MECHANICAL SYMBOLS LIST

CONTROLS AND SENSORS

THERMOSTAT

MECHANICAL DETAILS SHEET (1 OF 9)

MECHANICAL DETAILS SHEET (2 OF

MECHANICAL DETAILS SHEET (3 OF

MECHANICAL DETAILS SHEET (4 OF 9)

MECHANICAL DETAILS SHEET (5 OF 9)

MECHANICAL DETAILS SHEET (6 OF 9)

MECHANICAL DETAILS SHEET (7 OF 9)

MECHANICAL DETAILS SHEET (8 OF 9)

MECHANICAL DETAILS SHEET (9 OF 9)

MECHANICAL SCHEDULES

$\left(\begin{array}{c} \times \\ \times \end{array}\right)$	RISER SYMBOL			— AHU		
		\mathbb{T}_{S}	TEMPERATURE SENSOR	AL		
•	POINT OF NEW CONNECTION TO EXISTING	P	PRESSURE SENSOR	GD		
		<u> </u>	OCCUPANCY SENSOR	ВОВ		
	POINT OF DISCONNECTION FROM EXISTING	S	MANUAL ON/OFF SWITCH	BOD		
		(S)	DUCT SMOKE DETECTOR	BOE BOH		
	AIR DEVICES	(S)	SMOKE DETECTOR	CDS		
\bowtie	CEILING DIFFUSER SUPPLY		CO DETECTOR	CDR		
	CEILING DIFFUSER RETURN	DDC	DIRECT DIGITAL CONTROL PANEL	CFM		
	CEILING DIFFOSEN RETORN			C.O.		
	LINEAR DIFFUSER SUPPLY — CEILING		DUCTWORK	COP		
	☐ LINEAR DIFFUSER RETURN — CEILING	=======	AIR DUCT W/ 1.5" ACOUSTICAL LINING	CR		
		<u> </u>	FLEXIBLE DUCT	CD		
	LINEAR DIFFUSER SUPPLY — SIDEWALL	FC FC	FLEXIBLE CONNECTION	DN		
		24X12		EER		
<u>{</u>	LINEAR DIFFUSER RETURN — SIDEWALL	ø12	RECTANGULAR DUCT (WIDTH X DEPTH)	EG EN		
	EINEAN DITTOSEN NETONN - SIDEWALE		ROUND DUCT (DIAMETER)	EN ET		
	OUCT ACCESSORIES		ROUND DUCT CROSS SECTION	FTR		
			SUPPLY AIR RECTANGULAR DUCT	FC		
	GRAVITY DAMPER		CROSS SECTION	FD/AD		
	GRAVITT BAWI ER		RETURN AIR RECTANGULAR DUCT CROSS SECTION	FD		
. •			OKOSS SECTION	FSD GV		
	FIRE DAMPER W/ ACCESS DOOR			GX		
		. PIPE FIT	TINGS AND EQUIPMENT	GXF		
<u>M</u>	MOTORIZED DAMPER W/ ACCESS DOOR		IN LINE BUND	HS		
	MOTORIZED BYIMI ER WY YROCEGO BOOK		IN LINE PUMP	HSPF		
T^T , ,		Q P	PRESSURE GAUGE W/ COCK	KX		
	VOLUME DAMPER W/ ACCESS DOOR	Ş—ÎĪ—II—S	TRESSORE GROCE WY GOOK	KXF		
	VARIABLE AIR VOLUME BOX	Ψ	TEMPERATURE GAUGE	LDS		
		5 # 5		LDR		
		 	UNION	MAU		
	DUCT HEATER W/ ACCESS DOOR			MAF		
	DUCT HEATER W/ ACCESS DOOR	├	GATE VALVE	EI		
	HVAC PIPING	-		-		
		- S-D-S	GLOBE VALVE			
CP	THE WOOMBENGAME THINKS	-		TO THE		
CP	EXISTING GONDENOVIE IT II ING	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	STRAINER			
	NEW REFRIGERANT PIPING					
	2700 11170 1121 11021 1707 1 111110	S-	SWING CHECK VALVE			
cws	NEW CHILLED WATER SUPPLY PIPING	+0	AIR VENT			
cws	EXISTING CHILLED WATER SUPPLY PIPING		AIIV VEIVI			
CWR	NEW CHILLED WATER RETURN PIPING	-				
	EXISTING CHILLED WATER RETURN PIPING	M	IECHANICAL DRAWING LIST			
——————————————————————————————————————	——HWS —— NEW HOT WATER SUPPLY PIPING ——HWS —— EXISTING HOT WATER SUPPLY PIPING		CHANICAL SYMBOLS, ABBREVIATIONS, NOTES AND S	PECIFICATIONS(1		
——————————————————————————————————————			CHANICAL SPECIFICATION (2 OF 4)	.5,010,10(1		
HWR	HWR NEW HOT WATER RETURN PIPING		CHANICAL SPECIFICATIONS (3 OF 4)			
——————————————————————————————————————	EXISTING HOT WATER RETURN PIPING		CHANICAL SPECIFICATION (4 OF 4)			
————STS ———	NEW STEAM SUPPLY PIPING	M-1.0 MECHANICAL FIRST FLOOR PLAN M-1.1 MECHANICAL ROOF PLAN				
CTD	NEW CTEAN BETURN BIRING					

M - 5.1

M - 5.2

M - 5.3

M - 5.4

M - 5.5

M - 5.6

M - 5.7

M - 5.8

M - 5.9

M - 6.1

AC-1 (TXF-1)

——— STR ———

——— ST ———

NEW STEAM RETURN PIPING

EXISTING STEAM PIPING

EXISTING PIPE

EXPANSION LOOP

FLUID FLOW DIRECTION

PIPE TURNING DOWN

PIPE GOING UP

EQUIPMENT SYMBOL

RISER SYMBOL

ENERGY CONSERVATION CODE OF NEW YORK STATE COMPLIANCE

MECHANICAL ABBREVIATIONS

HWP

IEER

MD

NC

NO

OAI

OAF

RTU

REF

RG

SG

VAV

VD

VFD

VSD

WUH

W.M.S.

HOT WATER PUMP

EFFICIENCY RATIO

MOTORIZED DAMPER

NORMALLY CLOSED

OUTSIDE AIR INTAKE RISER

OUTSIDE AIR INTAKE FAN

NORMALLY OPEN

ROOF TOP UNIT

RETURN GRILLE

SUPPLY GRILLE

VOLUME DAMPER

REFRIGERANT PIPING

SEASONAL ENERGY

EFFICIENCY RATIO

VARIABLE AIR VOLUME

VARIABLE SPEED DRIVE

WATER UNIT HEATER

WIRE MESH SCREEN

VARIABLE FREQUENCY DRIVE

INTEGRATED ENERGY

ABOVE FINISHED FLOOR

AIR HANDLER UNIT

ACOUSTIC LINING

GRAVITY DAMPER

BOTTOM OF BEAM

BOTTOM OF DUCT

BOTTOM OF HOOD

CONDENSATE PUMP

EXHAUST GRILLE

ENERGY ANALYSIS

EXPANSION TANK

FIN TUBE RADIATOR

FLEXIBLE CONNECTION

FIRE SMOKE DAMPER

GENERAL EXHAUST RISER

GENERAL EXHAUST FAN

HYDRO SEPERATOR

HEATING SEASONAL

PERFORMANCE FACTOR

KITCHEN EXHAUST RISER

KITCHEN EXHAUST FAN

LINEAR DIFFUSER SUPPLY

LINEAR DIFFUSER RETURN

MAKE UP AIR UNIT

MAKE UP AIR FAN

ONS(1 OF 4)

GAS VENT

FIRE DAMPER W/ACCESS DOOR

FIRE DAMPER W/FUSIBLE LINK

CLEAN OUT

DOWN

BOTTOM OF EQUIPMENT

CEILING DIFFUSER SUPPLY

CEILING DIFFUSER RETURN

CUBIC FEET OF AIR PER MINUTE

COEFFICIENT OF PERFORMANCE

CONDENSATE RETURN PIPING

CONDENSATE DRAIN PIPE

ENERGY EFFICIENCY RATIO

AFF

FD/AD

TO THE BEST OF MY PROFE<mark>SSI</mark>ONAL KNO<mark>WL</mark>EDGE AND JUDGEMENT, THESE PLANS AND SPECIFICATION ARE IN COMPLIANCE WITH THE ASHRAE 90.1-2016

NYS BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF THE 2020 INTERNATIONAL BUILDING CODE (AS ADOPTED BY NEW YORK STATE,) EFFECTIVE OCTOBER, 2020 AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- 1. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2020 BUILDING CODE REQUIREMENTS AS OUTLINED IN SECTION [IBC 1704].
- THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS
- SPECIAL INSPECTIONS:
- THE FOLLOWING SYSTEMS SHALL BE INSPECTED IN ACCORDANCE WITH THE SECTION CITED FROM THE 2020 NYS BUILDING CODE.
- A. FIRE RESISTANT PENETRATIONS AND JOINTS- IBC 1705.17
- 5. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION OF 2020 INTERNATIONAL MECHANICAL CODE (AS ADOPTED BY NEW YORK STATE)
 - A. DUCT CONSTRUCTION AND INSTALLATION— IMC 603 B. AIR INTAKES, EXHAUSTS AND RELIEFS - IMC 401.5 C. AIR FILTERS - IMC 605
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH IMC 401.
- 8. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY IMC 403.3
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE
- 11. SMOKE DETECTOR SHALL MEET UL268A
- 12. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- 13. HVAC SYSTEM SHALL BE BALANCED IN ACCORDANCE WITH ASHRAE 111,"TESTING, ADJUSTING, AND BALANCING OF BUILDING HVAC SYSTEM" OR OTHER ACCEPTED ENGINEERING STANDARDS AS APPROVED BY THE DEPARTMENT. AIR FLOW RATES SHALL BE MEASURED AND ADJUSTED TO DELIVER FINAL FLOW RATES WITHIN THE TOLERANCES PROVIDED IN THE PRODUCT SPECIFICATIONS. TEST AND BALANCE ACTIVITIES SHALL INCLUDE AIR SYSTEM.
- 15. ALL LOW PRESSURE DUCTS OPERATING AT STATIC PRESSURE 2 INCH OF WATER GAUGE OR LESS SHALL BE PROPERLY SEALED AS PER REQUIREMENT AND APPROVED METHODS.
- 16. OPERATING AND MAINTENANCE MANUAL SHALL BE PROVIDED BY MECHANICAL CONTRACTOR AND SPECIFIED IN CONSTRUCTION
- 17. MECHANICAL SYSTEMS SHALL BE COMMISSIONED PER ASHRAE 90.1 (2016) AND A PRELIMINARY COMMISSIONING REPORT CERTIFIED BY THE DESIGNER OF RECORD SHALL BE PROVIDED TO THE OWNER AND AHJ.

SCOPE OF WORK

SCOPE OF WORK

- 1. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
- 2. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- 3. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL NOTES

- 1. CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- 2. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER. PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- 4. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- 5. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- 6. CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF THE DAY SUCH THAT EQUIPMENT MAY BE MOVED THROUGH AREAS.
- 7. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL MAKE ALLOWANCE IN PRICING FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE OTHER TRADES IS REQUIRED.
- 8. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
- 9. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING O MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- 10. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- 11. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRESTOPPED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- 12. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL OR CEILING. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- 13. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- 14. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- 15. MATERIALS AND WORKMANSHIP. UNLESS OTHERWISE NOTED. SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 16. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
- 17. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE. THE CONTRACTOR SHALL REPLACE ITEMS/MATERIAL WHICH WERE DAMAGED, LOST, OR STOLEN. WITHOUT ADDITIONAL COST TO THE OWNER.

GENERAL HVAC NOTES

<u>GENERAL:</u>

- 1. PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- 2. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- 3. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- 4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- 5. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- 6. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- 7. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- 8. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT DIMENSIONS BEFORE FABRICATION.
- 9. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- 10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- 11. LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF DUCT UP— AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
- 12. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- 13. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
- 14. MECHANICAL EQUIPMENT, DUCTWORK, SHALL NOT BE SUPPORTED FROM A METAL DECK.
- 15. ALL EQUIPMENT, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION—FREE INSTALLATION.
- 16. ALL DUCTWORK, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C—CLAMPS SHALL NOT BE PERMITTED.
- 17. ALL ROOF-MOUNTED EQUIPMENT CURBS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.
- 18. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
- 19. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- 20. ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT AND ROOFTOP UNIT SHALL BE FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
- 21. REFER TO TYPICAL DETAILS FOR DUCTWORK, AND EQUIPMENT INSTALLATION.
- 22. REINFORCEMENT, DETAILING, AND PLACEMENT OF CONCRETE SHALL CONFORM TO ASTM 315 AND ACI 318. CONCRETE SHALL CONFORM TO ASTM C94. CONCRETE WORK SHALL CONFORM TO ACI 318 PART ENTITLED "CONSTRUCTION REQUIREMENTS".COMPRESSIVE STRENGTH IN 28 DAYS SHALL BE 3,000 PSI. TOTAL AIR CONTENT OR EXTERIOR CONCRETE SHALL BE BETWEEN 5 AND 7 PERCENT BY VOLUME. SLUMP SHALL BE BETWEEN 3 AND 4 IN. CONCRETE SHALL BE CURED FOR 7 DAY AFTER PLACEMENT.

- 23. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT INSULATION IS APPLIED.
- 24. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

HVAC DUCTWORK - SHEET METAL

- 1. CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- 2. CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
- 3. PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- 4. SUPPLY AND RETURN DUCTWORK 20' FROM ALL AC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- 5. RE-INSULATE ALL DUCTWORK IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- 6. CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWING. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH REFLECTED CEILING PLAN.
- 7. IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- 8. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS AND HUMIDISTAT 4'-0" (CENTER LINE) ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
- 9. ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- 10. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- 11. PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- 12. COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- 13. FIELD-ERECTED AND FACTORY-ASSEMBLED AIR HANDLING UNIT COILS SHALL BE ARRANGED FOR REMOVAL FROM THE UPSTREAM SIDE WITHOUT DISMANTLING SUPPORTS. PROVIDE GALVANIZED STRUCTURAL STEEL SUPPORTS FOR ALL COILS (EXCEPT THE LOWEST COIL) IN BANKS OVER TWO COILS HIGH TO PERMIT THE INDEPENDENT REMOVAL OF ANY COIL.
- 14. ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- 15. LOCATE ALL MECHANICAL EQUIPMENT (SINGLE DUCT, DUAL DUCT, VARIABLE VOLUME, CONSTANT VOLUME, AND FAN-POWERED BOXES, FAN COIL UNITS, CABINET HEATERS, UNIT HEATERS, UNIT VENTILATORS, COILS, STEAM HUMIDIFIERS, ETC.) FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- 16. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
- 17. UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- 18. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- 19. ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- 20. PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, HUMIDIFIERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION
- 21. PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- 22. ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
- 23. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- 24. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

SPECIFICATIONS

SECTION 0001 - NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

- A. THE BIDDER BY MAKING A BID REPRESENTS THAT:

 THE BIDDER HAS READ AND UNDERSTANDS THE
 BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH
 DOCUMENTATION RELATES TO THE WORK FOR WHICH
 THE BID IS SUBMITTED, AND FOR OTHER PORTIONS
 OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY
 OR PRESENTLY UNDER CONSTRUCTION.
- B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
- C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
- D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
- E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

- A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

1.3 RESPONSIBILITIES

- A. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
- B. THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON—TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.
- C. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

SECTION 0101 - QUALITY OF WORK

1.1 WORKMANSHIP

- A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

1.2 CODE COMPLIANCE

A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES

HAVING JURISDICTION. END OF SECTION 0101

SECTION 0102 - REQUIRED DOCUMENTS

.1 SHOP DRAWINGS

A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.

1.2 SUBMITTALS

A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.

1.3 RECORD DRAWINGS

- A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.
- 1.4 EQUIPMENT OPERATING INSTRUCTIONS
- A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS, EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE-RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

 END OF SECTION 0102

SECTION 078413-PENETRATION FIRE-STOPPING

- 1.1 QUALITY ASSURANCE
- A. INSTALLER QUALIFICATIONS: AN FM
 GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A
 UL-QUALIFIED FIRE-STOP CONTRACTOR.
- B. FIRE—TEST—RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL
- 1.2 PENETRATION FIRESTOPPING
- A. PENETRATIONS IN FIRE—RESISTANCE—RATED WALLS: F—RATINGS PER ASTM E 814 OR UL 1479.
- B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND T-RATINGS PER ASTM E 814 OR UL 1479:
- C. PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.
- D. W-RATINGS: PER UL 1479.

1.3 INSTALLATION

- A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.
- 1.4 FIELD QUALITY CONTROL

 A. INSPECTION OF INSTALLED FIRE—STOPPING: BY

 OWNER—ENGAGED AGENCY ACCORDING TO
- 1.5 THROUGH—PENETRATION FIRESTOP SYSTEM SCHEDULE
- WHERE UL-CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.

FOR THE FOLLOWING SYSTEMS:

STM E 2174.

METALLIC AND NON-METALLIC CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED GROUPINGS OF PENETRANTS, USE ONE OR MORE THE FOLLOWING MATERIALS:

- a. LATEX SEALANT
- b. SILICONE SEALANTc. INTUMESCENT PUTTY
- d. MORTAR
- h. SILICONE FOAM
- i. PILLOWS/BAGS

 i intimescent wrap strips
- j. INTUMESCENT WRAP STRIPSk. INTUMESCENT COMPOSITE SHEET

1.6 MANUFACTURERS

- 1. HILTI CONSTRUCTION CHEMICAL, INC
- 2. TREMCO INC.
- 3. 3M FIRE PROTECTION PRODUCTS

END OF SECTION 078413

SECTION 230529 — HANGERS AND SUPPORTS FOR HVAC EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

- A. DELEGATED DESIGN: DESIGN EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.
- B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.
- 1. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.
- 2. DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.

1.2 SUBMITTALS

A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER

1.3 QUALITY ASSURANCE

A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE - STEEL."

1.4 COMPONENTS

- A. METAL FRAMING SYSTEMS: MFMA MANUFACTURERB. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE
- C. THERMAL—HANGER SHIELD INSERTS:

 D. FASTENER SYSTEMS: POWDER—ACTUATED FASTENERS
- OR MECHANICAL—EXPANSION ANCHORS

 E. EQUIPMENT SUPPORTS.

END OF SECTION 230529

SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. ONE-PIECE, CAST-BRASS TYPE: WITH POLISHED, CHROME-PLATED AND ROUGH-BRASS FINISH AND SETSCREW FASTENER.
- B. ONE-PIECE, DEEP-PATTERN TYPE: DEEP-DRAWN, BOX-SHAPED BRASS WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.
- C. ONE-PIECE, STAMPED-STEEL TYPE: WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.

2.2 FLOOR PLATES

A. ONE—PIECE FLOOR PLATES: CAST—IRON FLANGE WITH HOLES FOR FASTENERS.

T 3 - EXECUTION

1 INSTALLATION

- A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.
- B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.
- 1. ESCUTCHEONS FOR NEW PIPING:
- a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE—PIECE, DEEP—PATTERN
- b. INSULATED PIPING: ONE-PIECE, STAMPED-STEEL TYPE.
- c. BARE PIPING AT WALL AND FLOOR
 PENETRATIONS IN FINISHED SPACES:
 ONE—PIECE, CAST—BRASS TYPE WITH
 POLISHED, CHROME—PLATED FINISH OR
- STAMPED-STEEL TYPE.

 d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.

3.2 FIELD QUALITY CONTROL

A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.

END OF SECTION 230518

SECTION 230517 — SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

1.1 SLEEVE-SEAL SYSTEMS

- C. FIELD-ASSEMBLED, MODULAR SEALING-ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND
 - 1. SEALING ELEMENTS: EPDM RUBBER OR NBR.
- 2. PRESSURE PLATES: CARBON STEEL, PLASTIC, STAINLESS STEEL.3. CONNECTING BOLTS AND NUTS: CARBON STEEL
- WITH CORROSION-RESISTANT COATING, STAINLESS STEEL.

 B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE
- FOLLOWING:
- 1. ADVANCE PRODUCTS & SYSTEMS, INC
- 2. CALPICO, INC.
- 3. METRAFLEX COMPANY (THE)

4. PIPELINE SEAL AND INSULATOR, INC.

5. PROCO PRODUCTS, INC.

1.2 SLEEVE—SEAL FITTINGSA. MANUFACTURED PLASTIC, SLEEVE—TYPE, PLASTIC OR RUBBER WATER—STOP ASSEMBLY MADE FOR

IMBEDDING IN CONCRETE SLAB OR WALL. GROUT

1.3 GROUT

A. NON-SHRINK, FACTORY PACKAGED

1. INTERIOR PARTITIONS

1.4 SLEEVE AND SLEEVE—SEAL SCHEDULE
A. USE SLEEVES AND SLEEVE SEALS FOR THE

FOLLOWING PIPING—PENETRATION APPLICATIONS

GALVANIZED-STEEL-PIPE SLEEVES, PVC-PIPE SLEEVES.

b. PIPING NPS 6 (DN 150) AND LARGER:

a. PIPING SMALLER THAN NPS 6 (DN 150):

GALVANIZED—STEEL—SHEET SLEEVES END OF SECTION 230517

SECTION 230548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC EQUIPMENT

PART 1 — GENERAL

1.1 PERFORMANCE REQUIREMENTS

- A. SEISMIC-RESTRAINT LOADING:
- 1. SITE CLASS AS DEFINED IN THE IBC: A, B
- 2. ASSIGNED SEISMIC USE GROUP OR BUILDING CATEGORY AS DEFINED IN THE IBC: I II III a. COMPONENT IMPORTANCE FACTOR: 1.0
- b. COMPONENT RESPONSE MODIFICATION FACTOR:
- c. COMPONENT AMPLIFICATION FACTOR: 2.5.
- 3. DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (0.2 SECOND) 18%
- 4. DESIGN SPECTRAL RESPONSE ACCELERATION AT 1-SECOND PERIOD: 8%

1.2 COMPONENTS

- A. VIBRATION ISOLATORS:
 - 1. ISOLATOR PADS: NEOPRENE, RUBBER HERMETICALLY AND/OR SEALED COMPRESSED **FIBERGLASS**
 - 2. MOUNTS: DOUBLE-DEFLECTION TYPE.
 - 3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING.
- 4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN-SPRING TYPE.
- 5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING TYPE WITH SEISMIC RESTRAINT.
- 6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.
- 7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION
- 8. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.
- 9. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL-LIMIT STOP.

B. AIR-MOUNTING SYSTEMS:

- 1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED—AIR BELLOWS.
- 2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLOWS.
- C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR- AND WATERTIGHT CURB RAIL: WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.
- D. VIBRATION ISOLATION EQUIPMENT BASES:
 - 1. STEEL BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.
 - 2. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE

E. SEISMIC-RESTRAINT DEVICES:

- 1. SNUBBERS: WELDED STRUCTURAL-STEEL SHAPES AND REPLACEABLE RESILIENT ISOLATION WASHERS AND BUSHINGS.
- 2. CHANNEL SUPPORT SYSTEM: MFMA-3 SLOTTED STEEL CHANNELS.
- 3. RESTRAINT CABLES: GALVANIZED OR STAINLESS STEEL CABLES.
- 4. ANCHOR BOLTS: MECHANICAL OR ADHESIVE TYPE, SEISMIC RATED.
- 5. RESILIENT ISOLATION WASHERS AND BUSHINGS: MOLDED NEOPRENE.

