

SYMBOLS (NOT ALL USED)

GENERAL	
	NORTH ARROW
	DETAIL IDENTIFICATION NUMBER
	SECTION OR ELEVATION IDENTIFICATION LETTER
	EQUIPMENT ABBREVIATION (SEE ABBREVIATION LIST)
	REVISION CLOUD
	KEYNOTE
	REVISION
	POINT OF CONNECTION (P.O.C.)
	POINT OF DISCONNECTION (P.O.D.)
LINETYPE	
	NEW WORK
	EXISTING WORK
	WORK TO BE REMOVED
	FUTURE
EQUIPMENT AIR MOVING DEVICE & COMPONENTS	
	CENTRIFUGAL FAN
	PROPELLER FAN
	ROOF VENTILATOR, INTAKE
	ROOF VENTILATOR, EXHAUST
	DUCT SECTION, SUPPLY (POSITIVE)
	DUCT SECTION, RETURN (NEGATIVE)
	DUCT SECTION, EXHAUST (NEGATIVE)
	DIRECTION OF FLOW
	DUCT SIZE, WHERE FIRST DIMENSION IS VISIBLE DUCT
	CHANGE OF ELEVATION RISE (R) DROP (D)
	DUCTWORK, DOUBLE LINE
	ACOUSTICAL LINED DUCTWORK, DOUBLE LINE SIZE SHOWN INDICATES NET INSIDE DIMENSION
	FLEXIBLE DUCTWORK, FLEXIBLE EQUIPMENT CONNECTION, DOUBLE LINE
	DUCTWORK, SINGLE LINE
	ACOUSTICAL LINED DUCTWORK, SINGLE LINE SIZE SHOWN INDICATES NET INSIDE DIMENSION
	FLEXIBLE DUCTWORK, FLEXIBLE EQUIPMENT CONNECTION, SINGLE LINE
	TERMINAL UNIT, DUAL DUCT
	TERMINAL UNIT, SINGLE DUCT
	CEILING SUPPLY DIFFUSER WITH 4-WAY BLOW PATTERN
	CEILING SUPPLY DIFFUSER WITH 3-WAY BLOW PATTERN
	CEILING RETURN REGISTER
	CEILING EXHAUST GRILLE
	DIFFUSER/REGISTER NUMBER
	AIR INLET/OUTLET IDENTIFICATION
	AIRFLOW
	UNDERCUT DOOR, 1 INCH, 100 CFM
	HUMIDIFIER

DUCT ACCESSORIES & CONTROLS INSTRUMENTATION

	THERMOSTAT
	TEMPERATURE SENSOR
	REMOTE TEMPERATURE SENSOR
	CO2 SENSOR
	HUMIDITY SENSOR
	CALIFORNIA BUILDING CODE
	COOLING COIL
	CEILING DIFFUSER
	CONDENSATE DRAIN
	CALIFORNIA FIRE CODE
	CUBIC FOOT PER MINUTE
	COMBINATION FIRE/SMOKE DAMPER
	CHILLED WATER PUMP
	CHILLED WATER RETURN
	CHILLED WATER SUPPLY
	CEILING
	CALIFORNIA MECHANICAL CODE
	CONDENSATE
	CONNECTION
	CONTINUATION
	CEILING RETURN
	CEILING DIFFUSER
	CUBIC INCHES
	DOWN
	DRAWING
	EXHAUST AIR
	ENTERING AIR TEMPERATURE
	ENTERING DRY BULB TEMPERATURE
	ENERGY EFFICIENCY STANDARD (TITLE 24)
	EXHAUST FAN
	ELEVATION
	ELECTRICAL
	ENTERING
	EQUIPMENT
	EXTERNAL STATIC PRESSURE
	ENTERING WET BULB TEMPERATURE
	ENTERING WATER TEMPERATURE
	EXHAUST
	DEGREES FAHRENHEIT
	FUTURE
	FIRE DAMPER
	FURNACE FILTER
	FULL LOAD AMPERES
	FLOOR
	FLEXIBLE CONNECTION
	FEET PER MINUTE
	FEET PER SECOND
	FEET
	GAUGE
	GALLON
	GENERAL CONTRACTOR
	GALLONS PER HOUR
	GALLON PER MINUTE
	HEIGHT
	HEATING COIL
	HOT DECK/HOT DUCT
	HEATING HOT WATER RETURN
	HEATING HOT WATER SUPPLY
	KILOWATT
	LENGTH
	LINED DUCTWORK
	LEAVING AIR TEMPERATURE
	POUNDS
	LEAVING DRY BULB TEMPERATURE
	LINEAR FEET
	LEAVING WET BULB TEMPERATURE
	LEAVING WATER TEMPERATURE
	MAXIMUM
	MIXING BOX
	MINIMUM BTU PER HOUR
	MINIMUM
	MAKE-UP AIR
	N95 IN CONTACT
	NOT TO SCALE
	OSACOA
	OUTSIDE DIAMETER
	POINT OF CONNECTION
	POINT OF DISCONNECTION
	RETURN AIR
	RETURN GRILLE
	REHEAT COIL
	ROOM
	REVOLUTIONS PER MINUTE
	SUPPLY AIR
	SHUT OFF VALVE
	STATIC PRESSURE
	SPECIFICATION
	SQUARE FOOT
	STAINLESS STEEL
	TRANSFER AIR
	TEMPERATURE
	TRANSFER FAN
	TRANSFER GRILLE
	TURNINGS VANES
	TYPICAL
	UNLESS OTHERWISE NOTED
	UP THROUGH ROOF
	VOLTS
	VARIABLE AIR VOLUME
	VOLUME DAMPER
	VENTILATION AIR
	WIDTH
	WITH
	WITHOUT
	WET BULB
	WATER COLUMN
	WATER GAUGE
	WIRE MESH SCREEN

PIPING

	RISE OR DROP
	TEE DOWN
	90 DEGREE ELBOW

SLOPE

	DIRECTION OF SLOPE DOWN
	CHILLED WATER RETURN
	CHILLED WATER SUPPLY
	CONDENSER WATER RETURN
	CONDENSER WATER SUPPLY
	HIGH PRESSURE CONDENSATE
	HIGH PRESSURE STEAM
	MEDIUM PRESSURE CONDENSATE
	MEDIUM PRESSURE STEAM
	LOW PRESSURE CONDENSATE
	LOW PRESSURE STEAM
	HEATING HOT WATER RETURN
	HEATING HOT WATER SUPPLY
	PUMP CONDENSATE
	CONDENSATE
	REFRIGERANT LIQUID
	REFRIGERANT SUCTION

VALVES

	BALL VALVE
	BUTTERFLY VALVE
	PLUG VALVE
	GATE/GLOBE ANGLE VALVE
	GATE/GLOBE VALVE
	TWO WAY VALVE
	THREE WAY VALVE
	CHECK VALVE
	CONTROL VALVE
	PRESSURE REDUCING VALVE
	AIR VENT AUTOMATIC
	AIR VENT MANUAL

FITTING & PIPING SPECIALTIES

	PLUG OR CAP
	REDUCER
	BALANCING COCK
	UNION, SCREWED
	UNION, FLANGED
	FLEXIBLE CONNECTOR
	PRESSURE GAUGE
	PRESSURE SWITCH
	PUMP (INDICATE USE)
	STRAINER
	THERMOMETER, TEMPERATURE SENSOR

ABBREVIATIONS (NOT ALL USED)

AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AL	AL MINIMUM
AMB	AMBIENT
ARCH	ARCHITECTURAL
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BMS	BUILDING MANAGEMENT SYSTEM
BTU	BTU PER HOUR
BTUH	BTU PER HOUR
CD	DEGRESS CENTIGRADE (CELCIUS)
CBC	CALIFORNIA BUILDING CODE
CC	COOLING COIL
CD	CEILING DIFFUSER
CD	CONDENSATE DRAIN
CFC	CALIFORNIA FIRE CODE
CFM	CUBIC FOOT PER MINUTE
CFSD	COMBINATION FIRE/SMOKE DAMPER
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	CEILING
CMC	CALIFORNIA MECHANICAL CODE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CR	CEILING RETURN
CJ FT	CEILING DIFFUSER
CU IN	CUBIC INCHES
DN	DOWN
DWG	DRAWING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB TEMPERATURE
EES	ENERGY EFFICIENCY STANDARD (TITLE 24)
EF	EXHAUST FAN
ELEC	ELECTRICAL
ENT	ENTERING
EPM	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB TEMPERATURE
EWTP	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	DEGREES FAHRENHEIT
F	FUTURE
FD	FIRE DAMPER
FF	FURNACE FILTER
FLA	FULL LOAD AMPERES
FLR	FLOOR
FLX	FLEXIBLE CONNECTION
FFM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET
GA	GAUGE
GAL	GALLON
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLON PER MINUTE
H	HEIGHT
HC	HEATING COIL
HD	HOT DECK/HOT DUCT
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
KW	KILOWATT
L	LENGTH
(L)	LINED DUCTWORK
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LBD	LEAVING DRY BULB TEMPERATURE
LN FT	LINEAR FEET
LVB	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MB	MIXING BOX
MBH	THOUSAND BTU PER HOUR
MIN	MINIMUM
MJA	MAKE-UP AIR
NIC	N95 IN CONTACT
NTS	NOT TO SCALE
OSACOA	OSACOA
OD	OUTSIDE DIAMETER
POC	POINT OF CONNECTION
POD	POINT OF DISCONNECTION
RA	RETURN AIR
RG	RETURN GRILLE
RH	REHEAT COIL
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SF	SUPPLY FAN
SOV	SHUT OFF VALVE
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SQ.FT.	SQUARE FOOT
SS	STAINLESS STEEL
TA	TRANSFER AIR
TEMP	TEMPERATURE
TF	TRANSFER FAN
TG	TRANSFER GRILLE
TV	TURNINGS VANES
TYP	TYPICAL
UN	UNLESS OTHERWISE NOTED
UTR	UP THROUGH ROOF
V	VOLTS
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VENT	VENTILATION AIR
W	WIDTH
W	WITH
WO	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WG	WATER GAUGE
WMS	WIRE MESH SCREEN

GENERAL NOTES

- ALL WORK, INSTALLATION, AND MATERIALS SHALL COMPLY WITH ALL CURRENT GOVERNING CODES, BUILDING STANDARDS, REGULATIONS, SPECIFICATIONS, AND ALL OTHER REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION. WHERE REQUIREMENTS BETWEEN THESE VARY, THE MOST STRINGENT SHALL APPLY.
- ALL WORK SHALL BE PERMITTED. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, FEES, AND LICENSES, UNLESS OTHERWISE DEFINED BY OWNER.
- CONTRACTOR SHALL EXAMINE THE COMPLETE SET OF DRAWINGS AND SPECIFICATIONS FOR ALL TRADES PRIOR TO SUBMITTING BID AND START OF WORK.
- CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND THOROUGHLY FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS, INCLUDING BUT NOT LIMITED TO DIMENSIONS, THE EXISTING INSTALLATIONS, POINTS OF DISCONNECTION, AND REQUIRED CLEARANCES. CONTRACTOR SHALL MAKE ANY MINOR ADJUSTMENTS NECESSARY TO AVOID CONFLICTS WITH THE BUILDING STRUCTURE AND THE WORK OF OTHER TRADES. THIS SHALL BE VERIFIED PRIOR TO BID SUBMITTAL. START OF CONSTRUCTION, AND/OR FABRICATION OF MATERIALS, BY THE ACT OF SUBMITTING A BID, THE CONTRACTOR ACCEPTS THE GIVEN WORKING CONDITIONS.
- IF DISCREPANCIES ARE ENCOUNTERED BETWEEN THE DRAWINGS, BUILDING STANDARDS, SPECIFICATIONS, AND/OR CURRENT CONDITIONS, THE ENGINEER AND ARCHITECT SHALL BE NOTIFIED BY A REQUEST FOR CLARIFICATION, AND THE OWNER SHALL BE NOTIFIED IN WRITING PRIOR TO COMMENCEMENT OF WORK. IF WORK IS DONE WITHOUT WRITTEN APPROVAL FROM OWNER REPRESENTATIVE, THE WORK SHALL BE CONSIDERED AT-RISK, AND A NON-COMFORMABLE INSTALLATION.
- ALL DRAWINGS AND LAYOUTS ARE DIAGRAMMATIC TO SHOW DESIGN INTENT ONLY. CONTRACTOR SHALL COORDINATE NEW WORK WITH THE WORK OF ALL OTHER TRADES AND EXISTING CONDITIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSTALL ALL WORK IN SUCH A MANNER AS TO AVOID OBSTRUCTIONS, PRESERVE HEADROOM, KEEP OPENINGS AND PASSAGEWAYS CLEAR, AND MAKE ALL EQUIPMENT REQUIRING INSPECTION, MAINTENANCE, AND REPAIR ACCESSIBLE WITHOUT EXTRA COST TO THE OWNER. NO CONSIDERATION SHALL BE GRANTED DUE TO LACK OF FAMILIARITY ON THE PART OF THE CONTRACTOR WITH ACTUAL PHYSICAL CONDITIONS, REQUIREMENTS, AND PRACTICES AT THE SITE.
- SUBMIT ELECTRONIC COPIES OF SUBMITTAL DOCUMENTS WITH DESCRIPTIVE DATA AND PROJECT-SPECIFIC PERFORMANCE FOR ALL PRODUCTS AND MATERIALS PROPOSED FOR THE PROJECT. CLEARLY INDICATE EXACT MAKE/MODEL INCLUDING ANY ACCESSORIES AND OPTIONS PROPOSED. SHOP DRAWINGS AT THE SAME SCALE AS THE CONSTRUCTION DOCUMENTS OR LARGER SHALL BE INCLUDED WITH SUBMITTALS AS REQUIRED. HARD COPY SUBMITTALS WILL NOT BE ACCEPTED. ALLOW A MINIMUM OF FIVE (5) WORKING DAYS FOR ENGINEER TO REVIEW SUBMITTALS. SUBMITTALS SHALL BE FOR A COMPLETE SYSTEM AND NOT A PARTIAL REPRESENTATION OF A SYSTEM.
- SUBMIT REQUEST FOR INFORMATION (RFI) IN ELECTRONIC PDF FORMAT WITH PROPOSED SOLUTION INCLUDED, IF APPLICABLE. ALLOW MINIMUM OF THREE (3) WORKING DAYS FOR ENGINEER TO REVIEW AND RESPOND.
- PREPARE COORDINATED SHOP DRAWINGS WITH ALL TRADES, INCLUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION, STRUCTURAL, ETC. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION. COORDINATE WORK WITH THE WORK OF ALL OTHER TRADES AND JOB CONDITIONS.
- CONTRACTOR SHALL OBTAIN AND FOLLOW ALL LANDLORD/OVERSEER REQUIREMENTS, GUIDELINES, RULES, AND PROCEDURES FOR CONSTRUCTION. CONTRACTOR SHALL PROVIDE INSURANCE IN ACCORDANCE WITH THE BUILDING'S CERTIFICATE OF INSURANCE REQUIREMENTS.
- IF ANY EQUIPMENT SUBMITTED BY THE CONTRACTOR IS DIFFERENT FROM THE BASIS OF DESIGN SPECIFIED, CHANGES SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL. SUBMITTALS SHALL INDICATE ANY RESULTING CREDIT, ADDED COST, AND/OR ADJUSTMENT IN LEAD TIME. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PAYMENT OF ALL CHARGES RESULTING FROM ADDITIONS OR CHANGES IN THE WORK OF OTHER TRADES THAT ARE NECESSARY TO ACCOMMODATE THE REQUESTED SUBSTITUTION, UNLESS APPROVED BY OWNER. CONTRACTOR WILL PROCEED AT THEIR OWN RISK IF CHANGES OCCUR WITHOUT PRIOR APPROVAL.
- ALL PENETRATIONS OF DUCTWORK, PIPING, CONDUITS, AND VENTS THROUGH FIRE, SMOKE, OR COMBINATION FIRE/SMOKE RATED BARRIERS SHALL BE INSTALLED AND PROTECTED IN ACCORDANCE WITH THE STATE MINIMUM BUILDING CODE AND AUTHORITIES HAVING JURISDICTION. FIRESTOP AND SMOKE STOP PRODUCTS SHALL BE UL LISTED.
- ALL PENETRATIONS OF DUCTWORK, PIPING, CONDUITS, AND VENTS THROUGH NON-RATED CONSTRUCTION SHALL BE PROPERLY AND GENERALLY CALLED WITH SOUND-RESISTANT AND NON-HARDENING MATERIAL, SUCH AS SILICONE.
- COORDINATE WITH OWNER'S ROOFING CONTRACTOR PRIOR TO MAKING ANY PENETRATIONS THROUGH ROOF. ROOF WARRANTY SHALL BE MAINTAINED.
- FLASHING, COUNTER FLASHING, AND ROOF MEMBRANE PATCHES AT ALL ROOF OPENINGS SHALL MATCH AND BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE EXISTING ROOFING SYSTEM.
- PROVIDE GENERAL CONTRACTOR WITH FINAL SIZES AND LOCATIONS OF ALL WALL, FLOOR, AND ROOF PENETRATIONS TO COORDINATE REQUIRED STRUCTURAL FRAMING MEMBERS.
- COORDINATE ALL CUTTING, DRILLING, PATCHING, AND REINFORCING REQUIRED FOR WORK WITH THE GENERAL CONTRACTOR.
- PROVIDE ACCESS PANELS/DOORS FOR ALL EQUIPMENT LOCATED IN INACCESSIBLE AREAS, SUCH AS ABOVE HANG LID CEILING OR BEHIND WALLS. ALL ACCESS PANEL/FLOOR LOCATIONS SHALL BE COORDINATED WITH ARCHITECT.
- REQUIRED ACCESS AND WORKING SPACE CLEARANCES FOR ALL EQUIPMENT AND CONTROL DEVICES MUST BE MAINTAINED TO ALLOW READY AND SAFE OPERATION, EXAMINATION, AND MAINTENANCE. REQUIRED CLEARANCES SHALL BE PER MANUFACTURER'S RECOMMENDATION AND GOVERNING CODES.
- CONTRACTOR SHALL SECURE SITE WHILE WORK IS IN PROGRESS AND UNTIL THE WORK IS ACCEPTED BY OWNER'S REPRESENTATIVE.
- THE CONTRACTOR IS SOLELY RESPONSIBLE TO PROVIDE METHOD OF PROCEDURE AND PERFORM ALL CONSTRUCTION MEANS AND METHODS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, CAUSED BY THE WORK, TO EXISTING CONDITIONS OR THE WORK OF OTHER TRADES.
- CONTRACTOR SHALL COORDINATE MOVEMENT AND STORAGE OF EQUIPMENT AND ALL OTHER COMPONENTS, INCLUDING TAKING ALL NECESSARY PRECAUTIONS TO COVER ALL EQUIPMENT COMPONENTS TO PROTECT THEM FROM EXPOSURE TO TOXIC ELEMENTS, CONDITIONS OUTSIDE OF MANUFACTURER'S STORAGE CONDITIONS, AND CONSTRUCTION DEBRIS, WHETHER OR NOT EQUIPMENT IS POWERED OR IN USE.
- ALL MATERIALS SHALL BE NEW, BEAR THE UNDERWRITERS LABORATORIES (UL) OR EQUIVALENT TESTING AGENCY LABEL, AND BE APPROVED BY THE AUTHORITIES HAVING JURISDICTION. CONTRACTOR SHALL MAINTAIN RED-LINED AS-BUILT DRAWINGS DURING CONSTRUCTION TO DOCUMENT ALL CHANGES AND MODIFICATIONS TO THE CONTRACT DOCUMENTS. CONTRACTOR SHALL SUBMIT COMPLETE RED-LINED AS-BUILT DRAWINGS, UPON COMPLETION OF THE WORK, FOR REVIEW BY THE ARCHITECT/ENGINEER.
- FURNISH FINAL CERTIFICATE OF INSPECTION OR WRITTEN EVIDENCE OF ACCEPTANCE BY INSPECTION AUTHORITIES FOR ALL WORK INSTALLED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A CLEAN AND SAFE WORK ENVIRONMENT THROUGHOUT THE DURATION OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL CONSTRUCTION DEBRIS, WITH ALL COSTS FOR DISPOSAL BORNE BY CONTRACTOR. UPON COMPLETION OF WORK, AREA(S) OF WORK SHALL BE LEFT IN A CLEAN CONDITION, ACCEPTABLE TO OWNER.
- ALL CONSTRUCTION DEBRIS SHALL BE DISPOSED OF IN AN ENVIRONMENTALLY RESPONSIBLE FASHION. RECYCLABLE MATERIAL SHALL BE PROPERLY RECYCLED, AND HAZARDOUS MATERIALS SHALL BE DISPOSED OF WITH PROPER CHAIN OF CUSTODY.
- ALL PLANS APPROVED BY GOVERNING AGENCIES SHALL BE KEPT IN A SECURE PLACE AND SHALL NOT BE USED BY WORKERS. CONTRACTOR SHALL FURNISH ALL SUBCONTRACTORS CONSTRUCTION SETS REFLECTING THE APPROVED PLANS. CONTRACTOR SHALL ALSO MAINTAIN IN GOOD CONDITION, ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS. THIS COMPLETE SET SHALL REMAIN ON PREMISES AT ALL TIMES, UNDER CARE OF THE JOB SUPERINTENDENT.
- CONTRACTOR SHALL PROVIDE A WRITTEN WARRANTY TO REPLACE OR REMEDY ALL FAULTY, IMPROPER, OR INFERIOR MATERIALS AND/OR CORRECT FAULTY INSTALLATION AT NO COST TO OWNER, INCLUDING PARTS AND LABOR, FOR A PERIOD OF ONE (1) YEAR FROM DATE OF OWNER'S WRITTEN ACCEPTANCE OF ALL WORK INSTALLED.
- PROVIDE OWNER WITH OPERATION AND MAINTENANCE MANUALS, GUARANTEES, AND WARRANTIES FOR ALL EQUIPMENT INSTALLED IN THE PROJECT.

MECHANICAL NOTES

- ALL DRAWINGS AND LAYOUTS ARE DIAGRAMMATIC TO SHOW DESIGN INTENT ONLY. LOCATIONS OF DUCTWORK, PIPING, AND EQUIPMENT ARE APPROXIMATE. DUCT/PIPE OFFSETS, TRANSITIONS, SUPPORTS, AND HANGERS MAY VARY FROM THAT SHOWN IN THE CONTRACT DOCUMENTS. IF FIELD CONDITIONS DIFFER SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWINGS AND AFFECT MECHANICAL WORK, INFORM ENGINEER OF RECORD IMMEDIATELY AND CONFIRM FURTHER DIRECTION BEFORE PROCEEDING WITH THE WORK IN THAT AREA.
- DUE TO STRUCTURAL CONDITIONS, DUCTWORK OR PIPING INTERFERENCE, EXISTING OBSTRUCTIONS, OR OTHER REASONS, THE CONTRACTOR MAY WANT TO INSTALL WORK IN A MANNER DIFFERENT FROM THAT SHOWN IN THE CONTRACT DOCUMENTS. SUCH CHANGES SHALL BE PRESENTED TO THE ENGINEER OF RECORD AND OWNER'S REPRESENTATIVE FOR APPROVAL BEFORE PROCEEDING, AND THE RECORD DRAWING SHALL BE ACCURATELY REVISED TO SHOW THE CHANGES AS COMPLETED.
- ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE NET CLEAR INSIDE DIMENSIONS AFTER INSULATION/LINING HAS BEEN INSTALLED.
- PIPING ANCHORAGE, SUPPORT, AND THERMAL EXPANSION DEVICES ARE PROVIDED BY THE CONTRACTOR. ALL CODE REQUIREMENTS, PIPING SUPPORTS AND THERMAL EXPANSION DEVICES SHALL BE INCORPORATED INTO THE SHOP DRAWINGS. SHOP DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR APPROVAL.
- ALL DUCTWORK AND PIPING SHALL BE INSTALLED TIGHT TO STRUCTURE.
- WHERE DEMOLITION DOES NOT ALLOW FOR MAINTAINING EXISTING HVAC SERVICE, CONTRACTOR SHALL PROVIDE TEMPORARY COOLING AND/OR HEATING WITH SUFFICIENT CAPACITY TO MAINTAIN COMFORT COOLING AND/OR HEATING, AT NO ADDITIONAL COST

STATE OF CALIFORNIA
Mechanical Systems
 NRCC-MCH-1 (Issued 03/2022)
 CERTIFICATE OF COMPLIANCE
 Project Name: SHAKE SHACK VICTORIA GARDENS Report Page: Page 4 of 12
 Project Address: BUILDING 3150, 12456 N. MAINSTREET, RANCHO CUCAMONGA, 91739 Date Prepared: 03/07/2022

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft ²)	Thermostats (\$120.2)(a) & (1), (\$120.2)(a) or (\$141.0)(b)(2)	Shut-Off Controls (\$120.2)(a)	Isolation Zone Controls (\$120.2)(a)	Demand Response (\$120.1)(a) & (b)	Supply Air Temp. Reset (\$140.4)(f)	Window Interlocks per (\$140.4)(f)
FC-1	single zone	≤ 25,000 ft ²	Setback Thermostat	NA: 7 day per (\$120.2)(a)	NA: Single Zone	DR Tstat per §120.1.2	NA: Single Zone	NA: No operable windows
FC-2	single zone	≤ 25,000 ft ²	Setback Thermostat	NA: 7 day per (\$120.2)(a)	NA: Single Zone	DR Tstat per §120.1.2	NA: Single Zone	NA: No operable windows
FC-3	single zone	≤ 25,000 ft ²	Setback Thermostat	NA: 7 day per (\$120.2)(a)	NA: Single Zone	DR Tstat per §120.1.2	NA: Single Zone	NA: No operable windows

FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, freestanding or decorative gas appliances, wood stoves are not required to have setback thermostats.
 *NOTES: Control with "r" requires a note in the space below explaining how compliance is achieved.
 EX: System 1: SA Temp Reset. Exempt because zone complies with §140.4(f); EXCEPTION 1 to §140.4(f)

VENTILATION AND INDOOR AIR QUALITY
 Table Instructions: Complete the following Table to demonstrate compliance with mandatory ventilation requirements in §120.1 and §120.2(c)(3) for all nonresidential, high-rise residential and hotel/motel occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflow may be shown on the plans or the calculations can be presented in a spreadsheet.

01	02	03	04	05	06	07
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
System Name	FC-1	System Design OA CFM Air Flow:	450	System Design Transfer Air CFM:	0	Air Filtration per §120.1(c) and §141.0)(b)(2) ² Provided per §120.1(c) (NR & Hotel/Motel)

CA Building Energy Efficiency Standards - 2019 Nonresidential Compliance: <http://www.energy.ca.gov/title24/2019standards> September 2020

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Mechanical Systems
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 CERTIFICATE OF COMPLIANCE
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F. FAN SYSTEMS & AIR ECONOMIZERS
 Table Instructions: Complete the following Table for fan systems to demonstrate compliance with prescriptive requirements found in §140.4(c), §140.4(c) and §140.4(f). First document the system details, then add fans within that system to document compliance with fan power requirements. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table F.

System Name	CU-1	Economizer ¹	NA: Efficiency per Table 140.4-D	Economizer Controls:	System Fan Type:	Constant Volume:	
01	02	03	04	05	06	08	
Item Name or Item Tag	Fan Function	Qty	Maximum Design Supply Airflow (CFM)	HP Unit ¹	Design HP	Fan Power Pressure Drop Adjustment - Table 140.4-B	
						Device	Design Airflow through Device (CFM)
FC-1, FC-3	Supply	2	2,235	Nameplate HP	1.34		Calculated Adjustment (in H ₂ O)
FC-2	Supply	1	1,400	Nameplate HP	0.46		Calculated Adjustment (in H ₂ O)
MAU-1	Supply	1	1,936	BHP	1.8	None used	Calculated Adjustment (in H ₂ O)
Total System Design Supply Airflow (CFM):		7,806		Total System Design (BHP):		4.94	
				Maximum System Fan Power (BHP):			

FOOTNOTE: Computer room economizers must meet requirements of §140.9)(a) and will be documented on the NRCC-NRCC-E document.
 *The unit used for HP must be consistent for all fans within a system.

G. SYSTEM CONTROLS
 Table Instructions: Complete the following Table to demonstrate compliance with mandatory controls in §120.2 and §120.3 and prescriptive controls in §140.4(d) and (i) or requirements in §141.0)(b)(2) for altered space conditioning systems.

01	02	03	04	05	06	07
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CA Building Energy Efficiency Standards - 2019 Nonresidential Compliance: <http://www.energy.ca.gov/title24/2019standards> September 2020

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D. EXCEPTIONAL CONDITIONS
 This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

Table H indicates a Fan Power System Index that exceeds the maximum allowed per §140.4(c). Please revise to demonstrate compliance. Selections made in Table C have been changed by the permit applicant. See Table A: Additional Remarks for permit applicant's explanation.

E. ADDITIONAL REMARKS
 This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)
 Table Instructions: Complete the following equipment schedules to show compliance with mandatory requirements found in §120.1 and §120.2(a) and prescriptive requirements found in §140.4(a), §140.4(b) and §140.4(f) or §141.0)(b)(2) for alterations.

Dry System Equipment Sizing (Including air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters)

01	02	03	04	05	06	07	08	09	10	11
Name or Item Tag	Equipment Category per Tables 110.2.1 & 110.2.2	Equipment Type per Tables 110.2.1 & 110.2.2	Smallest Size Available ¹ (\$140.4)(a)	Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated Heating Load (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
CU-1	Variable Refrigerant Flow	VRF heat pump, air cooled	Yes	131.4	135		115.2	144	14.9	96.7

FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per §140.4(a). Heatpumps are exempt.
 *It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.
 *Equipment is heating only, show cooling output and load blank. If equipment is cooling only, leave heating output and load blank.
 *Authority Having Jurisdiction may ask for load calculations used for compliance per §140.4(f).

G. PUMPS
 This Section Does Not Apply

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A. GENERAL INFORMATION

01	02	03	04	05	06	07	08
Project Location (city)	RANCHO CUCAMONGA		Total Conditioned Floor Area	1,670			
Climate Zone	12	Unconditioned Floor Area	6				
Occupancy Types Within Project:	Retail (R)		# of Stories (Habitable Above Grade)	1			
Office (O)	<input checked="" type="checkbox"/>	Hotel (H)	<input type="checkbox"/>	Non-refrigerated Warehouse (S)	<input type="checkbox"/>		
Health/Most Guest Rooms (R-1)	<input type="checkbox"/>	School (E)	<input type="checkbox"/>	Healthcare Facility (F)	<input type="checkbox"/>		
High-Rise Residential (R-2/B-3)	<input type="checkbox"/>	Relocatable Class Bldg (E)	<input type="checkbox"/>	Other (Write In):	<input type="checkbox"/>		

FOOTNOTES: Climate zone can be determined on the California Energy Commission's website at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html

B. PROJECT SCOPE
 Table Instructions: Include any mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.4, or §141.0)(b)(2) for alterations.

01	02	03
My project consists of (check all that apply)	Wet System Components	Dry System Components
<input checked="" type="checkbox"/> Heating Air System	<input type="checkbox"/> Water Economizer	<input type="checkbox"/> Air Economizer
<input checked="" type="checkbox"/> Cooling Air System	<input type="checkbox"/> Pumps	<input type="checkbox"/> Electric Resistance Heat
<input type="checkbox"/> Mechanical Controls	<input type="checkbox"/> Hydronic System Piping	<input checked="" type="checkbox"/> Fan Systems
<input checked="" type="checkbox"/> Mechanical Controls (existing to remain, altered or new)	<input type="checkbox"/> Cooling Towers	<input checked="" type="checkbox"/> Ductwork (existing to remain, altered or new)
<input type="checkbox"/> Ventilation	<input type="checkbox"/> Chillers	<input type="checkbox"/> Ventilation
<input type="checkbox"/> Boilers	<input type="checkbox"/> Zonal Systems/ Terminal Boxes	

C. COMPLIANCE RESULTS
 Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D for guidance.

01	02	03	04	05	06	07	08	09
System Summary §120.1 AND §120.2	Pumps §140.4(b) AND §140.4(f)	Fan/Economizers §120.2 AND §140.4(f)	System Controls §120.2 AND §140.4(f)	Ventilation §120.1 AND §120.2	Terminal Box Controls §120.1 AND §140.4(f)	Distribution Towers §120.3 AND §120.2(a)(3)	Cooling Towers §120.1 AND §120.2(a)(3)	Compliance Results
See Table F	See Table G	See Table H	See Table I	See Table J	See Table K	See Table L	See Table M	COMPLIES

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D. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE
 Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E: Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCC/

YES	NO	Form/Title	Systems To Be Field Verified	Field Inspector
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCA-MCH-02-A Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	ALL	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-03-A Constant Volume Single Zone HVAC. NOTE: This form does not automatically move to "Yes" if Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".		<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCA-MCH-04-A Air Distribution Duct Leakage	FC-1, FC-2 AND FC-3	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-05-A Air Economizer Controls		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-06-A Demand Control Ventilation Systems Acceptance must be submitted for all systems required to employ demand controlled ventilation (refer to §120.1(c)(3) for any outside ventilation flow rates based on maintaining interior carbon dioxide (CO ₂) concentration setpoints.		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-07-A Supply Fan Variable Flow Controls		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-08-A Valve Leakage Test		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-09-A Supply Water Temperature Reset Controls		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-10-A Hydronic System Variable Flow Controls		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-11-A Automatic Demand Shed Controls		<input type="checkbox"/>

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M. COOLING TOWERS
 This Section Does Not Apply

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION
 Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E: Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCC/

YES	NO	Form/Title	Systems To Be Field Verified	Field Inspector
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-01-E - Must be submitted for all buildings.	ALL	<input type="checkbox"/>

O. TERMINAL BOX CONTROLS
 This Section Does Not Apply

L. DISTRIBUTION (DUCTWORK AND PIPING)
 Table Instructions: Complete the following tables to show compliance with mandatory pipe insulation requirements found in §120.3 and prescriptive requirements found in §140.4(f) for duct leakage testing.

