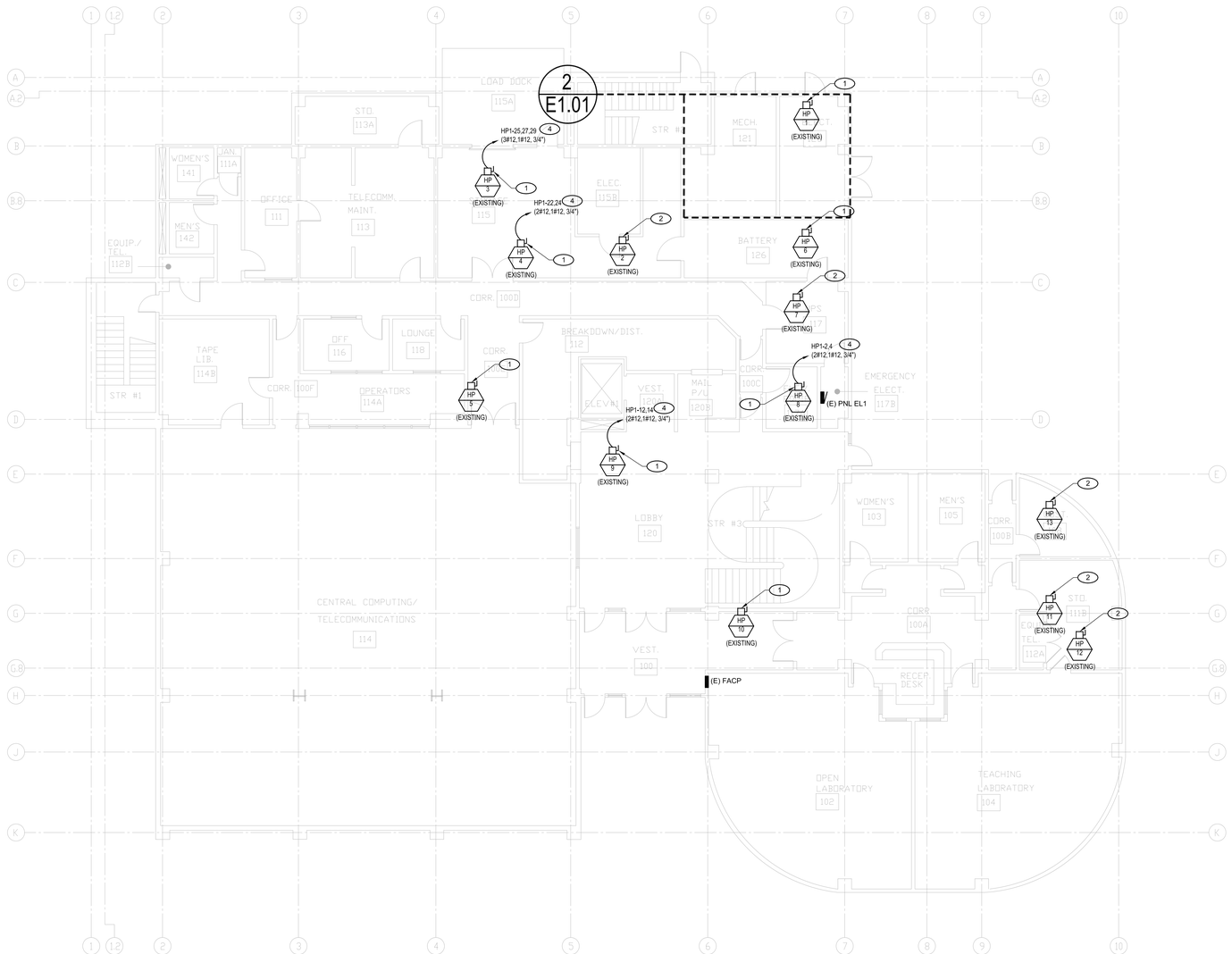
GENERAL NOTES:

1. CONTRACTOR SHALL VISIT THE BUILDING SITE, TAKE HIS OWN MEASUREMENTS AND OBTAIN SUCH OTHER INFORMATION AS MAY BE NECESSARY FOR HIS WORK. NO ALLOWANCES WILL SUBSEQUENTLY BE MADE FOR ANY ERROR OR OMISSION ON THE PART OF THE CONTRACTOR IN THIS REGARD.
2. DO NOT SCALE DRAWINGS. FIELD VERIFY EXACT EQUIPMENT LOCATIONS PRIOR TO BEGINNING WORK.
3. IN THE EVENT OF CONFLICTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, CONTRACTOR SHALL BID THE BETTER QUALITY OR GREATER QUANTITY.
4. CONTRACTOR SHALL REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION AND REQUIREMENTS FOR THIS PROJECT.



2 E1.01 ENLARGED DEMOLITION PLAN

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



1 E1.01 ELECTRICAL DEMOLITION PLAN - 1ST FLOOR

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

NORTH

0 04' 08' 16'

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

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LAS VEGAS, NEVADA 89154

PROJECT : SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

ELECTRICAL DEMOLITION PLAN - 1ST FLOOR

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413
Consultant Project No.	SIGMA1303
Date:	10.02.2013

Drawn By:	Checked By	Approved By
RE	NR	NR

File Name:

E1.01

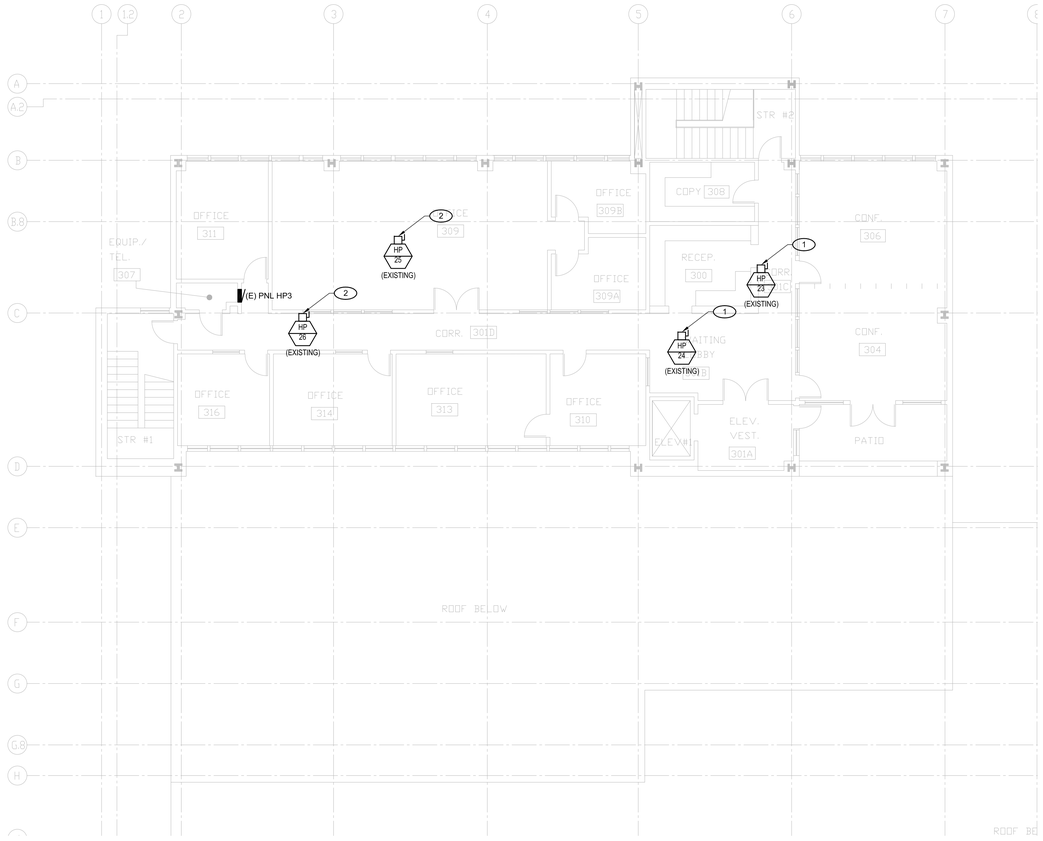
CONSTRUCTION

KEY NOTES: (#)