1.3 FIELD QUALITY CONTROL

A. TESTING: BY EITHER: OWNER-ENGAGED AGENCY, CONTRACTOR-ENGAGED AGENCY, OR CONTRACTOR.

PART-2 PRODUCTS

- 1.4 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS
- OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
 - 1. ACE MOUNTINGS CO., INC.
 - 2. AMBER/BOOTH COMPANY, INC.
- 3. CALIFORNIA DYNAMICS CORPORATION. 4. COOPER B-LINE, INC.; A DIVISION OF COOPER
- INDUSTRIES.
- 5. HILTI, INC. 6. ISOLATION TECHNOLOGY, INC.
- 7. KINETICS NOISE CONTROL
- 8. LOOS & CO.; CABLEWARE DIVISION.
- 9. MASON INDUSTRIES.
- 10. TOLCO INCORPORATED; A BRAND OF NIBCO INC.
- 11. UNISTRUT; TYCO INTERNATIONAL, LTD.
- 12. VIBRATION ELIMINATOR CO., INC.
- 13. VIBRATION ISOLATION. 14. VIBRATION MOUNTINGS & CONTROLS, INC.

END OF SECTION 230548

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

- 1.1 SUMMARY A. TESTING, ADJUSTING, AND BALANCING FOR THE
 - AIR SYSTEMS: CONSTANT-VOLUME, DUAL-DUCT, VARIABLE-AIR-VOLUME, MULTI-ZONE AND INDUCTION-UNIT SYSTEMS.
 - 2. EXISTING SYSTEMS.

1.2 QUALITY ASSURANCE

FOLLOWING:

A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.

1.3 EXECUTION

- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER
- B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
- D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
- E. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
- F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
- G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
- H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
- I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
- J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

1.1 QUALITY ASSURANCE

SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTME 84.

1.2 FIELD QUALITY CONTROL

A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.

1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;

- A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:
- B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET, MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS: UNCONDITIONED SPACES WITHIN BUILDING: R-6 WITHIN BUILDING ENVELOPE ASSEMBLY: R-8 R-8 OUTSIDE OF BUILDING:

1.4 ITEMS NOT INSULATED:

- 1. FIBROUS-GLASS DUCTS. 2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT
- THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.
- 3. FACTORY-INSILATED FLEXIBLE DUCTS.
- 4. FACTORY-INSULATED PLENUMS AND CASINGS. 5. FLEXIBLE CONNECTORS.
- 6. VIBRATION—CONTROL DEVICES.
- 7. 'FACTORY-INSULATED ACCESS PANELS AND DOORS. 8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

1.5 PRODUCTS THE FOLLOWING INSULATION MANUFACTURERS WILL BE

- ACCEPTABLE: 1. JOHNS-MANVILLE
- 2. OWENS-CORNING

1.6 ACOUSTICAL TREATMENT

1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED, END OF SECTION 230713

SECTION 233113 - METAL DUCTS

1.1 CONSTRUCTION

- A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2-1/2 INCH WG PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACN. 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING 1.3 SEISMIC-RESTRAINT DEVICES STANDARDS
- 1. DUCTWORK SHALL BE TRANSVERSELY JOINTED BY CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1-1/2"X1-1/2"X1/8" GALVANIZED ANGLES, TACK-WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET, OVERLAPPED AT CORNERS, GASKET SIMILAR TO 3M-1202 OR APPROVED EQUAL
- RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.
- 3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6' CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR
- 4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEALING COMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30-03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30-02 AND COVERED WITH APPROVED SEALING TAPE
- 5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER. FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWG A5.2.
- 6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION

C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION. THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:

<u>USG MAX. SIDE INCHES</u> <u>TRANSVERSE JOINTS AND</u>

		DIVACIINO
22	UP TO 12	S SLIP, DRIVE SLIP, ONE INCH POCKET LOCK ON 8 FOOT CENTERS

- 1"X1"X1/8" ANGLES ON 4 22 13 TO 24 FOOT CENTERS 1"X1"X1/8" ANGLES ON 2 25 TO 35
- FOOT CENTERS D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS
- PLUGGED TAPPING LOCATED AS FOLLOWS: 1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX. 2. DOWNSTREAM OF EACH REHEAT COIL AND VAV

WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT

E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3-6 AND AS SHOWN IN FIG. 3-1 AND 3-2 FOR ROUND DUCTWORK.

1.2 MATERIALS

- A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS. B. DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS.
 - 1. FIBROUS-GLASS OR FLEXIBLE ELASTOMERIC DUCT LINER FOR INTERSTITIAL INSULATION.
- 2. PERFORATED INNER DUCT. C. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND
- FITTINGS. D. DOUBLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS.
- 1. FIBROUS-GLASS OR FLEXIBLE ELASTOMERIC DUCT LINER FOR INTERSTITIAL INSULATION
- 2. PERFORATED INNER DUCT.

E. SHEET METAL MATERIALS:

- 1. GALVANIZED SHEET STEEL.
- 2. PVC-COATED, GALVANIZED SHEET STEE
- 3. CARBON-STEEL SHEETS.
- 4. STAINLESS-STEEL SHEETS. 5. ALUMINUM SHEET
- 6. FACTORY-APPLIED ANTI-MICROBIAL COATING.
- F. DUCT LINER: 1. FIBROUS GLASS, TYPE I, FLEXIBLE.
- a. WITH ANTI-MICROBIAL EROSION-RESISTANT
- 2. FLEXIBLE ELASTOMERIC
- NATURAL FIBER. G. SEALANT MATERIALS:
 - 1. TWO-PART TAPE SEALING SYSTEM.
 - 2. WATER-BASED JOINT AND SEAM SEALANT. 3. SOLVENT-BASED JOINT AND SEAM SEALANT.
- 4. FLANGED JOINT SEALANT.
- 5. FLANGE GASKETS.

6. ROUND DUCT JOINT O-RING SEALS.

- A. CHANNEL SUPPORT SYSTEM.
- B. STAINLESS-STEEL RESTRAINT CABLES. C. HANGER ROD STIFFENER: STEEL TUBE OR STEEL SLOTTED-SUPPORT-SYSTEM SLEEVE WITH INTERNALLY BOLTED CONNECTIONS OR REINFORCING STEEL ANGLE

1.4 DUCT CLEANING

- A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING,
- ADJUSTING, AND BALANCING. B. CLEAN THE FOLLOWING ITEMS:

CLAMPED TO HANGER ROD.

- 1. AIR OUTLETS AND INLETS. 2. SUPPLY, RETURN, AND EXHAUST FANS.
- 3. AIR-HANDLING UNITS.
- 4. COILS AND RELATED COMPONENTS. 5. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND

TURNING VANES.

- TURNING VANES. 6. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND
- 7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS

1.5 DUCT SCHEDULE

A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:

MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM. END OF SECTION 233113

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

- 1.1 PRODUCTS A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE
- B. MANUFACTURERS: TITUS

NOTED IN BAKED WHITE ENAMEL.

- 1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
- a. CARNES.
- b. HART & COOLEY INC.
- c. KRUEGER.
- d. METALAIRE, INC.
- e. NAILOR INDUSTRIES INC. C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713

THERMOSTATIC CONTROLS:

- A. GENERAL: THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE INDIVIDUALLY CONTROLLED BY THERMOSTATIC CONTROLS RESPONDING TO TEMPERATURE WITHIN THE ZONE. FOR THE PURPOSES OF SECTION 6.4.3.1, A DWELLING UNIT SHALL BE PERMITTED TO BE CONSIDERED A SINGLE ZONE.
- WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEAD BAND OF AT LEAST 5°F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

THERMOSTATS THAT REQUIRE MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.

C. SETBACK CONTROLS: HEATING SYSTEMS LOCATED IN CLIMATE ZONES 2-8 SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES ABOVE A HEATING SETPOINT ADJUSTABLE DOWN TO 55°F OR LOWER. COOLING SYSTEMS LOCATED IN CLIMATE ZONES 1B, 2B, AND 3B SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES BELOW A COOLING SETPOINT ADJUSTABLE UP TO 90°F OR HIGHER OR TO PREVENT HIGH SPACE HUMIDITY LEVELS.

EXCEPTION:

D. AUTOMATIC SHUTDOWN: HVAC SYSTEMS SHALL BE EQUIPPED WITH AT LEAST ONE OF THE FOLLOWING: CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER DIFFERENT TIME SCHEDULES FOR SEVEN DIFFERENT DAY-TYPES PER WEEK, ARE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST TEN HOURS, AND INCLUDE AN ACCESSIBLE MANUAL OVERRIDE, OR EQUIVALENT FUNCTION. THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO TWO HOURS.

RESIDENTIAL OCCUPANCIES MAY USE CONTROLS THAT CAN

START AND STOP THE SYSTEM UNDER TWO DIFFERENT TIME SCHEDULES PER WEEK.

E. SETPOINT OVERLAP RESTRICTION: WHERE HEATING AND COOLING TO A ZONE ARE CONTROLLED BY SEPARATE ZONE THERMOSTATIC CONTROLS LOCATED WITHIN THE ZONE, MEANS (SUCH AS LIMIT SWITCHES, MECHANICAL STOPS, OR, FOR DDC SYSTEMS, SOFTWARE PROGRAMMING) SHALL BE PROVIDED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT MINUS ANY APPLICABLE PROPORTIONAL

F. HEAT PUMP SUPPLEMENTARY HEAT HEAT PUMPS HAVING SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT, EXCEPT DURING DEFROST, PREVENT SUPPLEMENTARY HEAT OPERATION WHERE THE HEAT PUMP CAN PROVIDE THE

SEQUENCE OF OPERATION:

HEATING LOAD.

- MAKE-UP AIR UNIT a. THERMOSTAT CALLS FOR HEAT. b. IGNITION CONTROL MODULE ENERGIZES PILOT OPERATOR OF GAS VALVE AND INITIATES SPARK AT IGNITER OF THE PILOT
- c. PILOT BURNER IGNITION IS PROVEN TO THE IGNITION CONTROL BY THE FLAME SENSE PROBE AND SPARKING OF THE IGNITER IS DISCONTINUED.

d. ONCE PILOT BURNER OPERATION IS PROVEN, THE IGNITION

LIGHT, THE FAN TIME DELAY INITIATES FAN OPERATION.

g. IGNITION CONTROL MODULE DE-ENERGIZES PILOT AND MAIN

CONTROL BY THE MODULE ENERGIZES THE MAIN BURNER OPERATOR OF THE GAS VALVE, ALLOWING GAS FLOW TO THE MAIN BURNERS. e. APPROXIMATELY 60 SECONDS AFTER THE MAIN BURNERS

THERMOSTAT IS SATISFIED AND CALL FOR HEAT IS REMOVED.

BURNER OPERATORS OF THE GAS VALVE, CEASING ALL GAS h. APPROXIMATELY 2 MINUTES AFTER SATISFYING THE

THERMOSTAT, FAN OPERATION CEASES.

COMMERCIAL KITCHEN EXHAUST FAN: a. KEF SHALL BE INTERLOCKED WITH MUA UNIT. THERE CIRCULATION DAMPER ON MUA SHALL CLOSE AND THE UNIT OPERATES ON 100% OUTSIDE AIR WHILE KEF IS ENABLED. FAN SHALL BE ENABLED VIA TOGGLE SWITCH MOUNTED ON THE WALL ADJACENT TO THE HOODS.

1. SHEET METAL WORK

A. EXCEPT AS OTHERWISE SHOWN OR NOTED. ALL DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED SHEET STEEL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. DUCT CONSTRUCTION STANDARDS,

B. DUCTWORK STATIC PRESSURE CLASSIFICATION:

PRESSURE CLASSIFICATION 2 IN. W.G.

a. 2 IN OF W.G. UP TO 2 IN OF W.G. b.6 IN OF W.G. ABOVE 2 IN & UP TO 6 IN WG

- C. SEALING OF DUCTWORK SHALL COMPLY WITH SECTION 603.9 OF THE MECHANICAL CODE OF NEW YORK STATE OR IN NEW YORK CITY, THE NEW YORK CITY CONSTRUCTION CODES.
- . VOLUME DAMPERS: GALVANIZED STEEL, PER SMACNA "LOW VELOCITY MANUAL," EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT OTHER END. FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.
- E. ACCESS DOORS: INSULATED OR UNINSULATED. SAME AS
- 1) PROVIDE MINIMUM 20 IN. X 20 IN. (OR EQUIVALENT) ON ALL DUCTS, UNLESS OTHERWISE APPROVED, AT FIRE DAMPERS, AND AT ALL DUCT ACCESSORIES SUCH AS HUMIDIFIERS, DUCT SMOKE DETECTORS, AUTO DAMPERS, AND LOUVERS.
- 2) ACCESS DOORS SHALL BE LOCATED AT THE BOTTOM OF THE DUCT OR ON THE SIDE, AND NOT MORE THAN 16 INCHES FROM THE DUCT ACCESSORY THAT IT SERVES (FIRE DAMPER, FSD, ETC.).
- 3) WHERE DUCT SIZE DOES NOT PERMIT A 20 IN. X 20 IN. (OR EQUIVALENT AREA) ACCESS DOOR, THE ACCESS DOOR SHALL BE FABRICATED OF AN AREA EQUIVALENT TO A 20 IN. X 20 IN. WITH THE SMALLER DIMENSION BEING 2 INCHES SMALLER THAN THE DUCT SIZE WHERE IT WILL BE LOCATED, AND LOCATED NOT LESS
- THAN 1" FROM ANY DUCT EDGE. 4) FOR DUCTS WHICH LARGEST DIMENSION IS 12 INCHES (WIDTH AND OR HEIGHT), IT IS PERMISSIBLE TO PROVIDE A 10 IN. X 10 IN. (OR EQUIVALENT AREA) ACCESS DOOR LOCATED AT THE BOTTOM OR THE SIDE
- 5) ALL ACCESS DOORS TO BE HINGED, WITH LATCH
- F. KITCHEN RANGE HOOD EXHAUST DUCT INCLUDING FAN DISCHARGE TO ATMOSPHERE SHALL BE PROVIDED AS
- FOLLOWS: NOTE: IF ALL DUCTWORK IS INSIDE BUILDING.

SIMILAR TO VENTLOCK NO. 100.

OF THE DUCT. THAN

FOR OTHER AREAS.

- 1. NO. 10 USSG BLACK STEEL. NOTE: NYC CODE REQUIRES THAT ALL DUCTWORK MUST BE WELDED AND THICKER BLACK STEEL IF SOME DUCTWORK IS OUTDOORS. CHECK LOCAL CODE
- BLACK STEEL OF FOLLOWING GAUGES AND THICKNESSES. INSIDE BUILDING SHALL BE NO. 10 USSG. OUTDOOR DUCTWORK TO 7 SQ FT SHALL BE 1/8 INCH, ABOVE 7 SQ FT TO 12.5 SQ FT SHALL BE 3/16 INCH, AND OVER 12.5 SQ FT SHALL BE 1/4
- LIQUIDTIGHT CONTINUOUS EXTERNAL ARC WELDED. EXCEPT WHERE THE DUCT STUB COLLAR OF THE HOOD IS CONNECTED TO THE EXHAUST DUCT. CONNECTION TO THE HOOD SHALL BE CONTINUOUS LIQUIDTIGHT EXTERNAL ARC WELDED OR IN ACCORDANCE WITH NFPA 96, 1984.

4. ANGLE REINFORCING SHALL BE MINIMUM 1-1/2 INCH

X 1-1/2 INCH X 3/16 INCH AT MAXIMUM 4 FT ON

CENTERS AND IN ACCORDANCE WITH SMACNA

RECTANGULAR INDUSTRIAL DUCT CONSTRUCTION

3. ALL SEAMS, JOINTS AND PENETRATIONS SHALL BE

STANDARDS SHALL BE MOUNTED. 5. CLEANOUT DOORS ON HORIZONTAL DUCTS SHALL BE MOUNTED MAXIMUM 12 FT APART AND IN CHANGE OF DIRECTION. CLEANOUT DOORS ON HORIZONTAL DUCT SHALL BE MOUNTED ON SIDE OF DUCT. BOTTOM EDGE SHALL BE NOT LESS THAN 2 INCH ABOVE THE BOTTOM OF DUCT. CLEANOUT DOORS AT VERTICAL DUCTS SHALL BE MOUNTED AT BASE. DOOR AND FRAME SHALL BE SAME GAUGE AS DUCT. HINGES SHALL BE VENTLOCK NO. 260, EXTRA HEAVY ZINC PLATED. LATCHES SHALL BE VENTLOCK NO. 140, CAST ZINC. GASKETS SHALL BE BETWEEN DOOR AND FRAME. GASKETS SHALL BE 1/8 INCH DOUBLE THICKNESS RATED FOR 20000F. CLEANOUT DOOR

SIZE SHALL BE MAXIMUM 24 INCH X 24 INCH AND

MINIMUM SHALL BE 24 INCH ONE SIDE. AND OTHER

G. FLEXIBLE CONNECTIONS: NEOPRENE—COATED GLASS FABRIC, 30 OZ PER SQ YD WITH SEWED AND CEMENTED SEAMS. SIMILAR TO VENT FABRICS. PROVIDE WITH METAL

SIDE SHALL BE 2 INCH LESS THAN DUCT HEIGHT.

H. TURNING VANES: GALVANIZED STEEL SMALL

DOUBLE-THICKNESS VANES WITH 2 IN. INSIDE RADIUS.

COLLARS. ALLOW MINIMUM MOVEMENT OF 1 IN.

- I. FIRE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION, MULTIBLADED TYPE, SPRING LOADED, EQUIPPED WITH FUSIBLE LINK, CONFORMING TO NFPA STANDARD 90A AND APPROVED BY NEW YORK CITY BOARD OF STANDARDS AND APPEALS FOR NYC CAL-100-65-5M. SIMILAR TO AIR BALANCE MODEL 319-P, RATED AS REQUIRED. SEE INSTALLATION ON DRAWING.
- J. DUCTWORK FOR AREAS WITH HIGH HUMIDITY SHALL BE ALUMINUM FABRICATED ONE GAGE LARGER THAN GALVANIZED FOR THE SAME PRESSURE CLASSIFICATION. THESE DUCTS INCLUDE SHOWERS, OUTDOOR AIR INTAKE,

HUMIDIFIERS, ETC.

- K. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.
- L. AUTOMATIC DAMPERS: COMPLETE WITH LINKAGE AND ELECTRIC OPERATOR. OPPOSED BLADE DAMPER OR GALVANIZED STEEL MIN. 4 IN., MAX. 8 IN. WIDE WITH COMPRESSIBLE EDGE SEALS TO PREVENT LEAKAGE. FACTORY—ASSEMBLE STEEL LINKAGE AND SHAFT WITH NYLON OR OIL—IMPREGNATED BRONZE BEARINGS. MOTOR WITH SUFFICIENT POWER TO LIMIT LEAKAGE TO 10 CFM PER SQ FT. LINKAGE TO WITHSTAND LOAD EQUAL TO TWICE MAXIMUM OPERATING FORCE WITHOUT DEFLECTION. DAMPER MOUNTED IN WELDED STEEL CHANNEL FRAME.
- M. WIRE MESH SCREEN (WMS): NO. 16 USSG, 3/4 SQUARE MESH, 1 IN. WIDE GALVANIZED STEEL ENCLOSING FRAME. FLANGED DUCT OPENING TO RECEIVE FRAME.
- N. COMBINATION FIRE AND SMOKE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE. BLADES SHALL BE AIRFOIL SHAPED, DOUBLE SKIN, SINGLE PIECE CONSTRUCTION. EQUIPPED WITH FUSIBLE LINK CONFORMING TO NFPA STANDARD 90A, 92A & 92B, AND COMPLY WITH LATEST STANDARD UL555 AND UL555S WITH LEAKAGE CLASS I SMOKE DAMPERS, BLADE SEALS. SIMILAR TO RUSKIN MODEL FSD 60, NYC BSA LISTING# 176-82-SM. ACTUATOR SHALL BE ELECTRICALLY POWERED, 120 V/1 PH, AND MOUNTED IN THE FACTORY AT THE TIME OF FABRICATION.

A. GENERAL:

2. AIR OUTLETS

- 1) MARGIN TYPES, COLORS, FINISH AND METHODS OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH ARCHITECTURAL CEILING AND WALL DETAILS AND SPECIFICATIONS.
- 2) FRAME TYPE SUITABLE FOR MOUNTING IN CEILING OR WALL CONSTRUCTION AS INDICATED ON ARCHITECTURAL PLANS.
- 3) EXACT LOCATION OF ALL AIR OUTLETS AS PER ARCHITECTURAL PLANS.
- 4) SUITABLE FOR OPERATION AT 20% EXCESS AND 20% LESS THAN NOTED CAPACITY FOR CONSTANT VOLUME SYSTEMS AND AT 20% EXCESS AND 60% LESS THAN NOTED CAPACITY FOR VARIABLE VOLUME SYSTEMS. MANUFACTURER RESPONSIBLE FOR EXAMINING APPLICATION OF EACH OUTLET AND GUARANTEE THAT EACH WILL PROVIDE REQUIRED NC LEVELS AND COMFORT SPACE CONDITIONS WITHOUT DRAFTS THROUGHOUT OPERATING RANGE.
- 5) ALL REGISTERS AND DIFFUSERS SHALL BE PROVIDED WITH OPPOSED BLADE VOLUME DAMPERS. DAMPER OPERATING LEVERS SHALL BE ACCESSIBLE AT THE FACE OF AIR OUTLETS.
- A. LINEAR DIFFUSERS: EXTRUDED ALUMINUM CONSTRUCTION, NATURAL ANODIZED FINISH, REMOVABLE CORE, AIR DEFLECTION VANE AND CABLE DAMPER IN EACH BRANCH TAP WITH 3 FT CABLE TO DIFFUSER FACE. PROVIDE CABLE DAMPER SIMILAR TO ANEMOSTAT MODEL OBASL.
- B. SQUARE DIFFUSERS: DIFFUSERS SHALL BE STEEL CONSTRUCTION PAINTED WHITE SIMILAR TO ANEMOSTAT.
- C. REGISTERS AND GRILLES:
- 1) RETURN AND EXHAUST REGISTERS: STEEL CONSTRUCTION WITH VOLUME DAMPER.
- 2) SUPPLY REGISTERS: ALUMINUM CONSTRUCTION ADJUSTABLE DOUBLE DEFLECTION ALUMINUM AIRFOIL LOUVERS, WITH VOLUME DAMPER. PROVIDE AIR EQUALIZING DEFLECTOR WHERE REGISTER COLLAR DUCT IS LESS THAN 2 FT LONG.
- 3) TRANSFER GRILLES: STEEL CONSTRUCTION WITHOUT VOLUME DAMPER.3. NOISE CONTROL
- A. ALL ROOM NC LEVELS SHALL BE 35 OR LESS.
- B. PROVIDE SOUND LINING FOR THE FOLLOWING DUCTWORK:
- 1) ALL DUCTWORK WITHIN MECHANICAL ROOMS AND NOT LESS THAN 20 FT ON EACH SIDE OF ALL FANS AND AC UNITS
- 2) AIR TRANSFER DUCTS
- 3) DOWNSTREAM OF ALL VARIABLE AIR VOLUME AND CONSTANT VOLUME BOXES FOR A MINIMUM OF 15 FT.
- 4) ALL MIXED AIR PLENUMS, EXCEPT WHERE MOISTURE CARRYOVER FROM OUTDOOR AIR LOUVER WILL OCCUR.
- 5) FULL EXTENT OF SUPPLY DUCTS SERVING CONFERENCE ROOMS.
- 6) ALL EXPOSED INTERIOR SUPPLY DUCTWORK.
- 7) ALSO WHERE NOTED ON A DRAWING.
- C. SOUND LINING IN DUCTWORK: FIBROUS GLASS, MINIMUM 3 LB DENSITY, 1 IN. THICKNESS, MAXIMUM 0.25 K FACTOR AT 75 DEG F MEAN TEMPERATURE WITH ACRYLIC COATED FINISH FACTORY APPLIED EDGE COATING AND STENCILED IN ACCORDANCE WITH NFPA 90. FLAMESPREAD SHALL BE A MAXIMUM OF 25. LINING SHALL NOT SUPPORT MICROBIAL GROWTH AND SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1071 AND ASTM G21/G22. SIMILAR TO MANVILLE PERMACOTE LINA COUSTIC
- D. ALL SOUND LINING, ADHESIVES, FACES AND ACCESSORIES TO BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED

- 4. TESTING AND BALANCING
- A. AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF FANS AND BRANCH DAMPERS FOR MAJOR ADJUSTMENTS. ADJUSTMENT OF TERMINAL DAMPERS AND DEVICES SHALL BE FOR TRIM OR MINOR ADJUSTMENT ONLY. THIS SHALL BE DONE TO PERMIT THE LEAST NOISE GENERATION IN THE TERMINAL AREAS AND UTILIZE MINIMUM FAN ENERGY
- B. WATER BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF BALANCING VALVES AT PUMPS FOR PROPER FLOW. ADJUST FLOW THROUGH BOILERS, CHILLERS, HEAT EXCHANGERS AND COILS AS REQUIRED.
- C. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL REBALANCE ANY EXISTING PORTIONS OF AIR DISTRIBUTION SYSTEM AND WATER DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION AND ALSO BALANCE ALL NEW WORK
- D. THE CONTRACTOR SHALL PROVIDE ALL LABOR, PRESSURE GAUGES, FLOW METERS, SHEAVES, AND BELTS REQUIRED TO BALANCE SYSTEMS
- E. BALANCING REPORT SHALL BE PROVIDED ON AABC-TYPE FORMS.
- F. FANS, AIR HANDLING UNITS, PUMPS, AND COILS SHALL BE BALANCED TO WITHIN +5% OF THEIR DESIGN CAPACITIES. ALL OTHER AIR AND WATER QUANTITIES SHALL BE BALANCED TO WITHIN +10% OF THE DESIGN QUANTITIES.
- G. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY ONE OF THE FOLLOWING INDEPENDENT FIRMS SPECIALIZING IN TESTING AND BALANCING
- 1) INDEPENDENT TESTING AND BALANCING, INC.
- 2) AIR CONDITIONING TEST AND BALANCING CORP.
- 3) CFM TESTING AND BALANCING CQ
- H. THE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT TO BE DEMONSTRATED BY THE CONTRACTOR
- I. AFTER OCCUPANCY OF THE SPACE, AND APPROVAL OF THE BALANCE REPORTS, THE AIR BALANCE COMPANY SHALL RETURN TO PROVIDE COMFORT BALANCE SERVICES. THE AIR BALANCE COMPANY SHALL ADJUST VOLUME DAMPERS AND VAV TERMINAL UNITS MAXIMUM AND MINIMUM SETTINGS IN RESPONSE TO THE OCCUPANTS REQUIREMENTS. ALLOW ONE HALF DAY MINIMUM PER FLOOR AND UP TO THREE DAYS ON SITE FOR COMFORT BALANCE SERVICES

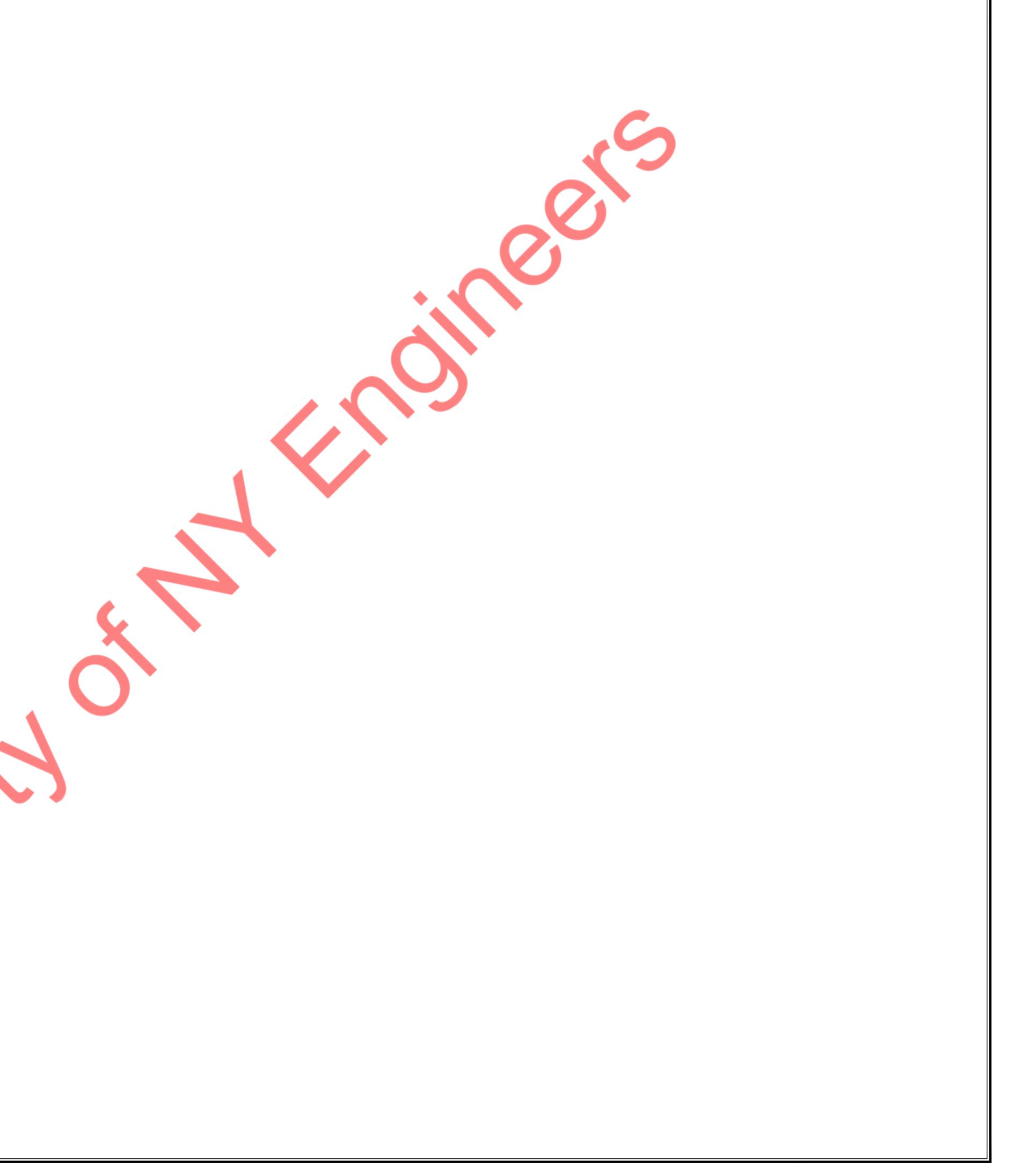
1.5 KITCHEN EXHAUST DUCTWORK

- A. ALL HORIZONTAL AND VERTICAL KITCHEN EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF 16 GAUGE MINIMUM BLACK IRON OR PREFABRICATED DOUBLE WALL GREASE DUCTWORK APPROVED FOR KITCHEN EXHAUST APPLICATION WITH ETL LISTED TO UL 1978 AND UL 2221 SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER INSTALLATION INSTRUCTIONS AND LOCAL CODES. ALL SEAMS AND JOINTS SHALL HAVE A LIQUID TIGHT CONTINUOUS EXTERNAL WELD AS PER NFPA 96 FOR BLACK IRON DUCTWORK. THE EXTERIOR OF ALL KITCHEN RANGE BLACK IRON EXHAUST DUCTS SHALL HAVE 1-1/2" X 1-1/2" X 1/8" WELDED ANGLES, PUNCHED FOR SECURING BLOCK INSULATION. WHERE KITCHEN RANGE BLACK IRON EXHAUST DUCT RISERS PASS VERTICALLY THROUGH FLOORS OF THE BUILDING, PROVIDE ANGLE CLIPS WELDED TO THE DUCT OF REQUIRED SIZES TO SUPPORT THE WEIGHT OF THE RISER SECTIONS ON THE BUILDING'S STRUCTURE AT EACH OF THE FLOOR LEVELS.PROVIDE AND INSTALL ALL SUPPLEMENTARY STRUCTURAL STEEL IN SHAFTS TO PROPERLY SUPPORT EXHAUST DUCTWORK FROM BUILDING CONSTRUCTION. PROVIDE MINIMUM 12"X12" ACCESS DOORS ON SIDE OF HORIZONTAL DUCT AT 12' SPACING. ACCESS DOORS SHALL BE SIMILAR TO DESCRIPTION IN "ACCESS DOORS IN SHEET METAL WORK" EXCEPT THAT DOOR GAUGE SHALL BE THE SAME AS DUCT GAUGE. ALL HORIZONTAL DUCTS SHALL BE PITCHED BACK TO HOODS 1 PER FOOT OF MAXIMUM PITCH ATTAINABLE. THIS TRADE SHALL DRILL OR CUT ALL REQUIRED OPENINGS AS REQUIRED BY THE DUCT EXTINGUISHING SYSTEM AND AS COORDINATED WITH THE TRADE SUPPLYING THE EXTINGUISHING SPRAY HEADS. MAINTAIN 1" CLEARANCE BETWEEN SHEET METAL DUCT AND ANY SURFACE SUCH AS SLAB, BEAM OR SHAFT ENCLOSURE.
- B. ALL HORIZONTAL AND VERTICAL KITCHEN RANGE BLACK IRON EXHAUST DUCTWORK GAUGES SHALL BE AS FOLLOWS:

SIZE	GAUGE OF BLACK IRON
LESS THAN 155 SQ. IN	16
155-200 SQ. IN.	14
ABOVE 201 SQ. IN.	12

C. ALL EXHAUST DUCTWORK FROM DISHWASHERS, POT SINKS, OVENS, OR OTHER KITCHEN APPARATUS EMITTING HEAT OR VAPOR (OTHER THAN RANGE HOOD EXHAUST) SHALL BE CONSTRUCTED OF ALUMINUM WITH WELDED JOINTS (USING SMACNA STANDARDS) AND MADE WATERTIGHT. THIS INCLUDES ALL DUCTWORK FROM THE EQUIPMENT TO THE EXHAUST FAN AND FROM THE EXHAUST FAN TO THE DISCHARGE AIR LOUVER. THE DUCTS SHALL PITCH BACK TO THE DISHWASHER FROM THE VERTICAL RISER OR WHERE THE RUN OF DUCT IS TOO LONG SHALL CHANGE PITCH TO DRAIN TO THE BOTTOM OF THE RISER. WHERE DUCTS LEAVE SHAFT TO ENTER THE EXHAUST FAN THEY SHALL ALSO BE PITCHED TO A LOW POINT AWAY FROM THE RISER. WELD 3" DRAINS AT ALL LOW POINTS AND RUN TO THE NEAREST DRAIN. THIS TRADE SHALL BE HELD RESPONSIBLE TO PROVIDE A WATERTIGHT AND DRAINED SYSTEM REGARDLESS OF THE QUANTITY OF STEAM OR WATER VAPOR LEAVING THE EQUIPMENT.

END OF SECTION 233113



KEY NOTES GENERAL NOTES KEY NOTES: KITCHEN EXHAUST SYSTEM NOTES: PROVIDE CLEAN OUT AT ALL ELBOWS AND BOTTOM OF RISER AND EVERY 15 FEET HORIZONTAL KITCHEN EXHAUST DUCT. CLEANOUT OPENINGS SHALL BE PROVIDED AT EVERY CHANGE IN EXHAUST DUCT RISER. DIRECTION AND WITHIN 3 FEET OF THE EXHAUST FAN. CLEANOUT OPENINGS SHALL BE EQUIPPED WITH TIGHT-FITTING DOORS CONSTRUCTED OF STEEL HAVING A THICKNESS NOT LESS THAN THAT REQUIRED FOR THE DUCT. DOORS SHALL BE EQUIPPED WITH A SUBSTANTIAL METHOD OF LATCHING. SUFFICIENT TO HOLD THE DOOR TIGHTLY CLOSED. DOOR ASSEMBLIES SHALL HAVE A GASKET OR SEALANT THAT IS NON-COMBUSTIBLE AND LIQUID TIGHT AND SHALL PROVIDE NEW FIRE SMOKE DAMPERS. NOT HAVE FASTENERS THAT PENETRATED THE DUCT. THE CLEANOUTS FOR HORIZONTAL GREASE DUCT SHALL BE LOCATED ON THE SIDE OF THE DUCT WITH THE OPENING NOT LESS THAN 1.5" ABOVE THE BOTTOM OF THE DUCT AND NOT LESS THAN 1" BELOW THE TOP OF THE DUCT. COMMERCIAL KITCHEN GREASE DUCTS SHALL BE DESIGNED FOR THE TYPE OF COOKING APPLIANCE AND HOOD SERVED. JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID TIGHT WELD OR BRAZE MADE IN THE EXTERNAL SURFACE IF THE DUCT SYSTEMS. DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET AND OUTLET OF THE FAN FOR INLINE FANS. APPROVED FLEXIBLE CONNECTIONS MAY BE PROVIDED. A VIBRATION ISOLATION CONNECTOR FOR CONNECTING A DUCT TO A FAN SHALL CONSIST OF NON-COMBUSTIBLE PACKING IN A METAL SLEEVE JOINT OF APPROVED DESIGN OR SHALL BE A COATED-FABRIC FLEXIBLE DUCT CONNECTOR LISTED AND LABELED FOR THE APPLICATION. VIBRATION ISOLATION CONNECTORS SHALL BE INSTALLED ONLY AT THE CONNECTION OF A DUCT TO A FAN INLET OR OUTLET. PRIOR TO THE USE OR CONCEALMENT OF ANY PORTION OF A GREASE DUCT SYSTEM. A LEAKAGE TEST SHALL BE PERFORMED. DUCT SHALL SERVICE CORRIDOR (N) WALK-IN COOLER/ BE CONSIDERED TO BE CONCEALED WHERE INSTALLED IN SHAFTS OR KEG BOX COVERED BY COATINGS OR WRAPS THAT PREVENT THE DUCTWORK STORAGE FROM VISUALLY INSPECTED ON ALL SIDE. THE DUCT INSTALLER SHALL BE RESPONSIBLE FOR PROVIDING THE NECESSARY EQUIPMENT AND HWHT BY PLUMBING PERFORMING THE GREASE DUCT LEAKAGE TEST. THE DUCT LEAKAGE CONTRACTOR TEST SHALL BE PERFORMED FOR ALL THE DUCT SYSTEMS, INCLUDING THE DUCT-TO-DUCT CONNECTION. THE DUCTWORK SHALL BE PERMITTED TO BE TESTED IN SECTIONS, PROVIDED THAT EVERY JOINT IS TESTED (IF TEST IS FAILED, CONTRACTOR TO PROVIDE NEW KITCHEN EXHAUST DUCT). PROVIDE SMOKE TEST TO PROOF TIGHTNESS OF THE GREASE DUCT. 2" DIA HOTWATER-GREASE DUCT BRACING AND SUPPORTS SHALL BE OF HEATER FLUE VENT AND NON-COMBUSTIBLE MATERIAL SECURELY ATTACHED TO THE STRUCTURE CDR-1 COMBUSTION AIR INTAKE AND DESIGNED TO CARRY GRAVITY AND SEISMIC LADS WITHIN THE 24"X24" STREET LIMITATIONS OF THE NEW YORK CITY BUILDING CODE. BOLTS, PROVIDE WMS SCREWS, RIVETS AND OTHER MECHANICAL FASTENERS SHALL NOT (E/N) OFFICE (N) WALK-IN ON RETURN PENETRATE DUCT WALLS. AIR DUCT A RESIDUE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER WITH PROVISION FOR CLEANOUT IN ACCORDANCE WITH NFPA 96. 12X8 A GREASE DUCT SERVING THE TYPE-1 HOOD THAT PENETRATED A CEILING, WALL OR FLOOR SHALL BE ENCLOSED FROM THE FIRE POINT MAIN OF PENETRATION TO THE OUTLET TERMINAL. DUCT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THAT OF THE MALL FIRE-RESISTANCE RATED ASSEMBLY PENETRATED BUT NEED NOT **ENTRY** 20X12 2% SLOPE KITCHEN-EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 (N) KITCHEN FEET HORIZONTALLY FROM PARTS OF THE SAME OR CONTIGUOUS CORRIDOR BUILDINGS, ADJACENT BUILDINGS AND ADJACENT PROPERTY LINE. THIS 12X6 EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM AND NOT LESS THAN 3 FEET ABOVE AIR INTAKE OPENINGS INTO ANY BUILDING. 7 12X12 PROVIDE TYPE-I EXHAUST DUCT FOR HOOD-1&2 EXHAUST, IN GREASE DUCT SHALL SLOPE COMPLIANCE WITH NYC MC 2014. (840) CDS-2 24"X24" NOT LESS THAN ONE FOURTH 16X14 PROVIDE UL LISTED 2 LAYERS OF 1.5" THICK FIRE WARP, TESTED IN UNIT VERTICAL IN 12 UNITS 24"X24 ACCORDANCE WITH ASTM E2336 FOR TYPE-I EXHAUST DUCTS. FIRE HORIZONTAL (2% SLOPE) 14¢DS 12 1 WRAP TO PROVIDE 1 OR 2-HR ENCLOSURE. THROUGH PENETRATION TOWARD THE KITCHEN HOODS 24"X24" FIRE STOP SYSTEMS ARE TO BE TESTED IN ACCORDANCE WITH ASTM E 24"X24" 814 (UL1479). FOIL COVERING TO BE PROVIDED ABOVE INSULATION. MECHANICAL GENRAL NOTES: CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN ON NEW DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR PIPING AND DUCTWORK UP 20X20 (3330) ROUTING. OFFEST AND RUN PIPING, DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA PIPING, DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE COORDINATE LOCATIONS AND SIZES OF EXISTING ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEER. 18X12 14X12 10X8 8X6 EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE 10X8 12X10 12X10 | VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR SG-1 SG-1 -SG-1 SG-1 SG-1 SG-1 ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SG-1 13'-3''X3'' ⁻29'-4''X3'' 24"X4" 24"X4" 24"X4" 24"X4" 24"X4" 24"X4" INSTALLATION. 24"X4" WIDE LINEAR SUPPLY AIR WIDE LINEAR SUPPLY AIR CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS (200)(200)(200)(200)(200)(200)GRILL. INACTIVE LENGTH (200) GRILL. INACTIVE LENGTH BASED ON ACTUAL EQUIPMENT SELECTED. TO BE BLANKED OFF TO BE BLANKED OFF

[4160] 1

←(4) PICK-UP

— (N) BAR

MALL FOOD

COURT

SEATING

INTERIOR

- COORDINATE WITH ALL TRADES FOR MATERIALS IN RATED AND PLENUM ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS
- MOUNT DUCTWORK AS HIGH AS POSSIBLE. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C AND

RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.

- PROVIDE 1.5" ACOUSTICAL LINING UP TO 20' OF DUCT RUN FROM AC UNITS IN SUPPLY AND RETURN DUCTS. PROVIDE 1.5" THERMAL INSULATION AFTER 20' OF DUCT RUN FROM AC UNITS. R-8(2" THICK) INSULATION TO BE PROVIDED TO OA DUCT.
- GREASE DUCT SYSTEM SHALL SLOPE NOT LESS THAN ONE-FOURTH UNIT VERTICAL IN 12 UNITS HORIZONTAL (2-PERCENT SLOPE) TOWARDS THE HOOD OR GREASE RESERVOIR. PRÒVIDE GREASE RESERVOIR IN DUCTS, WHERE HORIZONTAL DUCT RUN EXCEED 75 FEET. COORDINATE WITH ARCHITECT FOR GREASE RESERVOIR LOCATION AND ACCESS.
- RESIDUE TRAP TO BE PROVIDED AT THE BASE OF EACH VERTICAL RISER OF GREASE EXHAUST DUCT FOR CLEANOUT, IN ACCORDANCE WITH NFPA 96.

LANDLORD GENRAL NOTES:

- CONTRACTOR TO COORDINATE ALL TENANT WORK OUTSIDE OF DEMISED SPACE WALL WITH BASE BUILDING MANAGEMENT AND ADJACENT
- TENANTS, BEFORE INSTALLATION OF ANY HVAC WORKS. CONTRACTOR TO COORDINATE WITH BASE BUILDING MANAGEMENT AND SHALL MAINTAIN SAFE CONDITIONS AT ALL REQUIRED EGRESS ACCESS
- IN EXISTING TO REMAIN EGRESS CORRIDORS AND STAIRS. CONTRACTOR TO COORDINATE ALL ACCESS, INCLUDING KITCHEN EXHAUST CLEAN-OUTS AND PROVIDE MEANS OF OPERATION/ MAINTENANCE. REPAIR ALL EXISTING CONSTRUCTION, WHICH GETS DAMAGED DURING INSTALLATION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ALL EXISTING SPRAY FIREPROOFING DAMAGED AS A RESULT OF CONNECTION ANY/ALL
- NO EQUIPMENT, DUCTS ,PIPES OR CONTROLLER SHALL BÉ INSTALLED ON THE 2HRS RATED DEMISING WALL (SHARED WITH ADJACENT

MEP SUPPORTS TO EXISTING DECK AND STRUCTURE (ABOVE).

MECHANICAL FIRST FLOOR PLAN SCALE: 1/4"=1'-0"

MALL FOOD

COURT

SEATING

EXTERIOR

3" CONCENTRIC VENT

AND COMBUSTION INTAKE

FOR HOT WATER HEATER

- PROVIDE GREASE TRAP AT BOTTOM OF GREASE EXHAUST DUCT RISER. CONTRACTOR TO COORDINATE WITH ARCHITECT TO PROVIDE ACCESS FOR GREASE TRAP AT BOTTOM OF KITCHEN
- 2) INTERLOCK MOTORIZED DAMPER WITH MAU OPERATION ..
- CONTRACTOR TO VERIFY THE CONDITION OF EXISTING FIRE SMOKE DAMPER. IN CASE NO EXISTING DAMPER OR EXISTING IS NOT IN OPERATING CONDITION/DAMAGED, CONTRACTOR TO
- CONTRACTOR TO VERIFY THE CONDITION OF EXISTING THERMOSTATS FOR EXISTING RTU. IN CASE NO EXISTING THERMOSTAT OR EXISTING IS NOT IN OPERATING CONDITION/DAMAGED, CONTRACTOR TO PROVIDE NEW THERMOSTATS AND WIRE TO EACH RTU.

GENERAL NOTES

KITCHEN EXHAUST SYSTEM NOTES:

- A. PROVIDE CLEAN OUT AT ALL ELBOWS AND BOTTOM OF RISER AND EVERY 15 FEET HORIZONTAL KITCHEN EXHAUST DUCT.
- EVERY 15 FEET HORIZONTAL KITCHEN EXHAUST DUCT.

 B. CLEANOUT OPENINGS SHALL BE PROVIDED AT EVERY CHANGE IN DIRECTION AND WITHIN 3 FEET OF THE EXHAUST FAN.
- C. CLEANOUT OPENINGS SHALL BE EQUIPPED WITH TIGHT—FITTING DOORS CONSTRUCTED OF STEEL HAVING A THICKNESS NOT LESS THAN THAT REQUIRED FOR THE DUCT. DOORS SHALL BE EQUIPPED WITH A SUBSTANTIAL METHOD OF LATCHING, SUFFICIENT TO HOLD THE DOOR TIGHTLY CLOSED. DOOR ASSEMBLIES SHALL HAVE A GASKET OR SEALANT THAT IS NON—COMBUSTIBLE AND LIQUID TIGHT AND SHALL
- NOT HAVE FASTENERS THAT PENETRATED THE DUCT.

 D. THE CLEANOUTS FOR HORIZONTAL GREASE DUCT SHALL BE LOCATED ON THE SIDE OF THE DUCT WITH THE OPENING NOT LESS THAN 1.5" ABOVE THE BOTTOM OF THE DUCT AND NOT LESS THAN 1" BELOW
- THE TOP OF THE DUCT.

 E. COMMERCIAL KITCHEN GREASE DUCTS SHALL BE DESIGNED FOR THE
- TYPE OF COOKING APPLIANCE AND HOOD SERVED.

 F. JOINTS, SEAMS AND PENETRATIONS OF GREASE DUCTS SHALL BE MADE WITH A CONTINUOUS LIQUID TIGHT WELD OR BRAZE MADE IN THE
- EXTERNAL SURFACE IF THE DUCT SYSTEMS.