Duct Leakage Sealing

11	12	13	14	15
11	No	The scope of the project includes only duct systems serving healthcare facilities.		
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.		
13	Yes	The space conditioning system serves less than 5,000 ft ² of conditioned floor area.		
14	Yes	The combined surface area of the ducts in the following locations is more than 25% of the total surface area of the entire duct system:		
	<input type="checkbox"/>	Outdoors		
	<input type="checkbox"/>	In a space directly under a roof that has a U-factor greater than the U-factor of the ceiling, or if the roof does not meet the requirements of §140.3)(a)(1) or if the roof has fixed vents or openings to the outside/unconditioned spaces		
	<input checked="" type="checkbox"/>	In an unconditioned crawlspace		
	<input type="checkbox"/>	In other unconditioned spaces		
15	No	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.		
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix N/A.		

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Q. MANDATORY MEASURES DOCUMENTATION LOCATION
 Table Instructions: Indicate where mandatory measures are documented in the plan set or construction documentation. For any mandatory measures that do not apply, mark the plan sheet or construction document location as "N/A", any active cells that are left blank will result in non-compliance in Table C.

01	02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block:	Plan sheet or construction document location
Yes	M001

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P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION
 Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E: Additional Remarks. These documents must be completed by a HERS Rater and provided to the building inspector during construction. The final documents must be created by a HERS Provider's registry, but drafts can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCC/

YES	NO	Form/Title	Field Inspector
<input checked="" type="checkbox"/>	<input type="checkbox"/>	NRCC-MCH-04-H Duct Leakage Test NOTE: Must be completed by a HERS Rater	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCC-MCH-24 Enclosure Air Leakage Worksheet NOTE: Must be completed by a HERS Rater	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCC-MCH-27 High-Rise Residential NOTE: Must be completed by a HERS Rater	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCC-MCH-32 Local Mechanical Exhaust NOTE: Must be completed by a HERS Rater	<input type="checkbox"/>

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01	02	03	04	05	06	07	08	09
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-13-A Automatic FDD for Air Handling Units and Zone Terminal Units Acceptance		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-14-A Distributed Energy Storage DX AC Systems Acceptance NOTE: This form does not automatically move to "Yes" if Distributed Energy Storage DX AC Systems are included in the scope, permit applicant should move this form to "Yes".		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-15-A Thermal Energy Storage (TES) System Acceptance NOTE: This form does not automatically move to "Yes" if Chilled Water Storage, Ice-on-Cool Internal Melt, Ice-on-Cool External Melt, Ice Harvesters, Brine, Ice Slurry, Eutectic Salt, Calorimetric Hydrate Slurry (CHS), Cryogenic or encapsulated (ice-ball) Systems are included in the scope, permit applicant should move this form to "Yes".		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-16-A Supply Air Temperature Reset Controls		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-17-A Condenser Water Temperature Reset Controls		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-18 Energy Management Control Systems		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-19 Occupancy Sensor Controls		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-20 Multi-Family Ventilation		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NRCA-MCH-21 Multi-Family Envelope Leakage		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

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Nonresidential and Hotel/Motel Ventilation Systems

08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Occupancy Type ^a	Conditioned Floor Area (ft ²)	# of showerheads/toilets	# of people ^b	Required Min OA CFM	Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1)(b)(3), §120.1)(b)(5) & §120.2)(a)(3)*
DINING AREA	Restaurant Dining Rooms	645		30	450	450	450	DCV NA: Area <150 ft ² or design occupancy < 10 people
17 Total System Required Min OA CFM: 450								
18 Ventilation for this System Complies? Yes								

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08	09	10	11	12	13	14	15	16
Space Name or Item Tag	Occupancy Type ^a	Conditioned Floor Area (ft ²)	# of showerheads/toilets	# of people ^b	Required Min OA CFM	Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1)(b)(3), §120.1)(b)(5) & §120.2)(a)(3)*
KITCHEN/BACK O	Kitchen (cooking)	385		8	120	269.5	400	DCV NA: Not required space type
17 Total System Required Min OA CFM: 120								
18 Ventilation for this System Complies? Yes								

CA Building Energy Efficiency Standards - 2019 Nonresidential Compliance: <http://www.energy.ca.gov/title24/2019standards> September 20

DEMOLITION KEY NOTES

- 1 DISCONNECT AND DEMOLISHED EXISTING CONDENSER UNIT WITH ASSOCIATED REFRIGERANT PIPING SERVING EXISTING SPACE. PREPARE FOR INSTALLATION OF NEW CONDENSER UNIT.
- 2 EXISTING FAN COIL AND ASSOCIATED THERMOSTAT, DUCTWORK, REFRIGERANT PIPING, AND CEILING DIFFUSER TO BE DEMOLISHED.



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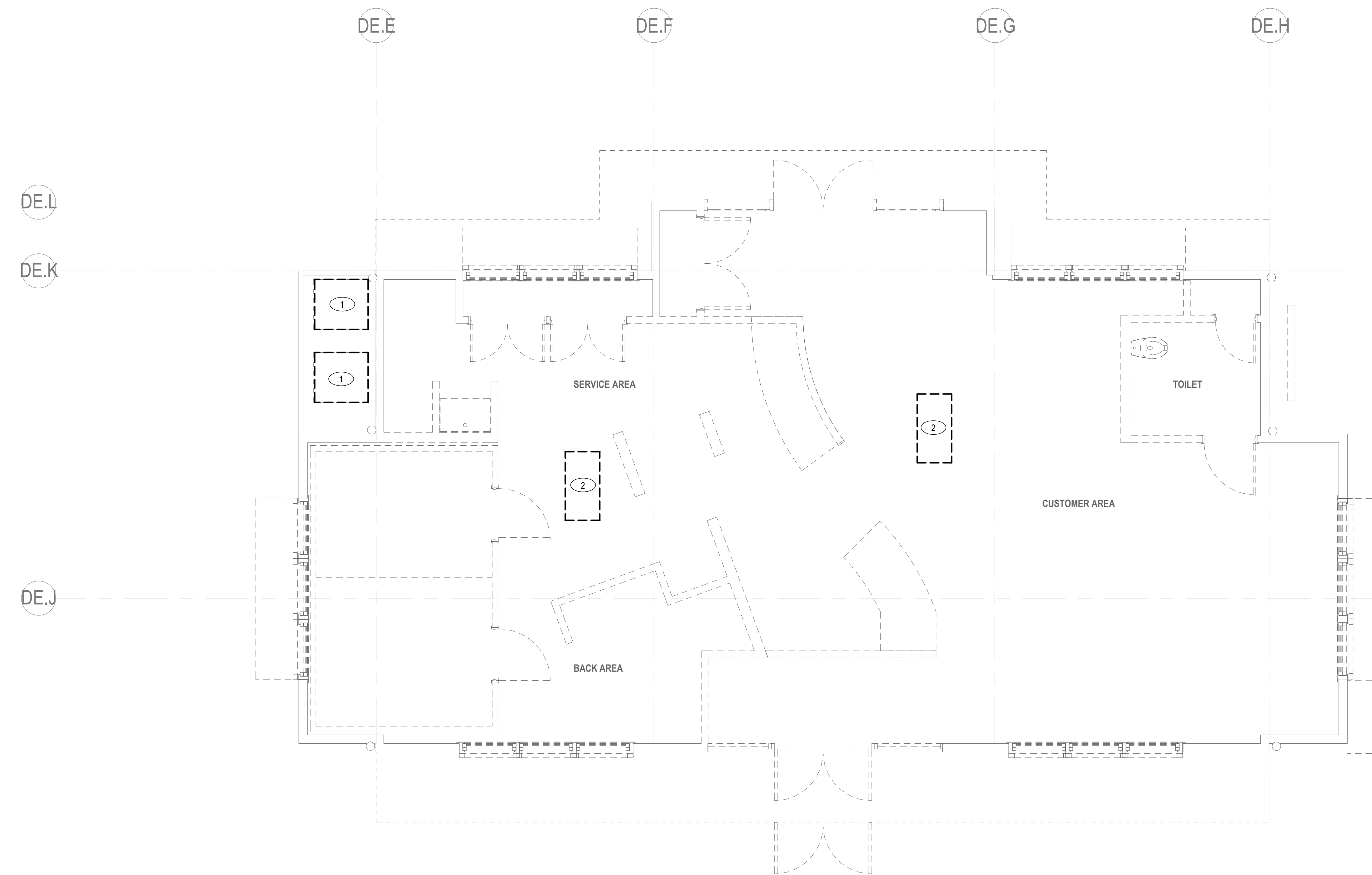
500 South Figueroa Street
Los Angeles, California 90071
United States
Contact:
Bryan Walsingham
Tel 213.239.8240



2361 ROSECRANS AVENUE
SUITE 368
EL SEGUNDO, CA 90245
Tel 310.725.1500
Fax 310.725.4699
Contact:
Yves Yanuaría
Tel 323.617.0332



505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620
Contact:
Michael Henderson
Tel 508.399.2392



Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name

SHAKE SHACK - VICTORIA GARDENS

Project Number

005.3846.000

Description

MECHANICAL 1ST FLOOR DEMO PLAN

Scale

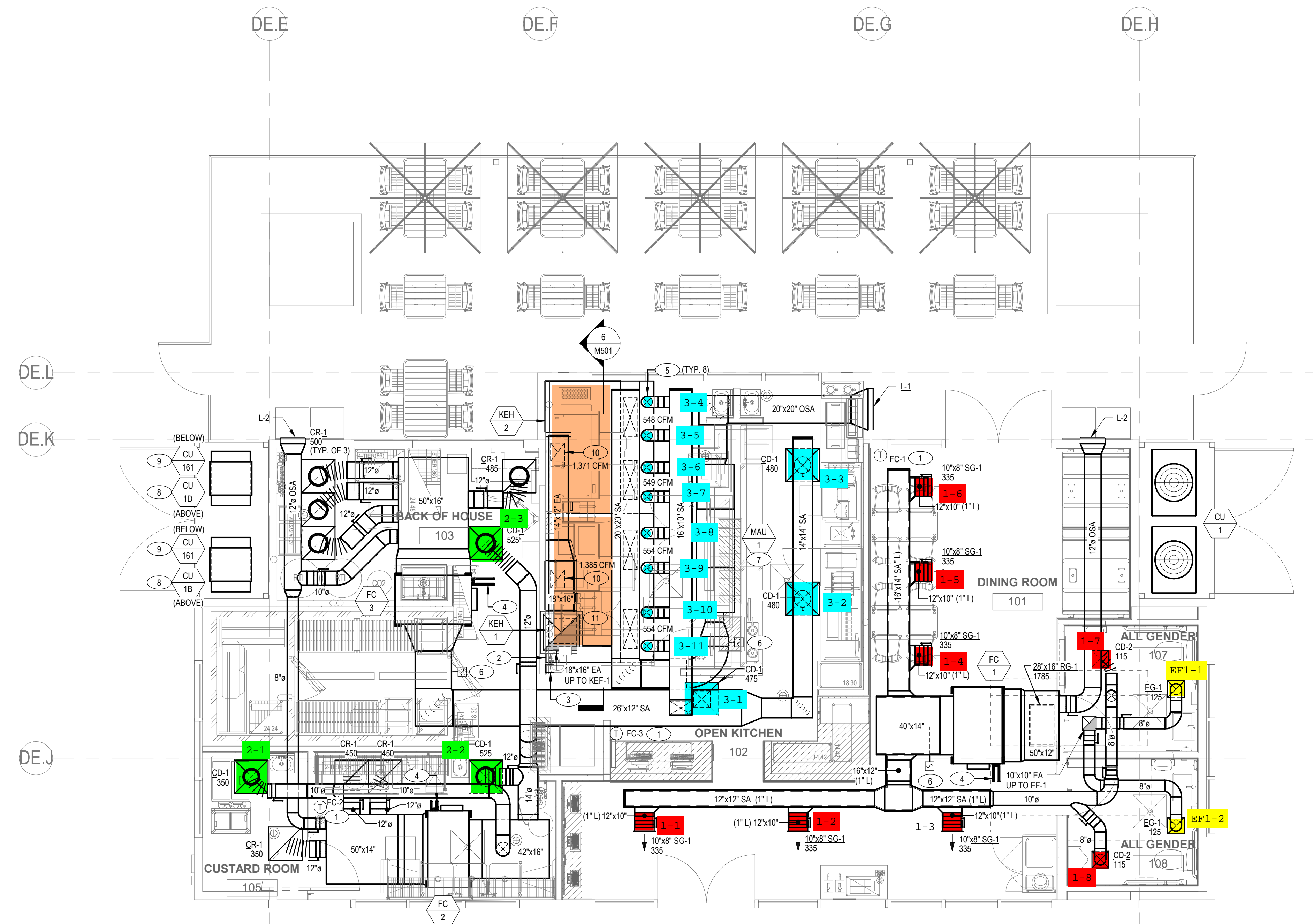
1/4" = 1'-0"

M111

1 MECHANICAL 1ST FLOOR - DEMO
SCALE: 1/4" = 1'-0"

RENOVATION KEY NOTES

- MOUNT THERMOSTAT CONTROLLER AT 48" ABOVE FINISHED FLOOR. COORDINATE WITH ARCHITECT FOR EXACT LOCATION.
- KITCHEN HOOD AND HOOD FIRE SUPPRESSION CABINET FURNISHED BY CAPTIVEAIRE AND INSTALLED BY CONTRACTOR. REFER TO KITCHEN EQUIPMENT DRAWINGS FOR ADDITIONAL INFORMATION. HOOD FIRE ALARM CONNECTION INSTALLED BY FIRE ALARM CONTRACTOR. COORDINATE EQUIPMENT FIRE PROTECTION REQUIREMENTS WITH THE FIRE PROTECTION CONTRACTORS PRIOR TO INSTALLATION.
- INSTALL HOOD FIRE SUPPRESSION MANUAL PULL STATION. COORDINATE EXACT LOCATION AND REQUIREMENTS WITH FIRE MARSHAL AND LOCAL CODE REQUIREMENTS.
- REFRIGERANT PIPING ROUTED TO CONDENSER UNIT (CU-1). FIELD COORDINATE EXACT PIPING ROUTING.
- DROP 8" SUPPLY DUCT DOWN TO HOOD CONNECTION. PROVIDE BALANCE DAMPER IN DUCT DROP. BALANCE AIRFLOW TO 100 CFM FOR EACH HOOD DROP CONNECTION AS INDICATED ON HOOD MANUFACTURER DRAWINGS SERIES M800.
- PROVIDE SMOKE DETECTOR FOR AUTOMATIC SHUT-DOWN OF UNIT UPON SMOKE DETECTION.
- MAKEUP AIR UNIT FURNISHED BY HALTON AND INSTALLED BY MECHANICAL CONTRACTOR. PROVIDE WITH SPRING VIBRATION ISOLATION FOR INSTALLATION OF MAKEUP AIR UNIT. UNIT TO HANG FROM STRUCTURE COORDINATE WITH STRUCTURAL DRAWINGS. INSTALL PER MANUFACTURER'S RECOMMENDATION. REFER TO HALTON DRAWING SERIES M800.
- COOLER/FREEZER CONDENSING UNITS TO BE PROVIDED BY VENDOR. INSTALLED PER MANUFACTURER'S RECOMMENDATION. TO BE INSTALLED ON PLATFORM. REFER TO STRUCTURAL DRAWINGS. REFER TO KITCHEN EQUIPMENT SCHEDULE FOR SPECIFICATIONS.
- CUSTARD MACHINE CONDENSING UNITS TO BE PROVIDED BY VENDOR. INSTALLED PER MANUFACTURER'S RECOMMENDATION. REFER TO KITCHEN EQUIPMENT SCHEDULE FOR SPECIFICATIONS.
- PROVIDE 18"x18" TYPE 1 GREASE DUCT DROP TO CONNECT TO EXHAUST RISER WITH DAMPER AT HOOD. BALANCE TO AIRFLOW INDICATED ON THE HOOD MANUFACTURER DRAWINGS.
- PROVIDE TYPE 1 GREASE EXHAUST DUCT FROM KITCHEN EXHAUST HOOD TO KITCHEN EXHAUST FAN. TRANSITION GREASE DUCT AS REQUIRED TO CONNECT TO NEW EXHAUST FAN ON ROOF. GREASE DUCT TO BE WRAPPED WITH FIRE WRAP TO MAINTAIN 0' CLEARANCE TO COMBUSTIBLE.



RENOVATION KEY NOTES

1 KITCHEN HOOD EXHAUST FAN. FURNISHED BY CAPTIVEAIRE AND INSTALLED BY MECHANICAL CONTRACTOR. INSTALL PER MANUFACTURER'S RECOMMENDATION. REFER TO CAPTIVEAIRE DRAWING SERIES M800.



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RANCHO CUCAMONGA, CA 91739

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Contact:
Bryan Walsingham
Tel 213.239.8240



2361 ROSECRANS AVENUE
SUITE 368
EL SEGUNDO, CA 90245
Tel 310.725.1500
Fax 310.725.4699
Contact:
Yves Yanuaris
Tel 323.617.0332

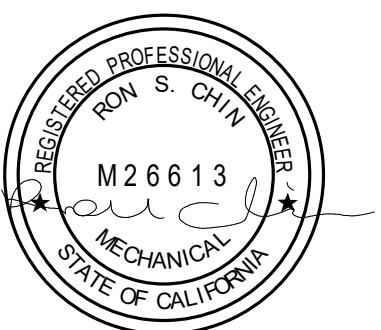


505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

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Seal / Signature



Project Name

SHAKE SHACK - VICTORIA GARDENS

Project Number

005.3846.000

Description

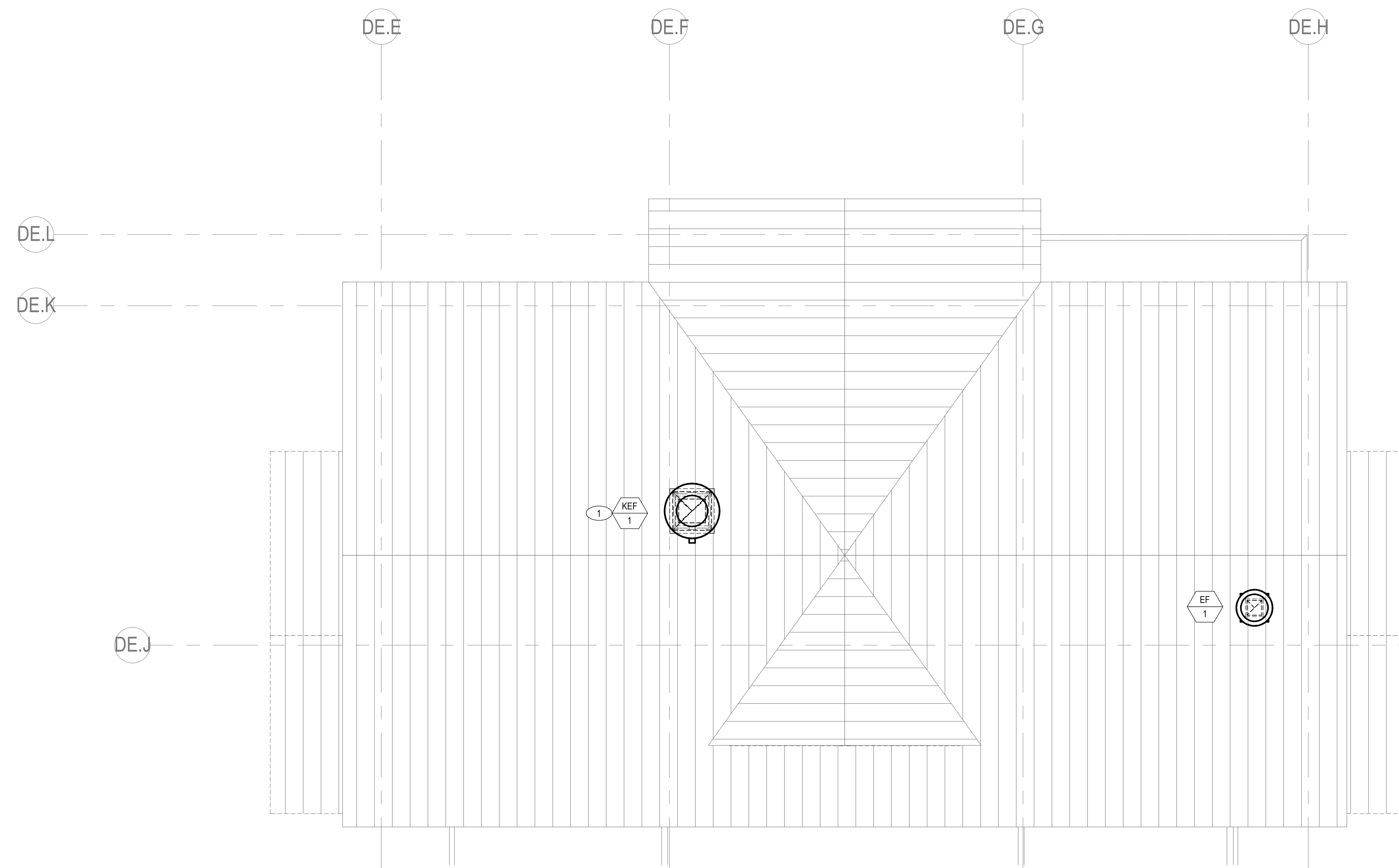
MECHANICAL ROOF REMODEL PLAN

Scale

1/4" = 1'-0"

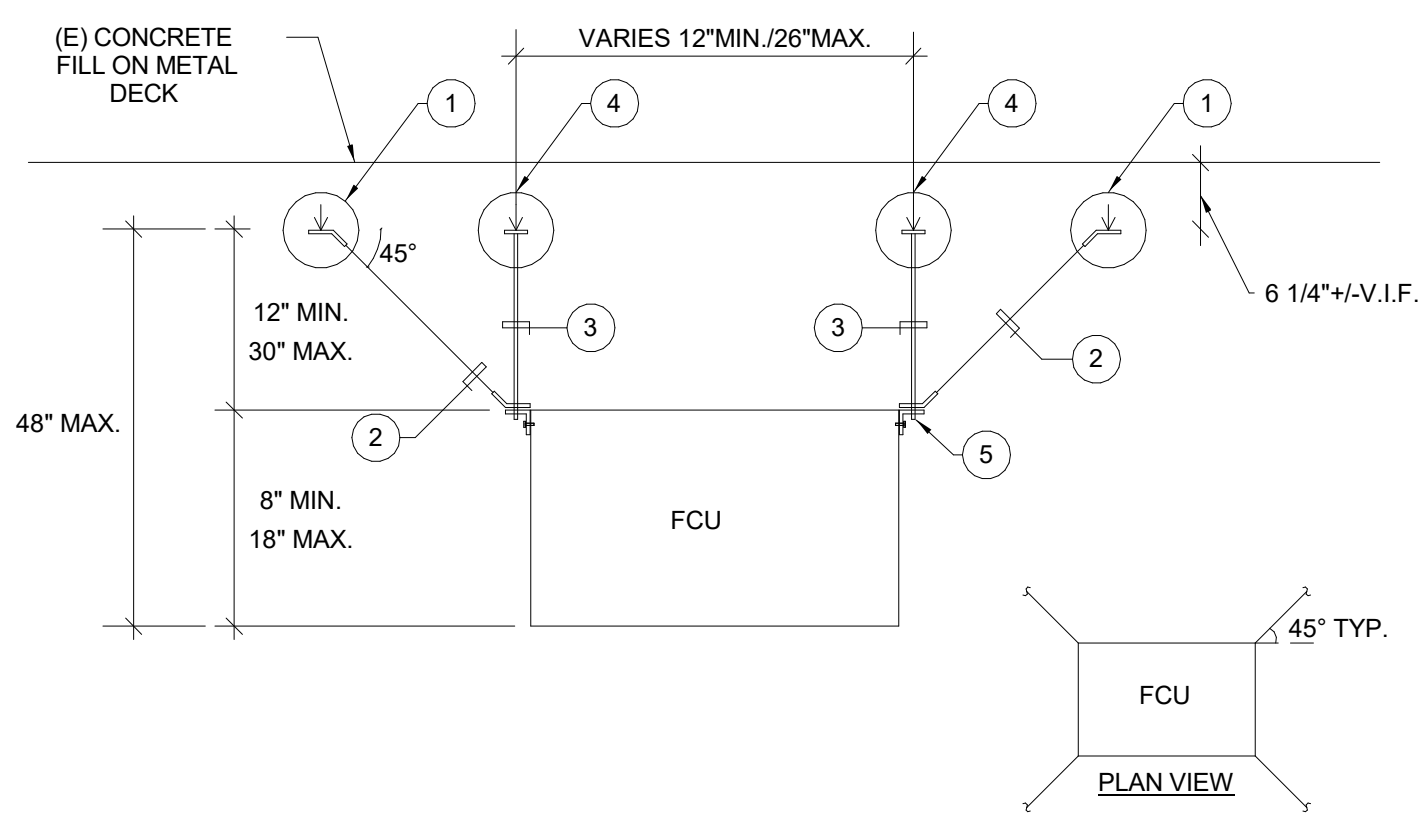
M122

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1 MECHANICAL ROOF REMODEL PLAN

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

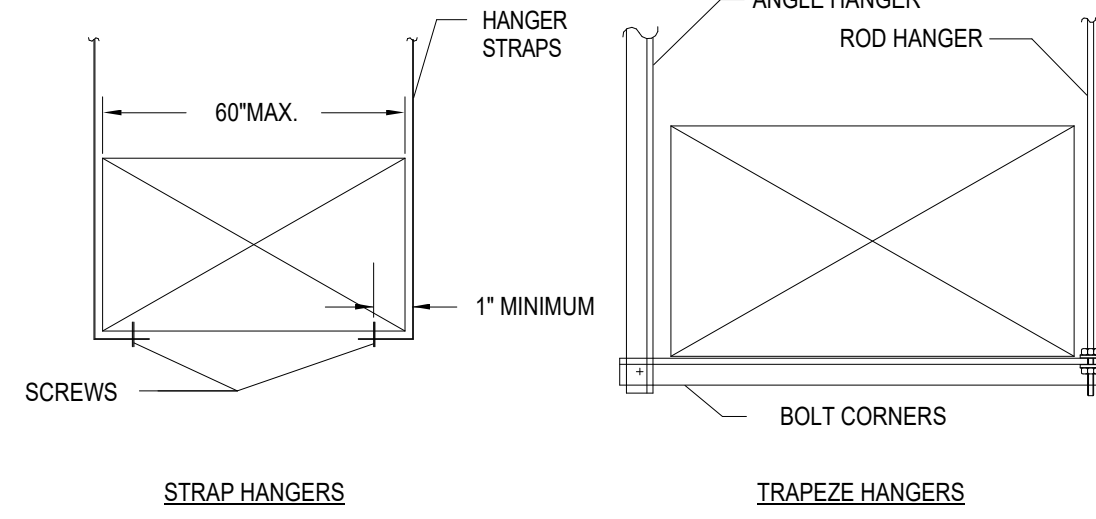


- NOTES:**
- 3/8"Ø HILTI KBTZ W/ 2" EMBED AT CENTERLINE OF BOTTOM FLUTE, TYPICAL.
 - MASON SCBA-1 SEISMIC CABLE BRACE AND ANCHOR, TYPICAL OF (4), NOT REQUIRED IF WEIGHT IS LESS THAN 75 LBS.
 - 1/2"Ø HANGER ROD, WITH ROD STIFFENERS (TYP-4), USE DBL NUT AND WASHERS AT ROD CONNECTION TO UNIT MOUNTING BRACKET AND SINGLE NUT AND WASHER AT TOP CONNECTION.
 - 3/8"Ø HILTI KBTZ WITH 2" EMBED AT CENTERLINE OF LOW FLUTE WITH COUPLING NUT FOR 1/2"Ø ROD, (TYP. OF 4).
 - BUILT-IN MOUNTING BRACKET BY MANUFACTURER.

FAN COIL MOUNTING DETAIL

SCALE
NTS

4

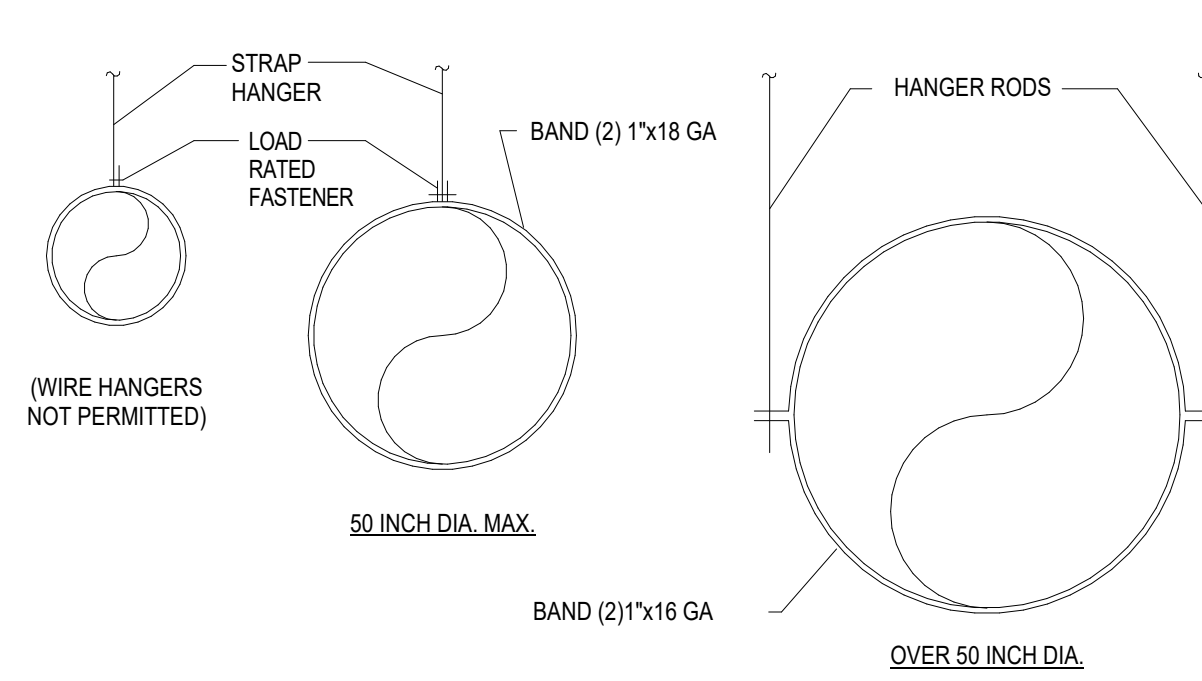


- NOTES:**
- CONSTRUCTION STANDARDS TABLE FOR HANGER SIZE AND SPACING, SEE 2005 SMACNA HVAC DUCT 5-2.
 - DUCT CONSTRUCTION STANDARDS FOR UPPER ATTACHMENT TO BUILDING SEE SMACNA HVAC FIG. 5-1 TO 5-4, WITH SPECIFIC BUILDING STRUCTURAL ENGINEER APPROVAL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH DETAILS AND SUPPORT LOCATIONS.
 - ALL DUCT HANGER AND ATTACHMENTS SHALL BE REVIEWED AND APPROVED BY SEOR BEFORE FABRICATION AND INSTALLATION.

RECTANGULAR DUCT SUPPORT

SCALE
NTS

3

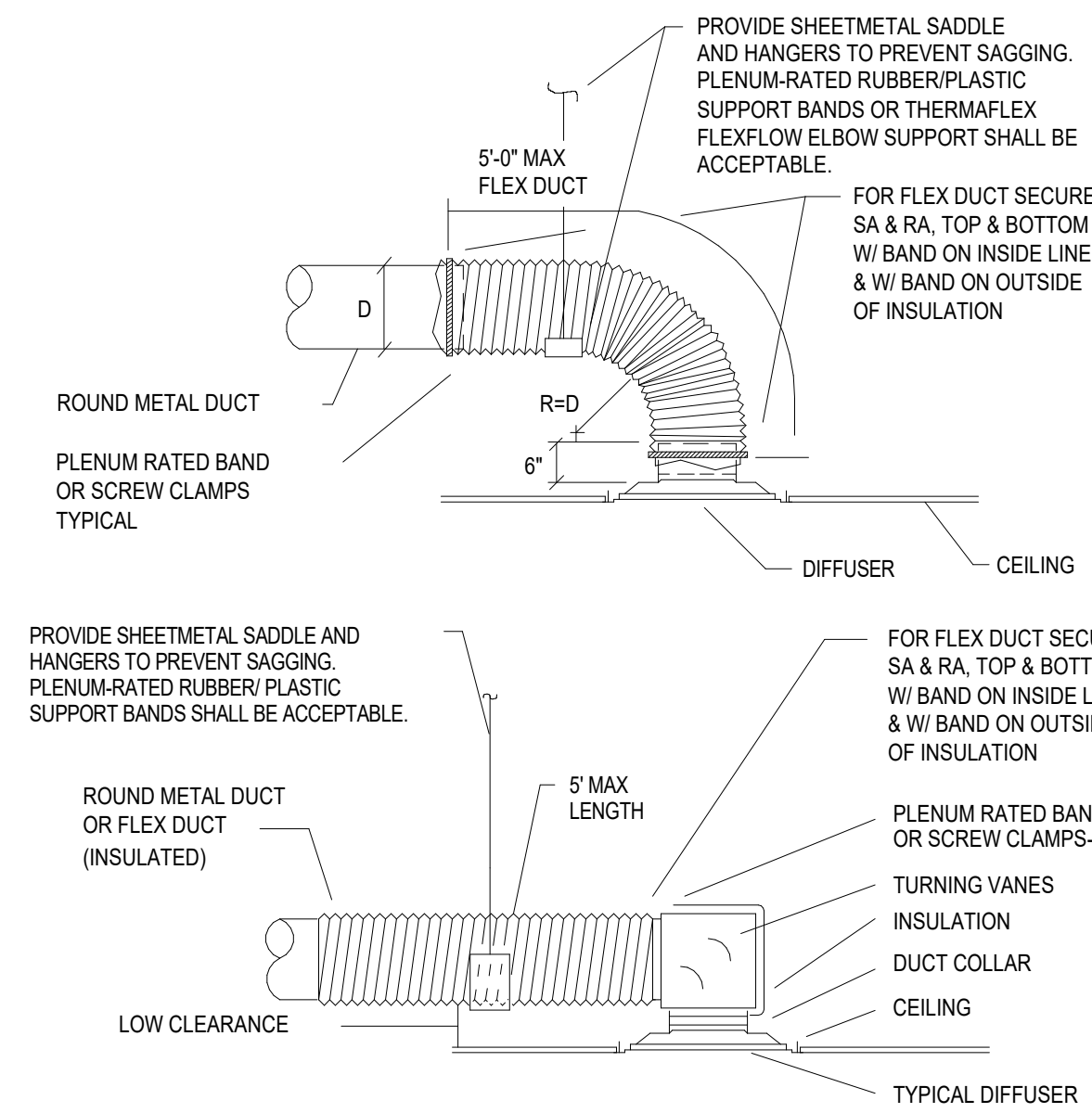


- NOTES:**
- FOR HANGERS SIZE AND SPACING, SEE 2005 SMACNA HVAC DUCT CONSTRUCTION STANDARDS TABLE 5-1 FOR TRAPEZE ALLOWABLE LOAD SEE TABLE 5-3.
 - FOR UPPER ATTACHMENT TO BUILDING, SEE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FIG. 5-1 TO 5-4, WITH SPECIFIC BUILDING STRUCTURAL ENGINEER APPROVAL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH DETAILS AND SUPPORT LOCATIONS.
 - ALL DUCT HANGER AND ATTACHMENTS SHALL BE REVIEWED AND APPROVED BY SEOR BEFORE FABRICATION AND INSTALLATION.