1. EXISTING EQUIPMENT TO BE REMOVED. REMOVE ELECTRICAL CONNECTION TO HEAT PUMP. REMOVE ALL HAND WRITTEN CIRCUIT IDENTIFICATION. PREPARE DISCONNECT SWITCH TO CONNECT NEW HEAT PUMP AND INSTALLATION OF NEW IDENTIFICATIONS.
2. EXISTING EQUIPMENT TO REMAIN. REMOVE HAND WRITTEN CIRCUIT IDENTIFICATION AND PREPARE TO INSTALL NEW IDENTIFICATIONS.

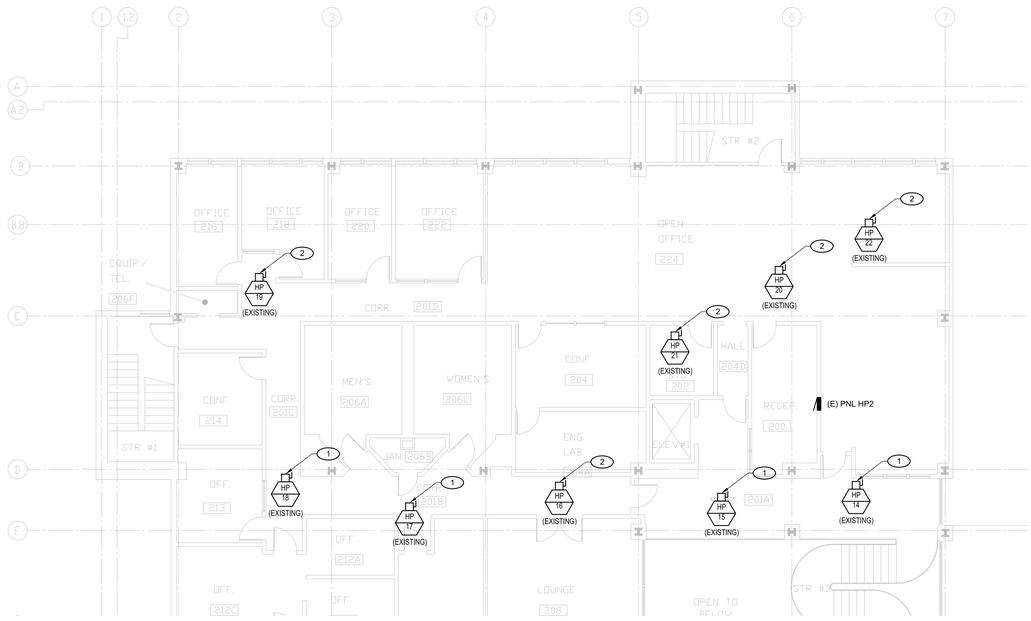
GENERAL NOTES:

1. CONTRACTOR SHALL VISIT THE BUILDING SITE, TAKE HIS OWN MEASUREMENTS AND OBTAIN SUCH OTHER INFORMATION AS MAY BE NECESSARY FOR HIS WORK. NO ALLOWANCES WILL SUBSEQUENTLY BE MADE FOR ANY ERROR OR OMISSION ON THE PART OF THE CONTRACTOR IN THIS REGARD.
2. DO NOT SCALE DRAWINGS. FIELD VERIFY EXACT EQUIPMENT LOCATIONS PRIOR TO BEGINNING WORK.
3. IN THE EVENT OF CONFLICTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, CONTRACTOR SHALL BID THE BETTER QUALITY OR GREATER QUANTITY.
4. CONTRACTOR SHALL REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION AND REQUIREMENTS FOR THIS PROJECT.