 G. DUCT TO EXHAUST FAN CONNECTIONS SHALL BE FLANGED, GASKETED AND BOLTED TO THE INLET AND OUTLET OF THE FAN FOR INLINE FANS. APPROVED FLEXIBLE CONNECTIONS MAY BE PROVIDED.
- A VIBRATION ISOLATION CONNECTOR FOR CONNECTING A DUCT TO A FAN SHALL CONSIST OF NON-COMBUSTIBLE PACKING IN A METAL SLEEVE JOINT OF APPROVED DESIGN OR SHALL BE A COATED-FABRIC FLEXIBLE DUCT CONNECTOR LISTED AND LABELED FOR THE APPLICATION. VIBRATION ISOLATION CONNECTORS SHALL BE INSTALLED ONLY AT THE CONNECTION OF A DUCT TO A FAN INLET OR OUTLET. PRIOR TO THE USE OR CONCEALMENT OF ANY PORTION OF A GREASE DUCT SYSTEM, A LEAKAGE TEST SHALL BE PERFORMED. DUCT SHALL BE CONSIDERED TO BE CONCEALED WHERE INSTALLED IN SHAFTS OR COVERED BY COATINGS OR WRAPS THAT PREVENT THE DUCTWORK FROM VISUALLY INSPECTED ON ALL SIDE. THE DUCT INSTALLER SHALL BE RESPONSIBLE FOR PROVIDING THE NECESSARY EQUIPMENT AND PERFORMING THE GREASE DUCT LEAKAGE TEST. THE DUCT LEAKAGE TEST SHALL BE PERFORMED FOR ALL THE DUCT SYSTEMS, INCLUDING THE DUCT-TO-DUCT CONNECTION. THE DUCTWORK SHALL BE PERMITTED TO BE TESTED IN SECTIONS, PROVIDED THAT EVERY JOINT IS TESTED (IF TEST IS FAILED, CONTRACTOR TO PROVIDE NEW KITCHEN
- J. PROVIDE SMOKÉ TEST TO PROOF TIGHTNESS OF THE GREASE DUCT.
 K. GREASE DUCT BRACING AND SUPPORTS SHALL BE OF NON-COMBUSTIBLE MATERIAL SECURELY ATTACHED TO THE STRUCTURE AND DESIGNED TO CARRY GRAVITY AND SEISMIC LADS WITHIN THE STREET LIMITATIONS OF THE NEW YORK CITY BUILDING CODE. BOLTS, SCREWS, RIVETS AND OTHER MECHANICAL FASTENERS SHALL NOT PENETRATE DUCT WALLS.
- L. A RESIDUE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER WITH PROVISION FOR CLEANOUT IN ACCORDANCE WITH
- M. A GREASE DUCT SERVING THE TYPE-1 HOOD THAT PENETRATED A CEILING, WALL OR FLOOR SHALL BE ENCLOSED FROM THE FIRE POINT OF PENETRATION TO THE OUTLET TERMINAL. DUCT ENCLOSURES SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THAT OF THE FIRE-RESISTANCE RATED ASSEMBLY PENETRATED BUT NEED NOT
- N. KITCHEN-EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM PARTS OF THE SAME OR CONTIGUOUS BUILDINGS, ADJACENT BUILDINGS AND ADJACENT PROPERTY LINE. THIS EXHAUST OUTLETS SHALL BE LOCATED NOT LESS THAN 10 FEET HORIZONTALLY FROM AND NOT LESS THAN 3 FEET ABOVE AIR INTAKE OPENINGS INTO ANY BUILDING.
- O. PROVIDE TYPE-I EXHAUST DUCT FOR HOOD-1&2 EXHAUST, IN COMPLIANCE WITH NYC MC 2014.
- P. PROVIDE UL LISTED 2 LAYERS OF 1.5" THICK FIRE WARP, TESTED IN ACCORDANCE WITH ASTM E2336 FOR TYPE-I EXHAUST DUCTS. FIRE WRAP TO PROVIDE 1 OR 2-HR ENCLOSURE. THROUGH PENETRATION FIRE STOP SYSTEMS ARE TO BE TESTED IN ACCORDANCE WITH ASTM E 814 (UL1479). FOIL COVERING TO BE PROVIDED ABOVE INSULATION.

MECHANICAL GENRAL NOTES:

EXHAUST DUCT).

- A. CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN ON
- B. NEW DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR PIPING AND DUCTWORK ROUTING. OFFEST AND RUN PIPING, DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA PIPING, DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
- C. COORDINATE LOCATIONS AND SIZES OF EXISTING ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEER.
- D. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.

 E. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM
- DIMENSIONS.

 F. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL FOLIPMENT SELECTED PRIOR TO
- ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
 G. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS
- BASED ON ACTUAL EQUIPMENT SELECTED.

 H. COORDINATE WITH ALL TRADES FOR MATERIALS IN RATED AND PLENUM SPACES.
- I. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT LENGTH AS NEEDED.

 J. MOUNT DUCTWORK AS HIGH AS POSSIBLE.
- K. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C AND
- L. PROVIDE 1.5" ACOUSTICAL LINING UP TO 20' OF DUCT RUN FROM AC UNITS IN SUPPLY AND RETURN DUCTS. PROVIDE 1.5" THERMAL INSULATION AFTER 20' OF DUCT RUN FROM AC UNITS. R-8(2" THICK) INSULATION TO BE PROVIDED TO OA DUCT.
- M. GREASE DUCT SYSTEM SHALL SLOPE NOT LESS THAN ONE-FOURTH UNIT VERTICAL IN 12 UNITS HORIZONTAL (2-PERCENT SLOPE) TOWARDS THE HOOD OR GREASE RESERVOIR. PROVIDE GREASE RESERVOIR IN DUCTS, WHERE HORIZONTAL DUCT RUN EXCEED 75 FEET. COORDINATE WITH ARCHITECT FOR GREASE RESERVOIR LOCATION AND ACCESS.
- N. RESIDUE TRAP TO BE PROVIDED AT THE BASE OF EACH VERTICAL RISER OF GREASE EXHAUST DUCT FOR CLEANOUT, IN ACCORDANCE WITH NFPA 96.

LANDLORD GENRAL NOTES:

A. CONTRACTOR TO COORDINATE ALL TENANT WORK OUTSIDE OF DEMISED SPACE WALL WITH BASE BUILDING MANAGEMENT AND ADJACENT TENANTS, BEFORE INSTALLATION OF ANY HVAC WORKS.

CONTRACTOR TO COORDINATE WITH BASE BUILDING MANAGEMENT AND

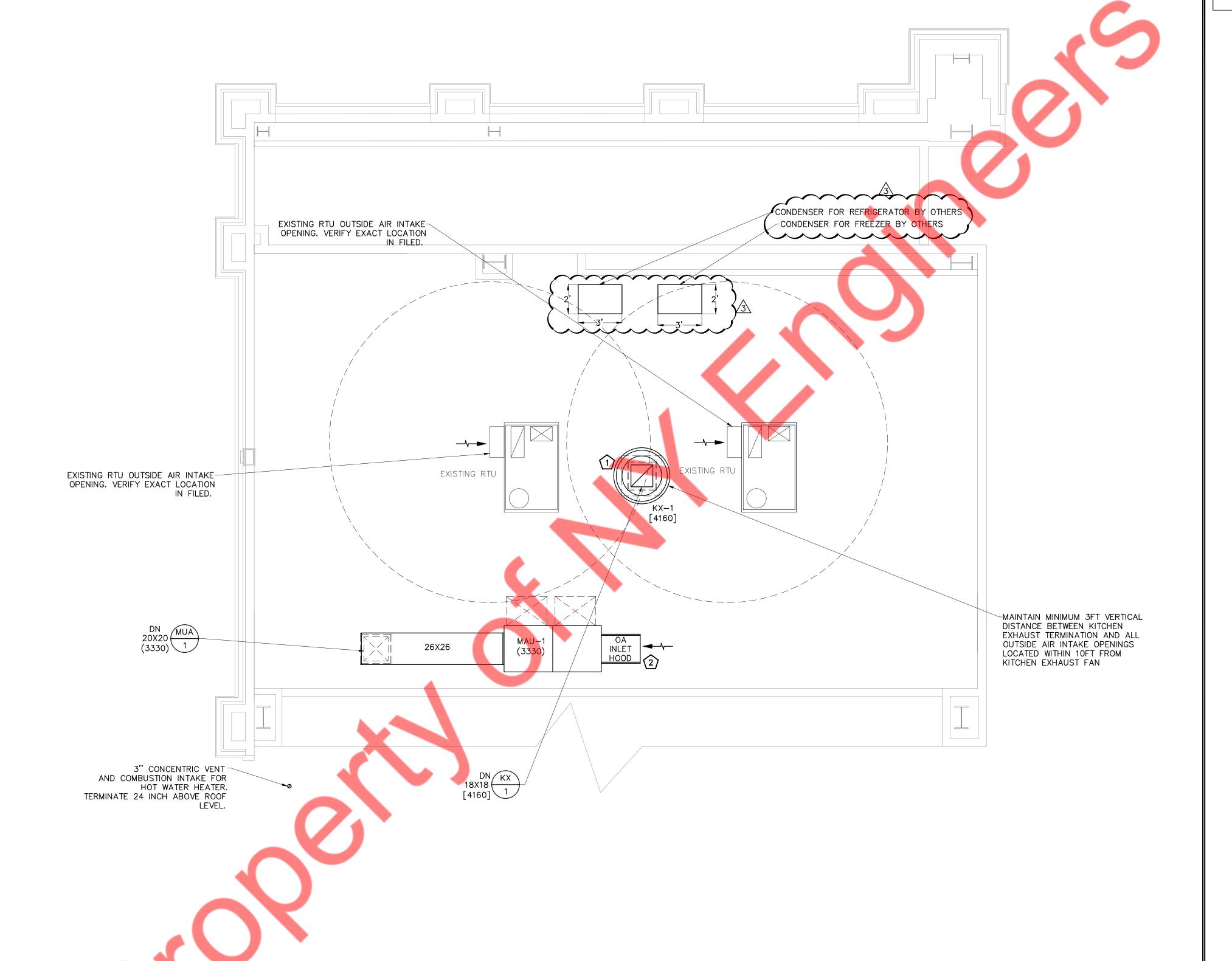
- SHALL MAINTAIN SAFE CONDITIONS AT ALL REQUIRED EGRESS ACCESS IN EXISTING TO REMAIN EGRESS CORRIDORS AND STAIRS.

 C. CONTRACTOR TO COORDINATE ALL ACCESS, INCLUDING KITCHEN
- EXHAUST CLEAN—OUTS AND PROVIDE MEANS OF OPERATION/
 MAINTENANCE. REPAIR ALL EXISTING CONSTRUCTION, WHICH GETS
 DAMAGED DURING INSTALLATION.
- D. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ALL EXISTING SPRAY FIREPROOFING DAMAGED AS A RESULT OF CONNECTION ANY/ALL MEP SUPPORTS TO EXISTING DECK AND STRUCTURE (ABOVE).
- E. NO EQUIPMENT, DUCTS ,PIPES OR CONTROLLER SHALL BE INSTALLED ON THE 2HRS RATED DEMISING WALL (SHARED WITH ADJACENT TENANTS)

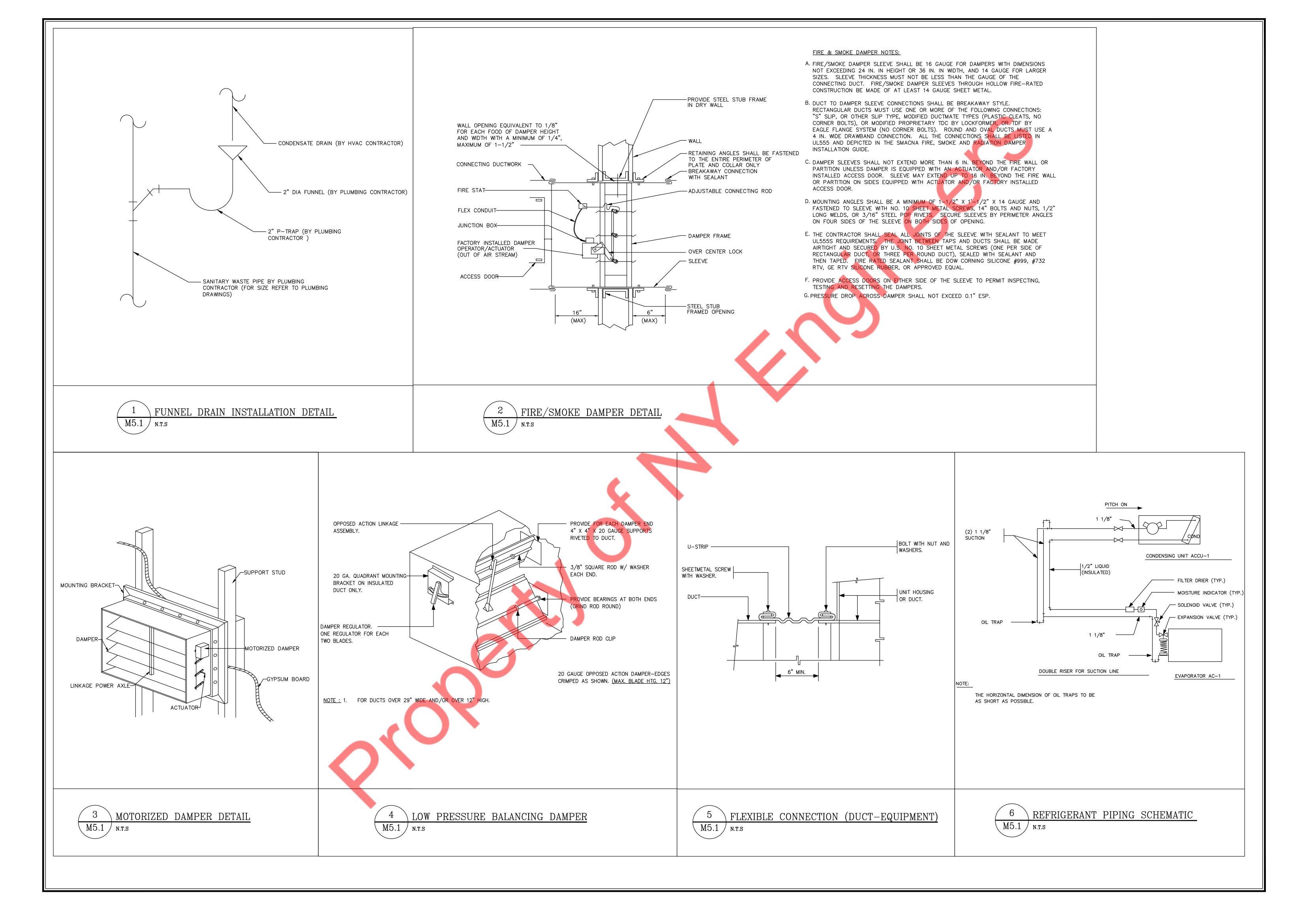
KEY NOTES

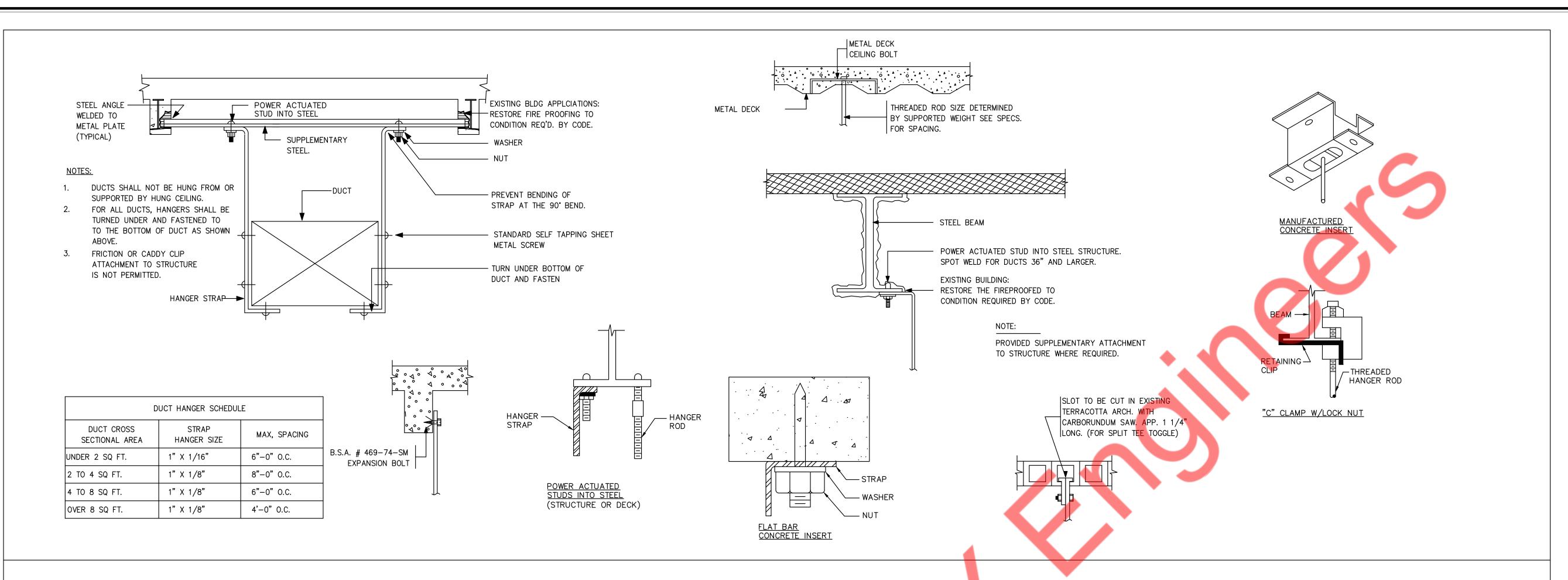
KEY NOTES:

- PROVIDE 24" ROOF CURB AND (2) 24" WIND BAND EXTENSION. KITCHEN EXHAUST TERMINATION SHALL BE 102" ABOVE ROOF LEVEL. MAINTAIN 3FT VERTICAL DISTANCE SEPARATION BETWEEN KITCHEN EXHAUST TERMINATION AND ALL OUTSIDE AIR INTAKE OPENINGS AND MAINTAIN 10FT DISTANCE FROM PARAPET WALL
- OUTSIDE AIR INTAKE SHALL BE 10 FEET FROM LOT LINE, 10 FEET FROM ANY EXHAUST AND 10 FEET FROM THE ADJACENT TENANT EXHAUST.

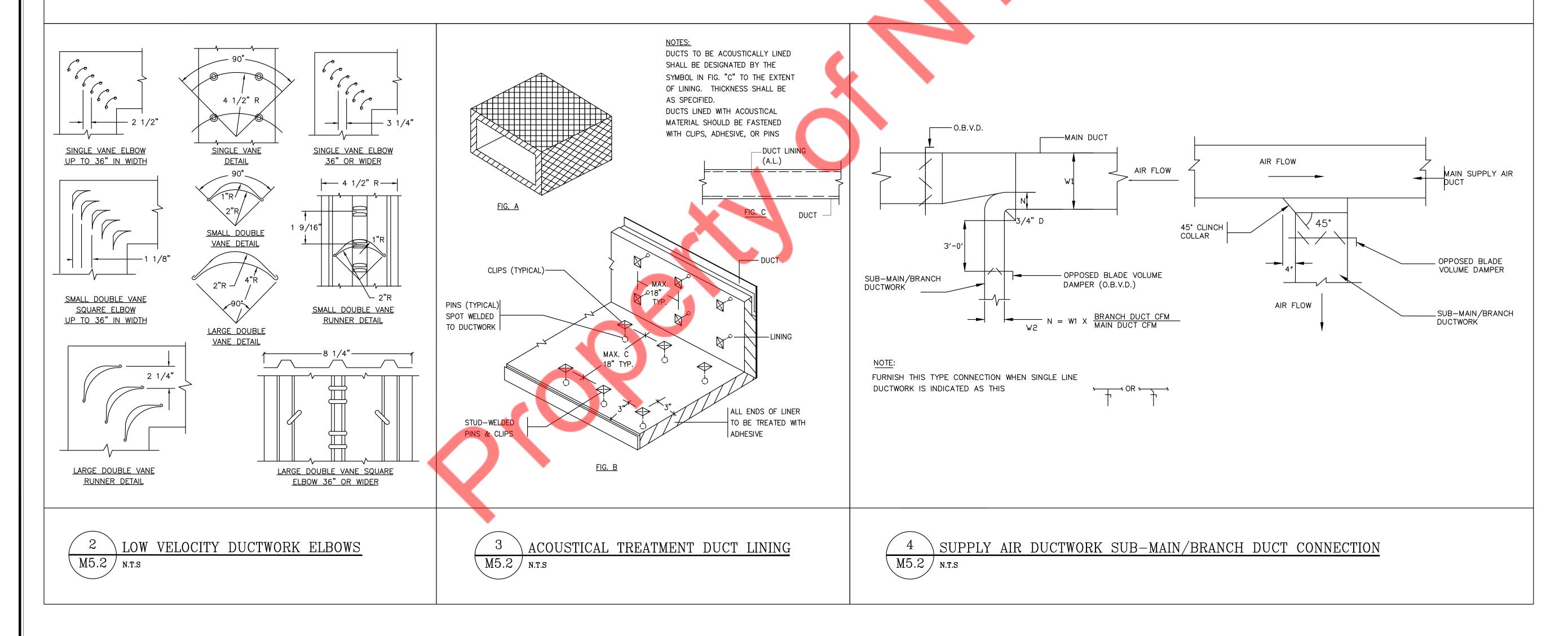


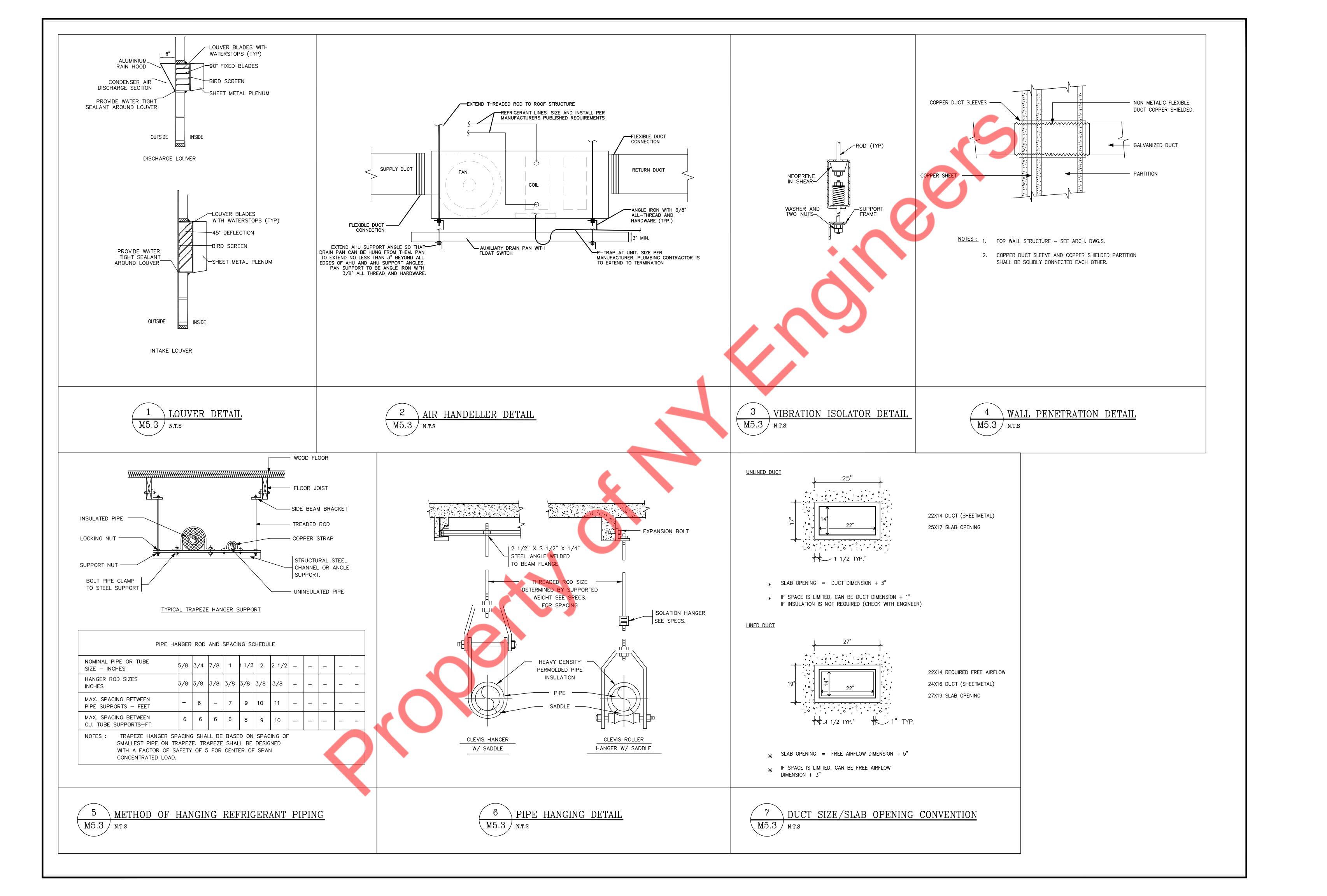
MECHANICAL ROOF PLAN











FOR QUESTIONS, CALL THE

Delaware / South NJ Mechanical REGION 19 PHDNE: (609) 654-8368 EMAIL: reg19@econair.com

PATENT NUMBERS

AC-PSP (UNITED STATES) - US PATENT 7963830 B2. AC-PSP WALL (CANADA) - CA PATENT 2820509. AC-PSP ISLAND (CANADA) - CA PATENT 2520330.