HORIZONTAL ROUND DUCT SUPPORT

SCALE
NTS

2

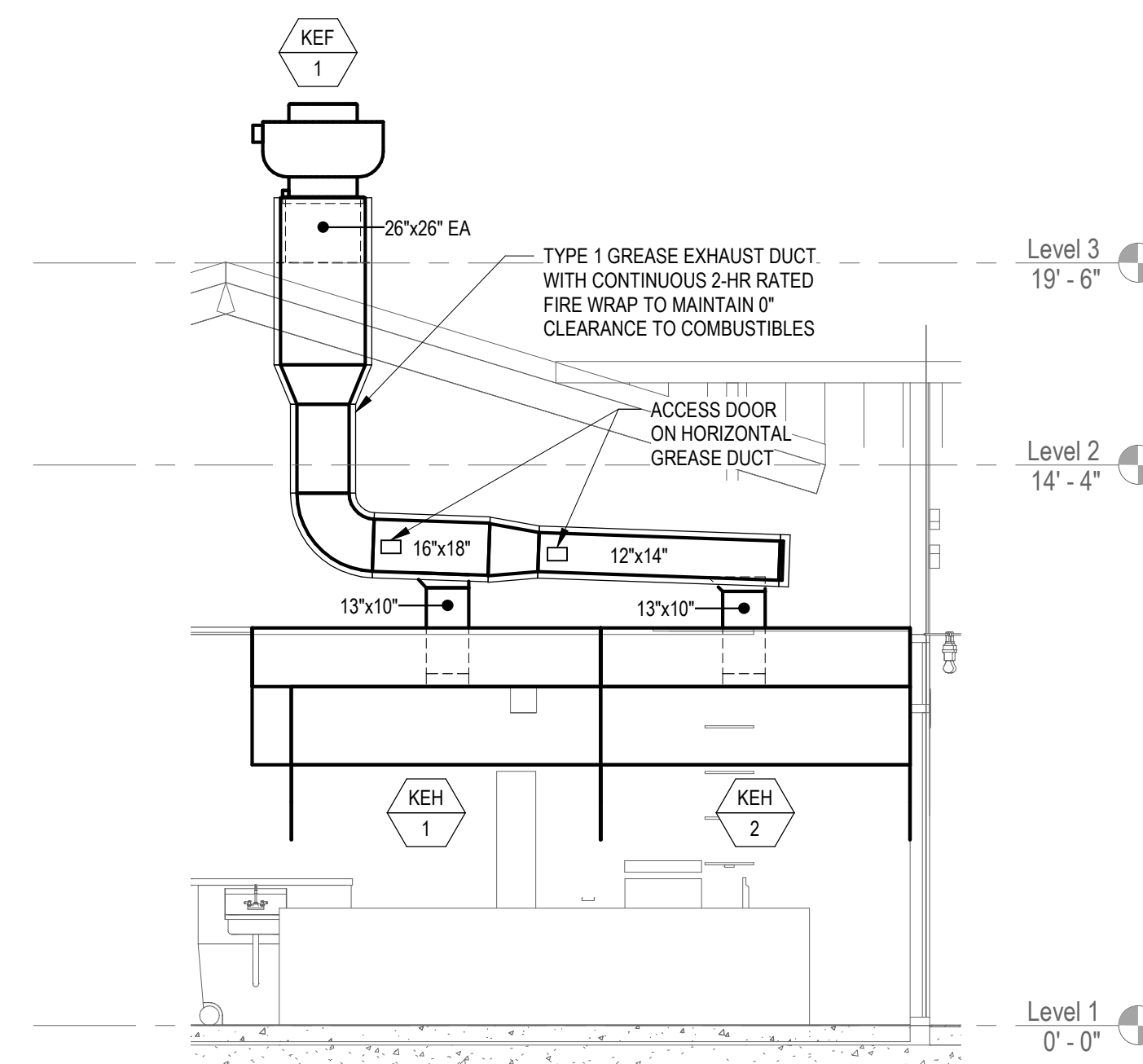


- NOTES:**
- FOR HANGERS SIZE AND SPACING, SEE 2005 SMACNA HVAC DUCT CONSTRUCTION STANDARDS TABLE 5-1 FOR TRAPEZE ALLOWABLE LOAD SEE TABLE 5-3.
 - FOR UPPER ATTACHMENT TO BUILDING, SEE SMACNA HVAC DUCT CONSTRUCTION STANDARDS FIG. 5-1 TO 5-4, WITH SPECIFIC BUILDING STRUCTURAL ENGINEER APPROVAL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH DETAILS AND SUPPORT LOCATIONS.
 - ALL DUCT HANGER AND ATTACHMENTS SHALL BE REVIEWED AND APPROVED BY SEOR BEFORE FABRICATION AND INSTALLATION.

DIFFUSER CONNECTION DETAIL

SCALE
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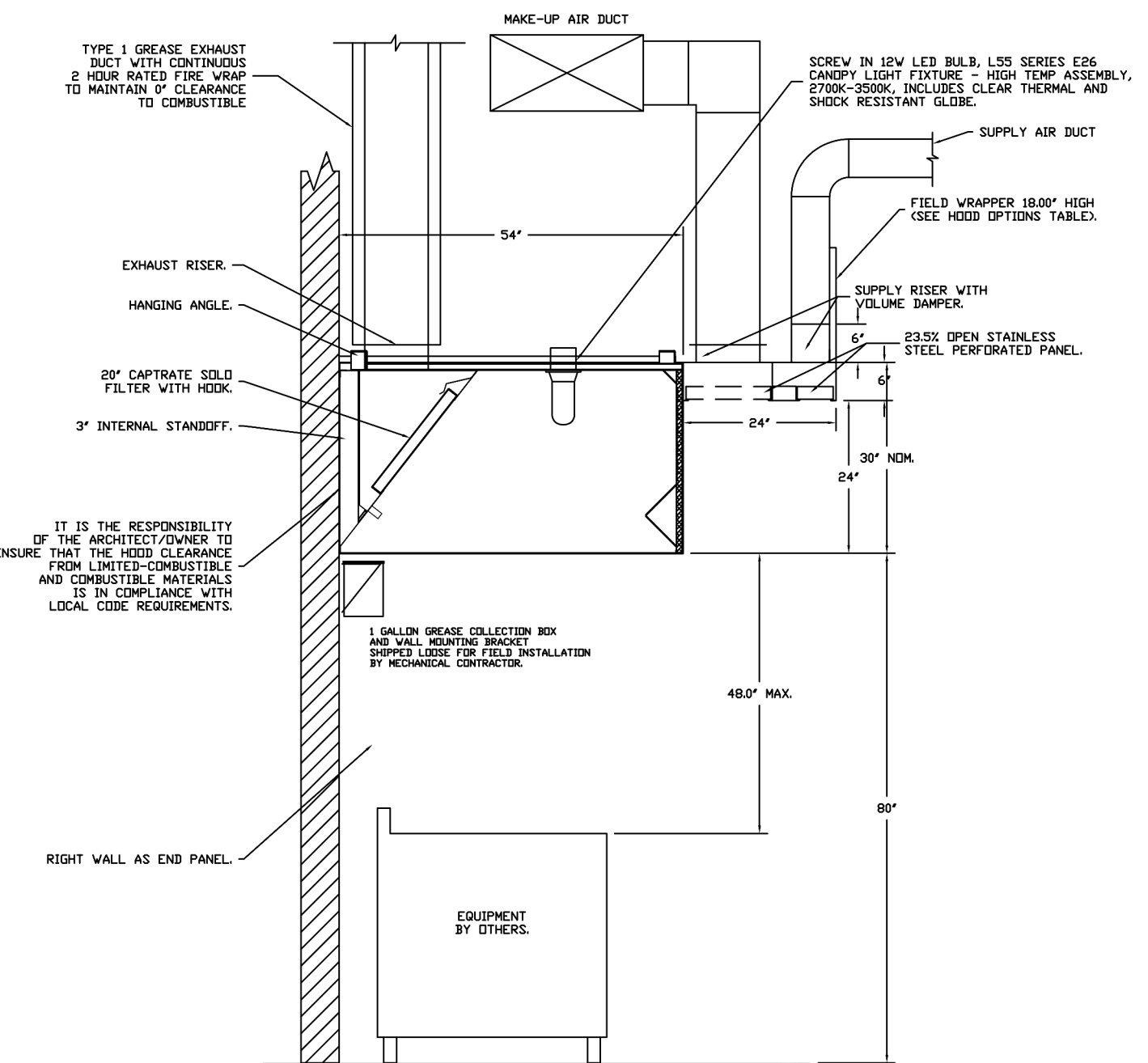
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KEH-1 & KEH-2 HOOD SECTION

SCALE
1/4\"/>

6



KITCHEN HOOD ELEVATION

SCALE
NTS

5

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name
SHAKE SHACK - VICTORIA GARDENS

Project Number
005.3846.000

Description
MECHANICAL DETAILS

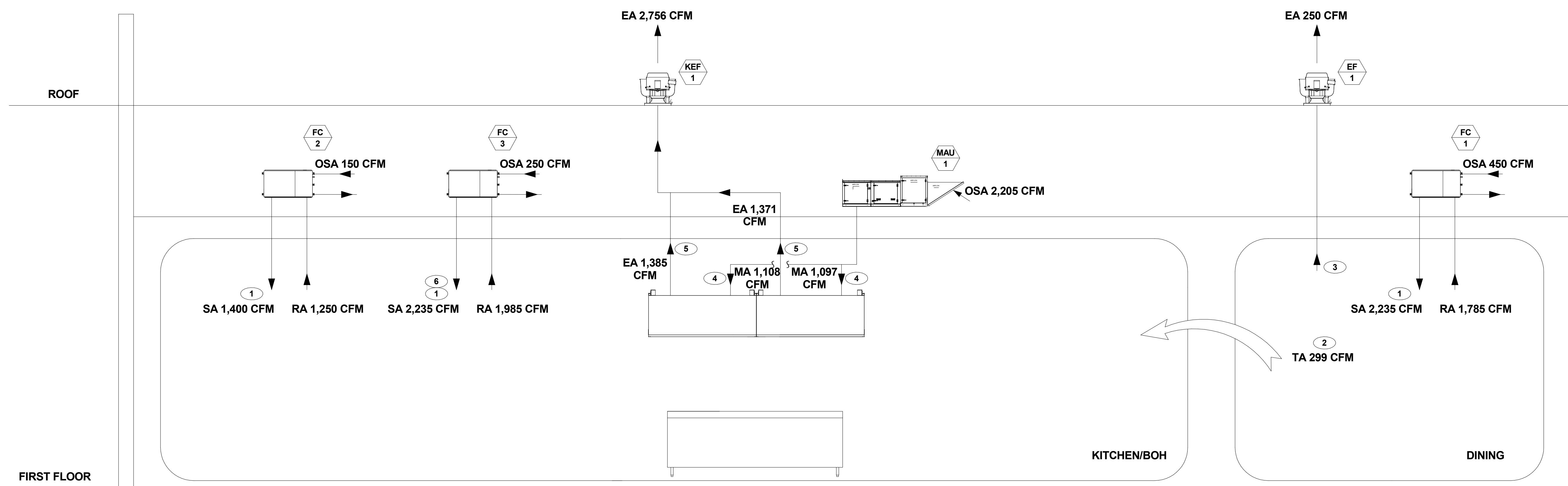
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As indicated

M501

AIR BALANCE TABLE AT DESIGN

	HVAC SUPPLY (CFM)	HVAC RETURN (CFM)	HVAC OSA (CFM)	HOOD EXHAUST (CFM)	GENERAL EXHAUST (CFM)	AREA SERVED
FC-1	2,235	1,785	450	-	-	DINING AREA
FC-2	1,400	1,250	150	-	-	BACK OF HOUSE
FC-3	2,235	1,985	250	-	-	KITCHEN AREA
MAU-1	-	-	2,205	-	-	KITCHEN HOOD
KEF-1	-	-	-	2,756	-	KITCHEN HOOD
EF-1	-	-	-	-	250	RESTROOMS
TOTAL	5,870	5,020	3,055	2,756	-	
OSA			3,055	-2,756		

TOTAL PRESSURIZATION DIFFERENCE = +299



- KEYNOTES:**
1. TOTAL OF AIR INLETS / OUTLETS.
 2. TRANSFER AIR TO KITCHEN FROM ADJACENT SPACE.
 3. TOTAL OF RESTROOM EXHAUST FANS.
 4. MAKE UP AIR TO SUPPLY KITCHEN HOOD.
 5. KITCHEN HOOD EXHAUST.
 6. INCLUDES SUPPLY TO KITCHEN HOOD.

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
08/05/2022	ADDENDUM #2
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name
SHAKE SHACK - VICTORIA GARDENS

Project Number
005.3846.000

Description
MECHANICAL AIRFLOW DIAGRAMS

Scale
NTS

M601

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BUILDING 3150
12456 N. MAINSTREET
RANCHO CUCAMONGA, CA 91739

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Contact:
Bryan Walsingham
Tel 213.239.8240

Tel 213.327.3600
Fax 213.327.3601



2361 ROSECRANS AVENUE
SUITE 368
EL SEGUNDO, CA 90245
Tel 310.725.1500
Fax 310.725.4699
Contact:
Yves Yanuaría
Tel 323.617.0332

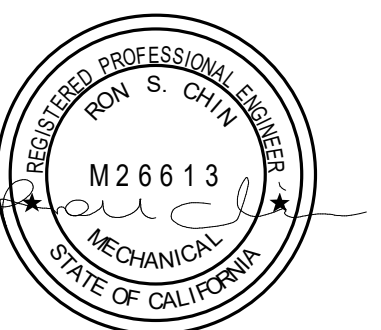


505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

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Project Name

SHAKE SHACK - VICTORIA GARDENS

Project Number

005.3846.000

Description

MECHANICAL CONTROL DIAGRAMS

Scale

NTS

M602

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GENERAL

1. PROVIDE ALL EQUIPMENT AND ACCESSORIES REQUIRED FOR A COMPLETE AND FUNCTIONAL CONTROL SYSTEM.
2. PROVIDE ALL NEW DDC CONTROLLERS, IOMS, ACTUATORS, CONTROL VALVES, SENSORS, HUMIDISTATS, AND THERMOSTATS.
3. ALL EQUIPMENT AND COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, LOCAL CODE, AND OWNER'S REQUIREMENTS.
4. COORDINATE WITH MECHANICAL AND ELECTRICAL CONTRACTORS FOR EXACT LOCATIONS OF EQUIPMENT FOR CONNECTION TO CONTROL SYSTEM.

VRF SYSTEMS

1. ALL HVAC MECHANICAL UNITS SHALL SHUT DOWN UPON ALARM FROM KITCHEN EXHAUST HOOD FIRE EXTINGUISHING SYSTEM.
2. DURING OCCUPIED HOURS, FAN COIL UNITS SUPPLY FANS SHALL RUN CONTINUOUSLY.
3. CONTROLS CONSIST OF A MICROPROCESSOR-BASED CONTROL SYSTEM WHICH CONTROLS SPACE TEMPERATURE, DETERMINE OPTIMUM FAN SPEED, AND RUN SELF DIAGNOSTICS..

MAU-1

1. MAKE-UP UNIT SUPPLY AIR FAN SHALL BE ENERGIZED AND THE OUTSIDE AIR DAMPER SHALL OPEN 100% WHEN EXHAUST FAN KEF-1 IS ENERGIZED.
2. MAKE-UP UNIT SUPPLY AIR FAN SHALL BE DE-ENERGIZED BY ANY KITCHEN EXHAUST HOOD FIRE EXTINGUISHING SYSTEM, SMOKE DETECTOR ALARMS, OR UPON ALARM FROM DUCT MOUNTED SMOKE DETECTOR OF MAU-1.

KEF-1

1. KEF-1 SHALL BE ENERGIZED BY CONTACTORS IN HOOD CONTROL PANEL. COORDINATE INSTALLATION WITH ELECTRICAL CONTRACTOR.
2. KEF-1 FIRE SYSTEM WILL ACTIVATE WHEN THE HOOD SYSTEM ACTIVATES AND WILL ACT IN REVERSE.

KITCHEN EXHAUST HOODS (KEH-1 AND KEH-2)

1. THE ELECTRICAL PACKAGE, TYPICALLY FP, IS DESIGNED TO THERMOSTATICALLY ACTIVATE THE EXHAUST FANS FOR AN EXHAUST HOOD WHENEVER ELEVATED TEMPERATURES ARE SENSED IN THE EXHAUST SYSTEM. THIS OPTION WILL MEET THE REQUIREMENTS OF BY PROVIDING A THERMOSTAT(S) MOUNTED IN THE DUCT OR HOOD RISER TO SENSE INCREASED EXHAUST TEMPERATURES.
2. CONTROLS SHALL BE LISTED BY ETL (UL 508A). THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.
3. TEMPERATURE PROBES(S) LOCATED IN THE DUCT RISER SHALL BE CONSTRUCTED OF STAINLESS STEEL.
4. A ROOM TEMPERATURE SENSOR IS ALSO PROVIDED FOR FIELD INSTALLATION IN THE KITCHEN SPACE IN ORDER TO START THE FAN(S) BASED ON THE TEMPERATURE DIFFERENTIAL BETWEEN THE ROOM AND THE EXHAUST AIR IN THE DUCT, RATHER THAN FIXED SET-POINTS. THE SYSTEM IS FACTORY PRE-SET TO ACTIVATE THE FANS AT 10 DEG-F ABOVE THE ROOM TEMPERATURE.
5. ONCE THE DUCT TEMPERATURE REACHES THE ACTIVATION POINT, THE EXHAUST FANS WILL BE ACTIVATED. THE CONTROLS ALSO PROVIDE HYSTERESIS TO PREVENT CYCLING OF THE FANS AFTER THE COOKING APPLIANCES HAVE BEEN TURNED OFF AND THE HEAT IN THE EXHAUST SYSTEM IS REDUCED. THE HYSTERESIS IS FACTORY SET 2 DEGREES AND WILL KEEP THE EXHAUST RUNNING UNTIL THE TEMPERATURE FALLS 2 DEGREES BELOW THE ACTIVATION SET POINT. A HYSTERESIS TIMER ALSO EXISTS TO KEEP THE FANS RUNNING FOR AT LEAST 30 MIN AFTER BEING ACTIVATED BY THE TEMPERATURE RISE.
6. THE ACTIVATION AND HYSTERESIS SETTINGS MAY BE FIELD ADJUSTED ON THE BOARD LCD INTERFACE LOCATED INSIDE THE CONTROL ENCLOSURE TO MEET APPLICATION NEEDS. THE PANEL IS FACTORY CONFIGURED TO SHUT DOWN SUPPLY FANS, TURN ON THE EXHAUST FANS AND TURN OFF THE HOOD LIGHTS IN A FIRE CONDITION.

CONTROLS

SCALE
NTS

1

SECTION 23000 - ENERGY CONSERVATION

SECTION 23000 - ENERGY CONSERVATION
SECTION 23000 - COMMON WORK RESULTS FOR HVAC
SECTION 23059 - HANGERS AND SUPPORTS
SECTION 23063 - IDENTIFICATION
SECTION 23069 - TESTING, ADJUSTING, AND BALANCING FOR HVAC
SECTION 23070 - HVAC INSULATION
SECTION 23080 - COMMISSIONING
SECTION 23200 - REFRIGERANT PIPING
SECTION 233113 - METAL DUCTS
SECTION 23330 - AIR DUCT ACCESSORIES
SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

SECTION 23000 - ENERGY CONSERVATION

A. HVAC SYSTEMS AND EQUIPMENT CAPACITIES DO NOT EXCEED CALCULATED LOADS.
B. THERMOSTATIC CONTROLS
1. THERMOSTATIC CONTROLS SHALL HAVE A DEADBAND.
2. THERMOSTATIC CONTROLS SHALL BE CAPABLE OF OPERATING THE DOWN TO 55 DEG F OR UP TO 85 DEG F.
3. EACH ZONE SHALL BE PROVIDED WITH AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS FOR SCHEDULING AND STOPPING THE SYSTEM FOR SEVERAL DIFFERENT DAILY SCHEDULES PER WEEK.

SECTION 23060 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1. GENERAL PROVISIONS
A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.
2. SCOPE OF WORK
A. PROVIDE LABOR, INCLUDING FIELD ERECTION AND SUPERVISION, MATERIALS, EQUIPMENT AND ANCHORAGES, AND COORDINATE, PROCURE, FABRICATE, DELIVER, ERECT OR INSTALL, INTERCONNECT EXISTING WORK, START, DEBUG AND TEST ALL SYSTEMS AS NECESSARY TO PROVIDE THE OWNER WITH A COMPLETE OPERATING FACILITY IN CONFORMANCE WITH THE CONTRACT DOCUMENTS AND IN CONFORMITY WITH REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION.
B. THE WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
1. DEMOLITION AND REMOVAL OF MECHANICAL WORK
2. DUCTWORK AND AIR OUTLETS
3. AIR-CONDITIONING AND EXHAUST SYSTEMS
4. KITCHEN HOOD AND EXHAUST SYSTEMS
5. MAKEUP AIR SYSTEMS
6. THERMAL INSULATION
7. COORDINATION WITH OTHER TRADES FOR LOCATION OF DUCTWORK AND TO INFORM THE GENERAL CONTRACTOR (VA DIMENSIONAL DRAWINGS) OF THE EXACT SIZE AND LOCATION OF ALL ROOF AND WALL OPENINGS
8. MISCELLANEOUS STEEL WORK, SUPPORTS AND HANGERS AND CUTTING AND PATCHING OF ROOF, WALLS AND PARTITIONS.
9. RECORD DRAWINGS
10. CONTROLS
11. TESTING, ADJUSTING, AND BALANCING

C. RELATED WORK INCLUDED IN THIS SECTION AND IN OTHER SECTIONS
1. GENERAL CONTRACTOR IS RESPONSIBLE FOR ALL WORK DESCRIBED IN THE CONSTRUCTION DOCUMENTS
2. REFER TO THE RESPONSIBILITY MATRIX FOR ADDITIONAL INFORMATION.
3. SUBMITTALS
A. PROVIDE CONTRACTOR SUBMITTAL MATERIAL WITH DESCRIPTIVE DATA FOR ALL PRODUCTS AND MATERIALS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING, PRIOR TO INSTALLATION. ALL SUBMITTALS SHALL BE REJECTED TO INDICATE SPECIFIC PRODUCTS OR MATERIALS BEING USED. ALLOW MIN 5 DAYS FOR ENGINEER TO REVIEW SUBMITTALS.
1. COORDINATED LAYOUT PLANS, SHOWING WORK OF ALL TRADES, INCLUDING BUT NOT LIMITED TO: MECHANICAL WORK, HVAC, REFRIGERANT PLUMBING, FIRE PROTECTION PIPING, ELECTRICAL CONDUITS AND BUS DUCTS; EQUIPMENT DRAWINGS SHALL BE 1/4" SCALE.
2. DUCTWORK ACCESSORIES
3. DUCTWORK TYPICAL CONSTRUCTION
4. DUCT SEALING
5. REFRIGERANT PIPING
6. DAMPERS
7. DIFFUSERS, GRILLES AND REGISTERS
8. CERTIFIED ACOUSTICAL TEST PERFORMANCE DATA FOR DIFFUSERS, REGISTERS, GRILLES AND TERMINAL AIR UNITS
9. AIR AND WATER TEST AND BALANCE
10. COMPLIANCE PROPOSED FOR USE IN COMPLYING AND RECORDING TEST AND BALANCE DATA.
11. CONTROL DEVICES AND SYSTEMS
12. CONTROL SEQUENCE AND SYSTEM DRAWINGS
13. FIRE PROTECTION SYSTEM LAYOUTS IN CODE COMPLIANCE.
14. VIBRATION ISOLATION
15. ONE SET OF AS-BUILT REPRODUCIBLE DRAWINGS
16. PROVIDE 1 COPY OF APPROVED SUBMITTALS TO THE OFFICE OF THE BUILDING ENGINEER.

14. PRODUCT SUBSTITUTIONS
A. THE CONTRACTOR SHALL CERTIFY THE FOLLOWING ITEMS ARE CORRECT WHEN USING SUBSTITUTED PRODUCTS OTHER THAN THOSE SCHEDULED OR SHOWN ON THE DRAWINGS AS A BASIS OF DESIGN.
1. THE PROPOSED SUBSTITUTION DOES NOT AFFECT DIMENSIONS SHOWN ON THE DRAWINGS.
2. THE CONTRACTOR SHALL PAY FOR CHANGES TO BUILDING DESIGN, INCLUDING ENGINEERING DESIGN, DETAILING, STRUCTURAL SUPPORTS, AND CONSTRUCTION COSTS.
3. THE PROPOSED SUBSTITUTION HAS NO ADVERSE EFFECT ON OTHER TRADES, CONSTRUCTION SCHEDULE, OR SPECIFIED WARRANTY REQUIREMENTS.
4. MAINTENANCE AND SERVICE PARTS AVAILABLE LOCALLY ARE READILY OBTAINABLE FOR THE PROPOSED SUBSTITUTION.
B. THE CONTRACTOR FURTHER CERTIFIES FUNCTION, APPEARANCE, AND QUALITY OF PROPOSED SUBSTITUTION ARE EQUIVALENT OR SUPERIOR TO SPECIFIED ITEM.
C. THE CONTRACTOR AGREES THAT THE TERMS AND CONDITIONS FOR THE SUBSTITUTED PRODUCT THAT ARE FOUND IN THE CONTRACT DOCUMENTS APPLY TO THIS PROPOSED SUBSTITUTION.

15. MAINTENANCE MANUALS AND AS-BUILT DRAWINGS
A. PROVIDE FOUR (4) COPIES OF OPERATING AND MAINTENANCE MANUAL FOR OWNERS USE FOR EACH PIECE OF EQUIPMENT WITHIN 90 DAYS OF ACCEPTANCE. EACH ITEM SHALL BE CROSS-REFERENCED AND NUMBERED WITH AS-BUILT DRAWING DESCRIPTIONS.
B. SOFT COPY OF AS-BUILT DRAWINGS ON AUTOCAD AND PDF AND ONE SET OF HARD COPY SHALL BE DELIVERED TO OWNER WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.
16. GUARANTEES
A. GUARANTEE - ALL MATERIALS, APPARATUS AND WORKMANSHIP INSTALLED UNDER THIS SECTION SHALL BE UNCONDITIONALLY GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE OF WORK BY THE OWNER AGAINST FAILURE DUE TO FAULT MATERIAL OR WORKMANSHIP. THE CONTRACTOR SHALL CORRECT DEFECTS AT NO ADDITIONAL COST TO THE OWNER. LABOR AND REPLACEMENT OF PARTS TO BE ACCOMPLISHED AT COST TO OWNER.
17. SEISMIC SUPPORT
A. CONTRACTOR SHALL SUPPORT AND BRACE ALL NEW HVAC PLUMBING AND FIRE PROTECTION SYSTEMS IN ACCORDANCE WITH REQUIREMENTS AND SPECIFICATIONS.

18. PRODUCT HANDLING
A. PROTECTION: PROTECT MATERIALS AND EQUIPMENT FROM DAMAGE DURING SHIPPING, STORAGE AND HANDLING. REMOVE FROM THE SITE ANY WET OR DAMAGED DUCT LINER OR INSULATION.
B. STORAGE: WHERE POSSIBLE, STORE MATERIALS AND EQUIPMENT INSIDE AND PROTECT FROM THE WEATHER. WHERE NECESSARY TO STORE OUTSIDE, STORE ABOVE GRADE AND ENCLOSE WITH WATERPROOF WRAPPING.
C. REPLACEMENT: IN THE EVENT OF DAMAGE, IMMEDIATELY REPAIR ALL DAMAGED AND DEFECTIVE WORK TO THE APPROVAL OF THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
19. CONTRACT DRAWINGS
A. CONTRACT DRAWINGS FOR MECHANICAL WORK ARE DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF THE WORK AND INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTS, PIPING AND APPROXIMATE SIZES AND LOCATIONS OF EQUIPMENT AND OUTLETS. DO NOT SCALE DRAWINGS FOR MEASUREMENTS.
B. CONSULT KITCHEN, MECHANICAL, PLUMBING, ARCHITECTURAL, STRUCTURAL AND ELECTRICAL CONTRACT DRAWINGS AND SPECIFICATIONS TO BECOME FAMILIAR WITH ALL CONDITIONS AFFECTING THE WORK. COORDINATE INTERCONNECTING WORK WITH OTHER TRADES AFFECTED, AND VERIFY ALL SPACES IN WHICH THE WORK WILL BE INSTALLED.