1 E1.02 ELECTRICAL DEMOLITION PLAN - 3RD FLOOR

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



2 E1.02 ELECTRICAL DEMOLITION PLAN - 2ND FLOOR

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

NORTH

0 04' 08' 16'

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

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SEAL:

STATE OF NEVADA — PROFESSIONAL ENGINEER — NOSRAT ROUHANI — No. 9915 — 10/02/13

CONSULTANT:

NRC engineers, inc.
Electrical Engineering
3373 Wynn Road, Suite A
Las Vegas, Nevada 89102
(702)248-1592, Fax:(702)248-1593

UNLV

UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154

PROJECT: SCS HEAT PUMP UNITS REPLACEMENT

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

ELECTRICAL DEMOLITION PLAN - 2ND & 3RD FLOOR

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.	361DC1413
Consultant Project No.	SIGMA1303
Date:	10.02.2013

Drawn By	Checked By	Approved By
RE	NR	NR

File Name:

E1.02

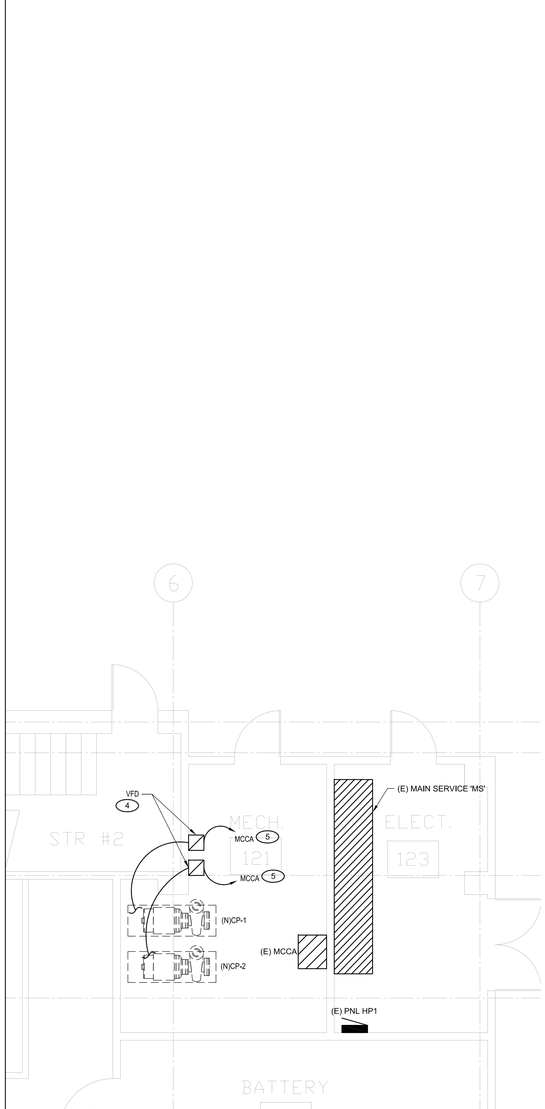
CONSTRUCTION

KEY NOTES: (#)

1. PROVIDE NEW NAMEPLATES AT EXISTING DISCONNECT SWITCHES. NAMEPLATES SHALL BE ENGRAVED MICARTA AND SHALL BE MECHANICALLY SECURED USING RIVET ATTACHMENT, NOT GLUED. NAMEPLATE SHALL CONTAIN EQUIPMENT DESIGNATION, SOURCE DESIGNATION, CIRCUIT IDENTIFICATION AND VOLTAGE.
2. CONNECT NEW HEAP PUMPS TO EXISTING DISCONNECT SWITCH. REFER TO PANEL SCHEDULES FOR MORE INFORMATION.
3. PROVIDE DUCT DETECTORS IN SUPPLY DUCT COMPATIBLE WITH EXISTING FIRE ALARM SYSTEM. CONNECT TO EXISTING FIRE ALARM PANEL AS REQUIRED. REFER TO MECHANICAL PLANS FOR ADDITIONAL REQUIREMENTS. EXISTING FIRE ALARM SYSTEM IS NOTIFIER. ALL WORK RELATED TO FIRE ALARM SYSTEM SHALL BE PERFORMED BY A LICENSED FIRE ALARM CONTRACTOR AUTHORIZED BY UNLV TO WORK ON THE EXISTING SYSTEM.
4. APPROXIMATE LOCATION OF NEW VFD'S . COORDINATE LOCATION TO PROVIDE REQUIRED WORK CLEARANCE.
5. SEE ONE-LINE DIAGRAM FOR CONDUIT AND WIRING REQUIREMENTS.
6. EXTEND CONDUIT AS REQUIRED AND PROVIDE NEW WIRING AS SHOWN.