 $HOOD\ INFORMATION - IOR#5656470$

110	$JOD\ INFORMATION\ -\ JOB\#5050470$																					
						MAX					EXHAUST PLENUM			TOTAL			CONFIG					
HO		TAG	MDDEL M	ANUFACTURE	RIFNGTH	COOKING	TYPE	APPLIANCE	DESIGN	DESIGN TOTAL		TOTAL RISER(S)			SUPPLY	HOOD	END TO D					
NI NI	╸╽					TEMP		DUTY	CFM/FT	CFM/FT EXH CFM W	WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	CFM		END	R□W	
1			5424	ECON-AIR	8′ 0 ″	600	т	 HEAVY	260	2080	10"	16″	4"		2080	1872	-0.890″	1665	430 SS	LEFT	ALONE	
1	•		EX-2-PSP-F	ECUN-AIR		DEG	1	HEAVI	260	200 2080	10	16	4	4 2080	2080	10/2 -0.03	-0.030	1000	WHERE EXPOSED	LEFI	ALUNE	
	$^{\prime}$		5424	EOUN AID	5 5, 4,	0/ 4#	600	-	LIEALAX	0.5.5	2222	10#		4.0		2000	1070	0.000#	1665	430 SS	DICUT	A1 0NE
ا ا	2		EX-2-PSP-F ECON-AIR	ECUN-AIR	8′ 1″	DEG	1	HEAVY	257	2080	10"	16"	4″		2080	1872	-0.890*	1665	WHERE EXPOSED	RIGHT	ALONE	

HOOD INFORMATION UTILITY CABINET(S FIRE HOOD EFFICIENCY @ 7 SYSTEMHANGING TYPE QTY HEIGHT LENGTH TYPE LOCATION SIZE TYPE SIZE MODEL # QUANTITY |PIPING|WEIGHT MICRONS 85% SEE FILTER CAPTRATE SOLO FILTER YES 20" L55 SERIES E26 1 LIGHT 85% SEE FILTER 703 CAPTRATE SOLO FILTER 20" L55 SERIES E26 RIGHT |12"×54"×24" | ANSUL R-102 3.0/3.0 1 FAN

HOOD	OPTIONS

HOOD NO		OPTION OPTION
		LEFT END STANDOFF (FINISHED) 1" WIDE 54" LONG INSULATED.
		WRAPPER CHANNEL - FRONT, LEFT.
1		INSULATION FOR BACK OF HOOD.
		SENSOR-CV.
		LEFT WALL AS END PANEL.
		WRAPPER CHANNEL - FRONT, RIGHT.
		INSULATION FOR BACK OF HOOD.
2	1	SENSOR-CV.
		RIGHT WIDE VERTICAL END PANEL 42" TOP WIDTH, 36" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.

PERFORATED SUPPLY PLENUM(S)

ПППП									RISERO	(2)			
NO NO	TAG	POS	LENGTH	WIDTH	HEIGHT	HEIGHT	HEIGHT	TYPE	WIDTH	LENG	DIA	CFM	SP
1		Front	97″	18″	6″	MUA	12"	28″		832	0.256"		
1		rront	97	10		MUA	12″	28″		832	0.256"		
2		Front	109″	18″	6"	MUA	12"	28″		832	0.222"		
		rront	109	10	0	MUA	12"	28"		832	0.222"		

FIRE SYSTEM INFORMATION - JOB#5656470

FIRE			"	MAX	INSTALLA	TION
SYSTEM NO	TAG	TYPE	SIZE	FLOW POINTS	SYSTEM	LOCATION ON HOOD
1		ANSUL R102	3.0/3.0	22	FIRE CABINET RIGHT	RIGHT, HOOD 2

GAS	VA I	VE	(S)
FIE)F		7

GAS VAI	VE(S)				
FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY		
1		MECHANICAL	TBD	ECON-AIR		

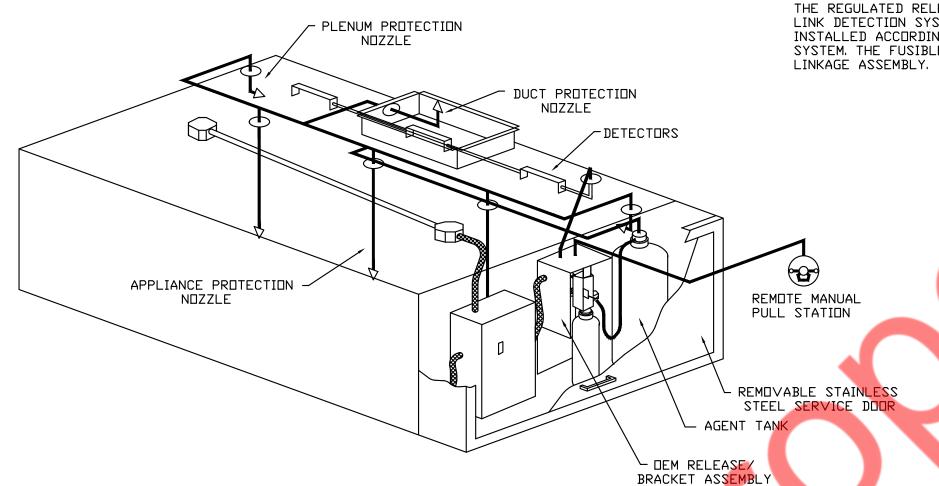
<u>SPECIFICATIONS</u>

THE RESTAURANT FIRE SUPPRESSION SYSTEM SHALL BE THE PRE-ENGINEERED TYPE WITH A FIXED NOZZLE AGENT DISTRIBUTION NETWORK. IT SHALL BE LISTED WITH UNDERWRITERS LABORATORIES, INC. (UL)

THE SYSTEM SHALL BE CAPABLE OF AUTOMATIC DETECTION AND ACTUATION WITH LOCAL OR REMOTE MANUAL ACTUATION. ACCESSORIES SHALL BE AVAILABLE FOR MECHANICAL OR ELECTRICAL GAS LINE SHUT-OFF APPLICATIONS.

THE EXTINGUISHING AGENT SHALL BE A POTASSIUM CARBONATE, POTASSIUM ACETATE-BASED FORMULATION DESIGNED FOR FLAME KNOCKDOWN AND SECUREMENT OF GREASE RELATED FIRES, IT SHALL BE AVAILABLE IN PLASTIC CONTAINERS WITH INSTRUCTIONS FOR LIQUID AGENT HANDLING AND USAGE.

THE REGULATED RELEASE MECHANISM SHALL BE COMPATIBLE WITH A FUSIBLE LINK DETECTION SYSTEM. THE FUSIBLE LINK SHALL BE SELECTED AND INSTALLED ACCORDING TO THE OPERATING TEMPERATURE IN THE VENTILATING SYSTEM. THE FUSIBLE LINK SHALL BE SUPPORTED BY A DETECTOR BRACKET/



TYPICAL ANSUL R-102 SYSTEM LAYOUT

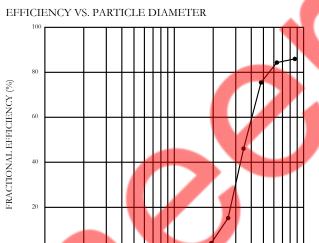
SPECIFICATION: CAPTRATE GREASE-STOP SOLO FILTER

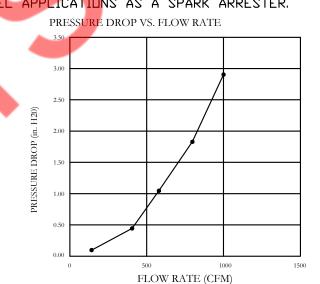
THE CAPTRATE GREASE-STOP SOLO FILTER IS A SINGLE-STAGE FILTER FEATURING A UNIQUE S-BAFFLE DESIGN IN CONJUNCTION WITH A SLOTTED REAR BAFFLE DESIGN, TO DELIVER EXCEPTIONAL FILTRATION EFFICIENCY.

FILTER IS STAINLESS STEEL CONSTRUCTION, AND SIZED TO FIT INTO STANDARD 2-INCH DEEP HOOD CHANNEL(S).

UNITS SHALL INCLUDE STAINLESS STEEL HANDLES AND A FASTENING DEVICE TO SECURE THE TWO COMPONENTS WHEN ASSEMBLED.

GREASE EXTRACTION EFFICIENCY PERFORMANCE SHALL REMOVE AT LEAST 75% OF GREASE PARTICLES FIVE MICRONS IN SIZE, AND 85% GREASE PARTICLES SEVEN MICRONS IN SIZE AND LARGER, WITH A CORRESPONDING PRESSURE DROP NOT TO EXCEED 1.0 INCHES OF WATER GAUGE. THE CAPTRATE GREASE-STOP SOLO WAS TESTED TO ASTM STANDARD ASTM F2519-05.
MANUFACTURER APPROVED FOR USE IN SOLID FUEL APPLICATIONS AS A SPARK ARRESTER.





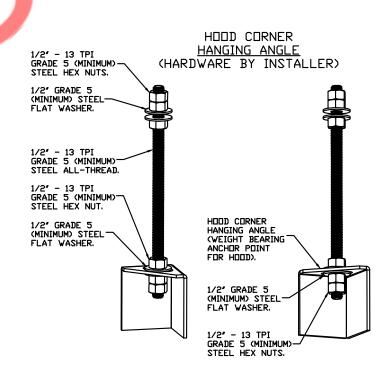
CAPTRATE FILTERS ARE BUILT IN COMPLIANCE WITH:

PARTICLE DIAMETER (UM)

UL STANDARD #1046. INT. MECH. CODE (IMC).

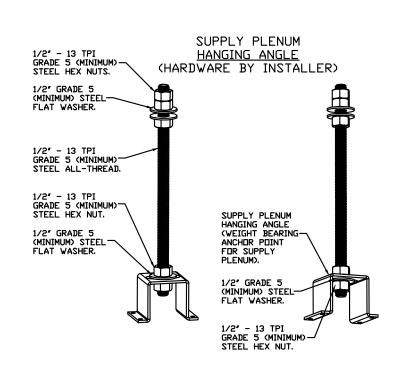






ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



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DATE: 10/10/2022

REVISIONS DESCRIPTION DATE:

DWG.#: 5656470

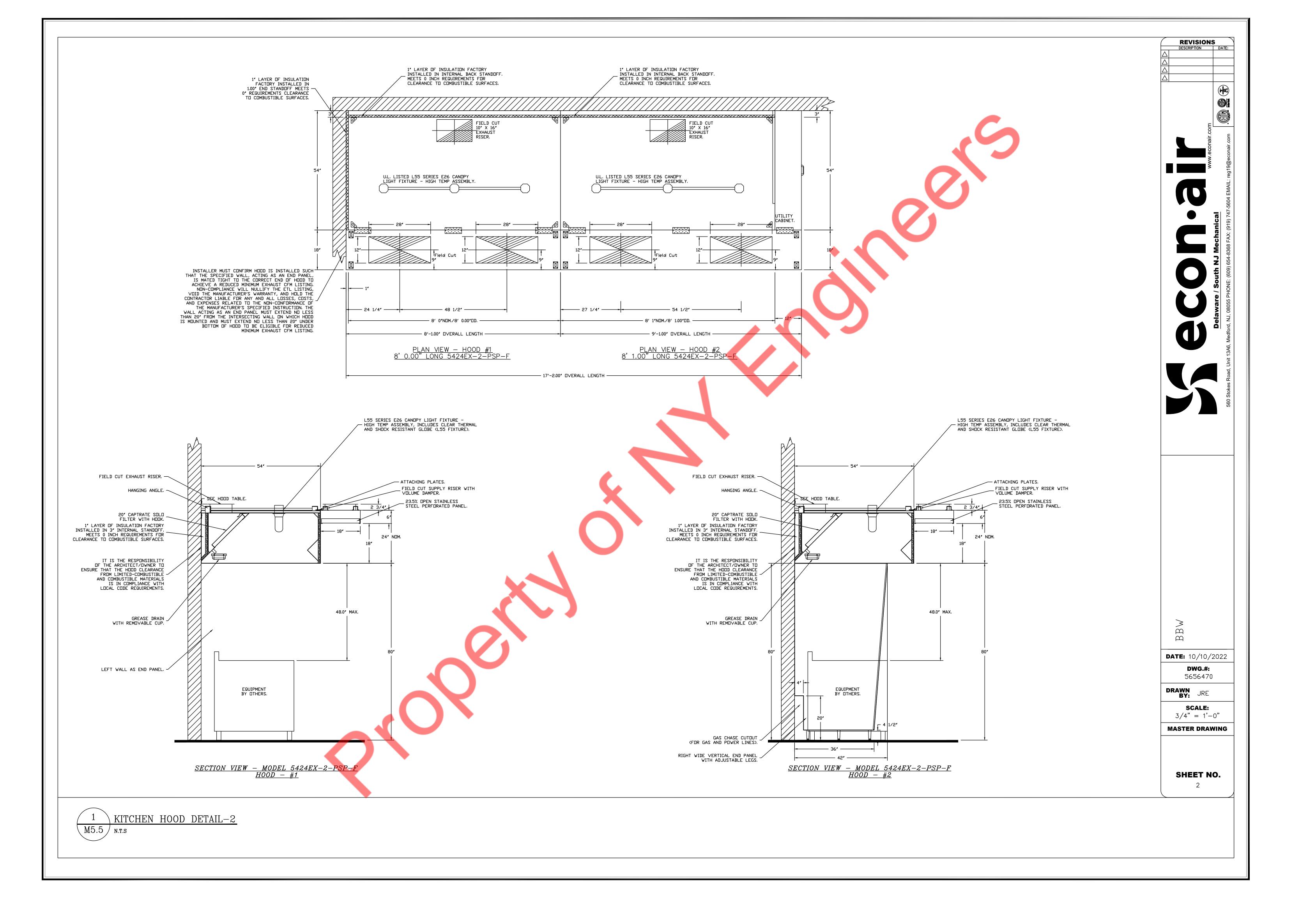
DRAWN JRE

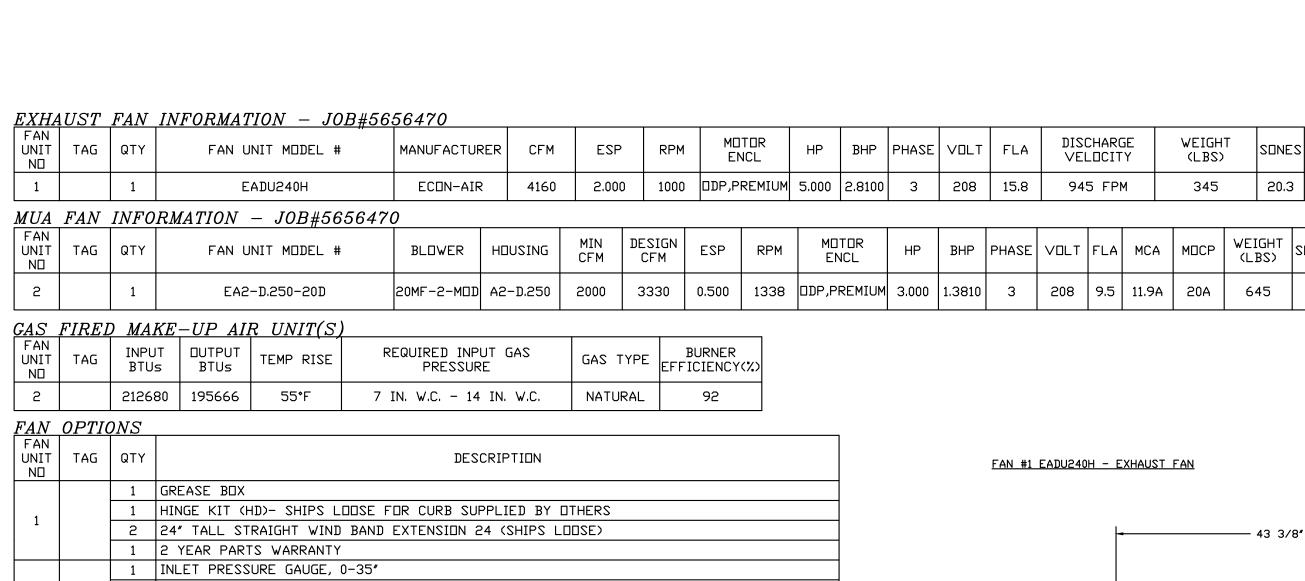
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MASTER DRAWING

SHEET NO.





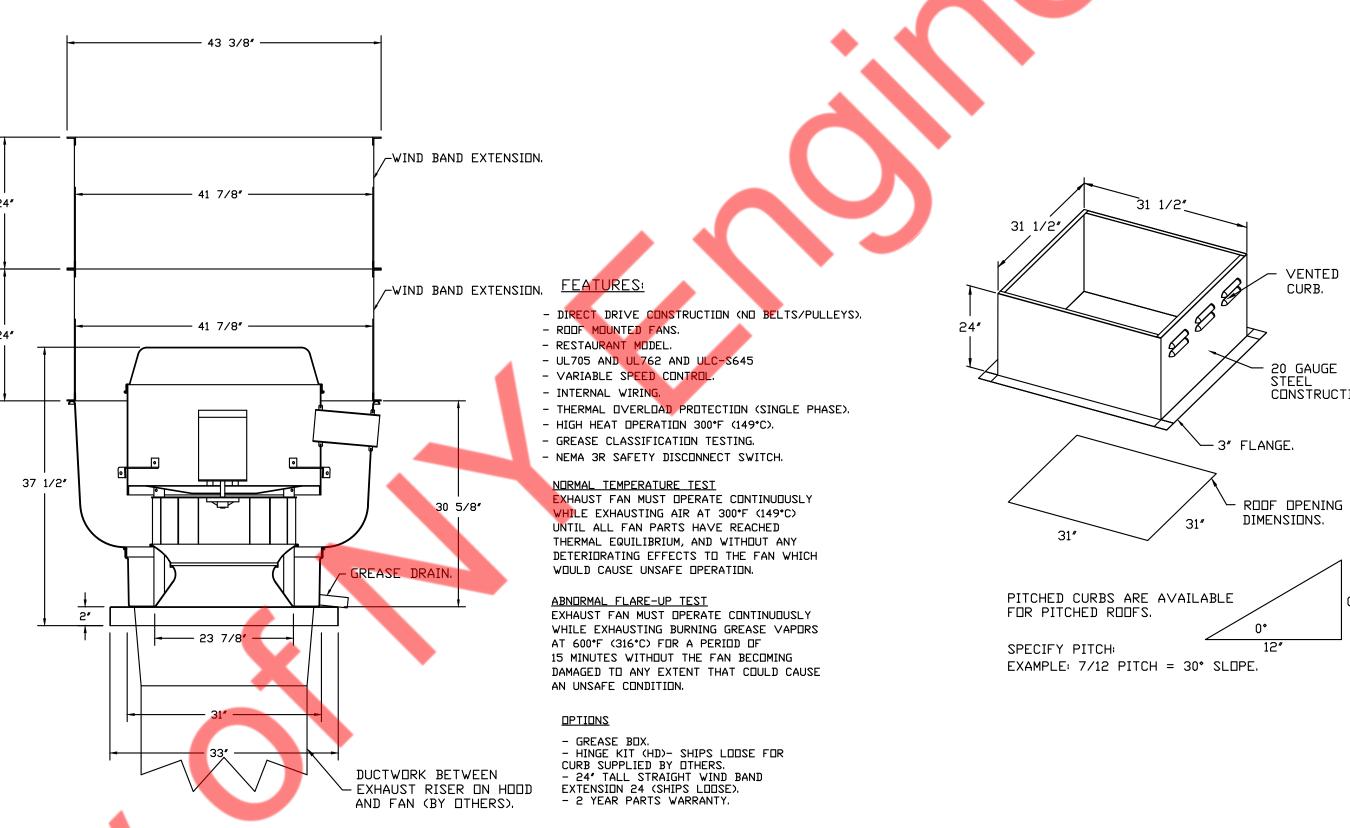


FAN UNIT TAG QTY 1 MANIFOLD PRESSURE GAUGE, -5 TO 15" WC 1 |LOW FIRE START 1 | MOTORIZED BACKDRAFT DAMPER FOR A2-D HOUSING - MEETS AMCA CLASS 1A RATING 1 | OPPOSITE SIDE HEATER CONTROLS SEPARATE 120V WIRING PACKAGE (REQUIRED AND USED ONLY FOR DCV OR PREWIRE WITH VFD) - THREE PHASE ONLY SIZE 2 DIRECT FIRED HEATER LOW CFM PROFILE PACKAGE - USED ON HEATERS UNDER 2500 1 2 YEAR PARTS WARRANTY

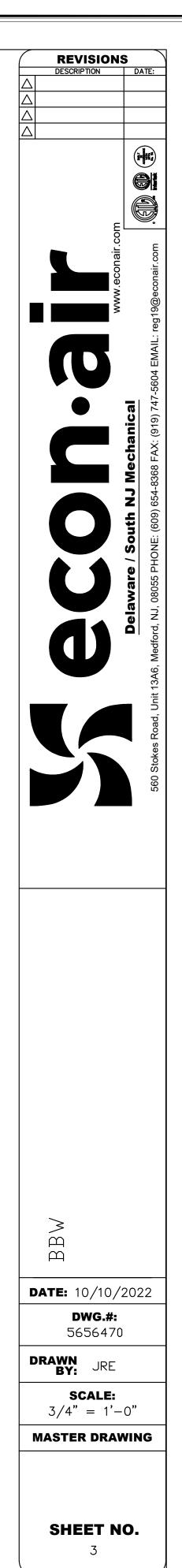
FAN ACCESSORIES									
FAN UNIT ND	TAG		EXHAUST		SUPPLY				
		GREASE CUP	GRAVITY DAMPER		SIDE DISCHARGE		MOTORIZED DAMPER	WALL MOUNT	
1		YES							
2					YES		YES		