C. WHERE JOB CONDITIONS REQUIRE REASONABLE CHANGES IN ORDER TO COORDINATE INSTALLATION WITH OTHER TRADES, THESE CHANGES SHALL BE MADE WITHOUT EXTRA COST TO THE OWNER.
1.10 DEMOLITION
A. PROTECT ADJACENT MATERIALS INDICATED TO REMAIN. INSTALL AND MAINTAIN DUST AND NOISE BARRIERS TO KEEP DIRT, DUST, AND NOISE FROM BEING TRANSMITTED TO ADJACENT AREAS. REMOVE PROTECTION AND BARRIERS AFTER DEMOLITION OPERATIONS ARE COMPLETE.
B. LOCATE, IDENTIFY, AND PROTECT MECHANICAL SERVICES PASSING THROUGH DEMOLITION AREA AND SERVING OTHER AREAS OUTSIDE THE DEMOLITION LIMITS. MAINTAIN SERVICES TO AREAS OUTSIDE DEMOLITION LIMITS. WHEN SERVICES MUST BE INTERRUPTED, INSTALL TEMPORARY SERVICES FOR AFFECTED AREAS.
C. MATERIALS AND EQUIPMENT TO BE SALVAGED: REMOVE, DEMOUNT, AND DISCONNECT EXISTING MECHANICAL MATERIALS AND EQUIPMENT INDICATED TO BE REMOVED AND SALVAGED, AND DELIVER MATERIALS AND EQUIPMENT TO THE OWNER.
D. REPAIR OR REPLACE EQUIPMENT OR MATERIALS DAMAGED DURING DEMOLITION TO SATISFACTION OF OWNERS DESIGNATED REPRESENTATIVE.
1.11 INTERRUPTION OF EXISTING UTILITY SERVICE
A. COORDINATE THE SHUT-OFF AND DISCONNECTION OF UTILITY SERVICES WITH THE OWNER AND THE UTILITY COMPANY.
B. NOTIFY THE OWNER'S REPRESENTATIVE OR OWNER'S PROJECT REPRESENTATIVE AT LEAST 5 DAYS PRIOR TO COMMENCING DEMOLITION OPERATIONS.
1.12 SCHEDULING:
A. SUBMIT SCHEDULES INDICATING PROPOSED METHODS AND SEQUENCE OF OPERATIONS FOR DEMOLITION PRIOR TO COMMENCEMENT OF WORK. INCLUDE COORDINATION FOR SHUT-OFF OF UTILITY SERVICES AND DETAILS FOR DUST AND NOISE CONTROL.
B. COORDINATE SEQUENCING WITH CONSTRUCTION PHASING AND OWNER OCCUPANCY.
1.13 MAINTENANCE OF EXISTING UTILITY SERVICES
A. UNINTERRUPTED NORMAL USE OF THE EXISTING FACILITIES MUST BE MAINTAINED DURING THE TIME REQUIRED TO PERFORM THE COMPLETE INSTALLATION OF THE WORK INDICATED IN THE CONTRACT DOCUMENTS. IT IS MANDATORY THAT THE EXISTING BUILDINGS BE MAINTAINED IN SERVICE.
B. INVESTIGATE EXISTING CONDITIONS AND THE LOCATION OF ALL EXISTING EQUIPMENT AND THE LOCATION OF ALL EXISTING SERVICES BEFORE STARTING.
C. IF A SERVICE IS DISTURBED, IMMEDIATELY WITHOUT REGARD FOR WORKING HOURS, PLACE THE SERVICE BACK INTO OPERATION.
D. SUFFICIENT ADVANCE NOTICE SHALL BE GIVEN TO THE OWNER AND ITS PERMISSION OBTAINED PRIOR TO INTERRUPTION OF PRESENT SERVICES. IT SHOULD BE ASSUMED THAT DISRUPTION OF UTILITIES AND SERVICES WILL BE DONE AT OTHER THAN NORMAL WORKING HOURS. NO ADDITIONAL OR EXTRA PAYMENT WILL BE AUTHORIZED TO COMPLY WITH THESE REQUIREMENTS.
E. REPAIR, REPLACE AND MAINTAIN IN SERVICE ANY UTILITIES, FACILITIES, OR SERVICES UNDERGROUND AND OVERGROUND, INTERIOR OR EXTERIOR, DAMAGED, BROKEN OR OTHERWISE RENDERED INOPERATIVE DURING THE COURSE OF CONSTRUCTION IN THE EXISTING BUILDING.
F. ALL OPENINGS MUST BE SECURELY COVERED, OR OTHERWISE PROTECTED, TO PREVENT INJURY DUE TO CARELESSLY OR MALICIOUSLY DROPPED TOOLS OR MATERIALS, DIRT, GRIT, OR ANY FOREIGN MATTER. DAMAGED WORK SHALL BE REPAIRED OR REPLACED UNTIL WORK IS FULLY AND FINALLY ACCEPTED.
G. PROTECT HEATING EQUIPMENT AND ALL SIMILAR ITEMS OF EQUIPMENT FROM DIRT, GRIME, PLASTER, PAINT AND WATER DURING ALL PHASES OF CONSTRUCTION. THIS PROTECTION SHALL BE PROVIDED BY COVERING WITH TRANSPARENT PLASTIC SHEETING.
H. MAKE ALL CONNECTIONS TO EXISTING SYSTEM PIPING AND EQUIPMENT SYSTEMS DURING DESIGNATED PERIODS UPON APPROVAL OF THE OWNER AND AT NO INCREASE IN THE CONTRACT SUM.
I. DO NOT INTERRUPT EXISTING UTILITIES UTILIZED BY THE OWNER, EXCEPT AS APPROVED BY THE OWNER. INTERRUPTIONS MUST BE SCHEDULED TO SUIT THE OWNER'S REQUIREMENTS.
J. VERIFY ALL EXISTING WORK, WHERE EXISTING CONNECTIONS ARE PARTIAL, PROVIDE ALL NECESSARY MATERIALS, LABOR AND EQUIPMENT REQUIRED TO MODIFY EXISTING WORK. IN ADDITION, MAINTAIN INTEGRITY OF THE EXISTING SYSTEMS, RECTIFY ANY CONTAMINATION, DEGRADATION OR CORROSION OF WORK NOT RELATED TO THE EXISTING SYSTEMS TO THE SATISFACTION OF THE OWNER.

14. INSTALLATION OF THE WORK
A. THE CONTRACT DRAWINGS INDICATE THE GENERAL ARRANGEMENTS FOR THE HVAC, KITCHEN, PLUMBING AND FIRE PROTECTION SYSTEMS
1. DRAWINGS ARE DIAGRAMMATIC AND DO NOT INDICATE NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL THE WORK IN SUCH A MANNER THAT IT WILL BE AT THE HIGHEST ELEVATION POSSIBLE CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, MAINTAIN HEADROOM, LEAVE ADEQUATE CLEARANCES FOR LIGHT FIXTURES, RETURN AIR OR PATHWAYS, MAINTENANCE AND REPAIR, AND PROVIDE CLEARANCE AND ACCESS AS REQUIRED BY CODES. NOTHING SHALL BE INSTALLED BELOW CEILING LEVEL WITHOUT ARCHITECT'S WRITTEN CONSENT.
3. ABOVE ITEMS TO BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
4. PROCEED AS RAPIDLY AS THE BUILDING CONSTRUCTION WILL PERMIT.
5. THOROUGHLY CLEAN ITEMS BEFORE INSTALLATION, CAP OPENINGS TO EXCLUDE DIRT UNTIL FINAL CONNECTIONS HAVE BEEN MADE.
6. CUT MATERIALS ACCURATELY; WORK INTO PLACE WITHOUT SPRINGING OR FORCING; PROPERLY CLEAN WINDOWS, DOORS AND OTHER OPENINGS; EXCESSIVE CUTTING OR OTHER WEAKENING OF THE BUILDING STRUCTURE WILL NOT BE PERMITTED.
7. MANUFACTURER'S DRAWINGS AND INSTRUCTIONS SHALL BE FOLLOWED IN ALL CASES WHERE THE SHOWINGS OF DEVICES AND EQUIPMENT FURNISH DIRECTIONS OR DETAILS NOT SHOWN ON THE DRAWINGS OR DESCRIBED IN THE SPECIFICATIONS.
8. DRAWINGS ARE NOT INTENDED TO BE SCALED, BUT SHALL BE FOLLOWED WITH SUFFICIENT ACCURACY TO COORDINATE WITH OTHER WORK AND STRUCTURAL LIMITATIONS.
9. SEISMIC DESIGN: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ANCHORS, SUPPORTS AND CONNECTIONS OF MECHANICAL WORK TO THE BUILDING STRUCTURE TO PREVENT DAMAGE AS A RESULT OF AN EARTHQUAKE INCLUDING MANUFACTURED EQUIPMENT. THE CONNECTION AND INTEGRITY OF SHOP FABRICATED AND FIELD FABRICATED MATERIALS AND EQUIPMENT, ALL SUPPORTS, TRANSFORMERS AND CONNECTIONS THERETO SHALL BE DESIGNED TO CONFORM TO THE REQUIREMENTS OF THE CALIFORNIA ADMINISTRATIVE CODE, OR OTHER GOVERNING CODES.
10. ALL WORK SHALL BE PROPERLY SUPPORTED FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER, INDEPENDENT OF THE CEILING SUPPORT SYSTEM, WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT DIRECT FASTENING OF SUPPORTS, FURNISH ADDITIONAL FRAMING.
11. ALL EQUIPMENT SHALL BE SECURELY FASTENED TO BUILDING CONSTRUCTION WITH APPROVED SUPPORTS.
12. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF DIFFUSERS, GRILLES, REGISTERS, AND THERMOSTATS (IF DEPICTED). IF THERMOSTATS ARE NOT DEPICTED SPECIFICALLY ON ARCHITECT'S DRAWINGS, OBTAIN ARCHITECT'S APPROVAL FOR LOCATIONS PRIOR TO INSTALLATION.
13. COORDINATE THE WORK OF THIS SECTION WITH THE WORK OF OTHER SECTIONS IN AMPLE TIME FOR PROPER INSTALLATION AND CONNECTION.
14. CAREFULLY CHECK SPACE REQUIREMENTS, INCLUDING SERVICE SPACE REQUIREMENTS, WITH OTHER SECTIONS TO ENSURE THAT ALL EQUIPMENT AND MATERIALS CAN BE INSTALLED IN THE SPACES ALLOTTED THERETO.
15. PREPARE DRAWINGS, ATTEND MEETINGS, OBTAIN ALL APPROVALS REQUIRED BY ALL AUTHORITIES HAVING JURISDICTION, CONDUCT REQUIRED TESTS AND OBTAIN REQUIRED PERMITS.
B. GENERAL:
1. PAINTING
a. PAINT:
1) BEST GRADE FOR ITS PURPOSE
2) DELIVER IN ORIGINAL SEALED CONTAINERS
3) APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS
4) COLORS TO MATCH EXISTING OR AS SELECTED BY ENGINEER.
b. GALVANIZED IRON PRIMER
c. HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE
d. ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS.
2. CLEANING:
a. BRUSH AND CLEAN WORK PRIOR TO CONCRETE, PAINTING AND ACCEPTANCE.
b. PAINTED EXPOSED WORK SOILED OR DAMAGED: CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE.
c. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
3. CUTTING AND PATCHING: AS REQUIRED FOR NEW WORK.
15. CONTROL AND DEVICES
A. ALL CONTROL DEVICES NOT SPECIFIED TO BE FURNISHED AND INSTALLED UNDER THE ELECTRICAL SECTIONS SHALL BE PROVIDED UNDER THIS SECTION.
16. PROJECT CLOSE-OUT
A. AFTER FINAL OPERATION FOR INSPECTION AND ACCEPTANCE DELIVER ALL COPIES OF OPERATION INSTRUCTIONS, MAINTENANCE MANUALS AND PARTS DESCRIPTIONS TO THE ENGINEER.
B. ALL TOOLS SUPPLIED WITH THE EQUIPMENT FOR MAINTENANCE SHALL BE TAGGED AND TEMPORARILY SECURED TO THE UNIT, OR TURNED OVER TO THE OWNER.

1.17 ELECTRICAL
A. GENERAL

1. ALL ELECTRICAL MATERIAL, EQUIPMENT, AND APPARATUS SPECIFIED HEREIN SHALL CONFORM TO THE REQUIREMENTS OF DIVISION 26. REFER TO THE RESPONSIBILITY MATRIX FOR ADDITIONAL INFORMATION.
2. PROVIDE ALL MOTORS FOR EQUIPMENT SPECIFIED HEREIN. PROVIDE MOTOR STARTERS, CONTROLLERS, AND OTHER ELECTRICAL APPARATUS AND WIRING WHICH ARE REQUIRED FOR THE OPERATION OF THE EQUIPMENT SPECIFIED HEREIN.
3. SET AND ALIGN ALL MOTORS AND DRIVES IN EQUIPMENT SPECIFIED HEREIN.
4. SPECIFIC ELECTRICAL REQUIREMENTS, INCLUDING SPECIAL WIRING REQUIREMENTS CHARACTERISTIC(S) FOR MECHANICAL EQUIPMENT ARE SCHEDULED ON THE DRAWINGS.
B. QUALITY ASSURANCE:
1. ELECTRICAL COMPONENTS AND MATERIALS SHALL BE UL OR ETL LISTED, LABELED AS SUITABLE FOR LOCATION AND USE, -NO EXCEPTIONS.
C. STARTERS AND ELECTRICAL DEVICES
1. MOTOR STARTER CHARACTERISTICS:
a. ENCLOSURES: NEMA 1 GENERAL PURPOSE ENCLOSURES WITH PADLOCK EARS, EXCEPT IN WET LOCATIONS SHALL BE NEMA 3R WITH CONDUIT HUBS
b. TYPE AND SIZE OF STARTER SHALL AS RECOMMENDED BY MOTOR MANUFACTURER AND THE DRIVEN EQUIPMENT MANUFACTURER FOR APPLICABLE PROTECTION AND START UP CONDITION
2. MANUAL SWITCHES SHALL HAVE PILOT LIGHTS AND ALL REQUIRED SWITCH POSITIONS FOR MULTI SPEED MOTORS; OVERLOAD PROTECTION: MELTING ALLOY OR BI METALLIC TYPE THERMAL OVERLOAD RELAYS, SIZED ACCORDING TO ACTUAL OPERATING CURRENT (FIELD MEASURED).
3. MAGNETIC STARTERS:
a. HEAVY DUTY, OIL RESISTANT, HAND-OFF-AUT (HQA), OR AS INDICATED, AND PILOT LIGHTS, PROPERLY ARRANGED FOR SINGLE SPEED OR MULTI SPEED OPERATION AS INDICATED.
b. TRIP FREE THERMAL OVERLOAD RELAYS, EACH PHASE, SIZED ACCORDING TO ACTUAL OPERATING CURRENT (FIELD MEASURED).
c. INTERLOCKS: PNEUMATIC SWITCHES AND SIMILAR DEVICES AS REQUIRED FOR COORDINATING MOTOR REQUIREMENTS OF DIVISION 23 CONTROLS SECTIONS.
d. BUILT IN PRIMARY AND SECONDARY FUSED CONTROL CIRCUIT TRANSFORMER, SUPPLIED FROM LOAD SIDE OF EQUIPMENT DISCONNECT.
e. EXTERNALLY OPERATED MANUAL RESET
f. UNDER VOLTAGE RELEASE OR PROTECTION FOR ALL MOTORS OVER 20 HP.
4. MOTOR CONNECTIONS: LIQUID TIGHT, FLEXIBLE CONDUIT, EXCEPT WHERE PLUG IN ELECTRICAL CORDS ARE SPECIFICALLY INDICATED.
D. LOW VOLTAGE CONTROL WIRING
1. GENERAL: 14 GAUGE, TYPE THIN, COLOR CODED, INSTALLED IN CONDUIT.
2. MANUFACTURER: GENERAL CABLE CORP., ALCAN CABLE, AMERICAN INSULATED WIRE CORP., SENATOR WIRE AND CABLE CO., OR SOUTHWEST CO.
E. DISCONNECT SWITCHES:
1. FUSIBLE SWITCHES: FOR EQUIPMENT 1/2 HP OR LARGER, PROVIDED FUSED, EACH PHASE; HEAVY DUTY, HORSEPOWER RATED, SPRING LOADED QUICK MAKE, QUICK BREAK MECHANISM, HEAD FRONT LINE SIZE SHIELD, SOLDERLESS LUGS SUITABLE FOR COPPER OR ALUMINUM CONDUCTORS; SPRING REINFORCED FUSE CLIPS; ELECTRO SILVER PLATED CURRENT CARRYING PARTS; HINGED DOORS, OPERATING LEVER ARRANGED FOR LOOKING IN THE "OPEN" POSITION; ARC QUENCHERS; CAPACITY AND CHARACTERISTICS AS INDICATED.
2. NON-FUSIBLE SWITCHES: FOR EQUIPMENT LESS THAN 1/2 HORSEPOWER. SWITCH SHALL BE HORSEPOWER RATED, TOGGLE SWITCH TYPE WITH THERMAL OVERLOAD QUANTITY OF POLES AND VOLTAGE RATINGS AS REQUIRED.

PART 2 - EXECUTION

2.1 GENERAL
A. WORKMANSHIP SHALL BE PERFORMED BY LICENSED JOURNEMEN OR MASTER MECHANICS AND SHALL RESULT IN AN INSTALLATION CONSISTENT WITH THE BEST PRACTICES OF TRADES.
B. INSTALL WORK UNIFORM, LEVEL, AND PLUMB, IN RELATIONSHIP TO LINES OF BUILDING; DO NOT INSTALL ANY DIAGONAL OR OTHERWISE IRREGULAR WORK UNLESS SO INDICATED ON DRAWINGS OR APPROVED BY ARCHITECT.
2.2 MANUFACTURER'S DIRECTIONS
A. FOLLOW MANUFACTURER'S DIRECTIONS AND RECOMMENDATIONS IN ALL CASES WHERE THE MANUFACTURERS OF ARTICLES USED ON THIS CONTRACT FURNISH DIRECTIONS COVERING POINTS NOT SHOWN ON THE DRAWINGS OR COVERED IN THESE SPECIFICATIONS.
2.3 INSTALLATION
A. COORDINATE THE WORK BETWEEN THE VARIOUS MECHANICAL SECTIONS AND WITH THE WORK SPECIFIED UNDER OTHER DIVISIONS. IF ANY COOPERATIVE WORK MUST BE ALTERED DUE TO JACK OF FIT, REPAIR DEFICIENCIES OR FAILURE TO MAKE PROPER AND TIMELY PROVISIONS, THE ALTERATIONS SHALL BE MADE TO THE SATISFACTION OF THE ENGINEER AND AT THE CONTRACTOR'S COST. COORDINATE ALL WALK AND CEILING WORK WITH THE GENERAL CONTRACTOR, AND HIS SUBCONTRACTORS IN LOCATING CEILING AIR OUTLETS, WALL REGISTERS, ETC.
B. INSPECT ALL MATERIAL, EQUIPMENT, AND APPARATUS UPON DELIVERY AND DO NOT INSTALL ANY DAMAGED OR DEFECTED MATERIALS.
2.4 ELECTRICAL REQUIREMENTS
A. MECHANICAL CONTRACTOR SHALL COORDINATE WITH DIVISION 26 WORK TO PROVIDE COMPLETE SYSTEMS AS REQUIRED TO OPERATE ALL MECHANICAL DEVICES INSTALLED UNDER THIS DIVISION OF WORK.
B. INSTALLATION OF ELECTRICAL CONNECTIONS: FURNISH, INSTALL, AND WIRE (EXCEPT AS MAY BE OTHERWISE INDICATED) ALL HEATING, VENTILATING, AIR CONDITIONING, PLUMBING AND FIRE PROTECTION, ETC., MOTORS AND CONTROLS IN ACCORDANCE WITH THE FOLLOWING SCHEDULE AND IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND WITH RECOGNIZED INDUSTRY PRACTICES, AND COMPLYING WITH APPLICABLE REQUIREMENTS OF UL, NEC, AND ALL OTHER APPLICABLE CODES AND REGULATIONS TO ENSURE THAT PRODUCTS FULLY REQUIREMENTS, CAREFULLY COORDINATE WITH WORK PERFORMED UNDER THE MECHANICAL DIVISION OF THESE SPECIFICATIONS.
C. DIVISION 23 HAS RESPONSIBILITIES FOR ELECTRICALLY POWERED OR CONTROLLED MECHANICAL EQUIPMENT WHICH IS SPECIFIED IN DIVISION 23 SPECIFICATIONS OR SCHEDULED ON DIVISION 23 DRAWINGS. THE SPECIFIC DIVISION OF RESPONSIBILITIES BETWEEN DIVISION 23 AND 26 FOR FURNISHING OR WIRING THIS EQUIPMENT IS AS FOLLOWS:
1. GENERAL
a. DIVISION 26 MECHANICAL RESPONSIBILITIES:
1) MOTORS: FURNISH AND INSTALL ALL MOTORS NECESSARY FOR MECHANICAL EQUIPMENT.
2) DISCONNECTS: PROVIDE THE DISCONNECTS WHICH ARE PART OF FACTORY WIRED DIVISION 23 EQUIPMENT. FACTORY WIRING TO INCLUDE WIRING BETWEEN MOTOR AND DISCONNECT OR COMBINATION STARTER/DISCONNECT.
3) CONTROLS: DIVISION 23 CONTRACTOR (INCLUDING THE TEMPERATURE CONTROLS SUBCONTRACTOR) IS RESPONSIBLE FOR THE FOLLOWING EQUIPMENT IN ITS ENTIRETY. THIS EQUIPMENT INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
1) CONTROL RELAYS NECESSARY FOR CONTROLLING DIVISION 23 EQUIPMENT.
2) CONTROL TRANSFORMERS NECESSARY FOR PROVIDING POWER TO CONTROLS FOR DIVISION 23 EQUIPMENT.
3) LINE VOLTAGE THERMOSTATS.
4) LOW OR NON-LOAD VOLTAGE CONTROL COMPONENTS.
5) REMOTE BULB THERMOSTATS.
6) NON-FIRE SAFETY RELATED VALVE OR DAMPER ACTUATORS.
7) FLOAT SWITCHES.
8) SOLENOID VALVES, EP AND SP SWITCHES.
9) REFRIGERATION CONTROLS. (DIVISION 26 PROVIDES POWER TO REFRIGERATION PANELS).
10) PNEUMATIC THERMOSTATS.
d. FIRE AND LIFE SAFETY EQUIPMENT:
1) FIRE/SMOKE DAMPERS: DIVISION 23 IS RESPONSIBLE FOR PROVIDING AND PHYSICALLY INSTALLING THE DAMPER AND FOR INSTALLING ANY REQUIRED CONTROL INTERFACE WIRING TO DIVISION 23 CONTROLS.
a) WHERE FIRE/SMOKE DAMPERS ARE PART OF AN INTEGRATED SMOKE CONTROL SYSTEM, DIVISION 23 IS RESPONSIBLE FOR PROVIDING DAMPERS WITH NECESSARY END SWITCHES FOR POINT OF CLOSURE.
b) WHERE THESE DAMPERS ARE NOT PART OF AN INTEGRATED SMOKE CONTROL SYSTEM, DIVISION 23 IS RESPONSIBLE FOR PROVIDING THE FIRE/SMOKE DAMPER WITH A DEDICATED DUCT DETECTOR INSTALLED PER THE REQUIREMENTS OF THE BUILDING CODE. IF NOT INTEGRAL WITH THE DAMPER ASSEMBLY, THE DETECTOR IS TO BE INSTALLED BY DIV. 23 BUT WIRED FOR DAMPER CONTROL BY DIV. 26.
2) FIRE SPRINKLER SYSTEM: DIVISION 23 IS RESPONSIBLE FOR PROVIDING NECESSARY CONTROLS INCLUDING FLOW SWITCHES AND ALARM BELLS.
3) SPECIALIZED FIRE SUPPRESSION SYSTEMS: DIVISION 23 IS RESPONSIBLE FOR PROVIDING NECESSARY SYSTEM CONTROLS AND ANY REQUIRED CONTROL INTERFACE WIRING TO THESE SYSTEMS. DIVISION 26 IS RESPONSIBLE FOR BRINGING POWER TO POINT OF CONNECTION WITH THE SYSTEM.
d. DIVISION 26 HAS RESPONSIBILITIES FOR ELECTRICALLY POWERED OR CONTROLLED MECHANICAL EQUIPMENT WHICH IS SPECIFIED IN DIVISION 23 SPECIFICATIONS OR SCHEDULED ON DIVISION 23 DRAWINGS. THE SPECIFIC DIVISION OF RESPONSIBILITIES BETWEEN DIVISION 23 AND 26 FOR FURNISHING

OR WIRING THIS EQUIPMENT IS AS FOLLOWS:
1. DIVISION 26 ELECTRICAL RESPONSIBILITIES:
2. MOTORS: PROVIDE THE POWER WIRING FOR THE MOTORS.
3. DISCONNECTS: PROVIDE ALL DISCONNECTS NECESSARY FOR DIVISION 23 MECHANICAL EQUIPMENT WHICH ARE NOT PROVIDED AS PART OF FACTORY WIRED DIVISION 23 EQUIPMENT. PROVIDE POWER WIRING TO ALL DISCONNECTS. IN ADDITION, PROVIDE POWER WIRING BETWEEN MOTOR AND DISCONNECT WHEN THE DISCONNECT IS NOT FACTORY INSTALLED. SEE ALSO STARTERS, CONTROLLERS, AND OTHER ELECTRICAL APPARATUS AND WIRING WHICH ARE REQUIRED FOR THE OPERATION OF THE EQUIPMENT SPECIFIED HEREIN.
a. CONTROLS: DIVISION 23 CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER TO CONTROL PANELS AND CONTROL CIRCUIT OUTLETS.
b. FIRE AND LIFE SAFETY EQUIPMENT:
1) FIRE/SMOKE DAMPERS: DIVISION 26 IS RESPONSIBLE FOR POWER WIRING TO THE DAMPER AND AS FOLLOWS:
a) WHERE THESE DAMPERS ARE PART OF AN INTEGRATED SMOKE CONTROL SYSTEM, DIVISION 26 IS RESPONSIBLE FOR PROVIDING THE DETECTORS AND FOR ALL FIVE DETECTION SYSTEM WIRING NECESSARY TO INTEGRATE DAMPERS AND RELATED END SWITCHES INTO THE SYSTEM.
b) WHERE THESE DAMPERS ARE NOT PART OF AN INTEGRATED AREA WIDE SMOKE DETECTION SYSTEM, DIVISION 23 IS RESPONSIBLE FOR PROVIDING EACH FIRE/SMOKE DAMPER WITH A DEDICATED DUCT DETECTOR INSTALLED PER THE REQUIREMENTS OF THE BUILDING CODE. (SEE SECTION 5880) IF NOT INTEGRAL WITH THE DAMPER ASSEMBLY, THE DETECTOR IS TO BE INSTALLED BY DIV. 23 BUT WIRED FOR DAMPER CONTROL BY DIV. 26.
2) FIRE SPRINKLER SYSTEM: DIVISION 26 IS RESPONSIBLE FOR PROVIDING POWER WIRING TO FIRE PROTECTION CONTROLS INCLUDING FLOW SWITCHES AND ALARM BELLS.
3) SPECIALIZED FIRE SUPPRESSION SYSTEMS: DIVISION 26 IS RESPONSIBLE FOR PROVIDING POWER WIRING TO SUPPRESSION SYSTEM AND ITS CONTROLS.
4. COORDINATE WITH OTHER WORK, INCLUDING WIRESCABLES, RACEWAY AND EQUIPMENT INSTALLATION, AS NECESSARY TO PROVIDE THE FOLLOWING:
1. INSTALLATION OF ELECTRICAL CONNECTIONS FOR EQUIPMENT WITH OTHER WORK.
2. CONNECT ELECTRICAL POWER SUPPLY CONDUCTORS TO EQUIPMENT CONDUCTORS IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND WIRING DIAGRAMS. MATE AND MATCH CONDUCTORS OF ELECTRICAL CONNECTIONS FOR PROPER INTERFACE BETWEEN ELECTRICAL POWER SUPPLIES AND INSTALLED EQUIPMENT.
3. MAINTAIN EXISTING ELECTRICAL SERVICE AND FEEDERS TO OCCUPIED AREAS AND OPERATIONAL FACILITIES, UNLESS OTHERWISE INDICATED, OR ARCHITECT/ENGINEER, PROVIDE TEMPORARY SERVICE DURING INTERRUPTIONS TO EXISTING FACILITIES, WHEN NECESSARY, SCHEDULE TEMPORARY OUTAGES FOR REPAIRING EXISTING WIRING SYSTEMS WITH NEW WIRING SYSTEMS, WHEN THAT OUTAGE OVER TIME HAS BEEN SUCCESSFULLY ACCOMPLISHED, REMOVE, RELOCATE, OR ABANDON EXISTING WIRING AS INDICATED.
4. COVER SPLICES WITH ELECTRICAL INSULATING MATERIAL EQUIVALENT TO, OR GREATER INSULATION RESISTIVITY RATING, THAN ELECTRICAL INSULATION RATING OF THOSE CONDUITS BEING SPliced.
5. PREPARE CABLES AND WIRES, BY CUTTING AND STRIPPING COVERING ARMOR, GROUND AND INSULATION PROTECT AND INSULATE UNDER AND NEAR APPEARANCE WHERE CABLES AND WIRES ARE TERMINATED. EXERCISE CARE TO AVOID CUTTING THROUGH TRAPS WHICH WILL REMAIN ON CONDUCTORS. ALSO AVOID "RINGING" COPPER CONDUCTORS WHILE SKIPPING WIRE.
E. MOTORS AND MOTOR CONTROL EQUIPMENT: CONFORM TO THE STANDARDS OF THE NEMA EQUIP MOTORS WITH MAGNETIC OR MANUAL LINE STARTERS WITH OVERLOAD PROTECTION. MOTOR STARTERS AND CONTROLS SHALL BE INSTALLED UNDER ELECTRICAL SECTION BUT LOCATED AND COORDINATED AS REQUIRED UNDER THIS SECTION OF THE WORK. STARTERS SHALL BE COMBINATION TYPE WITH NON-FUSIBLE DISCONNECT SWITCHES. ALL SINGLE PHASE FRACTIIONAL HORSEPOWER MOTOR SHALL HAVE BUILT IN OVERLOAD PROTECTION.

2) FORMED CHANNELS WITH FITTINGS, SIMILAR TO SUPERSTRUT, SUBMIT MANUFACTURER'S CALCULATIONS FOR INSTALLATION.
SECTION 23053 - IDENTIFICATION
A. AN IDENTIFICATION LABEL SHALL BE PROVIDED FOR THE FOLLOWING TYPES OF EQUIPMENT:
1. ROOF TOP UNITS
2. EXHAUST FANS
3. MAKEUP AIR UNITS
4. SPLIT SYSTEMS
5. CONDENSING UNITS
6. KITCHEN HOOD AND EXHAUST SYSTEMS
B. IDENTIFICATION LABELS SHALL BE SET ON, OR EQUIVALENT, PROVIDE LABELS & FLOW ARROWS ON ALL DUCT AND PIPING @ 10' INTERVALS.
C. TEMPERATURE CONTROL PANELS SHALL BE IDENTIFIED WITH ENGRAVED PHENOLIC NAMEPLATES AND EACH CONTROL COMPONENT SHALL BE IDENTIFIED WITH ITS SETPOINTS.
D. ALL MECHANICAL EQUIPMENT INSTALLED ABOVE SUSPENDED CEILING SHALL BE MARKED ON THE BOTTOM WITH ITS EQUIPMENT NUMBER MATCHING THE EQUIPMENT SCHEDULE AND CONTROL GRAPHICS.
E. ALL LABELING OF EXTERIOR EQUIPMENT SHALL USE ENGRAVED PHENOLIC LABELS.
F. IDENTIFICATION SHALL CONFORM TO ANSI/MESA A13.1 WHERE APPLICABLE.
SECTION 23063 - TESTING, ADJUSTING, AND BALANCING FOR HVAC
A. GENERAL:
1. TAB SHALL BE PERFORMED BY NATIONAL TAB, NORTH KANSAS CITY, MO (WILL TURNBURO 314-964-6244), NO EXCEPTIONS.
2. ADJUSTMENT: EACH PIECE OF EQUIPMENT, AND ALL OF THE SYSTEMS SHALL BE ADJUSTED TO INSURE PROPER FUNCTIONING OF ALL CONTROLS, AND SHALL BE LEFT IN OPERATING CONDITION. CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE EXISTING MOTOR SPEAKERS AND FAN BELLS AS REQUIRED.
3. PRELIMINARY OPERATION: THE OWNER RESERVES THE RIGHT TO OPERATE ANY SYSTEMS EQUIPMENT PRIOR TO FINAL COMPLETION AND ACCEPTANCE OF THE WORK. SUCH PRELIMINARY OPERATION SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY WORK.
B. AIR DISTRIBUTION SYSTEMS
1. BALANCE AND ADJUST AIR DISTRIBUTION SYSTEM TO QUANTITIES INDICATED ON DRAWINGS IN ACCORDANCE WITH ASSOCIATED AIR BALANCE COUNCIL (AABC) MANUAL, LATEST EDITION.
2. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED INDEPENDENT FIRM SPECIALIZING IN TESTING AND BALANCING. FIRM SHALL BE AN APPROVED BY THE CONTRACTOR. TEST REPORTS SHALL BE SUBMITTED IN FOLDOUT FOLDERS AND ON A8C TYPE REPORT FORMS, ALL AIR INLET/OUTLET SHALL BE IDENTIFIED BY DESIGNATIONS ON DRAWINGS.
3. ALL TESTING DATA SHALL BE PROVIDED IN A MICROSOFT EXCEL COMPATIBLE FORMAT.
4. DIFFUSER AIR DELIVERY SHALL NOT BE LESS THAN 80% EXCEED BY MORE THAN 10% THE AIR DELIVERY INDICATED ON THE PLAN.
5. VOLUME DAMPERS IN AIR INLET/OUTLETS SHALL BE ADJUSTED ONLY FOR MINOR ADJUSTMENT (LESS THAN 10% OF SPECIFIED CFM WHEN AVAILABLE).
6. CONTRACTOR SHALL PROVIDE MANUAL VOLUME DAMPERS IN DUCTS AS REQUIRED.
7. UPON COMPLETION OF THE INSTALLATION, CONTRACTOR SHALL REBALANCE ANY AIR DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION, INCLUDING TERMINAL AIR UNITS AND AIR OUTLETS.
C. ADDITIONAL NOTES:
1. KITCHEN HOODS SHALL BE BALANCED WITH KITCHEN.
2. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
3. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT.
4. OWNER TO BE PROVIDED WITH BALANCING REPORT.