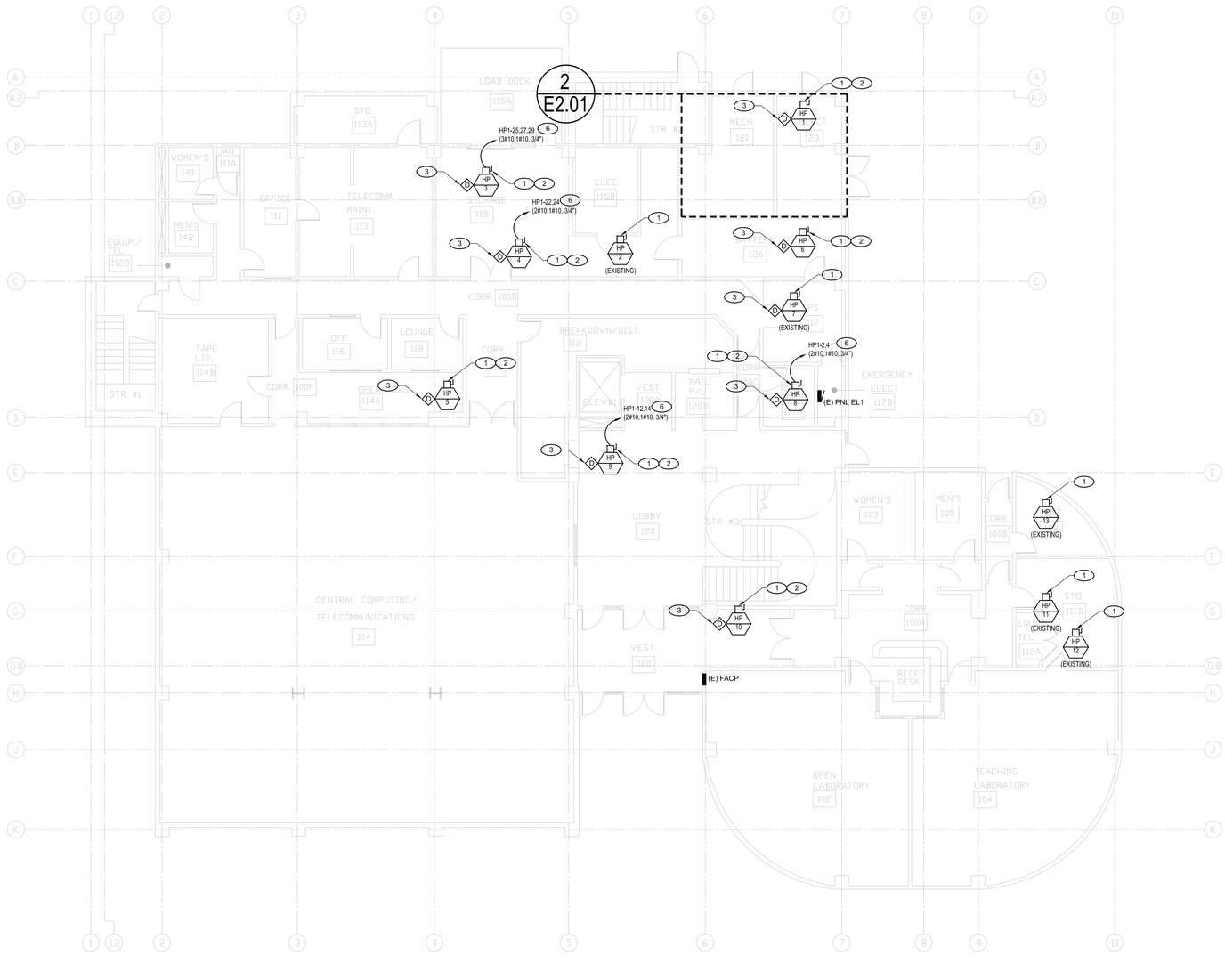
GENERAL NOTES:

1. CONTRACTOR SHALL VISIT THE BUILDING SITE, TAKE HIS OWN MEASUREMENTS AND OBTAIN SUCH OTHER INFORMATION AS MAY BE NECESSARY FOR HIS WORK. NO ALLOWANCES WILL SUBSEQUENTLY BE MADE FOR ANY ERROR OR OMISSION ON THE PART OF THE CONTRACTOR IN THIS REGARD.
2. CONTRACTOR SHALL COORDINATE ALL POWER OUTAGES WITH OWNER'S REPRESENTATIVE. OBTAIN PERMISSION AT LEAST SEVEN (7) DAYS BEFORE PARTIAL OR COMPLETE POWER OUTAGES.
3. DO NOT SCALE DRAWINGS. FIELD VERIFY EXACT EQUIPMENT LOCATIONS PRIOR TO BEGINNING WORK.
4. IN THE EVENT OF CONFLICTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, CONTRACTOR SHALL BID THE BETTER QUALITY OR GREATER QUANTITY.
5. CONTRACTOR SHALL REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION AND REQUIREMENTS FOR THIS PROJECT.
7. FINAL CONNECTIONS TO ALL EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS AND INSTRUCTIONS. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO VERIFY REQUIREMENTS AND PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
8. THE CONTRACTOR SHALL PATCH AND PAINT DAMAGED AREAS AS REQUIRED TO MATCH EXISTING SURFACES. THE CONTRACTOR SHALL REPLACE ANY CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION.
9. PROVIDE UPDATED PANEL DIRECTORY FOR ALL MODIFIED PANELS. DIRECTORY SHALL BY TYPE WRITTEN ON CARD STOCK MATERIAL AND SHALL BE OF SAME DESIGN AS PROVIDED BY MANUFACTURER.
10. NO CONDUIT SHALL BE INSTALLED ON ROOF. NO EXCEPTIONS.



2 E2.01 ENLARGED ELECTRICAL PLAN

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



1 E2.01 ELECTRICAL PLAN - 1ST FLOOR

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

NORTH

0 04' 08' 16'

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

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NO.	DATE	ISSUE

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ELECTRICAL PLAN - 1ST FLOOR

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SIGMA'S Project No.	361DC1413
Consultant Project No.	SIGMA1303
Date:	10.02.2013