<u>CUF</u>	RB AS	SSEMBLIES		
ND	□N FAN	WEIGHT	ITEM	SIZE
1	# 1	43 LBS	CURB	31.500"W X 31.500"L X 24.000"H ALONG LENGTH, RIGHT VENTED.
2	# 2	80 LBS	CURB	31.000"W X 79.000"L X 20.000"H ALONG WIDTH, RIGHT INSULATED

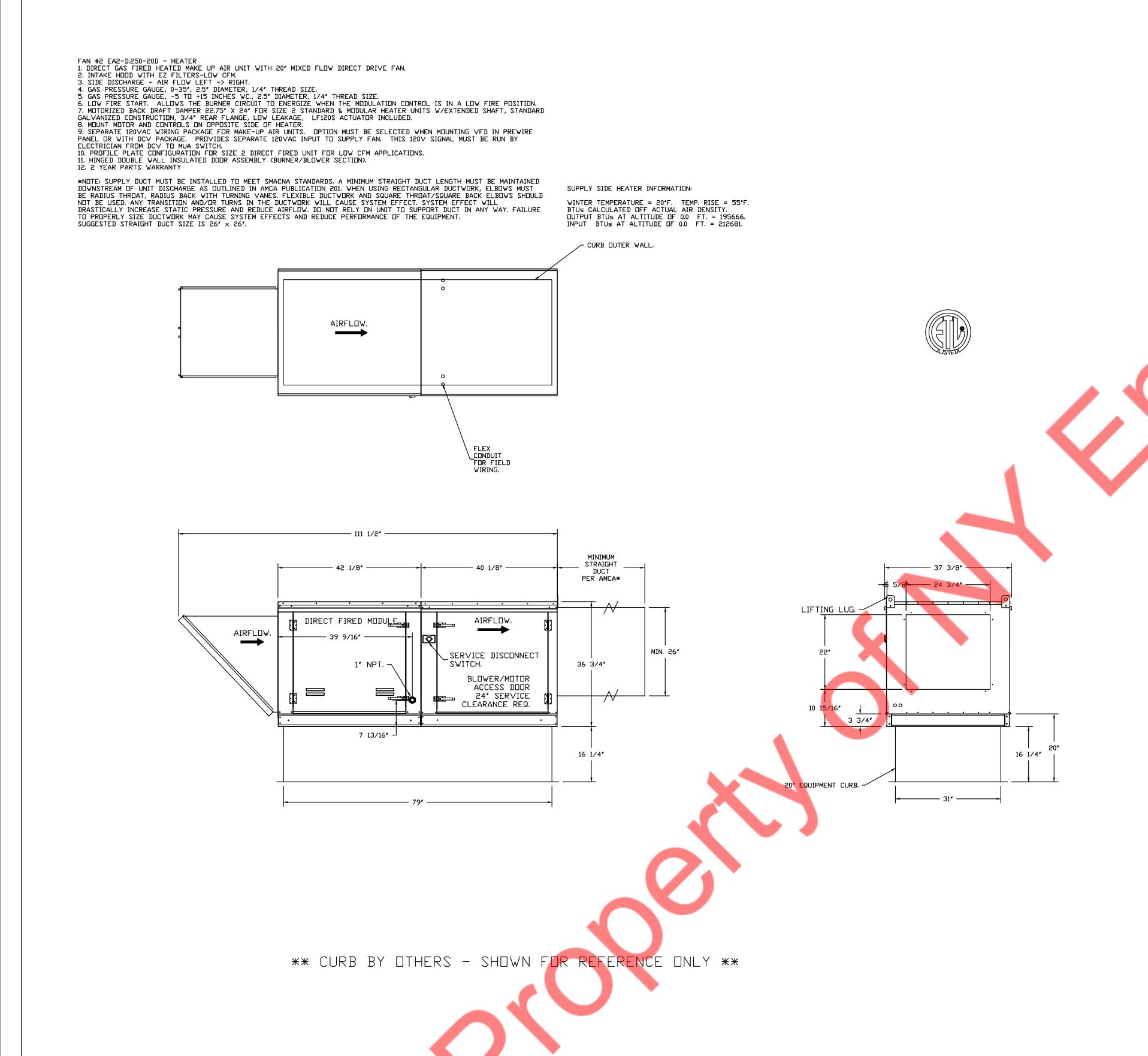
TOP VIEW

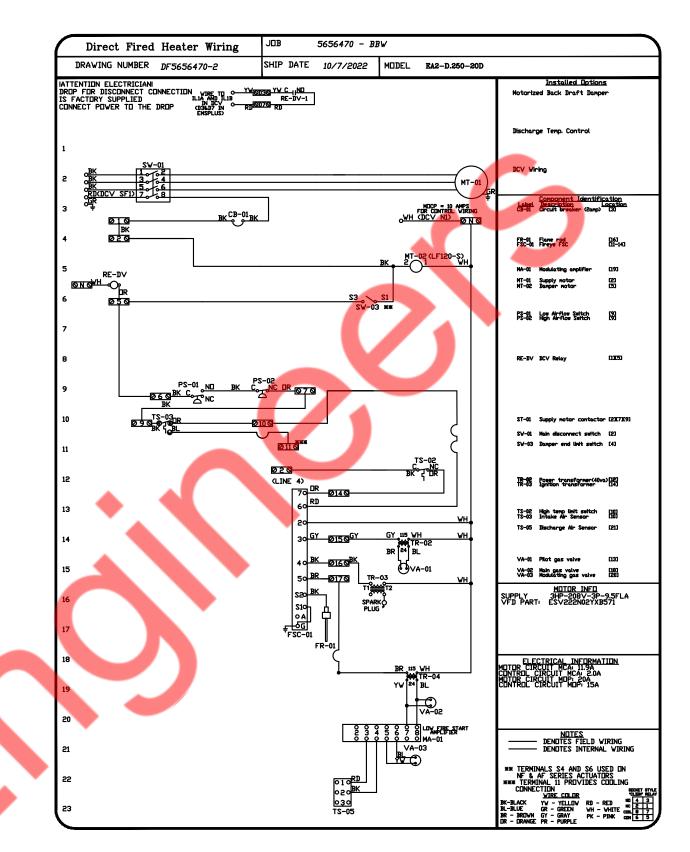


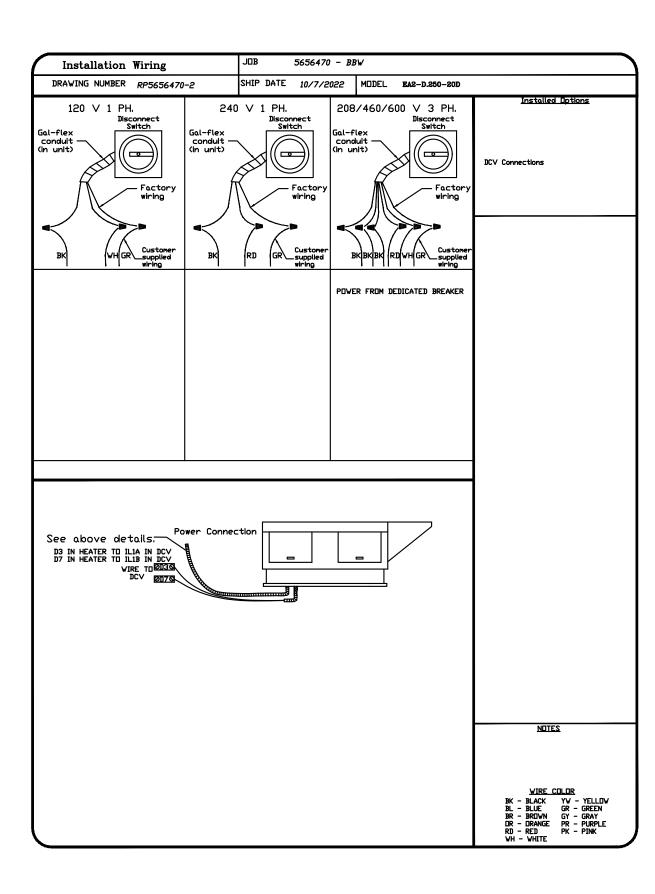
** CURB BY OTHERS - SHOWN FOR REFERENCE ONLY **

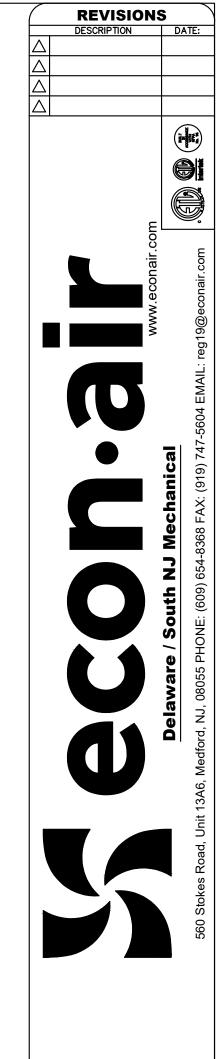


\ KITCHEN HOOD DETAIL-3 M5.6 \int n.t.s









DATE: 10/10/2022

DWG.#:
5656470

DRAWN
BY: JRE

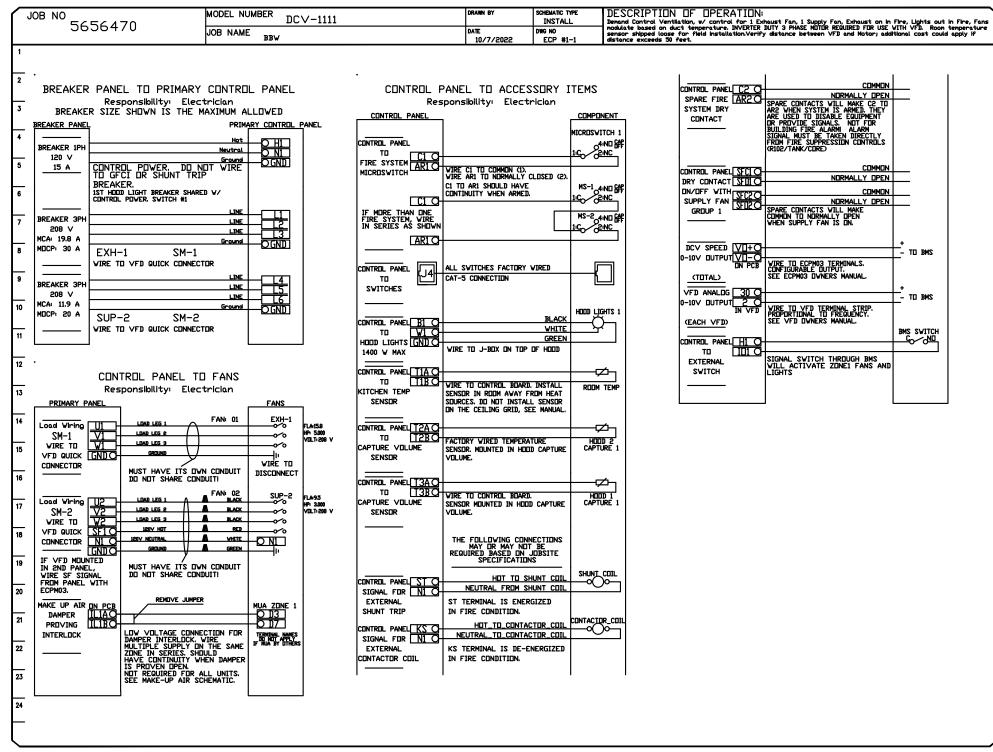
SCALE:
3/4" = 1'-0"

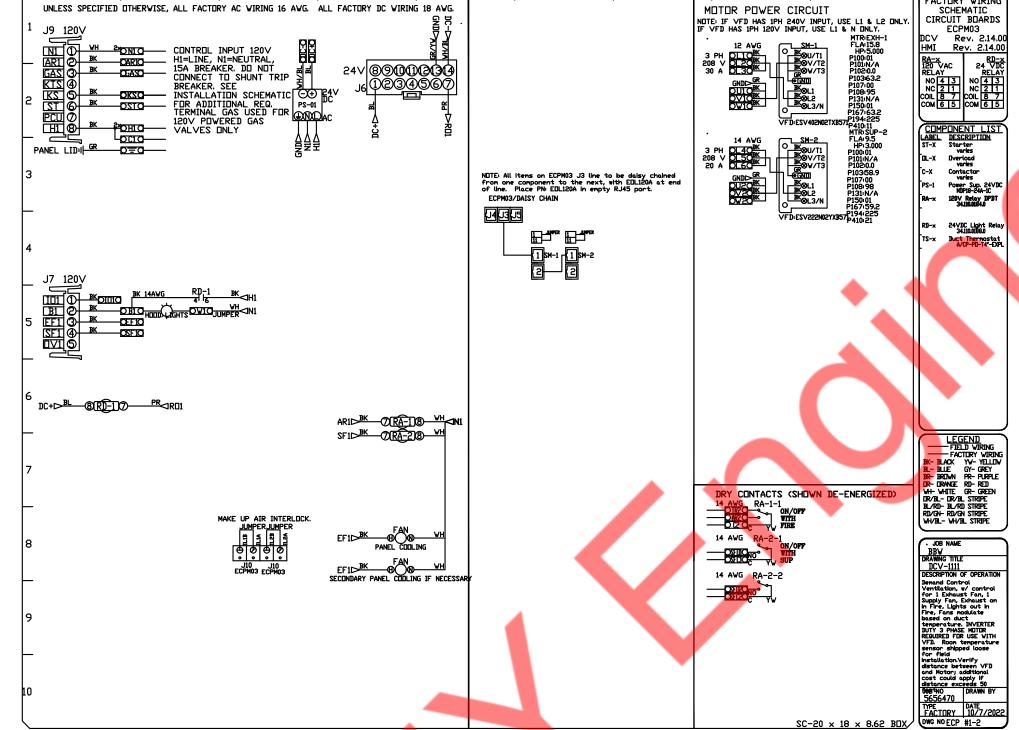
SHEET NO.

MASTER DRAWING

1 KITCHEN HOOD DETAIL-4 M5.7 N.T.S

ELE	CTRICAL	PACKAGE	E - JOB#5656470								
ND	TAG	PACKAGE	" LOCATION	SWITCH	I ES	OPTION	FAN	NS CI	ONTRO	LLED	
	" #			LOCATION	QUANTITY		TYPE	ф	HP	VOLT	FLA
1		DC∨-1111	UTILITY CABINET RIGHT	04 - UTILITY CABINET RIGHT	1 LIGHT	SMART CONTROLS DCV	EXHAUST	3	5.000	208	15.8
		DC V -IIII	OTILITY CABINET KIGHT	H00D # 2	1 FAN	SPIART CHITRES DOV	SUPPLY	з	3.000	208	9.5





DEMAND CONTROL VENTILATION HOOD CONTROL PANEL SPECIFICATIONS:

- CONTROLS SHALL BE LISTED BY ETL (UL 508A) AND SHALL COMPLY WITH DEMAND VENTILATION SYSTEM TURNDOWN REQUIREMENTS OUTLINED IN IECC 403.2.8 (2015).

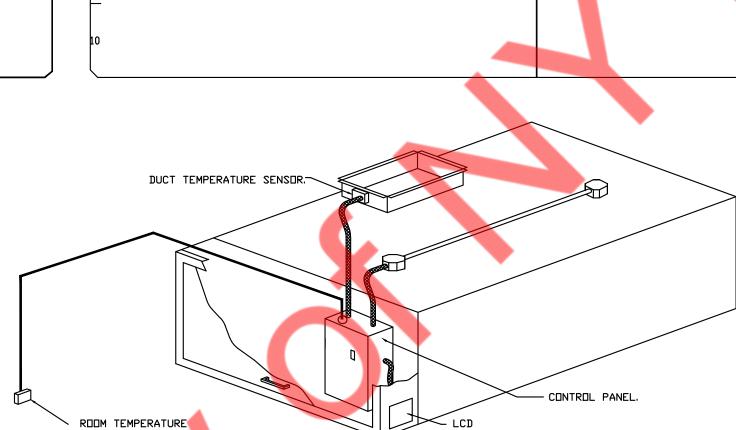
THE CONTROL ENCLOSURE SHALL BE NEMA 1 RATED AND LISTED FOR INSTALLATION INSIDE OF THE EXHAUST HOOD UTILITY CABINET. THE CONTROL ENCLOSURE MAY BE CONSTRUCTED OF STAINLESS STEEL OR PAINTED STEEL.

- TEMPERATURE PROBE(S) LOCATED IN THE EXHAUST DUCT RISER(S) SHALL BE CONSTRUCTED OF STAINLESS STEEL.
- A DIGITAL CONTROLLER SHALL BE PROVIDED TO ACTIVATE THE HOOD EXHAUST FANS DYNAMICALLY BASED ON A FIXED DIFFERENTIAL BETWEEN THE AMBIENT AND DUCT TEMPERATURES SENSORS. THIS FUNCTION SHALL MEET THE REQUIREMENTS OF IMC 507.1.1.
- A DIGITAL CONTROLLER SHALL PROVIDE ADJUSTABLE HYSTERESIS SETTINGS TO PREVENT CYCLING OF THE FANS AFTER THE COOKING APPLIANCES HAVE BEEN TURNED OFF AND/OR THE HEAT IN THE EXHAUST SYSTEM IS REDUCED.
- A DIGITAL CONTROLLER SHALL PROVIDE AN ADJUSTABLE MINIMUM FAN RUN-TIME SETTING TO PREVENT FAN CYCLING.
- VARIABLE FREQUENCY DRIVES (VFDS) SHALL BE PROVIDED FOR FANS AS REQUIRED. THE DIGITAL CONTROLLER SHALL MODULATE THE VFDS BETWEEN A MINIMUM SETPOINT AND A MAXIMUM SETPOINT ON DEMAND. THE DUCT TEMPERATURE SENSOR INPUT(S) TO THE DIGITAL CONTROLLER SHALL BE USED TO CALCULATE THE SPEED REFERENCE SIGNAL.
- THE VFD SPEED RANGE OF OPERATION SHALL BE FROM 0% TO 100% FOR THE SYSTEM, WITH THE ACTUAL MINIMUM SPEED SET AS REQUIRED TO MEET MINIMUM VENTILATION REQUIREMENTS.
- AN INTERNAL ALGORITHM TO THE DIGITAL CONTROLLER SHALL MODULATE SUPPLY FAN VFD SPEED PROPORTIONAL TO ALL EXHAUST FANS THAT ARE LOCATED IN THE SAME FAN GROUP AS THE SUPPLY FAN.

- THE SYSTEM SHALL OPERATE IN PREP MODE DURING LIGHT COOKING LOAD OR COOL DOWN MODE WHEN SUFFICIENT HEAT REMAINS UNDERNEATH THE HOOD SYSTEM AFTER COOKING OPERATIONS HAVE COMPLETED, OPERATION DURING EITHER OF THESE PERIODS WILL DISABLE THE SUPPLY FANS AND PROVIDE AN EXHAUST FAN SPEED THAT IS EQUAL TO THE MINIMUM VENTILATION REQUIREMENT.

- A DIGITAL CONTROLLER SHALL DISABLE THE SUPPLY FAN(S), ACTIVATE THE EXHAUST FAN(S), ACTIVATE THE APPLIANCE SHUNT TRIP, AND DISABLE AN ELECTRIC GAS VALVE AUTOMATICALLY WHEN FIRE CONDITION IS DETECTED ON A COVERED HOOD.
- A DIGITAL CONTROLLER SHALL ALLOW FOR EXTERNAL BMS FAN CONTROL VIA DRY CONTACT (EXTERNAL CONTROL SHALL NOT OVERRIDE FAN OPERATION LOGIC AS REQUIRED BY CODE).
- AN LCD INTERFACE SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:
- A. DN/DFF PUSH BUTTON FAN & LIGHT SWITCH ACTIVATION.
- B. INTEGRATED GAS VALVE RESET FOR ELECTRONIC GAS VALVES (NO RESET RELAY REQUIRED).
 C. VFD FAULT DISPLAY WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
- D. DUCT TEMPERATURE SENSOR FAILURE DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.
- E. MIS-WIRED DUCT TEMPERATURE SENSOR DETECTION WITH AUDIBLE & VISUAL ALARM NOTIFICATION.

 F. A SINGLE LOW VOLTAGE CAT-5 RJ45 WIRING CONNECTION.
- G. AN ENERGY SAVINGS INDICATOR THAT UTILIZES MEASURED KWH FROM THE VFDS.



SEQUENCE OF OPERATIONS:
THE HOOD CONTROL PANEL IS CAPABLE OF OPERATING IN ONE OR MORE OF THE FOLLOWING STATES AT ANY

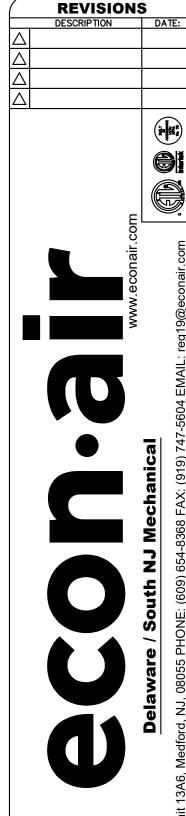
GIVEN TIME:

- <u>AUTOMATIC:</u> THE SYSTEM OPERATES BASED ON THE DIFFERENTIAL BETWEEN ROOM TEMPERATURE AND THE TEMPERATURE AT THE HOOD CAVITY OR EXHAUST DUCT COLLAR, FANS ACTIVATE AT A CONFIGURABLE TEMPERATURE DIFFERENTIAL THRESHOLD, DEPENDING ON THE JOB CONFIGURATION EACH FAN ZONE CAN BE CONFIGURED AS STATIC OR DYNAMIC, THESE TERMS REFER TO WHETHER A VARIABLE MOTOR (SUCH AS EC MOTORS OR VFD DRIVEN MOTORS) MODULATE WITH TEMPERATURE, IF THE PANEL IS EQUIPPED WITH VARIABLE SPEED FANS AND THE ZONE IS DEFINED AS "DYNAMIC", THESE WILL MODULATE WITHIN A USER-DEFINED RANGE BASED ON THE TEMPERATURE DIFFERENTIAL, PANELS EQUIPPED WITH VARIABLE SPEED FANS AND A FAN ZONE DEFINED AS "STATIC", FANS WILL RUN AT A SET SPEED CALCULATED FOR THE DRIVE, DEMAND CONTROL VENTILATION SYSTEMS ARE CAPABLE OF MODULATING EXHAUST AND MAKE UP AIR FAN SPEEDS PER THE REQUIREMENTS OUTLINED IN IECC 403.2.8.

TYPICAL HOOD CONTROL PANEL INSTALLATION

INTERFACE.

- MANUAL: THE SYSTEM OPERATES BASED ON HUMAN INPUT FROM AN HMI.
- SCHEDULE: A WEEKLY SCHEDULE CAN BE SET TO RUN FANS FOR A SPECIFIED PERIOD THROUGHOUT THE DAY, THERE ARE THREE OCCUPIED TIMES PER DAY TO ALLOW FOR THE USER TO SET UP A TIME THAT IS SUITABLE TO THEIR NEEDS. ANY TIME THAT IS WITHIN THE DEFINED OCCUPIED TIME, THE SYSTEM WILL RUN AT MODULATION MODE AND FOLLOW THE FAN PROCEDURE ALGORITHM BASED ON TEMPERATURE DURING THIS TIME. DURING UNOCCUPIED TIME, THE SYSTEM WILL HAVE AN EXTRA OFFSET TO PREVENT UNINTENDED ACTIVATION OF THE SYSTEM DURING A TIME WHERE THE SYSTEM IS NOT BEING OCCUPIED.
- <u>DTHER:</u> THE SYSTEM OPERATES BASED ON THE INPUT FROM AN EXTERNAL SOURCE (DDC, BMS OR HARD-WIRED INTERLOCK).
- FIRE: UPON ACTIVATION OF THE HOOD FIRE SUPPRESSION SYSTEM, THE EXHAUST FAN WILL COME ON OR CONTINUE TO TO RUN, THE HOOD MAKEUP AIR WILL SHUTDOWN, AND A SIGNAL WILL BE SENT FOR ACTIVATING THE SHUNT TRIP BREAKER PROVIDED BY THE ELECTRICIAN. FUEL GAS WILL SHUT OFF VIA A MECHANICAL/ELECTRICAL GAS VALVE ACTUATED BY THE HOOD FIRE SUPPRESSION SYSTEM.