SECTION 23059 - HANGERS AND SUPPORTS

A. PIPE HANGERS, SUPPORTS, AND GUIDES
1. GENERAL:
a. HANGERS AND SUPPORTS TO BE DESIGNED AND INSTALLED PER SMACNA GUIDELINES.
b. ASSURE ADEQUATE SUPPORT FOR PIPE AND CONTENTS.
c. PROVIDE RIGID INSULATION SECTION AT ALL HANGER SUPPORTS.
d. PROVIDE SEISMIC RESTRAINTS TO MEET LOCAL CODES.
e. PREVENT VIBRATION OR SWAYING.
f. PROVIDE SLEEVING FOR ALL PIPING THAT PENETRATES FLOOR SLABS.
g. PROVIDE FOR EXPANSION AND CONTRACTION.
h. SUPPORTS OF WIRE, ROPE, WOOD, CHAIN, STRAP PERFORATED BAR OR ANY OTHER MAKE/SHIFT DEVICE NOT PERMITTED.
i. COMPLY WITH APPLICABLE REQUIREMENTS AT ANSI B31.1.0 AND B31.2 FOR PIPING.
j. SUPPORT PIPING INDEPENDENTLY SO THAT EQUIPMENT IS NOT STRESSED BY PIPING WEIGHT OR EXPANSION.
k. HANGERS AND SUPPORTS SHALL HAVE MINIMUM SAFETY FACTOR OF THREE (3), BASED ON ULTIMATE TENSILE OR COMPRESSIVE STRENGTH, AS APPLICABLE, OF MATERIAL USED.
l. PRIME CAST EXPOSED STEEL HANGERS AND SUPPORTS, HANGERS AND SUPPORTS LOCATED IN CRAWL SPACES, PIPES SHIFTS AND SUSPENDED CEILING SPACES ARE NOT CONSIDERED EXPOSED.
2. HORIZONTAL PIPING, EXCEPT AS NOTED:
a. ADJUSTABLE CLEVIS TYPE AND ROD: ALL SERVICES AT OR BELOW 200 LBS/FG.
b. RODS OR SLIDE BASES: PIPE STAND, BRACKET, TRAPEZE OR OTHER EQUIVALENT STRUCTURAL SUPPORT, ROLLERS NOT REQUIRED WHERE SPRING HANGERS ARE CALLED FOR.
3. TRAPEZE HANGERS
a. NOT PERMITTED FOR PIPE AND SPRINKLER PIPING.
b. GUIDE INDIVIDUAL PIPES ON TRAPEZES WITH 1/4 INCH LIQUID OR SUPERSTRUT 702 PIPE CLAMP, INSTALLED THERMAL HANGER SHIELD AT EACH SUPPORT POINT.
4. INSTALL PIPE ISOLATORS BETWEEN HANGERS AND UNINSULATED COPPER TUBING.
b. WHEREVER ANY PIPE REQUIRES SOUND AND VIBRATION ISOLATION, 5. MISCELLANEOUS STEEL: PROVIDE MISCELLANEOUS STEEL MEMBERS, BEAMS, BRACKETS, ETC., FOR SUPPORT OF WORK IN THIS DIVISION UNLESS SPECIFICALLY INCLUDED IN OTHER DIVISIONS.
6. PIPE SUPPORT SPACING: PER IBC SECTION 305.
B. DUCT HANGERS AND SUPPORTS
1. GENERAL
a. SUPPORT HORIZONTAL DUCTS WITH HANGERS OF SIZE AND SPACING AS INDICATED IN PERTINENT SMACNA DUCT CONSTRUCTION STANDARDS.
b. PROVIDE SEISMIC CONSTRAINTS TO MEET LOCAL CODES.
2. HORIZONTAL DUCT SUPPORTS:
a. INSTALL HANGERS AT EACH CHANGE OF DIRECTION OF DUCT.
b. STRAP HANGERS:
1) EXTEND STRAP DOWN BOTH SIDES IN DIRECTION OF FLOW.
2) TURN UNDER BOTTOM ONE INCH MINIMUM.
c. METAL SCREW HANGERS TO:
a) BOTTOM OF DUCT.
b) UPPER AND LOWER SIDES OF CENTER.
c) NOT MORE THAN 12 INCHES IN CENTER.
d) ANGLE HANGERS:
a) PROVIDE ANGLE HANGERS FORMED BY EXTENDED VERTICAL BRACING ANGLES.
3. RECTANGULAR DUCT SUPPORT SPACING:
a. HORIZONTAL DUCTS 10"
b. VERTICAL DUCTS 12"
c. TRAPEZE DUCTS 8"
4. ROUND DUCT SUPPORT SPACING:
a. HORIZONTAL DUCTS (48" DIA): 10"
b. VERTICAL DUCTS: 12"
c. TRAPEZE DUCTS: 8"
C. HVAC EQUIPMENT
1. GENERAL
a. ALL FANS SHALL BE MOUNTED ON SPRING VIBRATION ISOLATORS.
b. COORDINATE LOCATION OF ALL EQUIPMENT WITH BUILDING OWNER.
D. ATTACHMENT TO STRUCTURE
1. STEEL BEAM ANCHORS
a. APPROVED BEAM OR CHANNEL CLAMPS.
b. DO NOT CUT OR WELD TO STRUCTURAL STEEL WITHOUT WRITTEN APPROVAL OF OWNER.
c. OTHER METHODS AS DETAILED ON DRAWINGS.
2. STUD WALL SIDE-WALL SUPPORTS:
a. TOGGLE BOLTS.
b. STUDS WELDED TO STRUCTURAL STUDS.
c. LAG SCREWS INTO WOOD BACKING.
d. OTHER METHODS.
3. SUPPORT SPREADERS
a. INSTALL SPREADERS SPANNING BETWEEN STRUCTURAL MEMBERS WHEN HANGERS FALL BETWEEN THEM, AND HANGER LOAD IS TOO GREAT FOR SLAB OR DECK ATTACHMENT.
b. SPREADERS MAY BE ONE OF METHODS LISTED BELOW, OR COMBINATION OF BOTH AS REQUIRED.
1) FABRICATED FROM STRUCTURAL CHANNEL END FITTINGS BOLTED OR WELDED. SECURE TO STRUCTURAL MEMBERS AS REQUIRED BY CONTRACT AND AS APPROVED BY STRUCTURAL ENGINEER.

SECTION 23313 - METAL DUCTS
A. GENERAL: ALL SAFING, DUCTS, DAMPERS, ACCESS DOORS, JOINTS, HANGERS, STIFFENERS, FIRE DAMPERS AND FIRE RETARDING MATERIALS IN ACCORDANCE WITH REQUIREMENTS OF SMACNA, "HVAC DUCT CONSTRUCTION STANDARDS" LATEST EDITION, AND ALL OTHER AUTHORITIES HAVING JURISDICTION AND AS DESCRIBED HEREIN. ALL SHEET METAL WORK SHALL HAVE A PRESSURE CLASSIFICATION AS FOLLOWS:
1. SUPPLY DUCT BETWEEN MAIN LOOP AND INLET TO TERMINAL AIR UNIT - 4 INCHES W.G.
2. SUPPLY DUCTS DOWNSTREAM OF TERMINAL AIR UNITS, AIR HANDLING UNITS AND FANS - 2 INCHES W.G.
3. RETURN AND EXHAUST AIR DUCTS - 2 INCHES W.G.
B. DUCTWORK: UNLESS OTHERWISE SPECIFIED:
1. COLD ROLLED "COMMERCIAL" QUALITY HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM NO. A663, OR.
2. DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
3. FITTINGS: SAME GAUGE AND CONSTRUCTION AS DUCTS. ELBOWS SHALL HAVE CENTERLINE RADIUS NOT LESS THAN 1.5 TIMES WIDTH.
4. DUCT SUPPORTS AS REQUIRED.
5. DUCTS WITH TRANSVERSE AND LONGITUDINAL BRACINGS IN ACCORDANCE WITH SMACNA.
6. DUCTWORK SHALL BE SEALED, JOINTS AND SEAMS SHALL COMPLY WITH SECTION 03.03 OF THE IMC.
C. KITCHEN COOKING HOOD AND GREASE EXHAUST
1. TYPE I GREASE HOOD EXHAUST DUCTWORK OF MINIMUM 16 GAUGE ROLLER STEEL, OR 18 GA STAINLESS STEEL WITH LIQUID TIGHT WELDS OR AS NOTED ON PLANS. ZERO CLEARANCE HOODS SHALL BE INSTALLED. HOOD AND GREASE DUCT, WITH ACCESS PANELS FOR GREASE CLEANING AS REQUIRED BY NFPA 96 AND LOCAL CODES.
2. SUPPORT BACK TOWARDS HOOD AT MINIMUM OF 1/4" PER LINEAL FOOT. MAINTAINING 18" CLEARANCE TO COMBUSTIBLE MATERIALS WHERE REQUIRED.
3. INSTALL GREASE DUCTS IN AN APPROVED FIRE-RATED ENCLOSURE SEPARATED FROM THE EXHAUST DUCT BY A MINIMUM OF 6" AND MAXIMUM 12" VENTILATED ENCLOSURE TO THE OUTSIDE AIR.
4. AS AN OPTION, IF APPROVED BY LOCAL CODES, PROVIDE AN APPROVED WRAP SYSTEM IN Lieu OF THE RATED DUCT ENCLOSURE SYSTEM. DUCT WRAP SYSTEM SHALL MEET UL REQUIREMENTS FOR GREASE DUCT ENCLOSURES.

SECTION 23300 - AIR DUCT ACCESSORIES
A. ACCESS DOORS:
1. FURNISH ACCESS DOOR OF SUFFICIENT SIZE AS REQUIRED, FOR ACCESS, INSPECTION, MAINTENANCE, AND REPLACEMENT TO ALL INSTRUMENTS, CONTROLS AND EQUIPMENT.
B. DAMPERS
1. FURNISH ALL DAMPERS WITH LOCKING MECHANISM NECESSARY FOR PROPER CONTROL AND BALANCING OF AIR DISTRIBUTION AS FOLLOWS:
a. ALL DUCTS WHICH SPLIT IN 2 OR MORE BRANCHES TO SERVE SUPPLY DIFFUSERS.
b. AT EACH SUPPLY AND RETURN BRANCH DUCT, AS FAR AWAY FROM EACH OUTLET AND INLET AS POSSIBLE.
c. ADJUSTABLE AND ACCESSIBLE.
d. ADDITIONALLY AS INDICATED.
2. FIRE/SMOKE DAMPERS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH NFPA STANDARD 96A AND UL STANDARD 555 AND SHALL BE SO LABELED WITH A PERMANENT IDENTIFICATION. FIRE/SMOKE DAMPER SHALL BE LISTED TO CLASS I, RATED FOR DYNAMIC USE, 165 DEG. FUSIBLE LINK, PROVIDED WITH FACTORY ELECTRIC ACTUATOR AND FACTORY INSTALLED AND PREWIRED DUCT MOUNTED SMOKE DETECTOR & REMOTE CEILING MTD, LED ANIMATOR. FIRE/SMOKE DAMPERS SHALL BE CSFM LISTED FOR BOTH FIRE AND SMOKE, RUSKIN OR APPROVED EQUAL.
D. TURNING VANES: GALVANIZED STEEL, DOUBLE THICKNESS TURNING VANES WITH 2 IN. INSIDE RADIUS FOR ALL SQUARE ELBOWS, UNLESS OTHERWISE NOTED.
E. DUCT MTD: SMOKE DETECTORS SHALL BE "SYSTEM SENSOR" (DHAO) OR EQUIVALENT. PROVIDE SHEET METAL COVER FOR EXTERNALLY MOUNTED DETECTORS.
F. MOTORIZED DAMPERS SHALL BE RUSKIN CDF-50 LOW LEAKAGE TYPE WITH ACTUATORS BY BELIMO UNLESS OTHERWISE NOTED.

SECTION 23070 - HVAC INSULATION
A. MINERAL-FIBER BLANKET INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN, COMPLY WITH ASTM C 553, TYPE I AND ASTM C 1290, TYPE III WITH FACTORY-APPLIED FSK JACKET, KNAUF ECO FRIEND, OR JOHNS MANVILLE (FORMERLY DRYFIRE).
B. CLOSED CELL PIPE INSULATION: ASTM C 534 TYPE I, AEROFLOK OR ARMACELL.
C. INSULATING CEMENTS: MINERAL-FIBER, HYDRULIC-SETTING INSULATING AND FINISHING CEMENT, COMPLY WITH ASTM C 448/F 448.
D. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2 GRADE A USE ADHESIVE THAT HAS A VOC CONTENT OF 80 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
E. FSK AND P/VC JACKET ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2 GRADE A FOR BONDING INSULATION JACKET LAP SEAMS AND JOINTS.
F. FSK AND METAL JACKET FLASHING SEALANTS:
1. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SURFACES.
2. FIRE- AND WATER-RESISTANT, FLEXIBLE, ELASTOMERIC SEALANT.
3. SERVICE TEMPERATURE RANGE: MINIMUM AT 20 TO PLUS 250 DEG. F.
4. COLOR: ALUMINUM.
5. FOR NATURAL APPLICATIONS, USE SEALANTS THAT HAVE A VOC CONTENT OF 250 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
G. FACTORY APPLIED FSK JACKET: ALUMINUM-FOLI, FIBERGLASS-REINFORCED SCORM WITH KRAFT-PAPER BACKING, COMPLYING WITH ASTM C 1136, TYPE II.
H. FIELD APPLIED ALUMINUM JACKET: ALUMINUM ROLL STOCK WITH 3-MIL MOISTURE BARRIER, COMPLYING WITH ASTM C 1129. PROVIDE FACTORY-FABRICATED COVERS FOR FITTINGS.
I. TYPE OF INSULATION
1. DUCT INSULATION: MINERAL-FIBER BLANKET INSULATION. R 6 VALUE. PROVIDE WEATHERPROOF JACKET ON OUTDOOR DUCT. EXTERNALLY INSULATE AIR DUCT WHEN CONCEALED ABOVE CEILING SPACES.
2. PIPING: PROVIDE THICKNESS PER IBC TABLE 403.2.10.
a. CONDENSATE CLOSED-CELL TYPE.
b. REFRIGERANT PIPING: CLOSED-CELL PIPE INSULATION PROVIDE WEATHERPROOF JACKET ON OUTDOOR PIPING.
J. ADDITIONAL PIPING INSULATION REQUIREMENTS
1. ALL REFRIGERANT COPPER LINES MUST BE FREE OF EXTRANEOUS CHEMICALS SUCH AS CORROSIVE CLEANERS OR BUILDING MATERIALS DUST PRIOR TO THE INSTALLATION OF THE INSULATION. THE INSULATION MUST BE CLEAN AND DRY PRIOR TO INSTALLATION.
2. REFRIGERANT PIPE SHALL BE SEALED WHILE SLIPPING ON INSULATION TO PREVENT FOREIGN MATTER FROM ENTERING THE TUBE.

SECTION 23080 - COMMISSIONING
A. MECHANICAL CONTRACTOR SHALL ALLOCATE ADEQUATE TIME IN THEIR PROPOSAL TO ASSIST IN ALL COMMISSIONING ACTIVITIES AS PRESCRIBED, CONSULT WITH THE GENERAL CONTRACTOR TO DETERMINE THE SPECIFIC COMMISSIONING SCOPE OF WORK.
B. COMMISSIONING SHALL BE PERFORMED FOR THE FOLLOWING SYSTEMS:
1. AIR HANDLING EQUIPMENT INCLUDING PACKAGED EQUIPMENT AND EXHAUST FANS.
2. SPLIT SYSTEMS.
3. KITCHEN HOOD, EXHA

INDOOR UNIT SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	TYPE	AREA SERVED	TONS	SUPPLY FAN			OSA (CFM)	COOLING CAPACITY				HEATING CAPACITY			REFRIGERANT AND PIPING			ELECTRICAL					FILTERS			WT. (LBS.)	REMARKS	
							CFM	E.S.P. (\"WG)	MOTOR		EAT		LAT		BTUH	EAT DB (\"F)	LAT DB (\"F)	REFR.	RL	RG	MCA	MOCP	V	PH	HZ	QTY.	SIZE	%EFF.			
											DB (\"F)	WB (\"F)	DB (\"F)	WB (\"F)																	
FC	1	CARRIER/TOSHIBA	MMD-AP0726HPUL	CEILING CONCEALED DUCTED	DINING AREA	6	2,235	1.0	DC MOTOR	480	72,000	80	67	82	46	81,000	70	100	R-410A	1/2"	7/8"	5.70	15	208	1	60	1	25" x 12" x 2"	MERV-13	235	1, 3, 4
FC	2	CARRIER/TOSHIBA	MMD-AP0546HPUL	CEILING CONCEALED DUCT	BACK OF HOUSE	4.5	1,400	1.0	DC MOTOR	150	54,000	80	67	48	44	60,000	70	105	R-410A	3/8"	5/8"	4.33	15	208	1	60	2	25" x 12" x 2"	MERV-13	128	1, 2, 4
FC	3	CARRIER/TOSHIBA	MMD-AP0726HPUL	CEILING CONCEALED DUCTED	OPEN KITCHEN	6	2,235	1.0	DC MOTOR	250	72,000	80	67	82	46	81,000	70	100	R-410A	1/2"	7/8"	5.70	15	208	1	60	1	25" x 12" x 2"	MERV-13	235	1, 3, 4

NOTES:

1. PROVIDE WITH REMOTE CONTROLLER (RBC-AMSS4E-UL).
2. PROVIDE MERV 13 FILTER CABINET KIT (FS-APBHP04).
3. PROVIDE MERV 13 FILTER CABINET KIT (FS-APBHP01).
4. PROVIDE FLEXIBLE DUCT CONNECTION AND SPRING VIBRATION ISOLATORS.

OUTDOOR CONDENSING UNIT SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	TYPE	MODULES (QUANT.)	TONS	COOLING CAPACITY		HEATING CAPACITY		REFRIGERANT AND PIPING			EER	COP	ELECTRICAL					WT. (LBS.)	REMARKS
							BTUH	AMBIENT DB (\"F)	BTUH	AMBIENT WB (\"F)	REFR.	RL	RG			MCA	MOP	V	PH	HZ		
CU	1	CARRIER/TOSHIBA	MMY-AP2166HT6P-UL	VRV HEAT PUMP	2	10-TONS	120,000	98	162,000	33	R-410A	3/4"	1-3/8"	12.25	4.0	23	30	460	3	60	1,368	
						8-TONS	96,000									20	25	460	3	60		

AIR DISTRIBUTION SCHEDULE

MARK NO.	MANUFACTURE MODEL NUMBER	NECK SIZE (IN)	CFM RANGE	MAX NC LEVEL	REMARKS
CD-1	PRICE PDS	6"	60-100	30	NOTE 1,2,3
	PRICE PDS	8"	101-200	30	NOTE 1,2,3
	PRICE PDS	10"	201-375	30	NOTE 1,2,3
	PRICE PDS	12"	376-500	30	NOTE 1,2,3
CR-1	PRICE PDS	14"	501-750	30	NOTE 1,2,3
	PRICE PDR	6"	60-100	30	NOTE 1,2,3
	PRICE PDR	8"	101-200	30	NOTE 1,2,3
	PRICE PDR	10"	201-375	30	NOTE 1,2,3
	PRICE PDR	12"	376-500	30	NOTE 1,2,3
	PRICE PDR	22"x22"	1,400	30	NOTE 1,2,3
RG-1	PRICE 630	SEE PLAN	SEE PLAN	30	NOTE 1
EG-1	PRICE 630	SEE PLAN	SEE PLAN	30	NOTE 1

NOTES:

1. FURNISH WITH OFF-WHITE BAKED ENAMEL FINISH UON. COORDINATE EXACT FINISHES WITH ARCH.
2. PROVIDE OPTIONAL INSULATION ON SUPPLY DIFFUSERS. OMIT INSULATION ON RETURN DIFFUSERS.
3. PROVIDE LAY IN TYPE 24x24 BORDER, OTHERWISE COORDINATE BORDER TYPE WITH ARCH. PRIOR TO ORDERING.

EVAPORATIVE COOLING/GAS HEATING MAKEUP AIR UNIT SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	AREA SERVED	CFM	E.S.P. (IN. WG.)	SUPPLY FAN			EVAPORATIVE COOLING				HEATING				ELECTRICAL					FILTER EFF. (%)	WT. (LBS)	REMARKS	
							FAN RPM	FAN BHP	HP	EDB (\"F)	EWB (\"F)	LDB (\"F)	LWB (\"F)	GPH	INPUT (MBH)	OUTPUT (MBH)	TEMP RISE (DEG-F)	EFF.	V	PH	FLA	MCA				MOCP
MAU	1	CAPTIVEAIRE	A1-D.250-16Z	KITCHEN	2,205	1.0	2777	2.5	3.4	100.0	70.0	82.0	70.0	3.53	85.0	78.2	40	92%	460	3	3.3	4.2	15	MERV-13	622	1, 2, 3, 4, 5, 6

NOTES:

1. PROVIDE WITH MANIFOLD PRESSURE GAUGES.
2. PROVIDE WITH MOTORIZE BACKDRAFT DAMPER.
3. PROVIDE WITH ECM MOTOR.
4. PROVIDE FLEXIBLE DUCT CONNECTION AND SPRING VIBRATION ISOLATORS.
5. SEE M806 FOR FIELD WIRING.
6. INTERLOCK MAU-1 WITH KEF-1 FOR OPERATION.

EXHAUST FAN SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	AREA SERVED	SUPPLY FAN				ELECTRICAL							WT. (LBS.)	REMARKS
					CFM	ESP	TYPE	DRIVE	RPM	HP	V	PH	HZ	FLA			
EF	1	GREENHECK	G-070-VG	RESTROOM	250	0.25	DOWNBLAST	DIRECT	1483	1/15	115	1	60	0.65	39	1, 2, 3, 4	
KEF	1	CAPTIVEAIRE	DU180HFA	KITCHEN HOOD	2,766	2.0	UPBLAST	DIRECT	1426	3.0	460	3	60	4.3	229	5, 6, 7	

NOTES:

1. PROVIDE WITH VARI-GREEN ECM WITH DIAL ONLY.
2. PROVIDE WITH STANDARD CURB CAP SIZE - 17" SQUARE.
3. PROVIDE WITH NEMA-1 TOGGLE SWITCH.
4. PROVIDE WITH BACKDRAFT DAMPER, GRAVITY OPERATED.
5. PROVIDE WITH FACTORY CURB, GREASE BOX, ECM WIRING PACKAGE, AND FAN BASE CERAMIC SEAL.
6. PROVIDE WITH PITCHED ROOF CURBS.
7. SEE M801-M806 FOR ADDITIONAL REQUIREMENTS AND FIELD WIRING.

DUCT SIZING CHART

AIRFLOW (CFM)	SIZE (IN)
190 TO 299	10X6 OR 8"
300 TO 429	14X6 OR 10"
430 TO 599	16X8 OR 12"
600 TO 799	20X8 OR 14"
800 TO 999	24X10 OR 16"
1000 TO 1199	30X10 OR 18"
1200 TO 1450	30X12 OR 20"

FOR COMMERCIAL KITCHEN EXHAUST DUCT.
AIR VELOCITY SHALL NOT BE LESS THAN 600 FPM AND NOT EXCEED 2500 FPM.

DUCT SIZING CHART

AIRFLOW (CFM)	SIZE (IN)
210	10X6 OR 8"
215 TO 380	14X6 OR 10"
381 TO 610	16X8 OR 12"
610 TO 910	20X8 OR 14"
911 TO 1300	24X10 OR 16"
1301 TO 1790	30X10 OR 18"
1791 TO 2000	30X12 OR 20"

FOR LOW VELOCITY SUPPLY AND RETURN DUCT.

KITCHEN EXHAUST HOOD SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	LENGTH X WIDTH	EXHAUST COLLAR				MAKE-UP COLLAR				AC COLLAR			HOOD CONSTRUCTION	FIRE SYSTEM	FIRE SYSTEM PIPING	WT. (LBS)	REMARKS	
					CFM	LENGTH	WIDTH	ESP	QUANTITY	CFM	LENGTH	WIDTH	ESP	CFM	DIAMETER						ESP
KEH	1	CAPTIVEAIRE	5430 ND-2-ACPSP-F	7'-11" X 76"	1385	10"	13"	-0.525	2	554	28"	10"	0.143	400	8"	0.03	430 SS	ANSUL R102	YES	765	1, 2
KEH	2	CAPTIVEAIRE	5430 ND-2-ACPSP-F	7'-10" X 76"	1371	10"	13"	-0.515	2	548	28"	10"	0.141	400	8"	0.03	430 SS	ANSUL R102	YES	580	1, 2

NOTES:

1. PROVIDE WITH UL APPROVED MANUAL AIR VOLUME DAMPER ON EXHAUST COLLAR BY HOOD MANUFACTURER.
2. SEE M801-M806 FOR ADDITIONAL REQUIREMENTS AND FIELD WIRING.

LOUVER SCHEDULE

ITEM	ITEM NO.	MANUFACTURER	MODEL	SIZE (L" x W")	REMARKS
L	1	RUSKIN	L637SD	30 x 18	1, 2, 3
L	2	RUSKIN	L637SD	18 x 12	1, 2, 3

NOTES:

1. PROVIDE 1/2" MESH ALUMINUM BIRDSCREEN.
2. LOUVER COLOR SHALL MATCH WALL, COORDINATE WITH ARCHITECT.
3. PROVIDE WITH LOW-LEAKAGE BACKDRAFT DAMPER.

REFRIGERANT VOLUME CALCULATION					
SYSTEM	AREA (SQ. FT.)	VOLUME (FT. ³)	CODE REQUIRED R-410A	SYSTEM VOLUME (LBS)	
CU-1/FC-1/FC-2/FC-3			26 LBS/1000 (FT. ³) (TABLE 1102.2)		
DINING 101	475	6650		172.9	75.9
OPEN KITCHEN102/BACK KITCHEN 103	450	4500		117	

Date Description

03/24/2022	ISSUE FOR PERMIT/BD
08/05/2022	ADDENDUM #2
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name

SHAKE SHACK - VICTORIA GARDENS

Project Number

005.3846.000

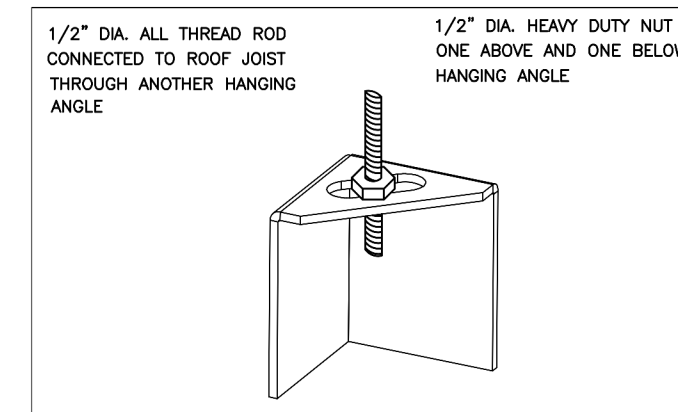
Description

MECHANICAL SCHEDULES

Scale

NTS

M701



*HOOD AND NUTS TO BE SUPPLIED BY INSTALLING CONTRACTOR HANGING ANGLE IS PRE-FABRICATED AT FACTORY

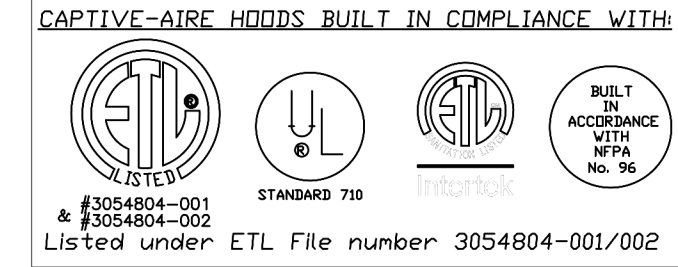
HANGING ANGLE DETAILS

HOOD STYLE / MODEL	450 DEGREES cfm/ft.	600 DEGREES cfm/ft.	700 DEGREES cfm/ft.
CANOPY ND-2	150	200	250
CANOPY ND-2 w/ END PANELS	105	140	175
SLOPED SND-2	228	294	-
ISLAND ND-2WI	269	300	350
ISLAND ND-2I	346	422	475

ETL HOOD LISTING DETAIL

EXHAUST CFM = LENGTH OF HOOD X CFM/IN.FT. (LOAD)
SUPPLY CFM = EXHAUST CFM X PERCENTAGE REQUIRED
TOTAL DUCT AREA (sq. in.) = 144 X CFM²
DUCT LENGTH = TOTAL DUCT AREA
DUCT WITH CAPTIVEAIRE VENTILATOR DUCT SIZES ARE CALCULATED USING AN EXHAUST VELOCITY OF 1500-1800 FPM AND A SUPPLY VELOCITY OF 1000 FPM.

CAPTIVEAIRE HOODS BUILT IN COMPLIANCE WITH



ETL LISTED UNDER ETL FILE NUMBER 3054804-001/002

BUILDING CODES

CAPTIVEAIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:
MATERIAL CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE NONE REQUIRED
LIMITED-COMBUSTIBLE 3" UNINSULATED STANDOFF
COMBUSTIBLE 1" UNINSULATED STANDOFF

CLEARANCE TO COMBUSTIBLES

INSTALLATION

1. ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
2. ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
3. HANGING BRACKETS LOCATED AND RELEASE AS SHOWN ON PLANS. ALL OTHER HANGING MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
4. ALL CONNECTIONS FROM CAPTIVEAIRE HOOD PER MECHANICAL CONTRACTORS PLANS.
5. COOKING EQUIPMENT TO SHUT OFF IN EVENT OF FIRE.
6. EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
7. ALL LIGHT FIXTURES SHOWN INSTALLED BY CAPTIVEAIRE ARE FACTORY PROVIDED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES ARE BY ELECTRICAL CONTRACTOR.
8. LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
9. SIGNIFICANT RESTRICTIONS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
10. INSTALLING CONTRACTORS ASSUME ALL RELATED RESPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION, AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

BALANCE

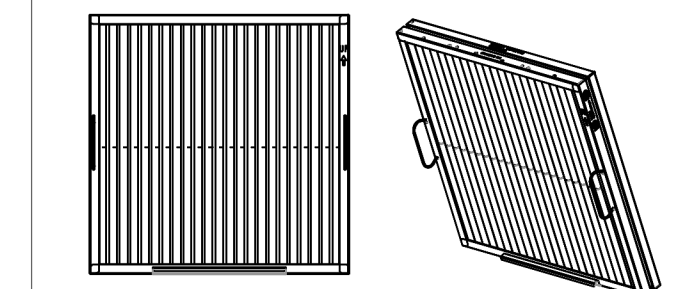
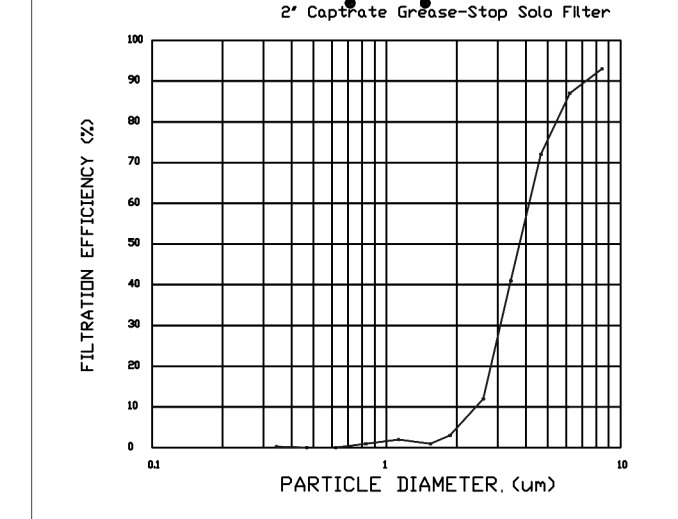
11. KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
12. KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DRINK AREA.
13. RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

ADDITIONAL

14. WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
15. SHOWN AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE PROVIDED TO THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.