Drawn By:	Checked By	Approved By
RE	NR	NR

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E2.01

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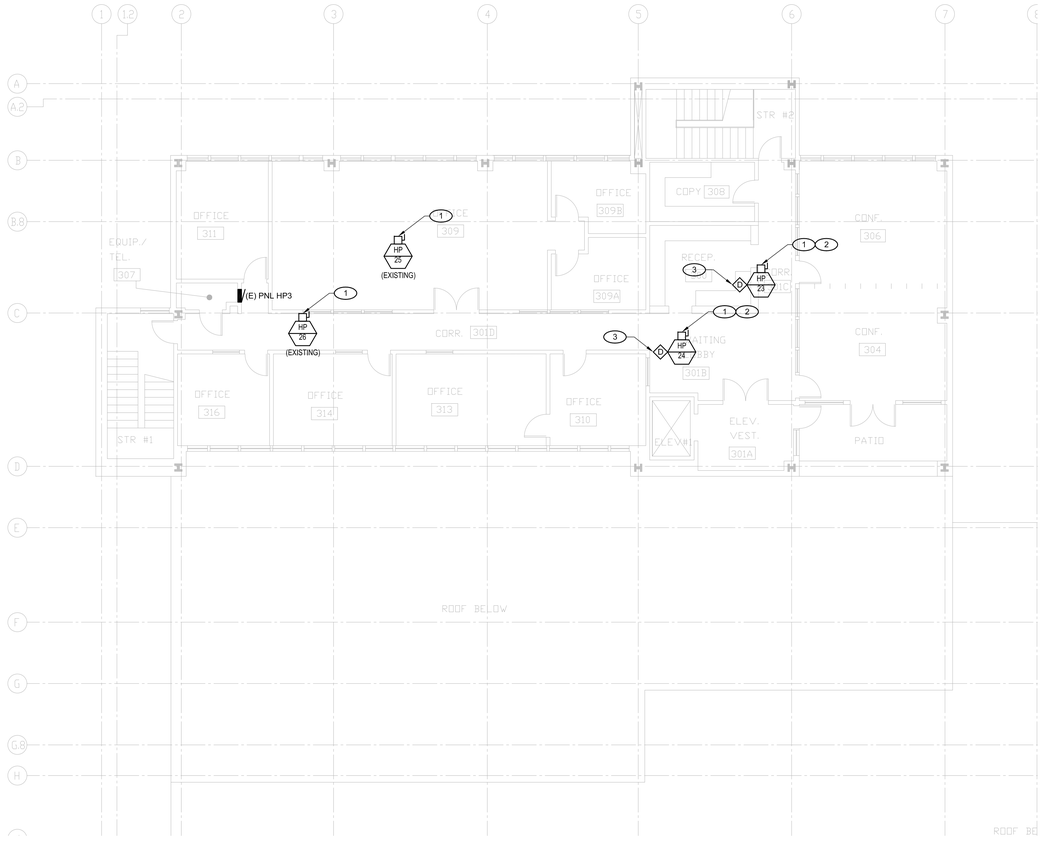
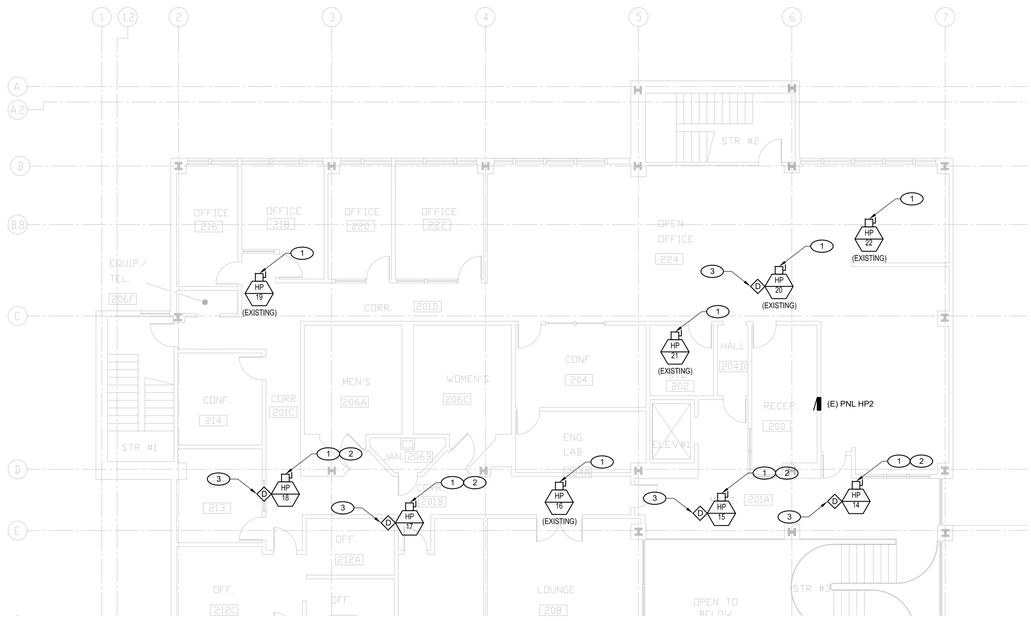


1 E2.02 ELECTRICAL PLAN - 3RD FLOOR

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



2 E2.02 ELECTRICAL PLAN - 2ND FLOOR

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

NORTH

0 04' 08' 16'

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

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