BBW

DATE: 10/10/2022

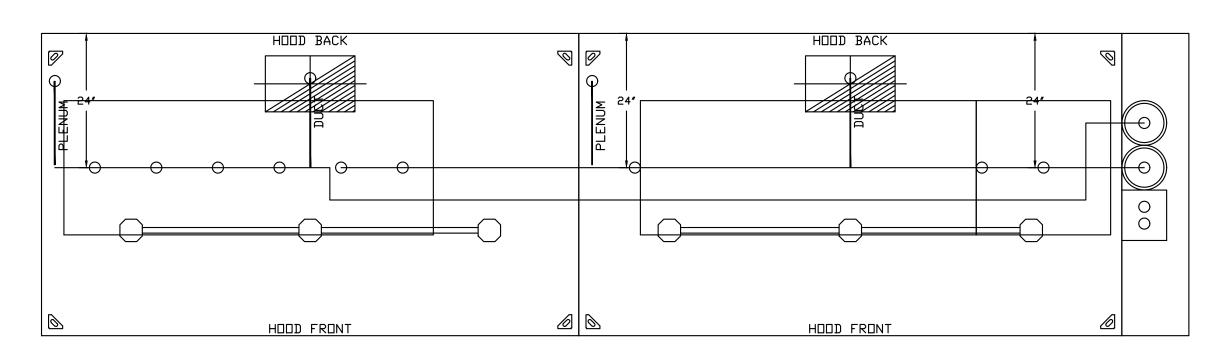
DWG.#: 5656470

DRAWN BY: JRE

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

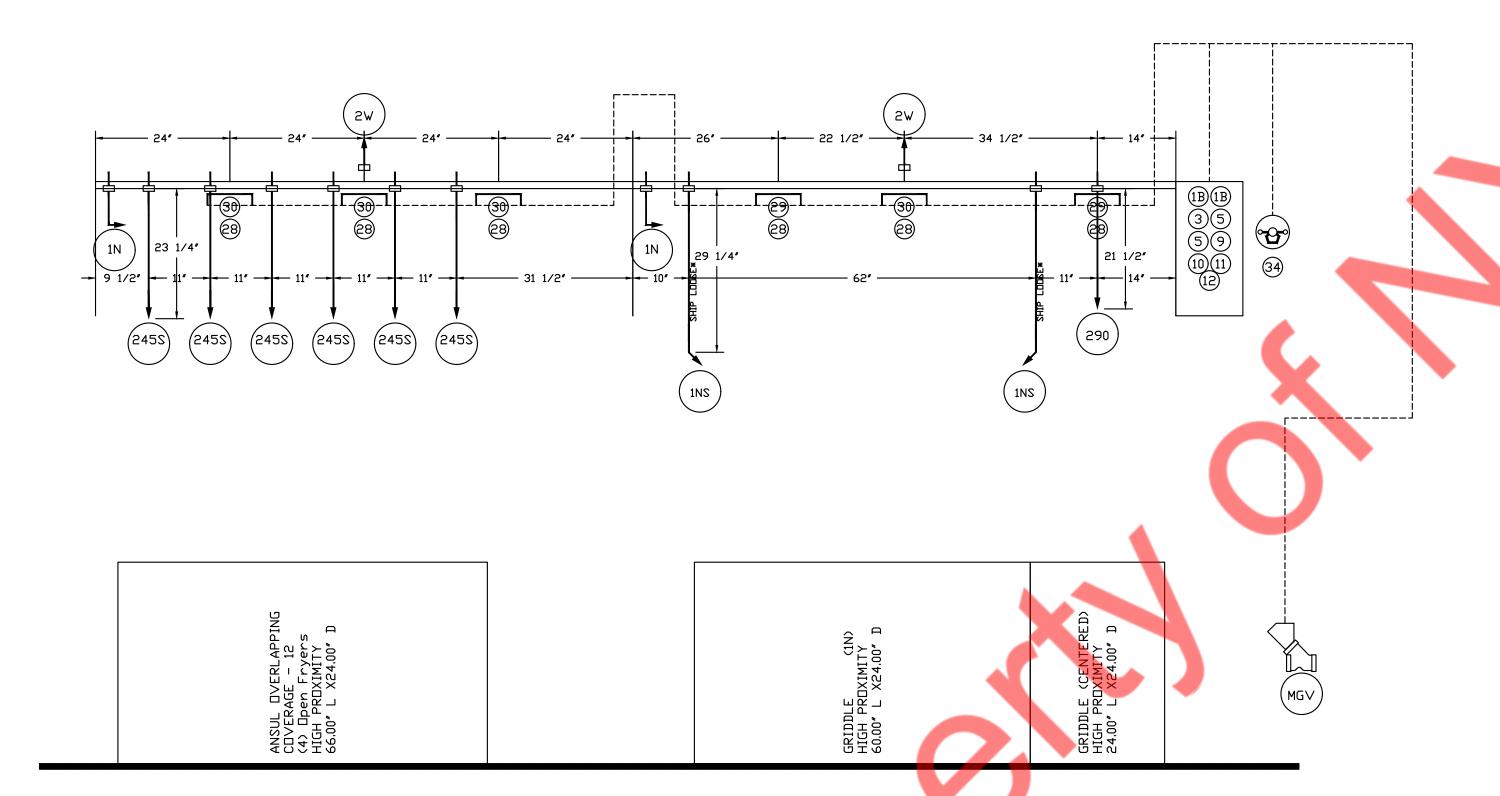
MASTER DRAWING

SHEET NO.



HOOD # 1 JOB # 5656470 FS # 1 MODEL: ND-2-PSP-F SIZE: 54"x24" LENGTH: 8' 0"

HOOD # 2 JOB # 5656470 FS # 1 MODEL: ND-2-PSP-F SIZE: 54"x24" LENGTH: 8' 1"



- FIELD PIPE DROPS AS SHOWN - FIELD PIPE DRUPS AS SHOWN
SLEEVING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROP: FACTORY WILL PROVIDE QTY 1 60IN LONG PIECE OF CHROME PLATED PIPING SHIPPED LOOSE TO BE FIELD-INSTALLED.
- SHIP LOOSE DROP: FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC. - MAXIMUM 9 ELBOWS IN SUPPLY L - 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 OVER<mark>al</mark>l APPLIANCE SIZE. - THIS FIRE SYSTEM COMPLIES WITH U.L. 300 REQUIREMENTS. J□B #: 565647<mark>0</mark>. J□B NAME: BBW. SYSTEM SIZE: ANSUL-3.0/3.0 TOTAL FP REQUIRED: 22. HODD # 1 8' 0.00" LONG \times 54" WIDE \times 24" HIGH. RISER # 1 SIZE: $10'' \times 16''$. HODD # 1 METAL BLOW-OFF CAPS INCLUDED.
HODD # 2 8' 1.00" LONG × 54" WIDE × 24" HIGH.
RISER # 1 SIZE: 10" × 16".
HODD # 2 METAL BLOW-OFF CAPS INCLUDED. <u>LEGEND - FIRE CABINET ANSUL SYSTEM</u> 1.5 GALL□N TANK. 3 GALLON TANK. DEM AUTOMAN RELEASE. DEM REGULATED RELEASE. DEM REGULATED ACTUATOR. ANSULEX LIQUID AGENT (3 GAL.). ANSULEX LIQUID AGENT (1.5 GAL.). CARTRIDGE (101-20).

CARTRIDGE (101-10).
CARTRIDGE (101-30).
CARTRIDGE (LT-A-101-30).
DDUBLE TANK CARTRIDGE. TEST LINK. DOUBLE MICROSWITCH. HOSE ASSEMBLY. DUCT NOZZLE (430913). DUCT N□ZZLE (419337). NOZZLE ASSEMBLY (419336). NOZZLE ASSEMBLY (419333). NOZZLE ASSEMBLY (419335). 1/2N NOZZLE ASSEMBLY (419334). NOZZLE ASSEMBLY (419338). 245 NOZZLE ASSEMBLY (419340). 230 NOZZLE ASSEMBLY (419339). 2120 NOZZLE ASSEMBLY (419343). 290 NOZZLE ASSEMBLY (419342). NOZZLE ASSEMBLY (419341). DETECTOR BRACKET. LOW TEMP FUSIBLE LINK. HIGH TEMP FUSIBLE LINK. MGV MECHANICAL GAS VALVE. EGV ELECTRICAL GAS VALVE. 34 REMOTE MANUAL PULL STATION. SWIVEL ADAPTOR.

Delaware / South NJ Mechanical

REVISIONS
DESCRIPTION DATE:

BBW

DATE: 10/10/2022

DWG.#:

5656470

DRAWN BY: JRE

SCALE:

3/4" = 1'-0"

MASTER DRAWING

SHEET NO.



	GRILLE SCHEDULES												
UNIT TAG	UNIT TAG QTY. MANUFACTURER USE NECK SIZE (IN) SIZE (IN) CFM MODEL NOISE CRITERIA (DB)												
SG	2	TITUS	SUPPLY	-	REFER PLAN	2000	CT-481	28					
CDS-1	1	TITUS	SUPPLY	5	12X12	100	OMNI-AA	18					
CDS-2	5	TITUS	SUPPLY	10	24X24	300-400	OMNI-AA	25					
CDR-1	3	TITUS	RETURN	15	24X24	-	OMNI-AA	-					
NOTES													

1. ALL GRILLES: CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO

ENSURE PROPER AIR DEVICE BORDER SELECTION.
2. COORDINATE COLOR/FINISH WITH ARCHITECT.

				FANS SCHEDULE													
MARK	QTY	MODEL	CFM	ESP (IN W.G)	ELEC (V/Hz/Ph.)	MOTOR SIZE (hp)	FLA (A)	FAN SPEED (RPM)	SONE	WEIGHT (LBS)	MAKE						
KX-1	1	EADU240H	4160	2	208/60/3	5	15.8	1000	20.3	345	ECON-AIR						
NOTEC.																	

1) PROVIDE 24 INCH ROOF CURB, HINGE KIT AND (2) 24 INCH TALL WIND BAND EXTENSION.

2) THE MOTOR AND DRIVES WILL SHIP LOOSE TO BE INSTALLED ON SITE Y THE INSTALLING CONTRACTOR TO AVOID FRIGHT DAMAGE.

3) PROVIDE GREASE BOX.

4) PROVIDE 2 YEAR PARTS WARRANTY.

					HOOD 9	SCHEDULE					
UNIT ID	MANUFACTURER	MODEL	LENGTH	COOKING MAX	APPLIANCE	FILTER TYPE	DESIGN	EXHAUST	SUPPLY	HOOD	WEIGHT
UNITID	IVIANOFACTORER	MODEL	LENGIH	TEMPERATURE	DUTY	FILIER TIFE	CFM/FT	CFM	CFM	CONSTRUCTION	(LBS)
LEFT HOOD	ECON-AIR	5424 EX-2-PSP-F	8'-0"	600	HEAVY	CAPTRATE SOLO FILTER	260	2080	1665	430 SS	461
RIGHT HOOD	ECON-AIR	5424 EX-2-PSP-F	8'-1"	600	HEAVY	CAPTRATE SOLO FILTER	257	2080	1665	431 SS	703
NOTES:-		-		-							

1) CONTRACTOR TO FIELD VERIFY WORKING CONDITION AND EXACT LOCATION.

	KITCHEN MAKE UP AIR UNIT SCHEDULE															
	FLOW EXTERNAL SPEED GAS HEATING CAPACITY ELECTRIC DATA WEIGHT BASIS OF DESIGN															
TAG	SERVICE	RATE	SP	SPEED	GAS TYPE		OUTPUT	REQUIRED INPUT GAS	FEEIGIENICV	FICIENCY V/PH/HZ	FLA	N/CA (A)	MOCD (A)			DF DESIGN
		CFM	IN W.G.	RPM	GASTIFE	BTUH	BTUH	PRESSURE (MIN - MAX)	EFFICIENCY	V/PH/HZ	FIIIIZ FLA		MOCP (A)	(LDS)	MANUFACTURER	MODEL
MAU-1	HOOD	3330	0.5	1338	NATURAL	213	196	7 IN WC - 14 IN WC	92%	208/3/60	9.5	11.9	20	645	ECON-AIR	EA2-D.250-20D
NOTES:																

1) PROVIDE ALL NECESSARY ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATIONS.

2) CONTRACTOR TO FIELD VERIFY WORKING CONDITION AND EXACT LOCATION.



		E	LECTRICAL SYMBOLS LIST
	LIGHTING		POWER AND TELECOMMUNICATION
	LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR	J	JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED
	"EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.	Φ	DUPLEX CONVENIENCE RECEPTACLE, +12" AFF OR AS NOTED.
	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.	•	DOUBLE DUPLEX RECEPTACLE - 20A-1P, 125V, NEMA 5-20R.
	— CIRCUIT NUMBER : INDICATED BY NUMBER	0	OUTLET (JUNCTION BOX) 4" SQUARE BOX MINIMUM.
AO _a 2	SWITCHING INDICATED BY LOWER CASE LETTERS.	•	DATA OUTLET — (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE RUN (2) COMPOSITE CABLES FROM EACH OUTLET TO NID BOX
⊘ EM ─	- DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.		
		J	JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED
$\otimes \underline{\otimes} \underline{\otimes} \overline{\underline{\bullet}}$	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONALARROWS AS INDICATED. SHADED AREA DENOTES FACE(S).		MOTORS AND CONTROLS
	ISOLITE ELITE SERIES LED EXIT SIGN	M	MOTOR AS NOTED WITH CONTROLLER
	SWITCHES AND CONTROLS		MUA UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT
\$.	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE/SWITCHED RECEPTACLE CONTROLLED.	WP	SWITCH WITH WEATHER PROOF.
\$ _{os}	WALL OCCUPANCY SENSOR, NUMBER INDICATES TYPE.		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED.
	ASCO CONTACTOR C-25 TORK TIMER T-25 STACKED.		30A/240V NON FUSED DISCONNECT SWITCH
\$ ₀ v	WALL MOUNTED SPRING WOUND TIME SWITCH TORK		60A/240V NON FUSED DISCONNECT SWITCH
Ψ0V			100A/240V NON FUSED DISCONNECT SWITCH
	ELECTRICAL DRAWING LIST	S _M	MANUAL MOTOR SWITCH
E0.1	ELECTRICAL SYMBOL LIST, ABBREVIATIONS, GENERAL NOTES, LIGHTING FIXTURE SCHEDULE AND CONTROLS		ANNOTATION
E0.2	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2	+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.
E0.3	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2	\bigcirc	KEYED NOTE REFERENCE
E1.0	ELECTRICAL LIGHTING PLAN		
E2.0	ELECTRICAL POWER PLAN	1	DETAIL REFERENCE: DETAIL NUMBER INDICATED ON
E2.1	ELECTRICAL POWER ROOF PLAN	<u>E/2-1</u>	TOP; DRAWING NUMBER INDICATED ON BOTTOM
E3.0	ELECTRICAL DETAILS		POWER DISTRIBUTION
[40	ELECTRICAL RISER DIACRAM AND DANIEL SCHEDULES		

POWER PANELBOARD - 208V/120V

LIGHT FIXTURE SCHEDULE:

LIGHT FIXTURE TAG	DESCRIPTION	WATTAGE	QUANTITY
A1	2 x 2 TROFFER LIGHT FIXTURE	30	19
A2	4" RECESSED LIGHT FIXTURE	10	2
А3	PENDANT LIGHT	20	23
A5	LED SPOT LIGHT	10	30
A10	PENDENT LIGHT	10	6
EX-1	EMERGENCY EGRESS EXIT SIGN	5	1
EM	EMERGENCY LIGHTING	5	6

ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES

GENERAL NOTES:

COORDINATE FINAL FIXTURE MAKE AND MODEL WITH ARCHITECT.

LIGHTING CONTROLS NOTES:

- 1. AUTOMATIC LIGHTING CONTROLS: OCCUPANCY SENSOR SHALL BE CAPABLE OF TURNING OFF LIGHTS WITHIN 20 MINUTES OF ALL OCCUPANT LEAVING THE SPACE.
- 2. ALL ILLUMINATED EXIT SIGN TO HAVE A MAX WATTAGE OF 5 PER SIDE.

LIGHTING CONTROLS:

AREA	CONTROLS
BAR, PICKUP AREA AND KITCHEN AREA	1. TIME—CLOCK WITH MANUAL OVERRIDE SWITCH. EMERGENCY LIGHT FIXTURES TO REMAIN ENERGIZED AT EMERGENCY CONDITION.
	2. LOCAL MULTI-LEVEL SWITCHES FOR MANUAL ON/OFF OF LIGHT FIXTURES.
OFFICE	WALL MOUNTED OCCUPANCY SENSOR FOR MANUAL/AUTOMATIC ON/OFF OF LIGHT FIXTURE.
ENTRANCE	MANUAL SWITCH ON/OFF FOR LIGHT FIXTURE.

GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF NATIONAL ELECTRIC CODE, NYS EDITION, LOCAL JURISDICTION REQUIREMENTS, AND ALL NEW YORK STATE GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.

ELECTRICAL ABBREVIATIONS

EQUIP

FΑ

GP

PP 🬗

PWR

SECT

 SW

SYM

SYS

TELE

TEMP

UON

CL

EACH

EMERGENCY

EQUIPMENT

FIRE ALARM

EXISTING

FLOOR

GROUND

ELECTRICAL METALLIC TUBING

EXISTING TO BE RELOCATED

GROUND FAULT INTERRUPTER

GENERAL PURPOSE

HOW WATER HEATER

INTERRUPTING CAPACITY

HORSEPOWER

POWER PANEL

RELOCATED EXISTING

RIGID GALVANIZED STEEL

SINGLE POLE DOUBLE THROW

SINGLE POLE SINGLE THROW

REMOVE & RELOCATE

RECEPTACLE

SECTION

SPECIFICATION

SYMMETRICAL

SWITCH

SYSTEMS

TELEPHONE

TYPICAL

TEMPERATURE

VOLT/VOLTAGE

VOLT AMPERE

CURRENT LIMITER

TOILET EXHAUST FAN

UNLESS OTHERWISE NOTED

POWER

AMPERES

A/C, AC | AIR CONDITIONING UNIT

AMP SWITCH

AMP TRIP

AUTOMATIC

CONDUIT

CIRCUIT

CEILING

COPPER

DIAMETER

DISCONNECT

DOWN

DRAWING

KILOVOLT

KILOWATTS

LIGHTING

MAXIMUM

MOUNTED

NEUTRAL

PANEL

WATT

PHASE

KILOVOLT-AMPERES

MAIN CIRCUIT BREAKER

MAIN LUGS ONLY

NOT IN CONTRACT

NOT TO SCALE

WEATHER PROOF

JUNCTION BO

ONE THOUSAND CIRCULAR MILS

AS

ΑT

AUTO

AWG

C/B,CB

CKT

CLG

COMM

CU

DIA

DISC

JB

ΚV

KVA

ΚW

MAX

NTS

PNL

KCMIL

AMPERE FRAME/AMP FUSE

AMPS INTERRUPTING CAPACITY

ABOVE FINISHED FLOOR

AMERICAN WIRE GAUGE

CIRCUIT BREAKER

COMMUNICATION

CURRENT TRANSFORMER

- 2. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
- 3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
- 4. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
- SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORTRACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
- LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
- 7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
- 8. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- 9. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
- 10. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.
- 11. MINIMUM SIZE OF CONDUIT SHALL BE 3/4", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
- 12. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
- 13. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
- 14. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
- 5. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
- 16. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
- 17. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- 18. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
- 19. ALL CONDUITS AND EQUIPMENT TO BE CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
- 20. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
- 21. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE—RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE—RATED BOXES OR PUTTY PADS ARE UTILIZED.
- 22. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.
- 23. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
- 24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
- 25. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
- 26. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
- 27. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.

ELECTRICAL SPECIFICATIONS

GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION,"
 AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS
 AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.
- C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOROPERATION, MAINTANANCE AND REPAIR, MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
- F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
- G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- J. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
- K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT ND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- L. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- M. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- O. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.
- GENERAL PROVISIONS FOR ELECTRICAL WORK:
- A. DEFINITIONS:
 - 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
 - 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
 - 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE. AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
 - 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
 - 5) "WIRING": RACEWAY. FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
 - 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
 - 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
 - 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

- B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
- C. QUALITY ASSURANCE
 - 1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
 - 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
- 3) CURRENT CHARACTERISTICS:
- a. DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

4) HEIGHTS OF OUTLETS:

- a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
 - RECEPTACLES AND TELEPHONES: (AS PER CODE & ARCHITECTURAL DRAWING).
 - WALL SWITCHES: 4 FT-0 IN.
 - WALL FIXTURES: 7 FT-0 IN.
 - MOTOR CONTROLLERS: 5 FT-0 IN.
- CLOCKS: 7 FT 6 IN
- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE. OR AS NOTED OR DIRECTED.
- D. PRODUCT DELIVERY, STORAGE AND HANDLING
 - 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
 - 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
- E. MATERIALS
- 1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN.
 WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH
 DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET,
 TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE.
 NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.

3) INSERTS AND SUPPORTS:

- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED
- SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
- MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.
- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD—APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH
- I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

3. SCOPE OF WORK:

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT

- IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR
- THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK
- E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE STATE BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.
- F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS.
 CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL
 SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND
 SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED
 POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.
- 4. SHOP DRAWINGS
 - PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
 - B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
 - 1) PROJECT NAME AND LOCATION
 - 2) NAME OF ARCHITECT AND ENGINEER
 - 3) ITEM IDENTIFICATION
 - 4) APPROVAL STAMP OF PRIME CONTRACTOR
 - C. SUBMISSIONS:
 - 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
 - 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
 - D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
 - 1) SAFETY/DISCONNECT SWITCHES
 - 2) FUSES
 - 3) CIRCUIT BREAKERS
 - 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
 - 5) RACEWAYS
 - 6) WIRE AND CABLE
 - 7) WALL SWITCHES
 - 8) INSERTION RECEPTACLES
 - 9) MOMENTARY CONTACT SWITCHES
- 10) TIME SWITCHES
 - 11) LIGHTING FIXTURES.
- ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING. PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.
- 5. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- 3. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS—BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK.
 "AS—BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
- 6. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.
- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED.

VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE- QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES

7. FUSES:

CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.

- B. MOTOR CIRCUITS ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW—PEAK DUAL—ELEMENT TIME—DELAY LPN—RK (AMP)SP (250V) /LPS—RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
- C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
- D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.
- CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL—MAGNETIC, QUICK—MAKE—QUICK—BREAK, BOLT—ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP—FREE HANDLE. MULTI—POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT—TRIPPING, OPEN A ND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
- 1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE.
- 2)120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM

MATERIALS

1) RACEWAYS:

- a. RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED,
- b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.
- c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.
- d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16
 GAUGE STEEL WITH GROUND CONTINUITY. FINISH
 SHALL BE BAKED ENAMEL. COVERS SHALL BE
 SCREW-ON.
- e. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW—ON.

2) FITTINGS AND ACCESSORIES:

- a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
- c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH
- INSULATED THROAT.

 d. BUSHINGS: METALLIC INSULATED TYPE.

IRON. ZINC DIE CAST NOT PERMITTED.