GENERAL NOTES

FILTER COLLECTION EFFICIENCY



CaptiveAire Captrate Solo Filter
ETL Listed Grease Extracting Filters
Made From 430 Stainless Steel

FILTER DETAIL

HOOD INFORMATION - JOB#5376350

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S)				MUA CFM	AC CFM	HOOD CONSTRUCTION	HOOD CONFIG		
										WIDTH	LENG	HEIGHT	DIA				CFM	VEL	SP
1	Hood Left	S430 ND-2-ACPS-P-F	CAPTIVEAIRE	7' 11"	600 DEG	I	HEAVY	175	1385	10"	13'	4'	1385	1534	-0.525'	1108	430 SS WHERE EXPOSED	LEFT	ALONE
2	Hood Right	S430 ND-2-ACPS-P-F	CAPTIVEAIRE	7' 10"	600 DEG	I	HEAVY	175	1371	10"	13'	4'	1371	1519	-0.515'	1097	430 SS WHERE EXPOSED	RIGHT	ALONE

HOOD INFORMATION

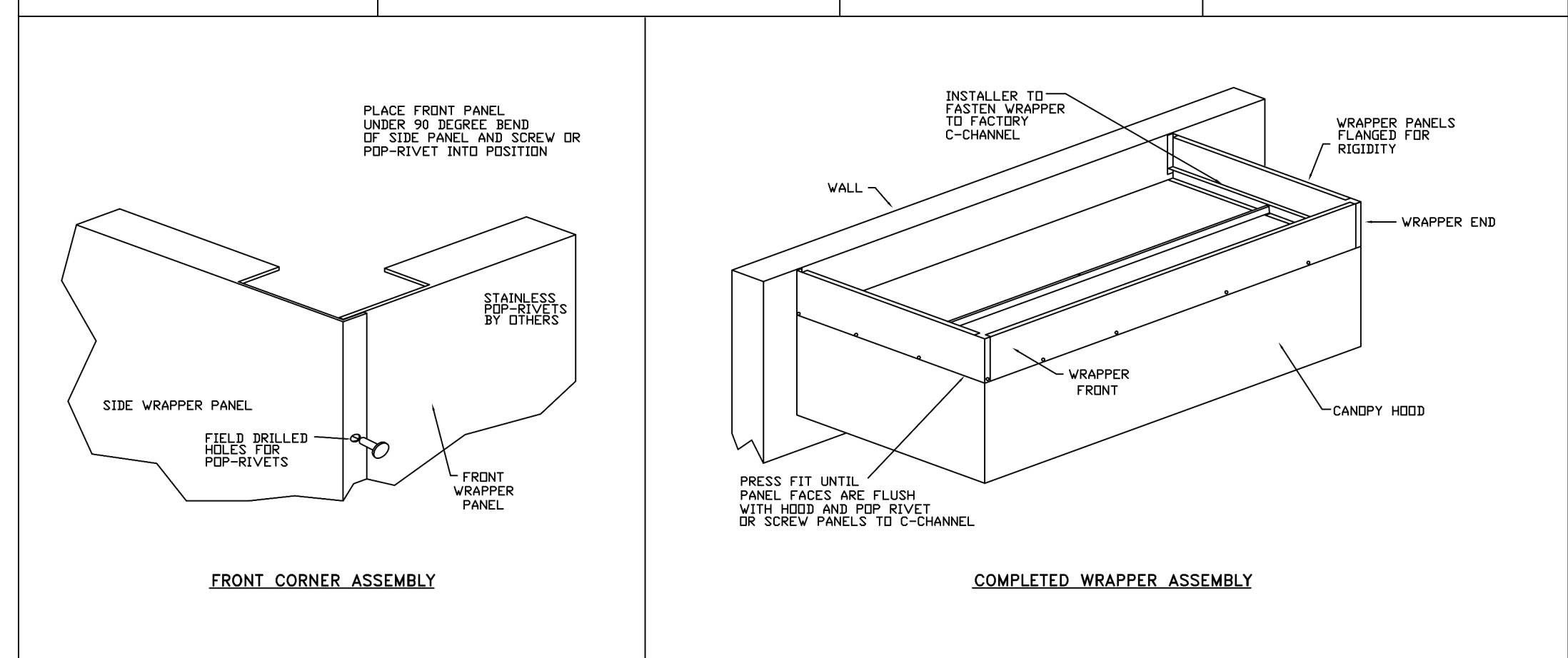
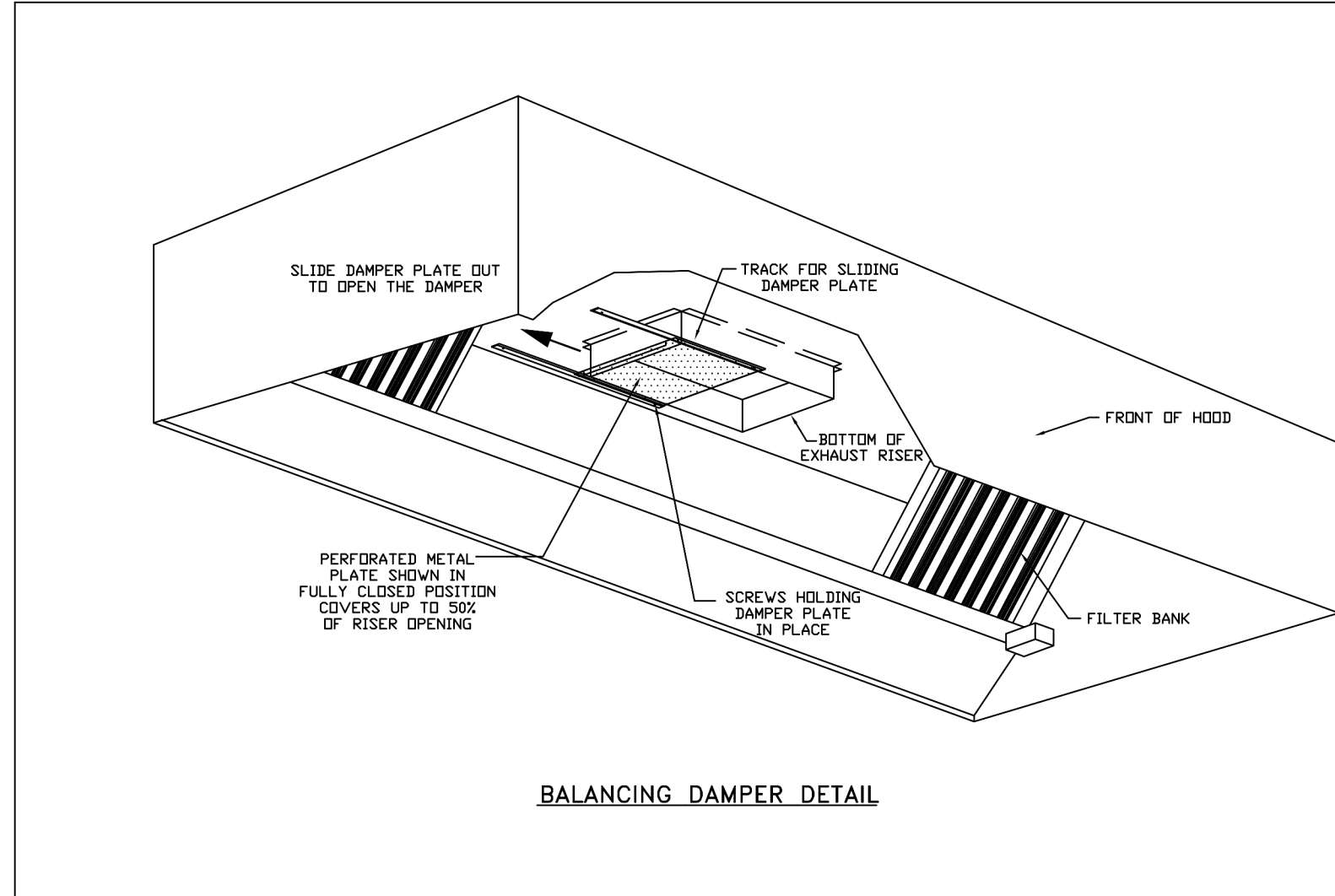
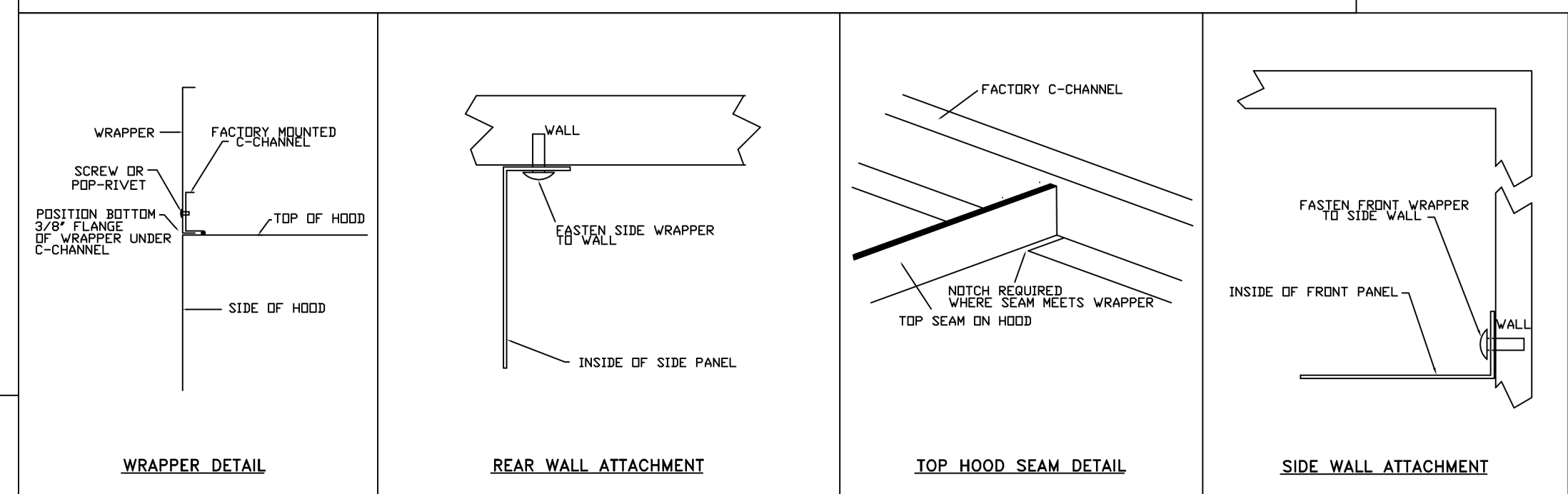
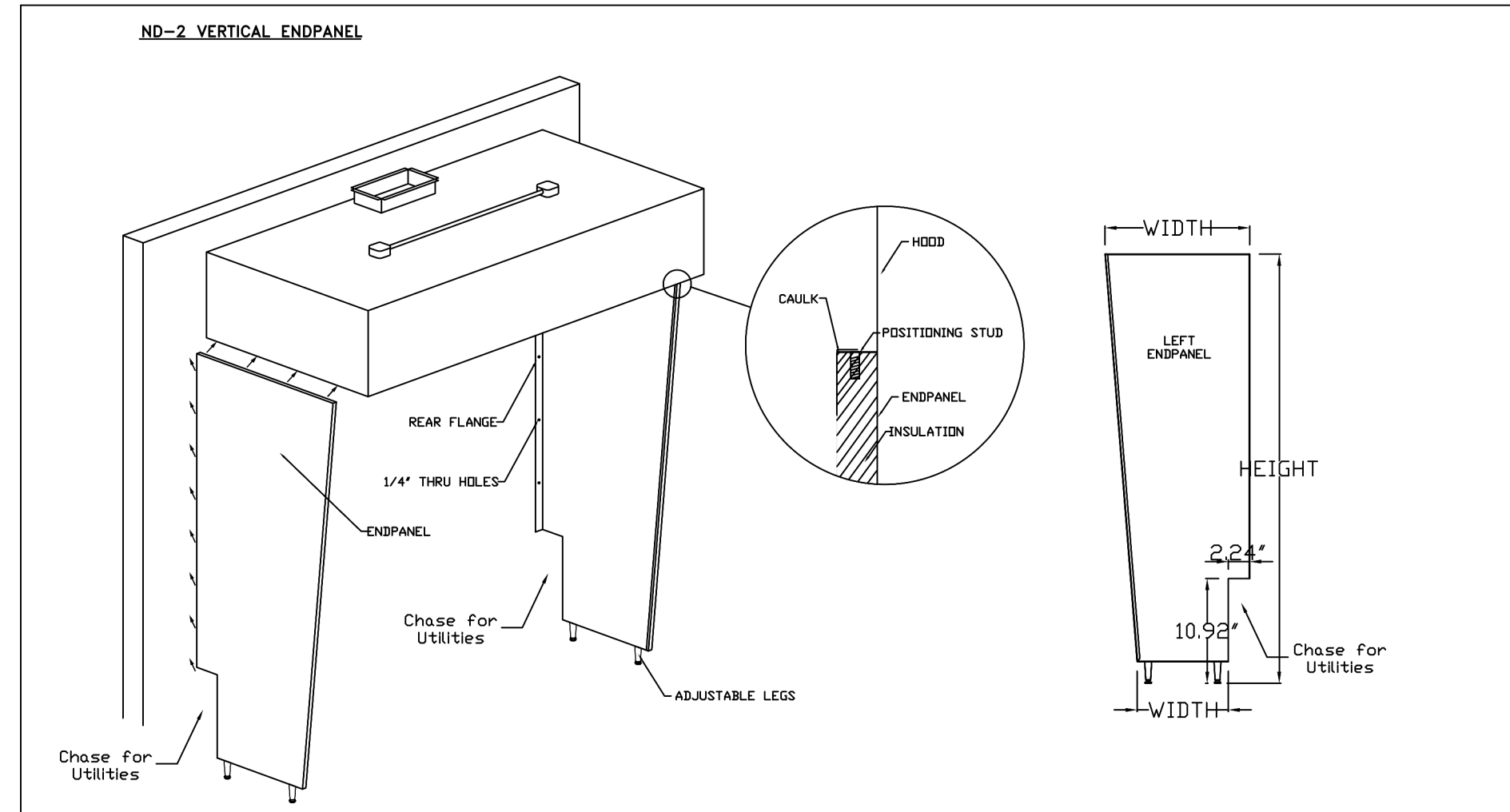
HOOD NO	TAG	FILTER(S)				LIGHT(S)				UTILITY CABINET(S)				FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
		TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	QTY	TYPE	LOCATION	SIZE	TYPE	SIZE	ELECTRICAL MODEL #		
1	Hood Left	CAPTRATE SOLD FILTER	5	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO	LEFT	12"x54"x30"	ANSUL R-102	3.0/3.0/3.0		770 LBS
2	Hood Right	CAPTRATE SOLD FILTER	5	20"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO						532 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	Hood Left	FIELD WRAPPER 12.00" HIGH FRONT, LEFT. BALANCE DAMPERS. RISER SENSOR INSTALL 6IN PLEN. LEFT WIDE VERTICAL END PANEL 42" TOP WIDTH, 36" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.
2	Hood Right	FIELD WRAPPER 12.00" HIGH FRONT. RIGHT END STANDOFF (FINISHED) 1' WIDE 54" LONG INSULATED. BALANCE DAMPERS. RISER SENSOR INSTALL 6IN PLEN. RIGHT WALL AS END PANEL.

PERFORATED SUPPLY PLENUM(S)

HOOD NO	TAG	POS	LENGTH	WIDTH	HEIGHT	TYPE	RISER(S)			
							WIDTH	LENG	DIA	CFM
1	Hood Left	Front	107'	22'	6'	MUA	10"	28"	554	0.143'
							10"	28"	554	0.143'
							8"	100	0.032"	
							8"	100	0.032"	
							8"	100	0.032"	
							8"	100	0.032"	
2	Hood Right	Front	95'	22'	6'	MUA	10"	28"	548	0.141'
							10"	28"	548	0.141'
							8"	100	0.032"	
							8"	100	0.032"	
							8"	100	0.032"	
							8"	100	0.032"	



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVEAIRE
www.captiveaire.com
Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg1108@captiveaire.com

Shake Shack-1436-Victoria Gardens, CA-R2
RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022
DWG.#: 5376350
DRAWN BY: joe.shilba
SCALE: 3/4" = 1'-0"
MASTER DRAWING
SHEET NO. 1

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name
SHAKE SHACK - VICTORIA GARDENS
Project Number
005.3846.000
Description
CAPTIVEAIRE DRAWINGS

Scale

REVISIONS	
DESCRIPTION	DATE

CAPTIVE
Eastern PA Mechanical
www.captiveaire.com
PO Box 2620, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 604-4126 EMAIL: reg108@captiveaire.com

Shake Shack-1436-Victoria Gardens, CA-R2
RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022
DWG.#: 5376350
DRAWN BY: joe.shilba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 2

Date	Description
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09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature

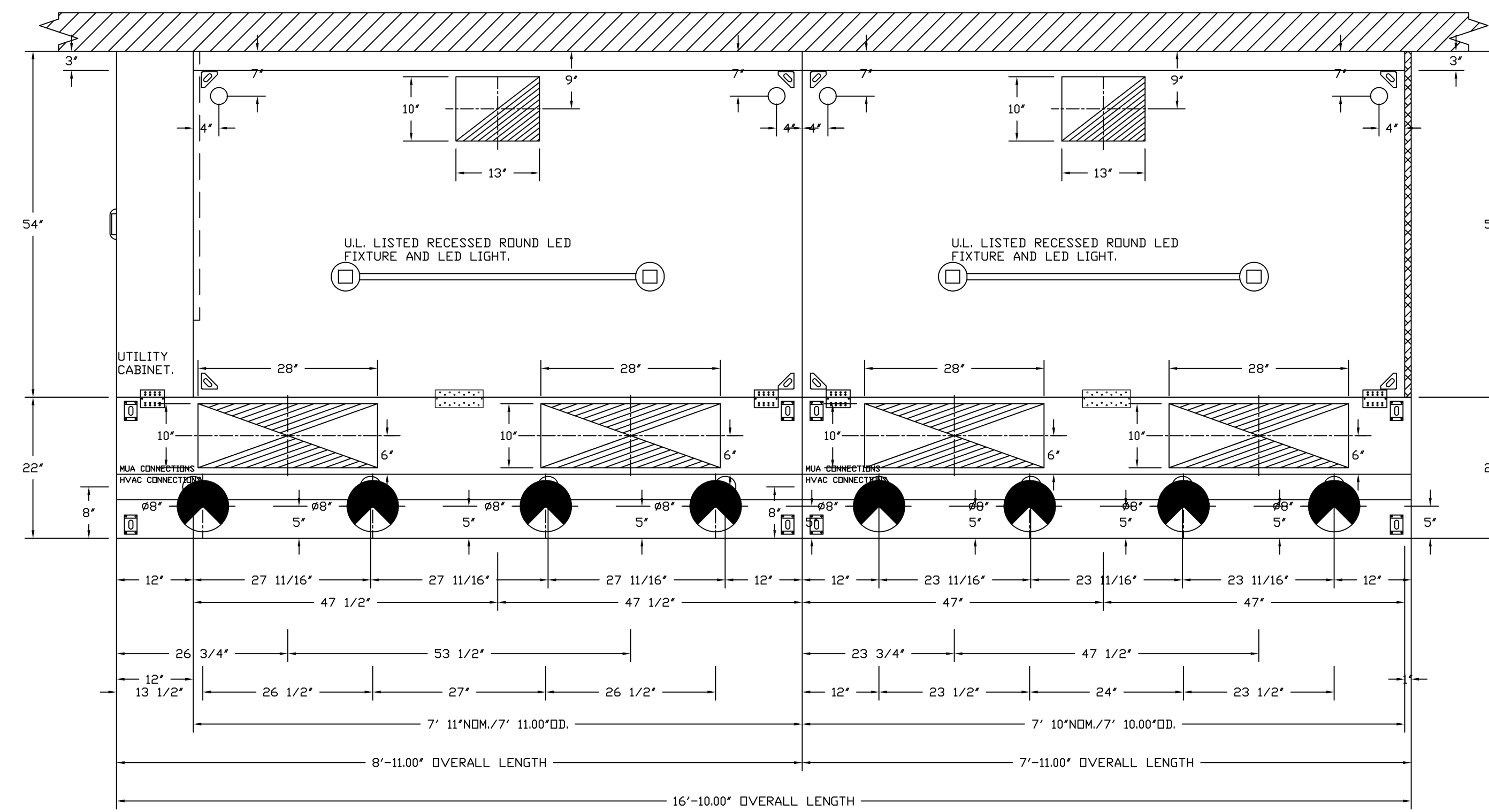


Project Name
SHAKE SHACK - VICTORIA GARDENS

Project Number
005.3846.000

Description
CAPTIVEAIRE DRAWINGS

Scale

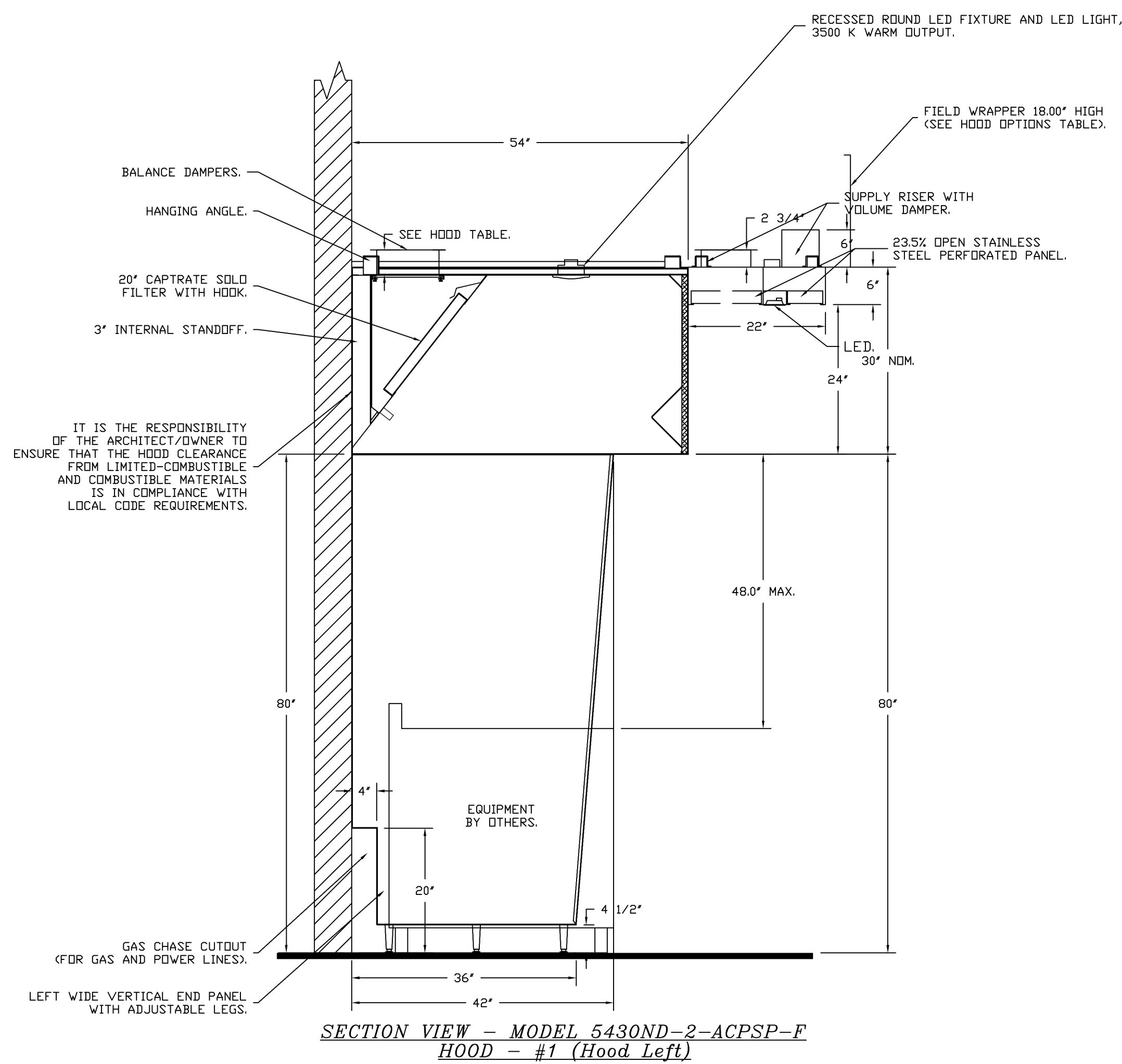


PLAN VIEW - HOOD #1 (Hood Left)
7' 11.00" LONG 54.30ND-2-ACPSP-F

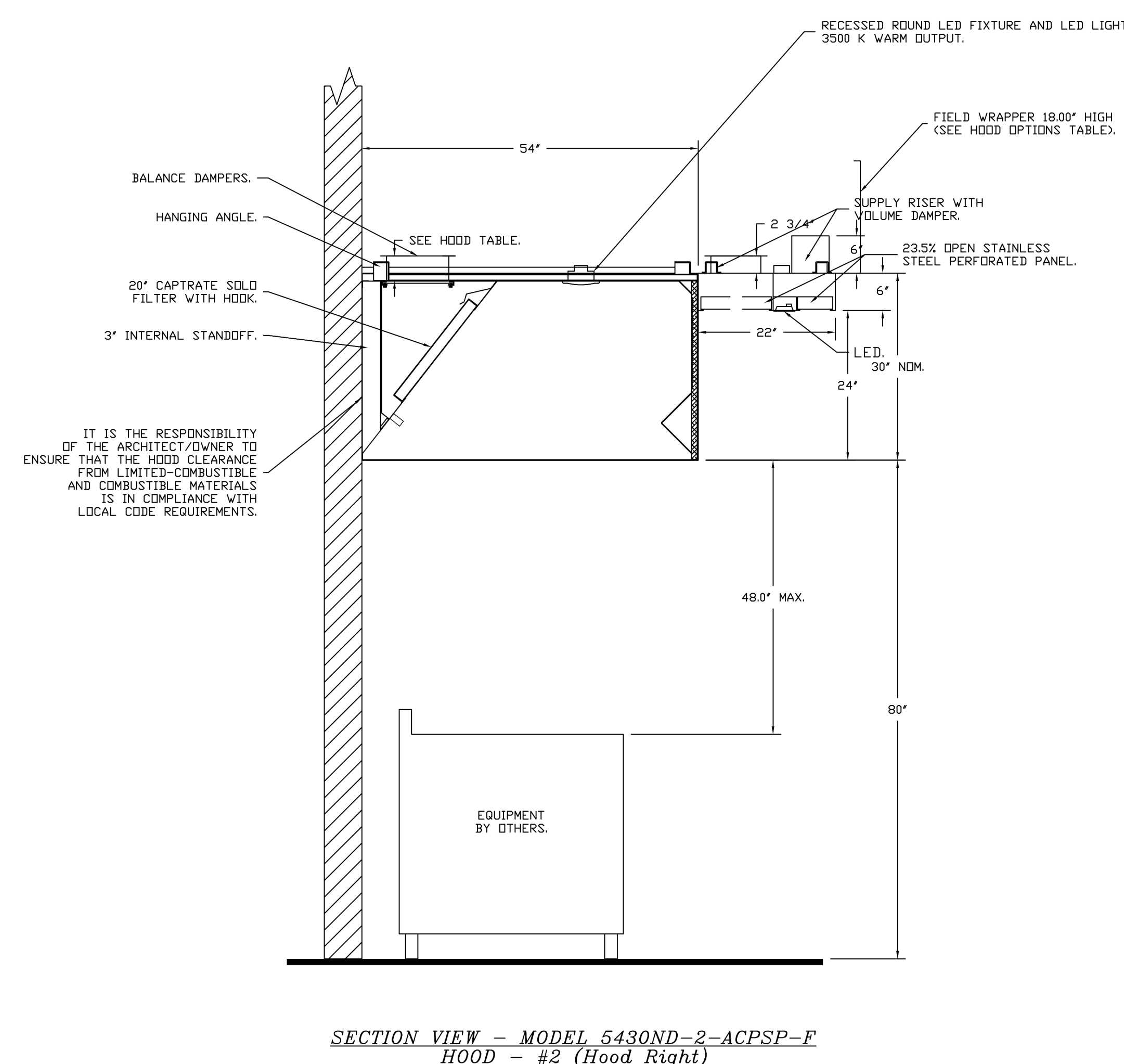
PLAN VIEW - HOOD #2 (Hood Right)
7' 10.00" LONG 54.30ND-2-ACPSP-F

ACPSP SHIPS LOOSE FOR FIELD INSTALLATION

ACPSP SHIPS LOOSE FOR FIELD INSTALLATION



SECTION VIEW - MODEL 5430ND-2-ACPSP-F
HOOD - #1 (Hood Left)



SECTION VIEW - MODEL 5430ND-2-ACPSP-F
HOOD - #2 (Hood Right)

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Tel 213.327.3600
Fax 213.327.3601

Contact:
Bryan Walsingham
Tel 213.239.8240



2361 ROSECRANS AVENUE
SUITE 368
EL SEQUENDO, CA 90245
Tel 310.725.1500
Fax 310.725.4699



505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02703
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

FIRE SYSTEM INFORMATION - JOB#5376350

FIRE SYSTEM NO	TAG	TYPE	SIZE	FLOW POINTS	INSTALLATION	
					SYSTEM	LOCATION ON HOOD
1		ANSUL R102	3.0/3.0/3.0	32	FIRE CABINET LEFT	LEFT, HOOD 1

CAS VALVE(S)

FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY
1		MECHANICAL	2.000	CAPTIVEAIRE SYSTEMS

NOTES

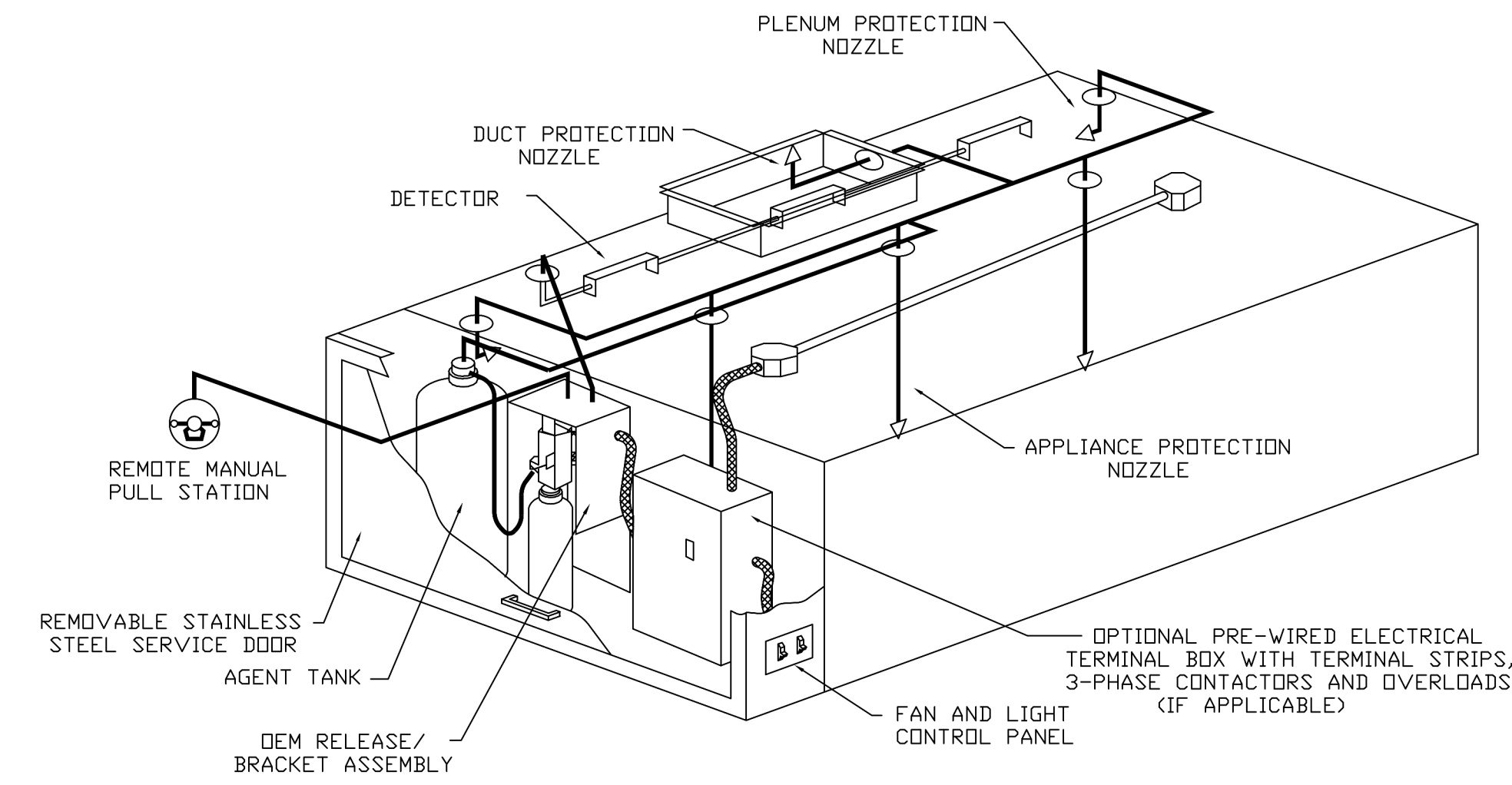
- FIELD PIPE DROPS AS SHOWN
- SLEEVING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- MAXIMUM 9 ELBOWS IN SUPPLY LINE.
- MINIMUM 72 INCHES OF AGENT LINE FROM TANK TO FIRST NOZZLE
- COVERING A RANGE, FRYER, OR WOK TO REFLECT GENERAL PIPING REQUIREMENTS.
- IF APPLICABLE, PRE-PIPED CHARBROILER DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6' ABOVE THE TOP OF THE HOOD.
- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.
- THIS FIRE SYSTEM COMPLIES WITH UL 300 REQUIREMENTS.

JOB #: 5376350.
JOB NAME: SHAKE SHACK-1436-VICTORIA GARDENS,CA-R2.

SYSTEM SIZE: ANSUL-3.0/3.0/3.0 TOTAL FP REQUIRED: 32.
HOOD # 1 7' 11.00" LONG x 54" WIDE x 30" HIGH.
RISER # 1 SIZE: 10" x 13".
HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.
HOOD # 2 7' 10.00" LONG x 54" WIDE x 30" HIGH.
RISER # 1 SIZE: 10" x 13".
HOOD # 2 METAL BLOW-OFF CAPS INCLUDED.

LEGEND - FIRE CABINET ANSUL SYSTEM

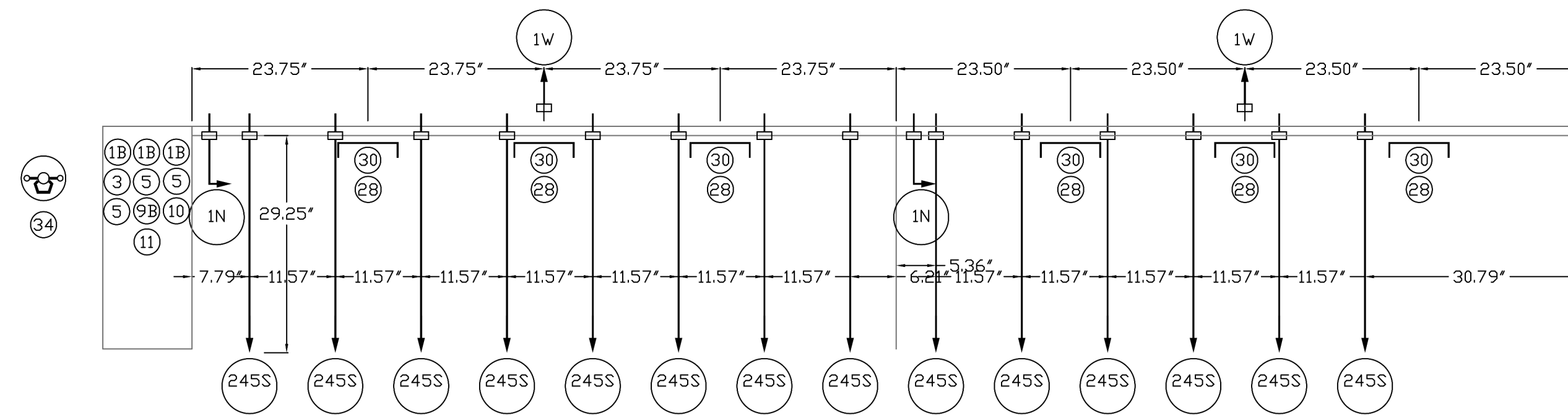
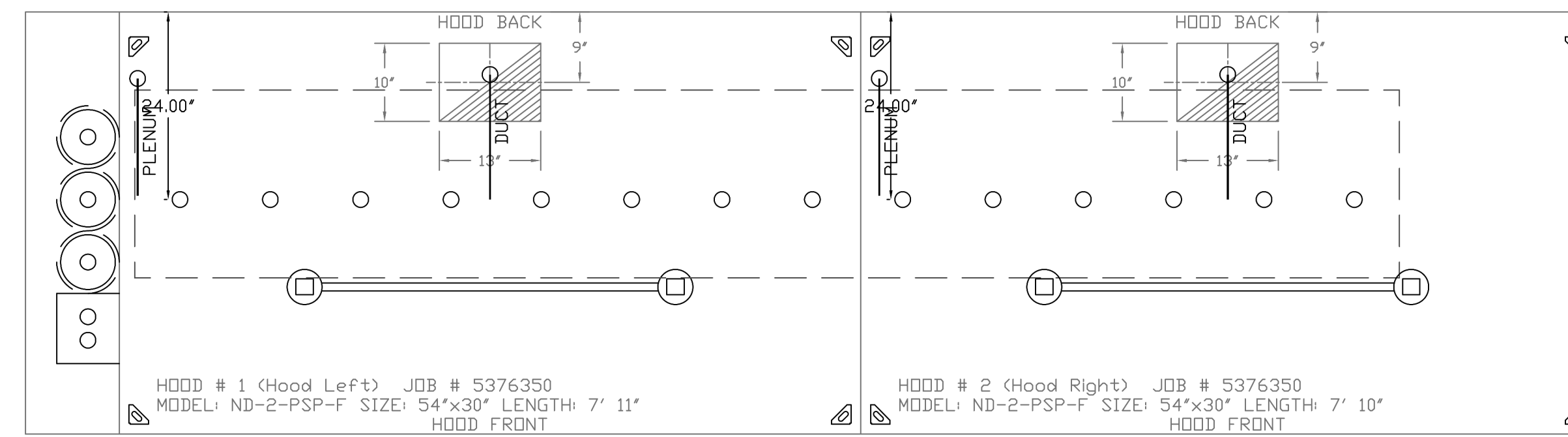
- 1A 1.5 GALLON TANK.
- 1B 3 GALLON TANK.
- 2 DEM AUTOMAN RELEASE.
- 3 DEM REGULATED RELEASE.
- 4 DEM REGULATED ACTUATOR.
- 5 ANSULEX LIQUID AGENT (3 GAL.).
- 6 ANSULEX LIQUID AGENT (1.5 GAL.).
- 7 CARTRIDGE (101-20).
- 8 CARTRIDGE (101-10).
- 9 CARTRIDGE (101-30).
- 9A CARTRIDGE (LT-A-101-30).
- 9B DOUBLE TANK CARTRIDGE.
- 10 TEST LINK.
- 11 DOUBLE MICROSWITCH.
- 12 HOSE ASSEMBLY.
- 1100 DUCT NOZZLE (430913).
- 2W DUCT NOZZLE (419337).
- 1W NOZZLE ASSEMBLY (419336).
- 1F NOZZLE ASSEMBLY (419333).
- 1N NOZZLE ASSEMBLY (419335).
- 1/2N NOZZLE ASSEMBLY (419334).
- 3N NOZZLE ASSEMBLY (419338).
- 245 NOZZLE ASSEMBLY (419340).
- 230 NOZZLE ASSEMBLY (419339).
- 2120 NOZZLE ASSEMBLY (419343).
- 290 NOZZLE ASSEMBLY (419342).
- 260 NOZZLE ASSEMBLY (419341).
- 28 DETECTOR BRACKET.
- 29 LOW TEMP FUSIBLE LINK.
- 30 HIGH TEMP FUSIBLE LINK.
- MGV MECHANICAL GAS VALVE.
- EGV ELECTRICAL GAS VALVE.
- 34 REMOTE MANUAL PULL STATION.
- S SWIVEL ADAPTOR.



TYPICAL ANSUL R-102 SYSTEM LAYOUT

JOB #: 5376350.
JOB NAME: SHAKE SHACK-1436-VICTORIA GARDENS,CA-R2.

SYSTEM SIZE: ANSUL-3.0/3.0/3.0 TOTAL FP REQUIRED: 32.
HOOD # 1 7' 11.00" LONG x 54" WIDE x 30" HIGH.
RISER # 1 SIZE: 10" x 13".
HOOD # 2 7' 10.00" LONG x 54" WIDE x 30" HIGH.
RISER # 1 SIZE: 10" x 13".



ANSUL OVERLAPPING
HIGH PROXIMITY
162.00" L X24.00" D

REVISIONS

DESCRIPTION	DATE

CAPTIVEAIRE

Eastern PA Mechanical
PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg186@captiveaire.com

Shake Shack-1436-Victoria Gardens,CA-R2
RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022

DWG.#: 5376350

DRAWN BY: Joe.shilba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 3

Date	Description
03/24/2022	ISSUE FOR PERMIT/BD
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name

SHAKE SHACK - VICTORIA GARDENS

Project Number

005.3846.000

Description

CAPTIVEAIRE DRAWINGS

Scale

M803

EXHAUST FAN INFORMATION - JOB#5376350

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL.	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SDNES
2	KEF-1	1	DUI80HFA	CAPTIVEAIRE	2756	2.000	1426	DDP,PREMIUM	3.000	1.9120	3	460	4.3	636 FPM	188	21

MUA FAN INFORMATION - JOB#5376350

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP	RPM	MOTOR ENCL.	HP	BHP	PHASE	VOLT	FLA	MCA	MDCP	EVAP FLOW RATE (Gal/Hr)	EVAP COOLER ENTERING DB TEMP	EVAP COOLER ENTERING WB TEMP	EVAP COOLER LEAVING DB TEMP	EVAP COOLER LEAVING WB TEMP	WEIGHT (LBS)	SDNES
1	MAU-1	1	A1-D.250-16Z	16Z-1-MDD	A1-D.250	1000	2205	1.000	2777	DDP-ECM	3.400	2.5080	3	460	3.3	4.2A	15A	3.53	100.0°F	70.0°F	82.0°F	70.0°F	616	32

GAS FIRED MAKE-UP AIR UNIT(S)

FAN UNIT NO	TAG	INPUT BTUS	OUTPUT BTUS	TEMP RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE	BURNER EFFICIENCY(%)
1	MAU-1	96868	89119	40°F	7 IN. W.C. - 14 IN. W.C.	NATURAL	92

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1	MAU-1	1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, -5 TO 15" WC
		1	LDV FIRE START
		1	MOTORIZED BACKDRAFT DAMPER FOR A1-D HOUSING - MEETS AMCA CLASS 1A RATING
		1	DF1 INDOOR HANGING OPTION - INCLUDES 2 HSA125 HANGING SPRING ISOLATORS PER UNI-STRUT
		1	IBT/MUA EVAP INTERLOCK
		1	COMMERCIAL SMOKE DETECTOR/ALARM INTERLOCK - ALARM SUPPLIED BY OTHERS
		1	OCCUPIED SCHEDULING
		1	CLOGGED FILTER SWITCH - NOTIFICATION ON HMI
		1	FREEZE/STAT
2	KEF-1	1	ECM WIRING PACKAGE-SUPPLY - PWM SIGNAL FROM ECPM03 PREWIRE (3 - PHASE ZIEHL MOTOR)
		1	2 YEAR PARTS WARRANTY
2	KEF-1	1	GREASE BOX
		1	FAN BASE CERAMIC SEAL - INSTALLED AT PLANT - FOR GREASE DUCTS
		1	2 YEAR PARTS WARRANTY

FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1	MAU-1				YES		YES	
2	KEF-1	YES						

CURB ASSEMBLIES

NO	DN FAN	TAG	WEIGHT	ITEM	SIZE
2	# 2	KEF-1	41 LBS	CURB	26.500"W X 26.500"L X 20.000"H ALONG LENGTH, RIGHT VENTED HINGED.

REVISIONS	
DESCRIPTION	DATE

CAPTIVE

Eastern PA Mechanical
PO Box 2550, 1 Union Ave, Bala Cynwyd, PA 19004 PHONE: (267) 504-4126 EMAIL: resp108@captivemechanical.com

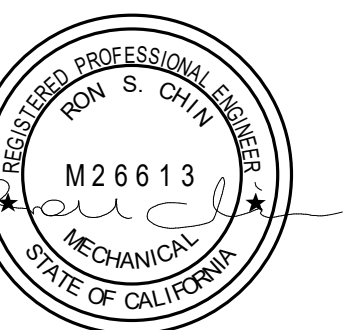
Shake Shack-1436-Victoria Gardens, CA-R2
RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022
DWG.#: 5376350
DRAWN BY: Joe.shilba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO.
4

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

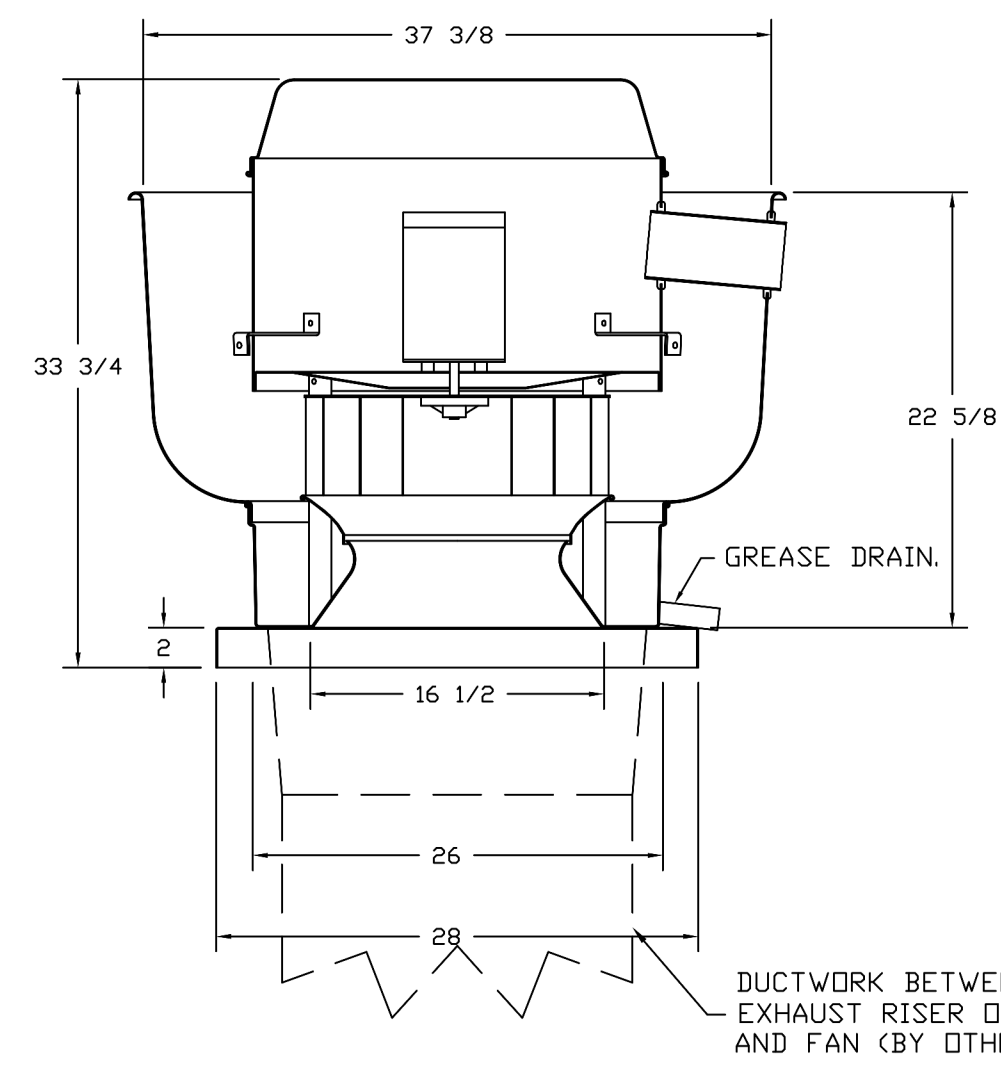
Seal / Signature



Project Name
SHAKE SHACK - VICTORIA GARDENS
Project Number
005.3846.000
Description
CAPTIVEAIRE DRAWINGS

Scale

FAN #2 DU180HFA - EXHAUST FAN (KEF-1)



TOP VIEW

FEATURES:

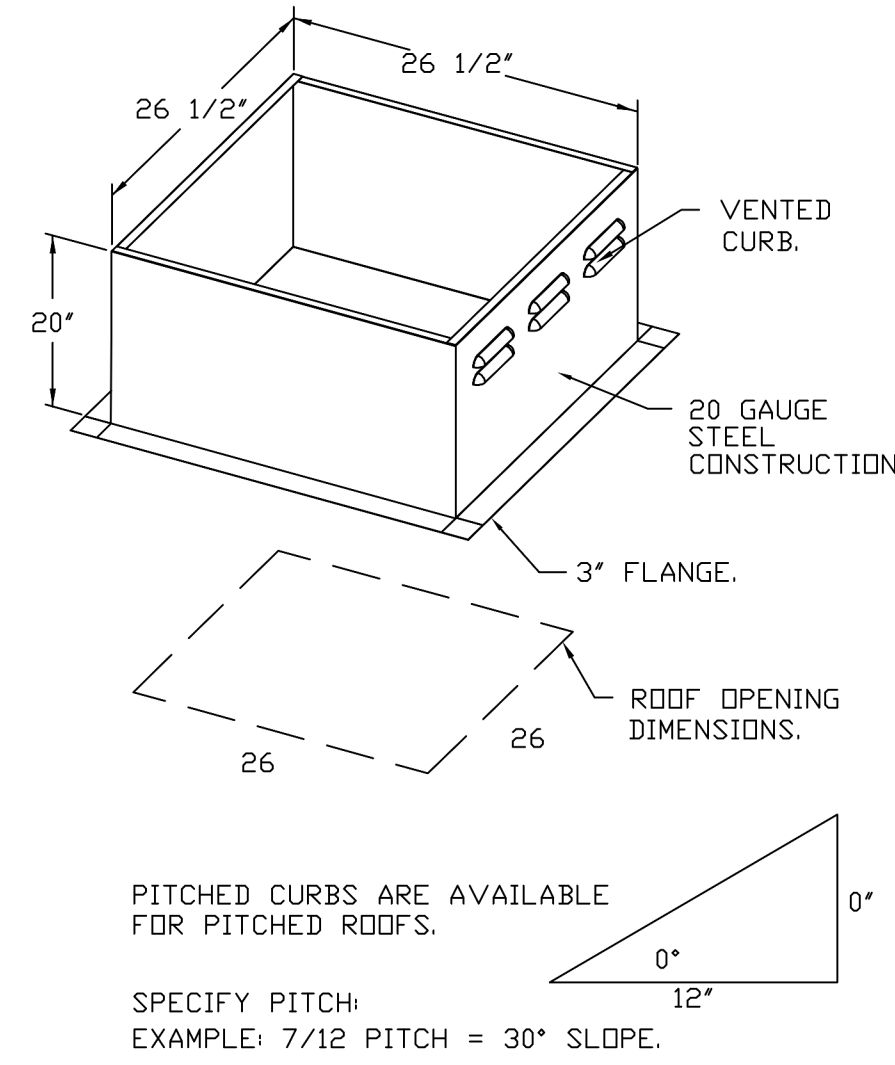
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-5645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

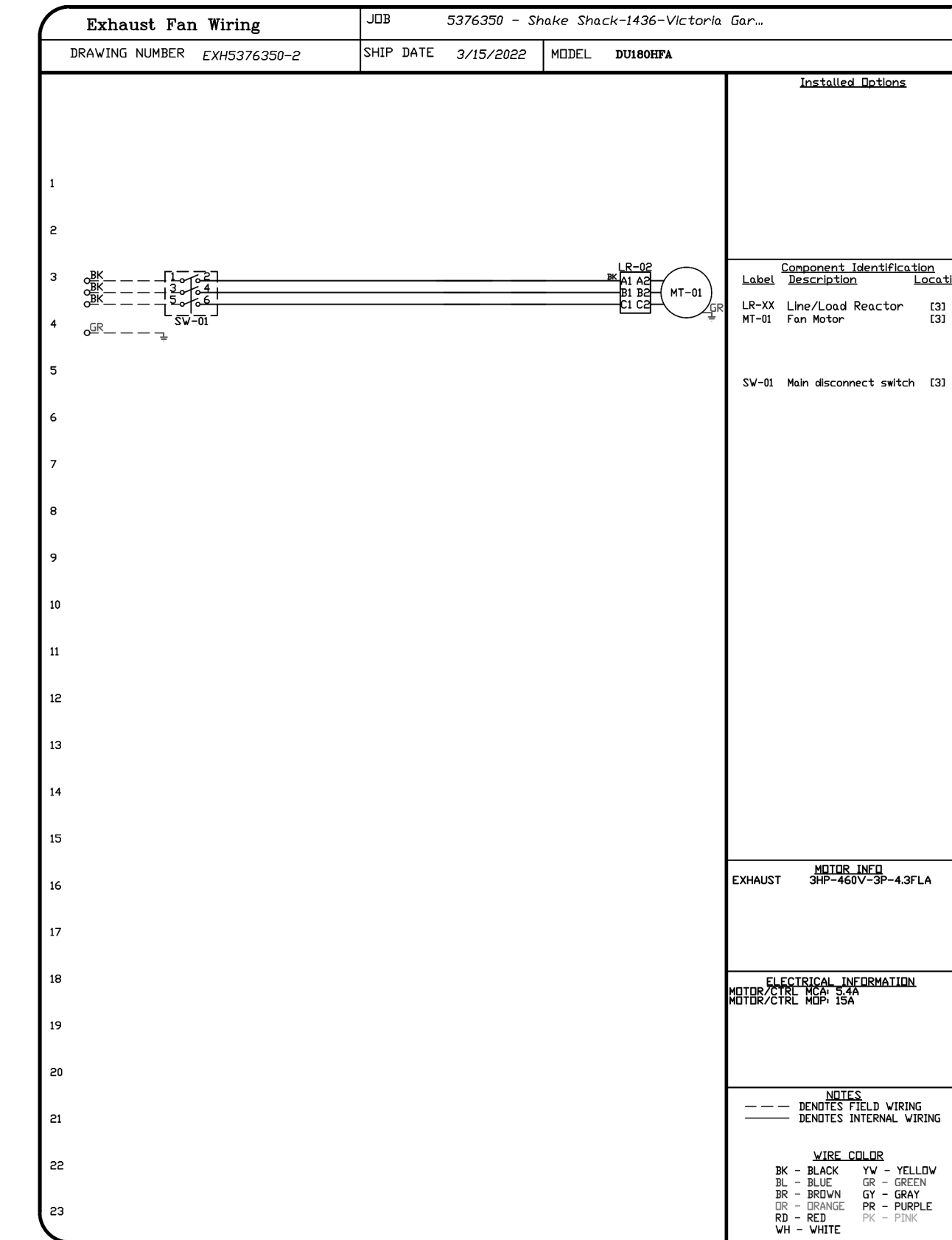
ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS

GREASE BOX:
FAN BASE CERAMIC SEAL - INSTALLED AT PLANT - FOR GREASE DUCTS.
LEAD REACTOR MOUNTED IN FAN.
2 YEAR PARTS WARRANTY.



PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.
SPECIFY PITCH.
EXAMPLE: 7/12 PITCH = 30° SLOPE.



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVEAIR
Eastern PA Mechanical
www.captiveair.com
PO Box 2520, 1 Union Ave. East Croydon, PA 19024 PHONE: (267) 504-4126 EMAIL: mg108@captiveair.com

Shake Shack-1436-Victoria Gardens, CA-R2
RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022
DWG.#: 5376350
DRAWN BY: Joe.shilka
SCALE: 3/4" = 1'-0"
MASTER DRAWING
SHEET NO. 5

Gensler

500 South Figueroa Street
Los Angeles, California 90071
United States
Contact:
Bryan Walsingham
Tel 213.239.8240



2361 ROSECRANS AVENUE
SUITE 368
EL SEGUNDO, CA 90245
Tel 310.725.1500
Fax 310.725.4699



505 COLLINS ST
PO BOX 3505
SOUTH ATTLEBORO
MA 02743
Tel 508.399.6000
Fax 508.761.3620

Contact:
Michael Henderson
Tel 508.399.2392

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



Project Name
SHAKE SHACK - VICTORIA GARDENS
Project Number
005.3846.000
Description
CAPTIVEAIRE DRAWINGS

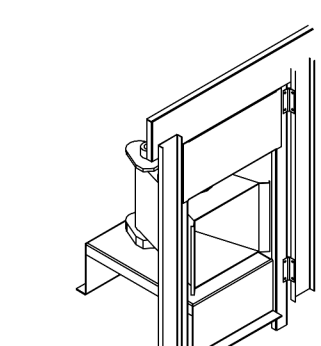
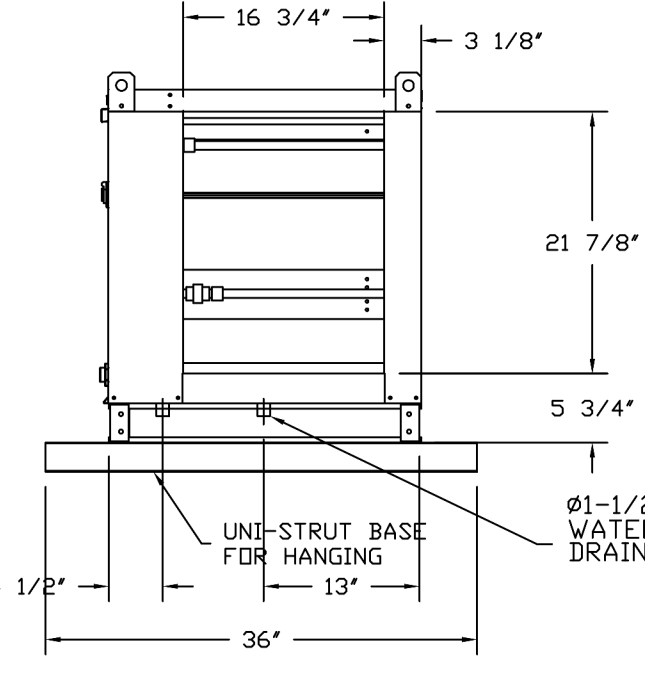
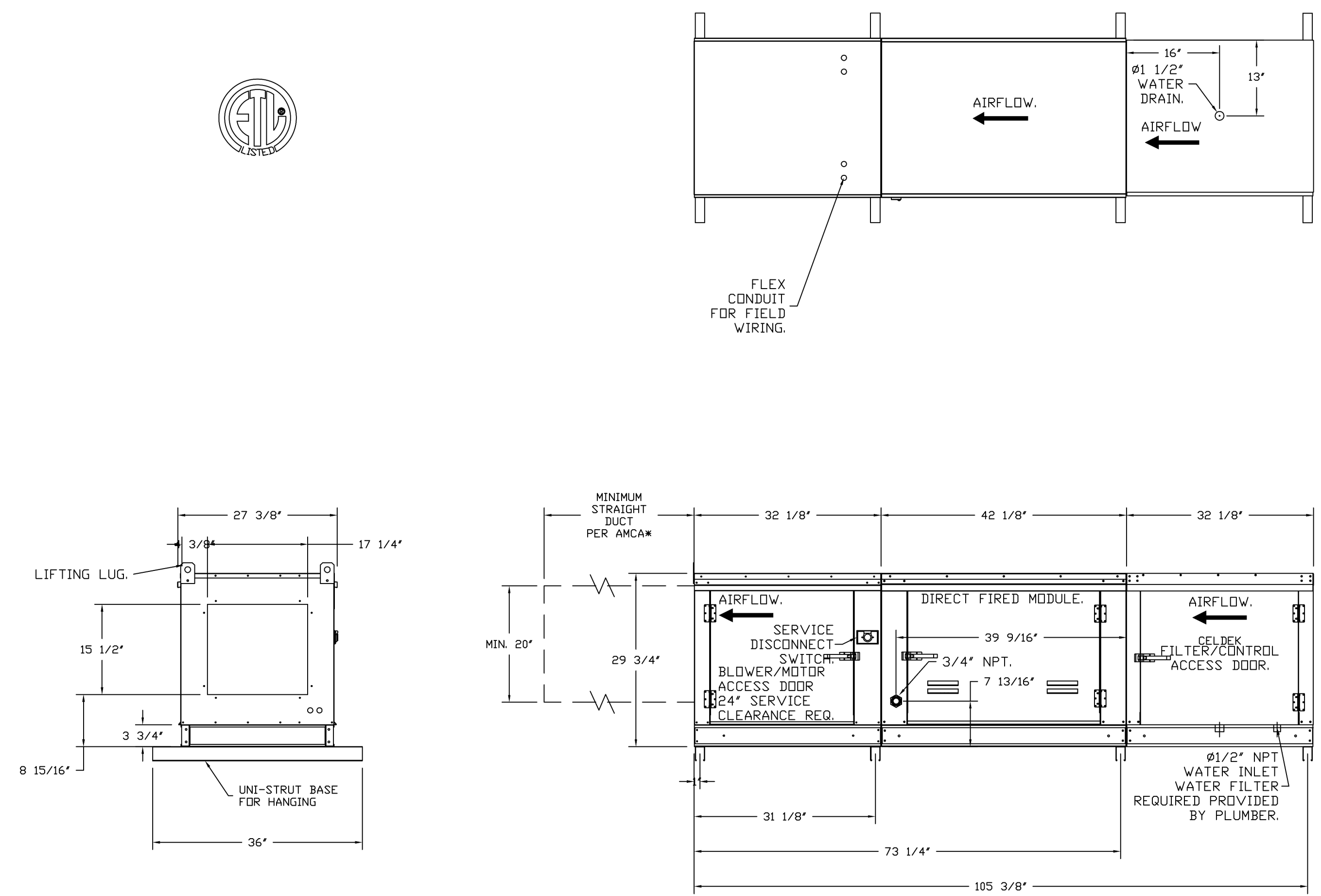
Scale

- FAN #1 AI-D250-16Z - HEATER (MAU-D)
1. DIRECT GAS FIRED HEATED MAKE UP AIR UNIT WITH 16" DIRECT DRIVE FAN.
 2. EVAP COOLER (CELBEK) - INDOOR.
 3. SIDE DISCHARGE - AIR FLOW RIGHT -> LEFT.
 4. GAS PRESSURE GAUGE, 0-35", 2.5" DIAMETER, 1/4" THREAD SIZE.
 5. GAS PRESSURE GAUGE, -5 TO +15 INCHES WC, 2.5" DIAMETER, 1/4" THREAD SIZE.
 6. LOW FIRE START - ALLOWS THE BURNER CIRCUIT TO ENERGIZE WHEN THE MODULATION CONTROL IS IN A LOW FIRE POSITION.
 7. MOTORIZED BACK DRAFT DAMPER 16" X 18" FOR SIZE 1 STANDARD & MODULAR HEATER UNITS W/EXTENDED SHAFT, STANDARD GALVANIZED CONSTRUCTION, 3/4" REAR FLANGE, LOW LEAKAGE, TUBES ACTUATOR INCLUDED.
 8. INDOOR HANGING CRADLE FOR THE SIZE 1 DIRECT FIRED UNIT. 2 HSA125 HANGING ISOLATORS PER UNI-STRUT INCLUDED.
 9. LAYER CONTROL FOR IBT EVAP.
 10. COMMERCIAL SMOKE DETECTOR INTERLOCK (DETECTOR BY OTHERS).
 11. OCCUPIED SCHEDULING DEFAULTED FOR IBT/RTU.
 12. CLOGGED FILTER SWITCH WITH NOTIFICATION ON HMI.
 13. FREEZE/STAT FACTORY SET AT 35°F AND 10 MINUTES.
 14. EDW WIRING PACKAGE FOR ZIEHL SUPPLY MOTORS WITH PWM SIGNAL FROM ECPM03 PREWIRE.
 15. HINGED DOUBLE WALL INSULATED DOOR ASSEMBLY (BURNER/BLDWER/EVAP SECTION).
 16. 2 YEAR PARTS WARRANTY.

NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 820. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES, FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT. SUGGESTED STRAIGHT DUCT SIZE IS 20" X 20".

SUPPLY SIDE HEATER INFORMATION

WINTER TEMPERATURE = 39°F, TEMP. RISE = 40°F.
 BTUS CALCULATED OFF ACTUAL AIR DENSITY.
 OUTPUT BTUS AT ALTITUDE OF 0.0 FT. = 99528.
 INPUT BTUS AT ALTITUDE OF 0.0 FT. = 101661.
 OUTPUT BTUS AT ALTITUDE OF 1330 FT. = 89119.
 INPUT BTUS AT ALTITUDE OF 1330 FT. = 96969.



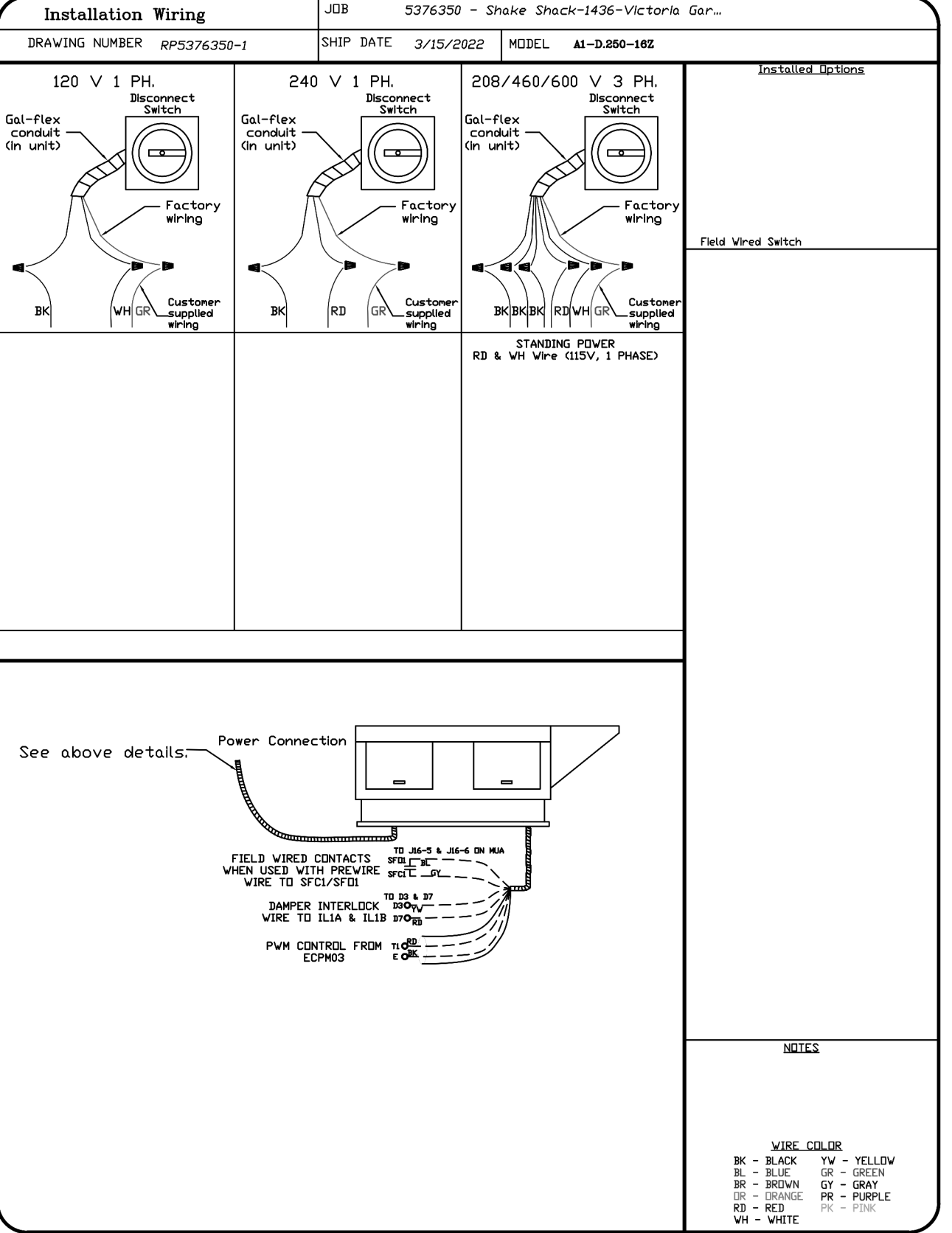
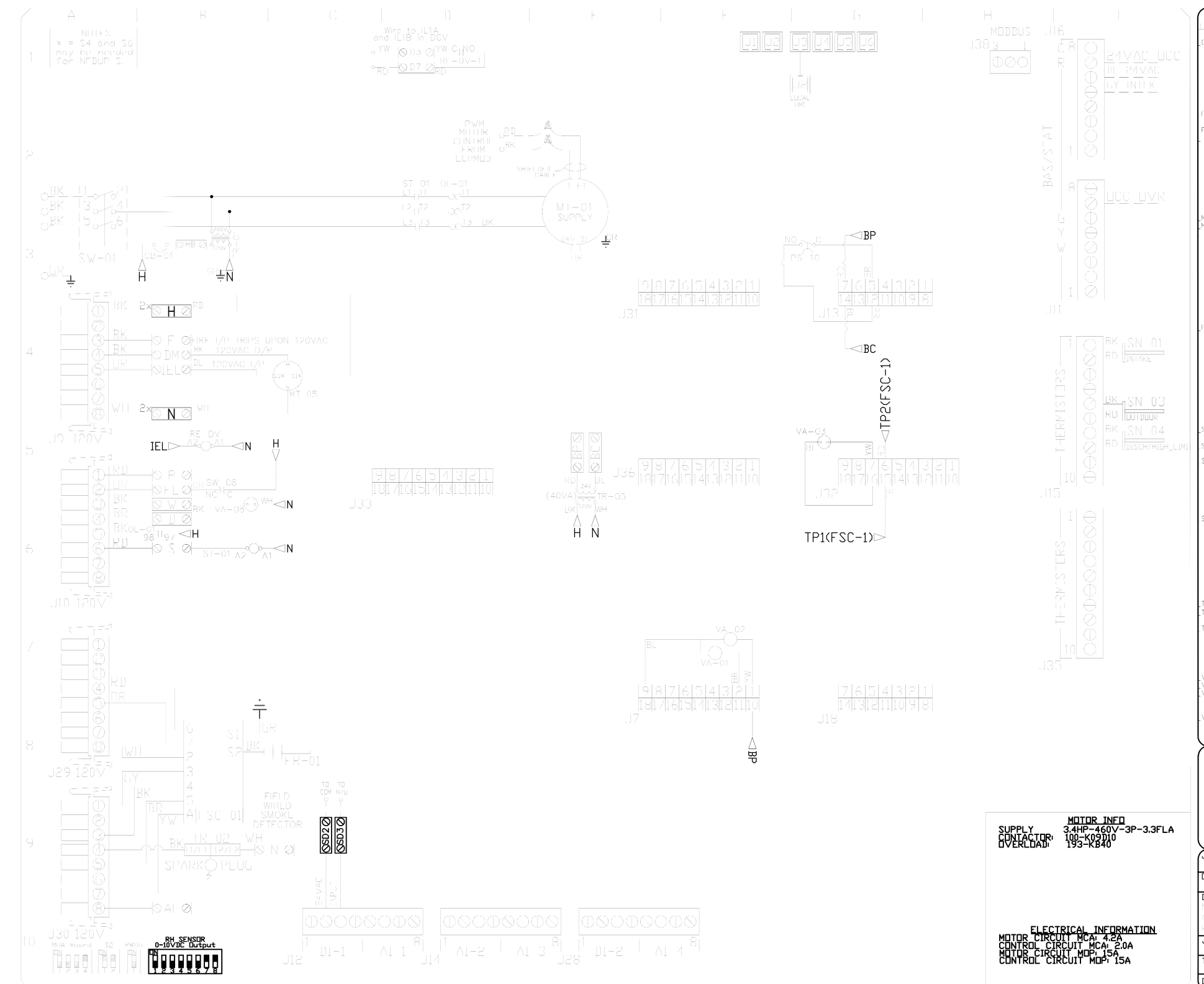
DIRECT FIRED (DF) PROFILE PLATE ASSEMBLY

DESCRIPTION:
 DIRECT FIRED BURNERS SHALL HAVE PATENTED (US PATENT NO. US6625028B2), SELF-ADJUSTING PROFILE PLATES DESIGNED TO ENSURE PROPER AIR VELOCITY AND PRESSURE DROP ACROSS THE BURNER. PROFILE PLATES SHALL ALLOW BURNERS TO ACHIEVE CLEAN COMBUSTION BY LIMITING BY-PRODUCT LEVELS TO A MAXIMUM OF 5% OF GARDEN HEATER CO2 AND 50% OF AMERICAN SOURCE UNDERFLOOR PREHEAT. UNITS SHALL BE CONSIDERED WITH THE BURNER HEATED DOWNSTREAM OF THE BURNER. THIS ARRANGEMENT WILL ENSURE A CONSISTENT AIRFLOW, REGARDLESS OF INLET AIR TEMPERATURE.

APPLICATION:
 SPRING LOADED BURNER PROFILE PLATES ARE ENGINEERED TO AUTOMATICALLY REACT TO THE MOMENTUM OF A FRESH AIR STREAM WITHOUT THE NEED FOR ANY METERS OR ACTUATORS TO MECHANICALLY ADJUST THEM. WITH THIS FEATURE, ALL OF UNITS ARE DESIGNED FOR DEMAND CONTROL VENTILATION (DCV) REQUIREMENTS.

CERTIFICATIONS:
 ALL PROFILE PLATE ASSEMBLIES SHALL BE INCLUDED IN THE DF UNITS ETL LISTING AND COMPLY WITH COMBINED SAFETY STANDARDS ANSI Z88.4 AND CSA 3.7 (NON-RECIRCULATING OF HEATERS) AND ANSI Z83.18 (RECIRCULATING OF HEATERS).

GENERAL CONSTRUCTION:
 -PROFILE PLATES SHALL BE FORMED FROM 0.80 GALVANIZED STEEL.
 -PROFILE PLATES SHALL VARY IN SIZE PER UNIT.
 -PROFILE PLATES SHALL BE HEATED ALONG THE SAME PLANE AS THE DISCHARGE OF THE BURNER.
 -DESIGN SHALL INCORPORATE PROPERLY TORQUED, PERMANENTLY MOUNTED SPRING HINGES.
 -SPRING HINGES SHALL BE MADE FROM PLATED STEEL.



REVISIONS	
DESCRIPTION	DATE

CAPTIVE

Eastern PA Mechanical

PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4126 EMAIL: reg108@captiveme.com

Shake Shack-1436-Victoria Gardens, CA-R2
 RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022

DWG.#: 5376350

DRAWN BY: Joe.shilba

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 6

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
09/02/2022	ISSUE FOR CONSTRUCTION

Seal / Signature



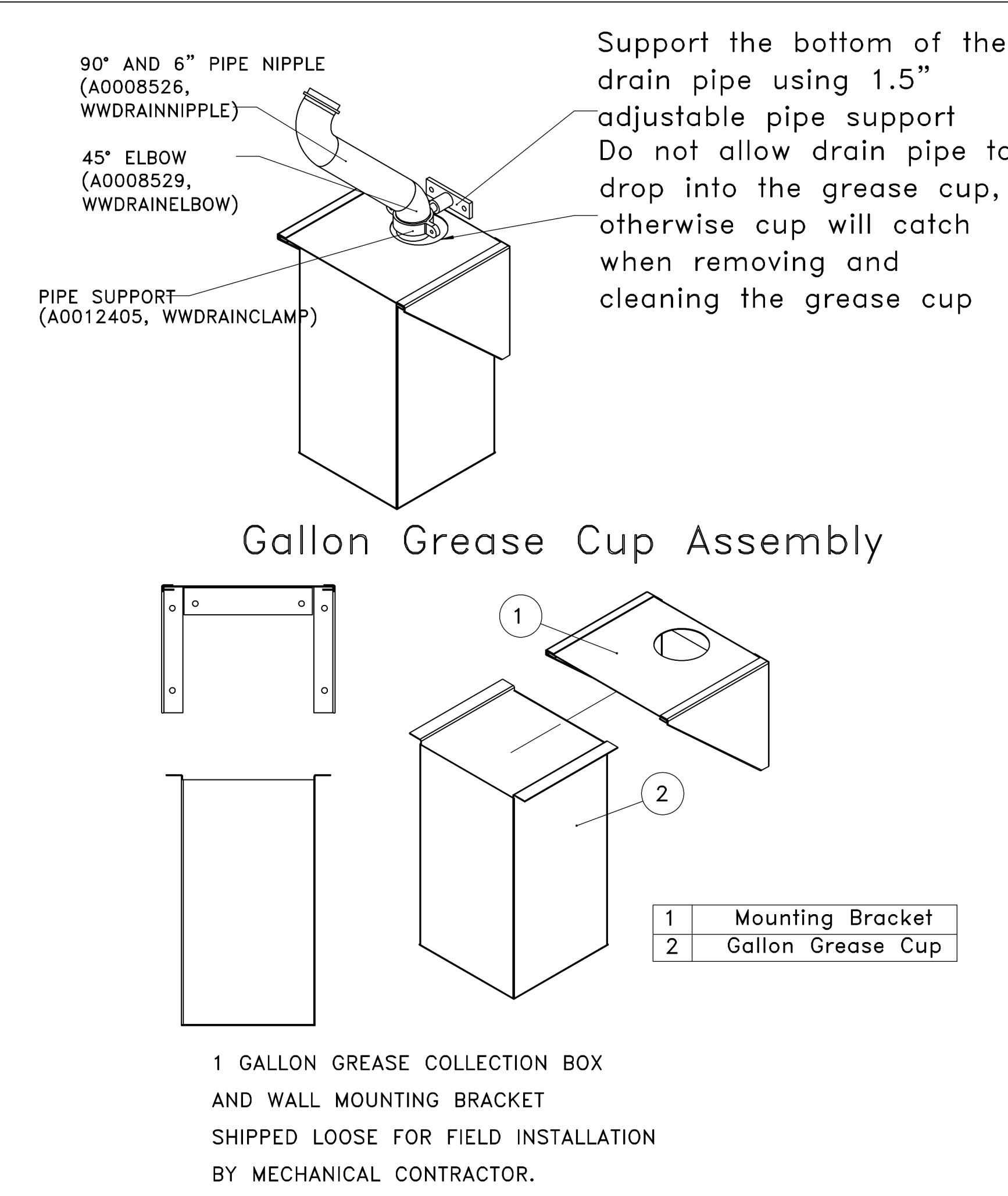
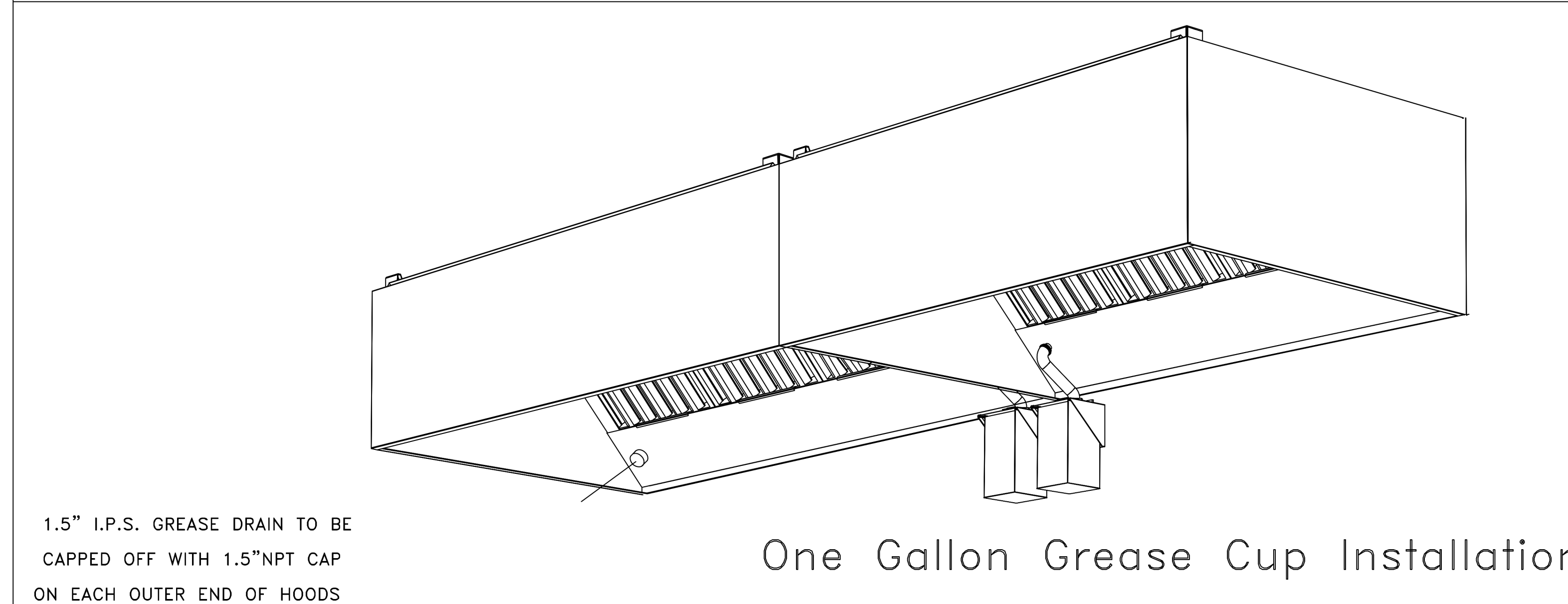
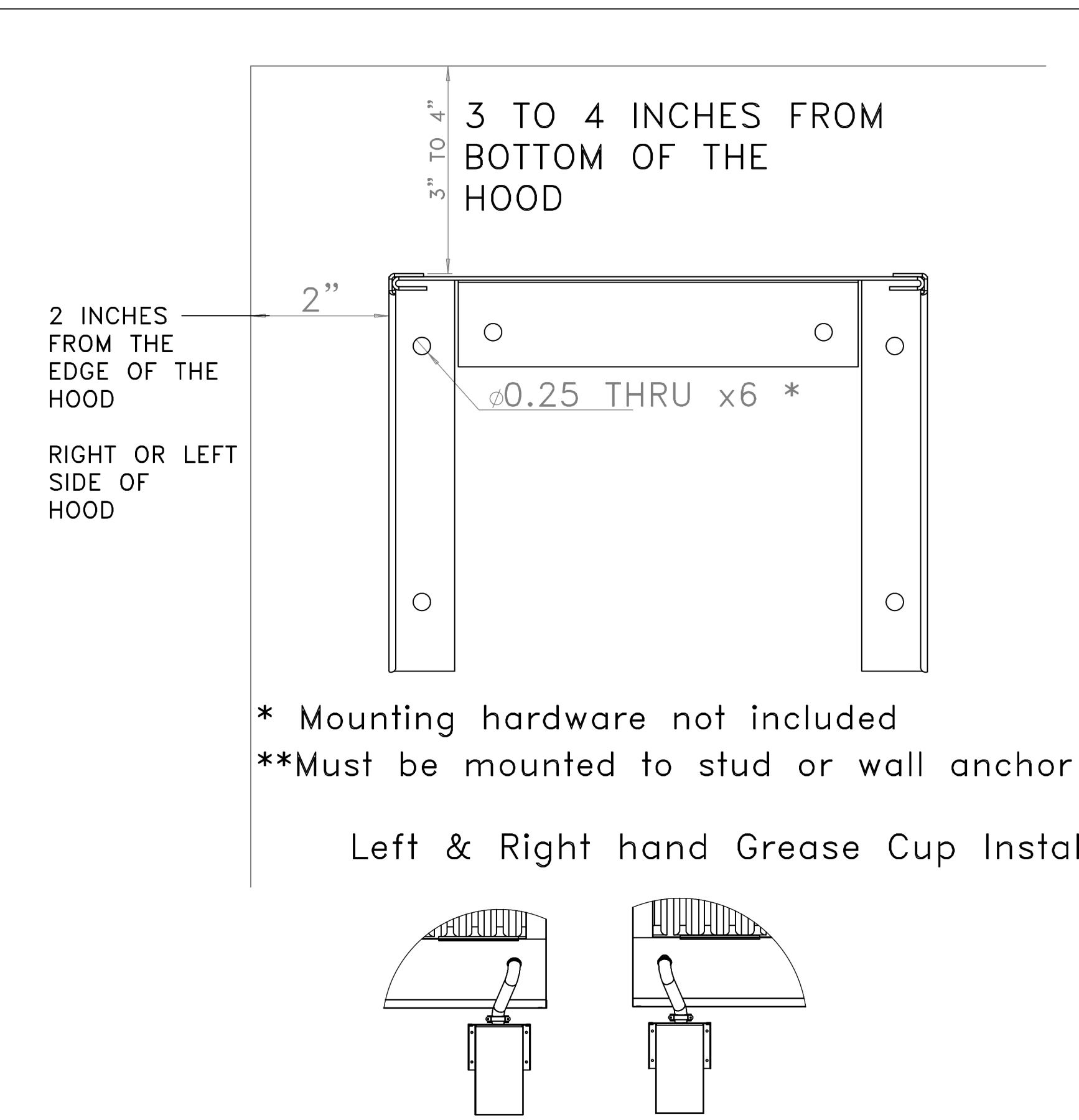
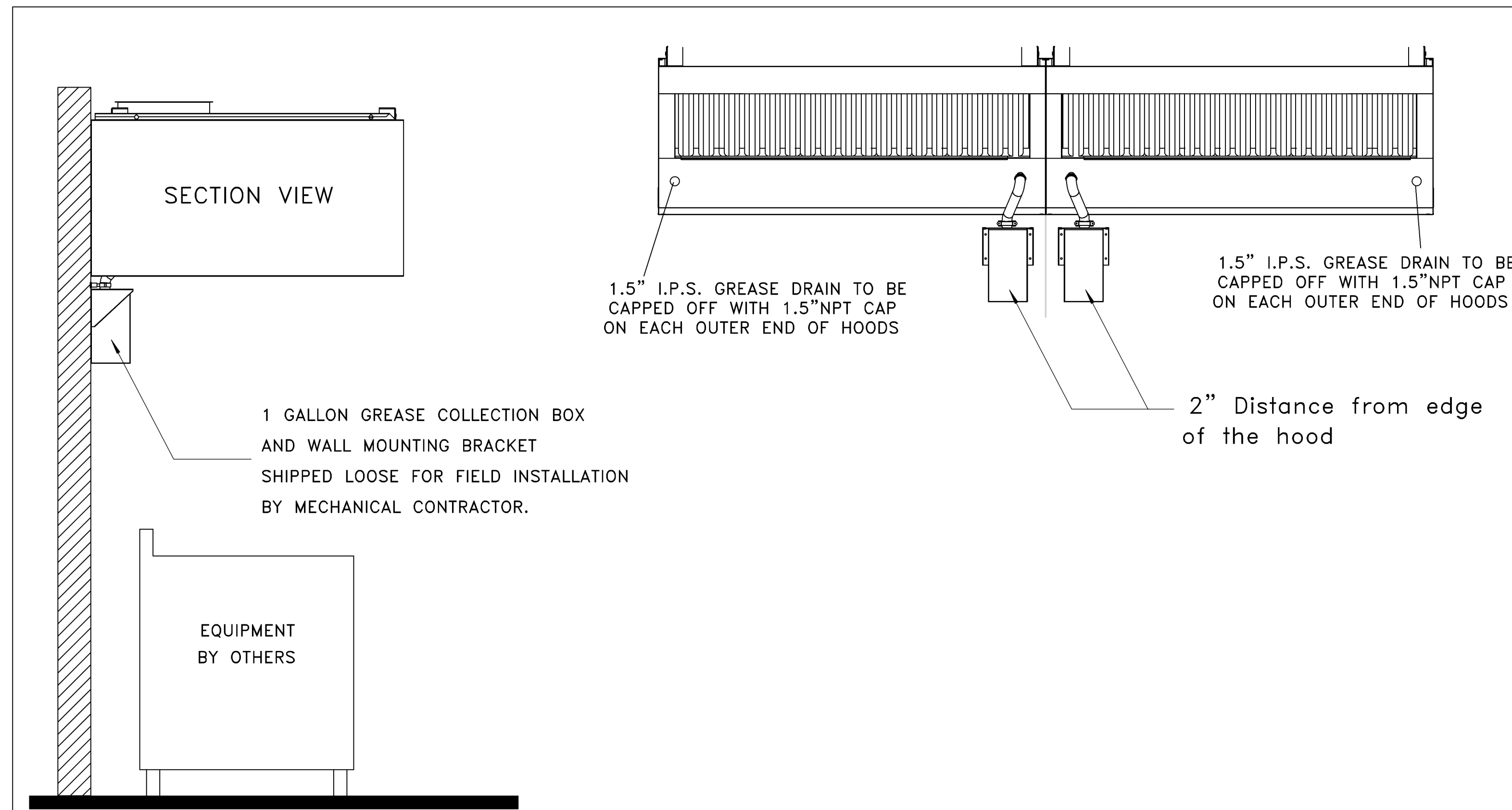
Project Name
SHAKE SHACK - VICTORIA GARDENS

Project Number
005.3846.000

Description
 CAPTIVEAIRE DRAWINGS

Scale

9/2/2022 8:52:14 AM B:\1380\005\3846\000 - Shake Shack - Victoria Gardens\005\3846\000 - Shake Shack - Victoria Gardens_M2.rvt



REVISIONS	
DESCRIPTION	DATE

CAPTIVE
 Eastern PA Mechanical
 PO Box 2520, 1 Union Ave, Bala Cynwyd, PA, 19004 PHONE: (267) 504-4128 EMAIL: reg108@captivemechanical.com

Shake Shack-1436-Victoria Gardens, CA-R2
 RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022

DWG.#: 5376350

DRAWN BY: joe.shilba

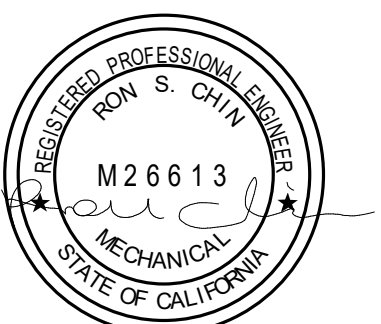
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MASTER DRAWING

SHEET NO. 7

Date	Description
03/24/2022	ISSUE FOR PERMIT/BID
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Project Name
SHAKE SHACK - VICTORIA GARDENS

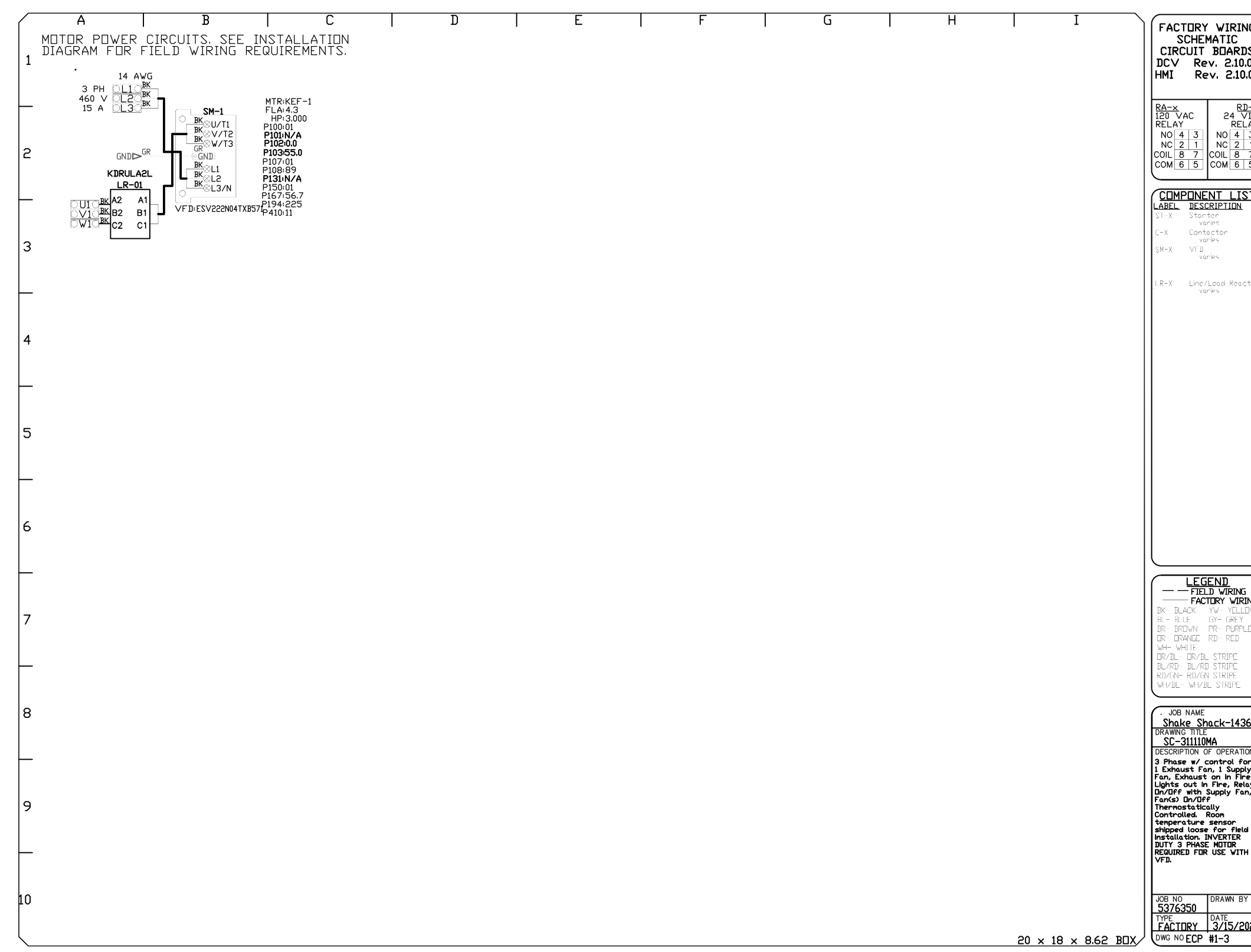
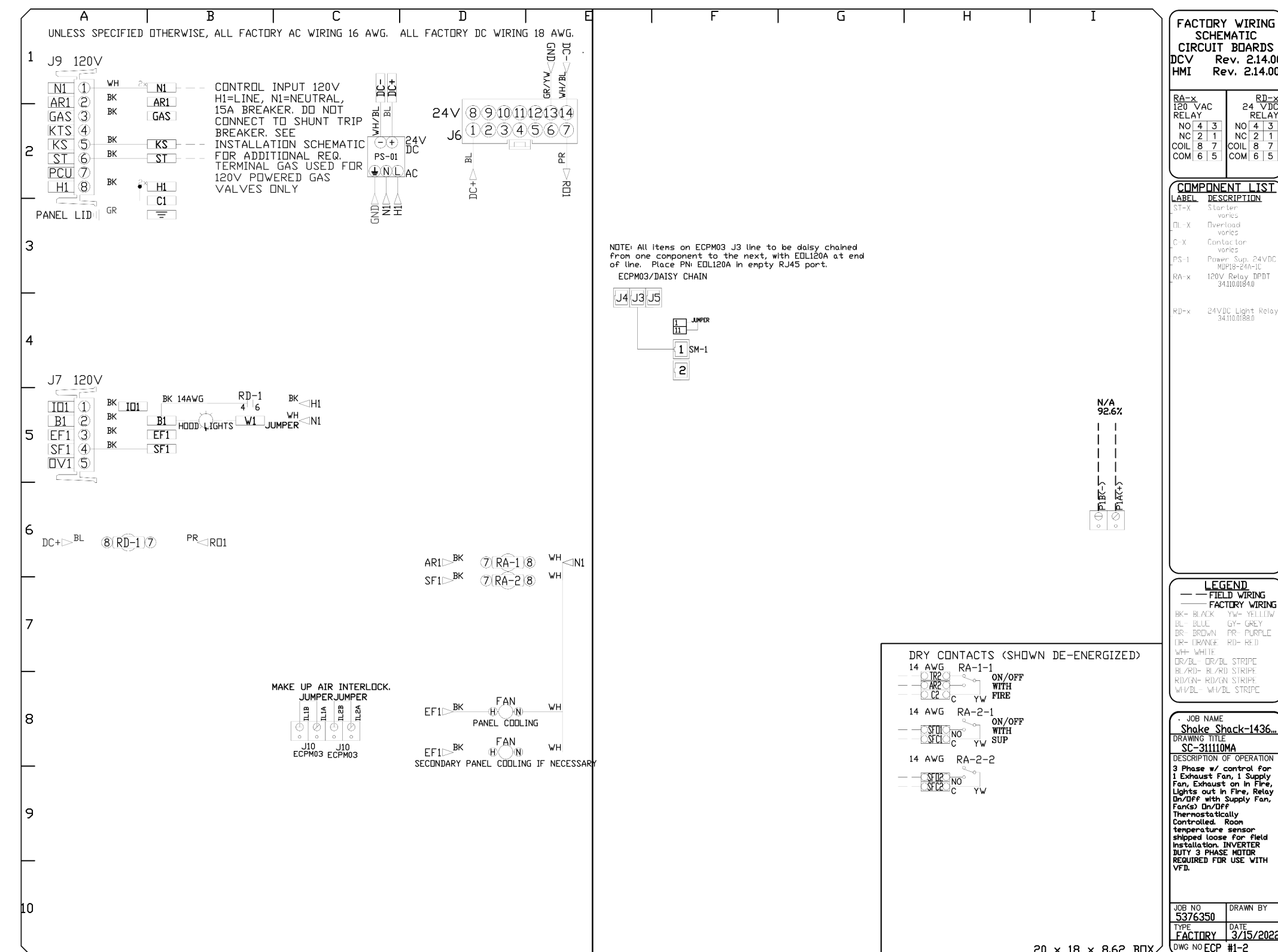
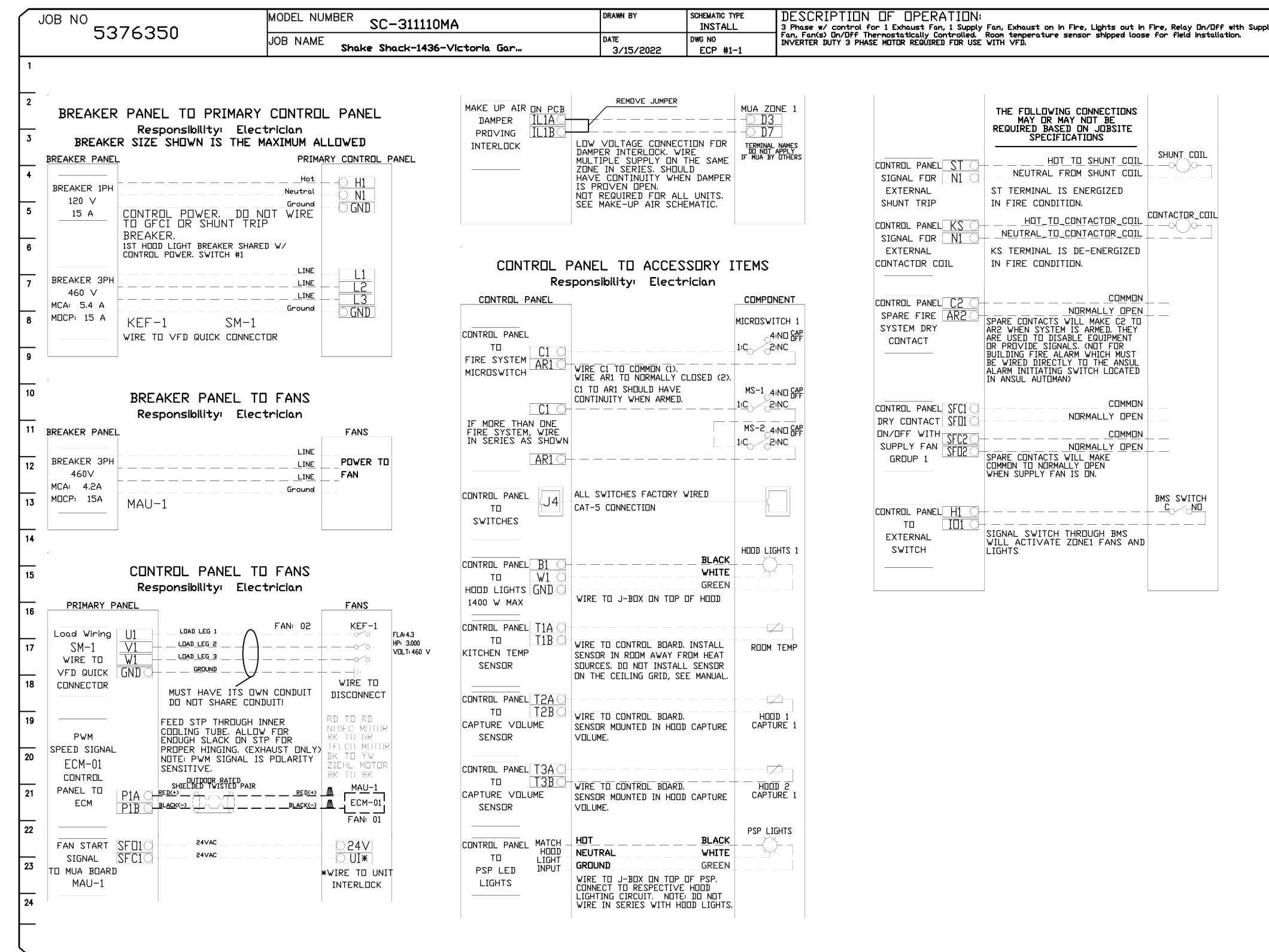
Project Number
005.3846.000

Description
CAPTIVEAIRE DRAWINGS

Scale

ELECTRICAL PACKAGE - JOB#5376350

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED					
				LOCATION	QUANTITY		FAN TAG	TYPE	HP	VOLTS	FLA	
1		SC-31110MA	WALL MOUNT IN SS BDX	05 - SS WALL MOUNT BDX	1 LIGHT 1 FAN	SMART CONTROLS THERMOSTATIC CONTROL W/ RELAY DIVERSITY WITH SUPPLY	MAU-1	SUPPLY	3	3,400	460	3.3
							KEF-1	EXHAUST	3	3,000	460	4.3



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVE

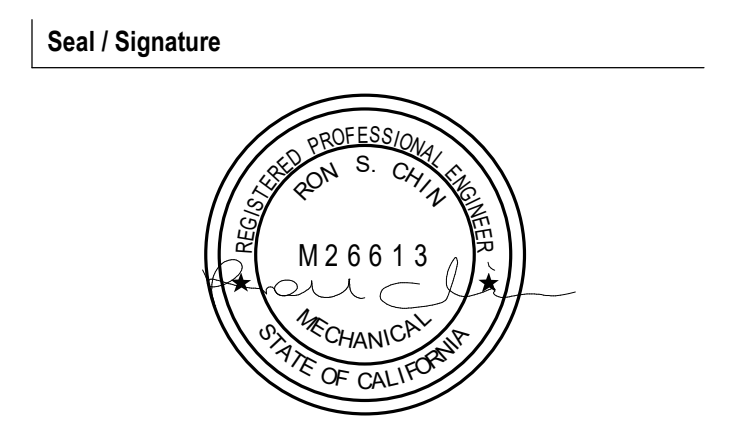
Eastern PA Mechanical
www.captiveva.com

Shake Shack-1436-Victoria Gardens, CA-91739
RANCHO CUCAMONGA, CA, 91739

DATE: 3/15/2022
DWG.#: 5376350
DRAWN BY: joe.shilba
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO.
8

Date	Description
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09/02/2022	ISSUE FOR CONSTRUCTION



Project Name
SHAKE SHACK - VICTORIA GARDENS

Project Number
005.3846.000

Description
CAPTIVEAIRE DRAWINGS