CONTINUATION: 3) BOXES:

- a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.
- b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.
- C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX. TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS. CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

RACEWAYS PASSING THROUGH FIRE—RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

D. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTIURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

- A. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.
- D. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR

MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR—TO—CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

- E. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE—PARTITIONS ROOMS.
- F. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

9. WIRE AND CABLE:

- A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.
- 3. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.
- C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
- D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).
- E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS.
- F. COLOR CODING SHALL BE AS FOLLOWS:

120/208 VOLT SYSTEM: 277/480 VOLT SYSTEM: BLACK FOR A PHASE BROWN FOR A PHASE ORANGE FOR B PHASE BLUE FOR C PHASE YELLOW FOR C PHASE

1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

- G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.
- H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION—TYPE OF TWIST—ON SPRING—LOADED CONNECTORS AND CLEAR NYLON—INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON
- I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.
- J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL
- K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

11. WIRING DEVICES:

- A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES
- B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/277 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).
- C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.
- 1)SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2—POLE, 3—WIRE GROUNDING, 15A, 125V, NEMA 5—20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).
- 2) USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT.
- D. INSERTION RECEPTACLES SHALL BE DUPLEX RECEPTACLE CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT. GROUNDED, EXCEPT AS NOTED.

- DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.
- F. COLORS: COORDINATE COLORS WITH ARCHITECT.
- G. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

12. LIGHTING FIXTURES:

- A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.
- B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.
- C. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ET1 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24—INCH LAMPS AND RAPID START FOR 48—INCH. TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.
- D. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.
- E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE, DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.
- F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.
- G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.
- H. EXIT SIGNS SHALL BE PRECISION DIE—CAST ALUMINUM HOUSING WITH LASER—FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED FOR USE IN CITY. AC POWERED WITH PREMIUM LONG—LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3—HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

13. TELEPHONE CONDUIT SYSTEM:

- A. PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.
- B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE COMPANY.
- C. OUTLETS SHALL BE:
- 1) WALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.
- D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.
- E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET BOX TO BUSHED END THRU WALL 6" BELOW THE PLASTER CEILING.
- F. FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

14. GROUNDING AND BONDING:

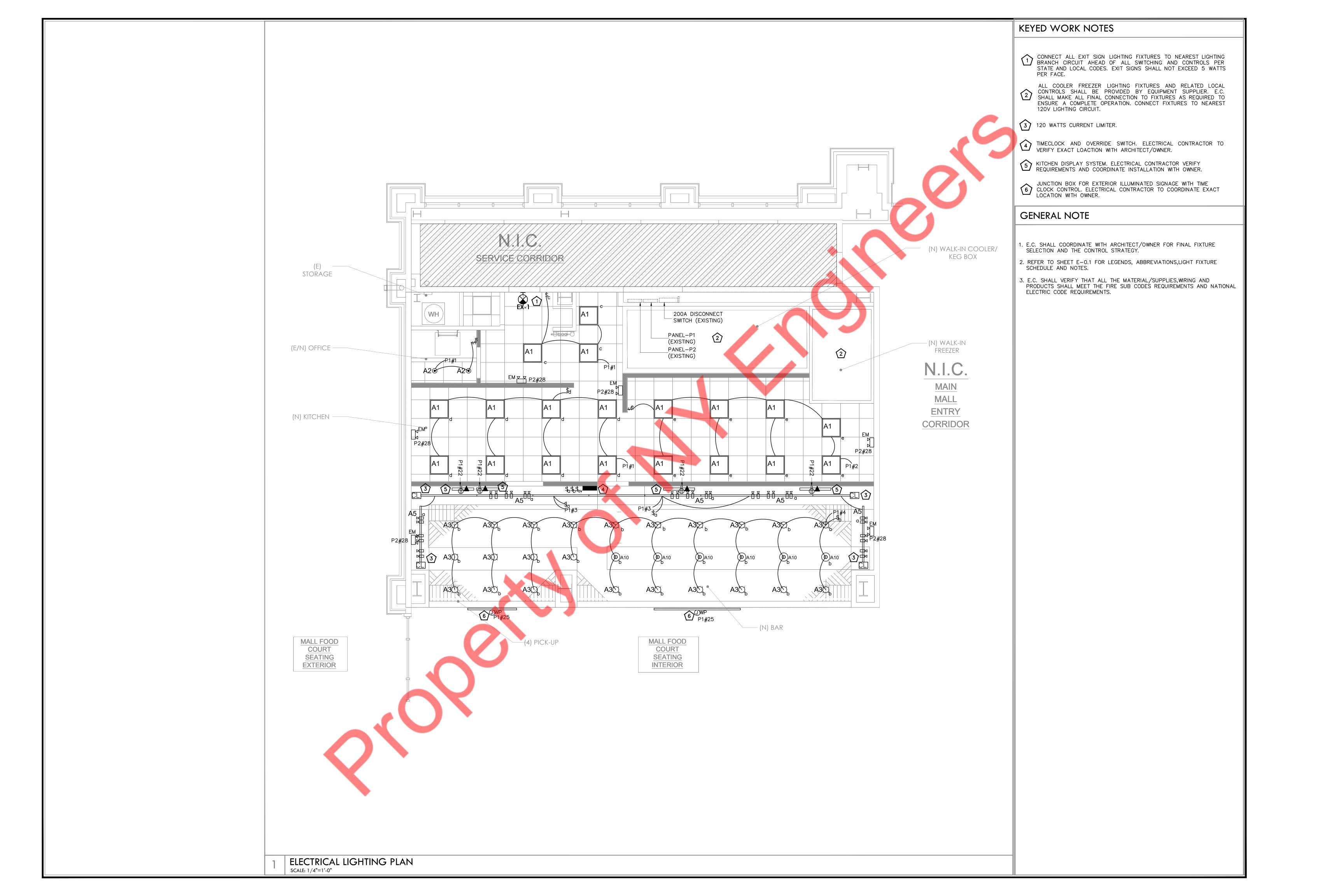
- A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (2017 NATIONAL ELECTRICAL CODE WITH AMENDMENTS), AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE
- B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.
- C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.
- D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.
- E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:

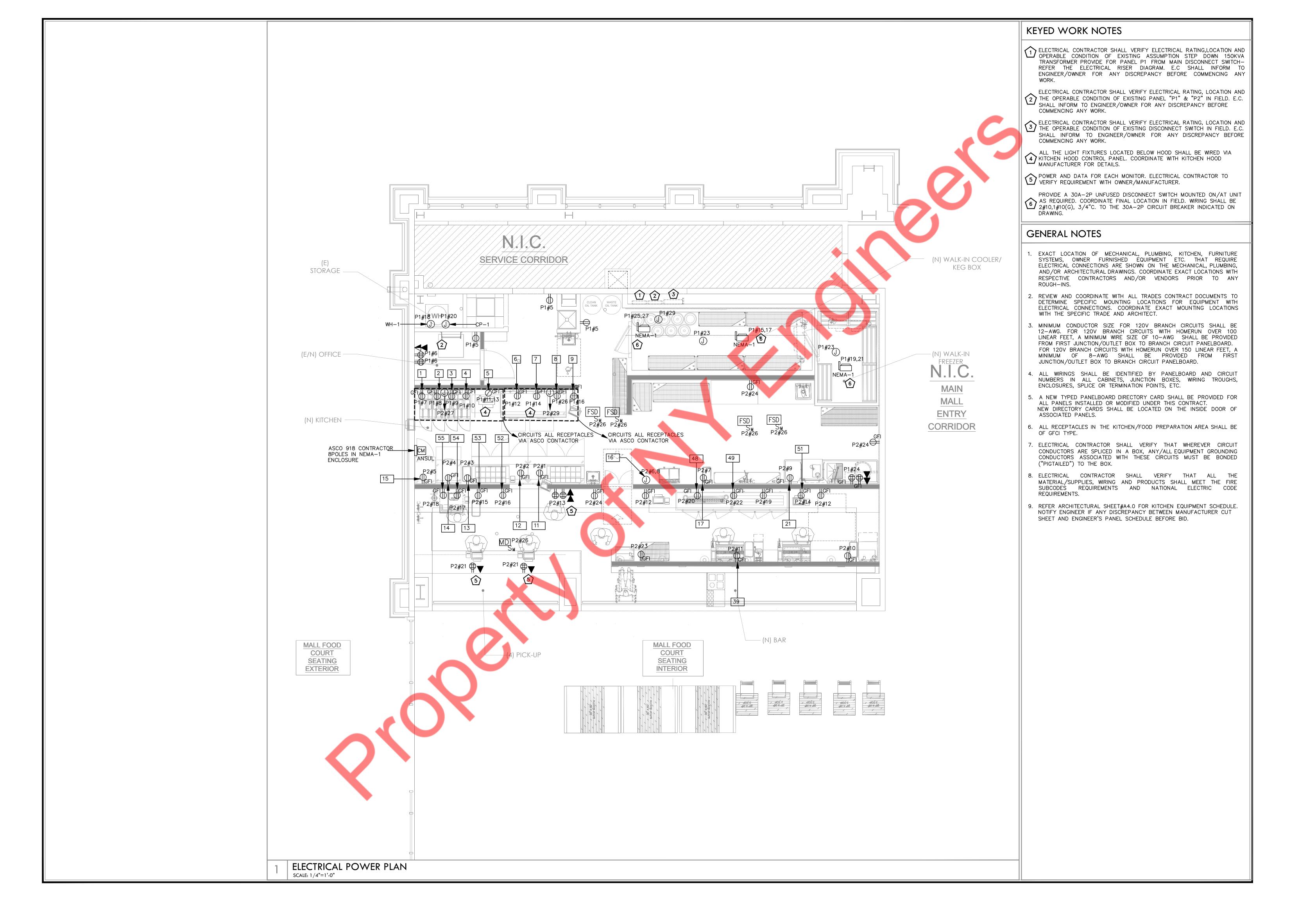
 1) CIRCUITS SERVING ANY WALL BOX DIMMER.
 - 2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES.
 TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING
 CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE, OR
 AS OTHER WISE NOTED ON DRAWINGS.
 - 3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES
 - 4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

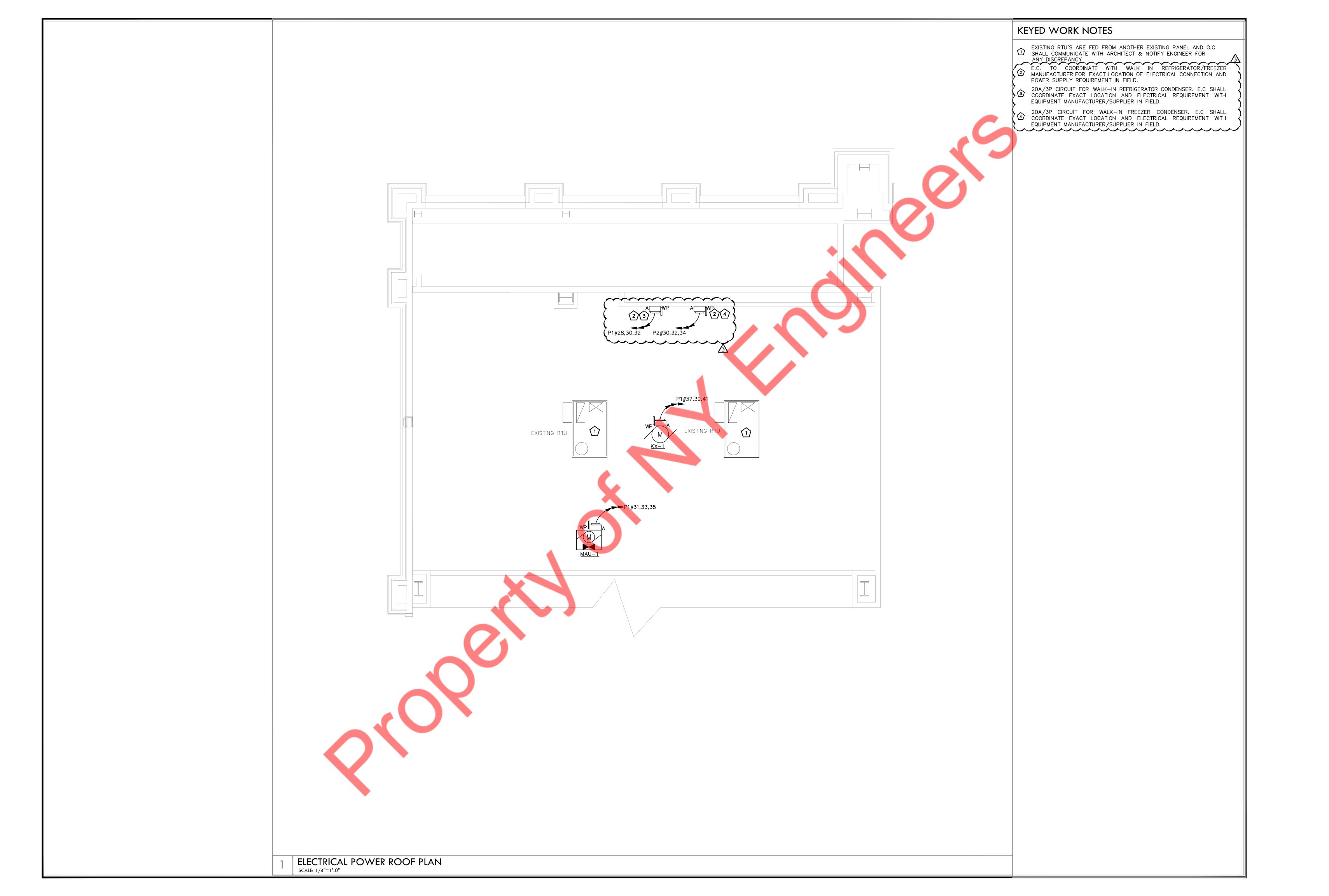
15. PANELBOARDS:

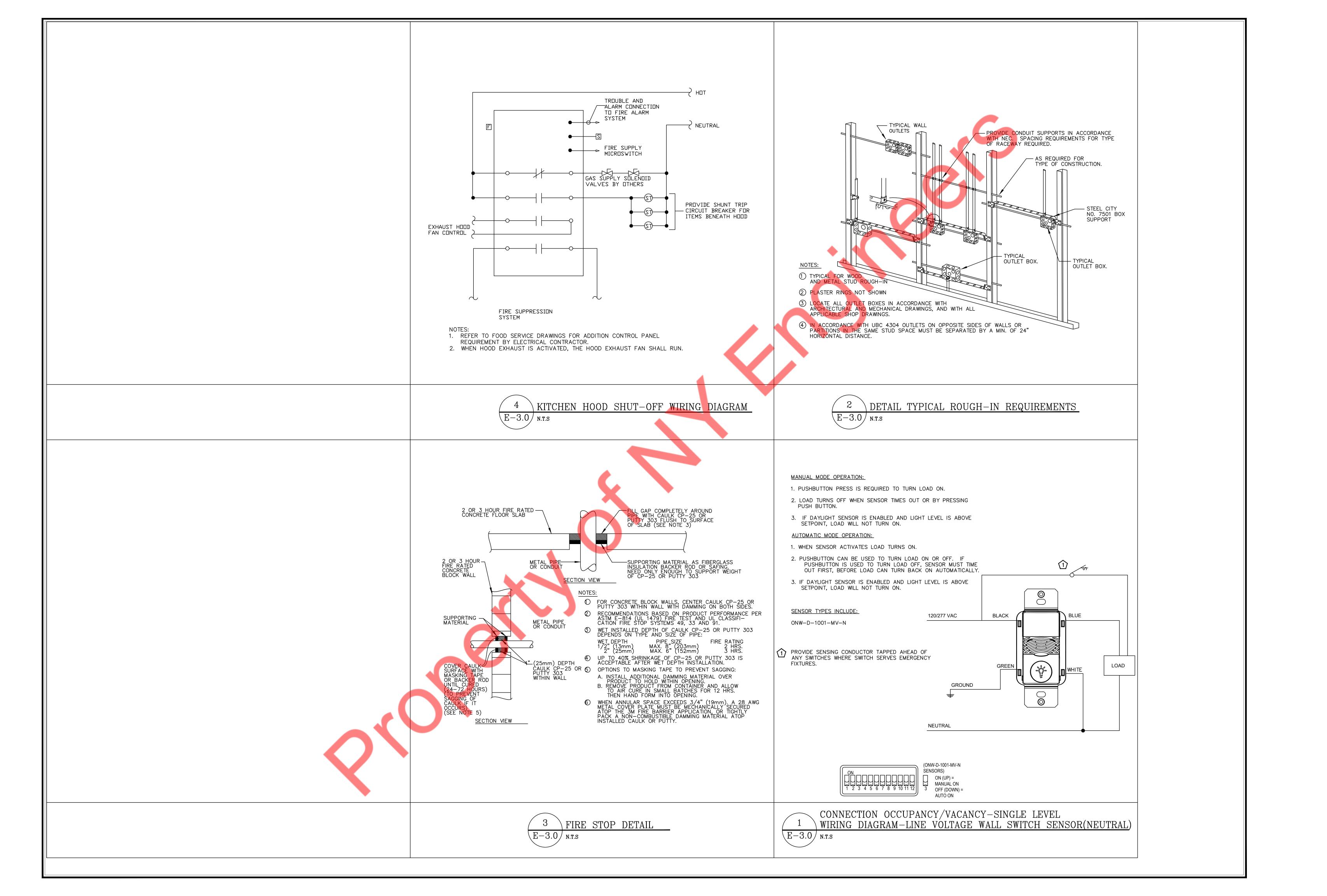
- A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE.
- B. CIRCUIT BREAKERS SHALL BE OF THE BOLT—ON THERMAL MAGNETIC MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.

- C. LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 SPARE LOCKING TABS SHALL BE FURNISHED TO THE OWNER.
- D. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.
- E. ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR—IN—DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.
- F. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.
- H. FURNISH ALL PANELBOARDS WITH FEED-THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.
- J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.
- K. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.
- ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.
- M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM AND 14,000 AMPERES R.M.S. SYMMETRICAL FOR 480Y/277 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.
- N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.









PANELBOARD PANEL: P1(EX) **MOUNTING:** SURFACE VOLTS, PHASE, 208Y/120 WIRE 400A MLO: NA MAIN CB BUS: 400A EXISTING INTERRUPTING RATING PER PHASE (KVA) LOAD LOAD MINIMUM BRANCH LOAD LOAD CKT NO. **DESCRIPTION OF LOAD** MINIMUM BRANCH CIRCUIT DESCRIPTION OF LOAD **AMPS** TYPE (KVA) CIRCUIT (KVA) TYPE **AMPS** Α В LIGHTING 1.75 L LIGHTING L 20 0.88 2#12, #12G, 3/4"C 0.87 2#12, #12G, 3/4"C LIGHTING 1.63 L LIGHTING 0.75 2#12, #12G, 3/4"C 2#12, #12G, 3/4"C 0.88 20 20 FOH RECEPTACLE 0.72 R QUAD RECEPTACLE 1.26 20 0.54 2#12, #12G, 3/4"C 2#12, #12G, 3/4"C FRYER (#1) E FRYER(#2) 20 0.92 2#12, #12G, 3/4"C 2#12, #12G, 3/4"C 0.92 20 20 | FRYER (#3) 0.92 1.84 2#12, #12G, 3/4"C 0.92 FRYER(#4) 20 10 2#12, #12G, 3/4"C 2.08 E CHEF BASE(#6) 12 2#12, #12G, 3/4"C 20 20/2P | TOASTER(#5) 2#12, #12G, 3/4"C 1.10 | E |GRIDDLE(#7) 13 2.70 14 1.60 2#12, #12G, 3/4"C 20 0.54 R TRASH RECEPTACLE(#9) 3.03 16 E 2.49 2#12, #12G, 3/4"C 20 30/2P WALK-IN FREEZER 2#10, #12G, 3/4"C 17 2.99 2.49 2#12, #12G, 3/4"C 0.50 20 0.50 | M | RCP 20 2.49 2#12, #12G, 3/4"C 20 30/2P WALK-IN REFRIGERATOR 2#10, #12G, 3/4"C 0.72 | R | RECEPTACLE 21 3.21 22 2.49 2#12, #12G, 3/4"C 20 20 WALK-IN MISCELLANEOUS R QUAD RECEPTACLE 24 1.22 0.50 2#12, #12G, 3/4"C 2#12, #12G, 3/4"C 0.72 20 GRIDDLE(#8) 26 2.93 2#12, #12G, 3/4"C 20 2.49 30/2P | KEG COOLER 2#10, #12G, 3/4"C 27 4.29 1.80 O 28 WALK-IN REFRIGERATOR 20 WALK-IN MISCELLANEOUS 20/3P 3-12 + 1#12G, 3/4"C. E 0.50 2.30 1.80 O 30 2#12, #12G, 3/4"C (CONDENSER) 2.94 М 1.14 SPARE 20 34 3#12, #12G, 3/4"C 20/3P MAU-1 1.14 33 M 1.14 20 1.14 M 20 6.85 M 1.89 4.96 20/3P KX-1 3#12, #12G, 3/4"C EXISTING 100/3P PANEL-P2 40 6.49 0 M 1.89 4.60 M 1.89 8.73 6.84 42 22.00 21.63 19.72 TOTAL CONNECTED LOAD (KVA) LOAD CLASSIFICATION CONNECTED LOAD (KVA) **DEMAND FACTOR** DEMAND LOAD (KVA) PANEL TOTAL LOAD TOTLA LIGHTING 3.38 100% 3.38 **TOTAL RECEPTACLE** 3.24 100% 3.24 63.35 TOTAL CONNECTED LOAD KVA **TOTAL HVAC** 0.50 100% 0.50 TOTAL DEMAND LOAD 54.66 KVA 100% 9.59 **TOTAL CONNECTED CURRENT** 176.05 TOTAL MOTOR 9.59 AMP TOTAL KITCHEN/EQUIPMENTS 24.84 65% 16.15 TOTAL DEMAND CURRENT 151.89

PANEL:	P2(EX)												MOUNTING:		URFAC	
08Y/120		VOLTS, 3		PHASE,		4				WIRE						
		•														
IAIN CB		MLO:	100	0A	BUS:	125A		INT	ERRUPTING	RATING	EXISTING	ì		FRO	/I PANE	L-P1
		T		T	1		1			ı	Γ	T				
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD		LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	A	PER PHASE (KV	(A) C	MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LO	DAD 🖊	TRIP MPS	CKT NO
1	20	FRIDGE(#11)		F	0.70	2#12, #12G, 3/4"C	1.40			2#12, #12G, 3/4"C	0.70	F	FRIDGE(#12)		20	2
3	20	TRASH RECEPTACLE(#13)		R	0.70	2#12, #12G, 3/4"C		0.82		2#12, #12G, 3/4"C	0.28	E	FRIDGE(#14)		20	4
5	20	FREEZER(#15)		F	0.31	2#12, #12G, 3/4"C			0.96		0.65	F				6
7	20	TRASH RECEPTACLE(#13)		R	0.54	2#12, #12G, 3/4"C	1.19			- 2#12, #12G, 3/4"C	0.65	E	ICE MAKER(#16)	2	0/2P	8
9	20	CLEAN DISTABLE RECEPTACLE		R	0.54	2#12, #12G, 3/4"C		1.08		2#12, #12G, 3/4"C	0.54	R	TRASH RECEPTACLE(#29)		20	10
11	20	TRASH RECEPTACLE(#39)		R	0.54	2#12, #12G, 3/4"C			1.08	2#12, #12G, 3/4"C	0.54	R	GFI RECEPTACLE		20	12
13	20	QUAD RECEPTACLE		R	0.72	2#12, #12G, 3/4"C	0.96			2#12, #12G, 3/4"C	0.24	E	BACK BAR REFRIGERATOR	/ !! = 4\	20	14
15	20	TRASH RECEPTACLE(#53)		R	0.54	2#12, #12G, 3/4"C		0.78		2#12, #12G, 3/4"C	0.24	E	BACK BAR REFRIGERATOR	/ !! = a \	20	1
17	20	DRINK MIXER(#54)		Е	1.80	2#12, #12G, 3/4"C			3.60	2#12, #12G, 3/4"C	1.80	E	ICE CREAM FREEZER(#55)		20	1
19	20	LIQUOR DISPLAY(#50)		R	0.57	2#12, #12G, 3/4"C	0.81			2#12, #12G, 3/4"C	0.24	F	BACK BAR REFRIGERATOR	/!! 40\	20	2
21	20	QUAD RECEPTACLE		R	0.72	2#12, #12G, 3/4"C		1.12		2#12, #12G, 3/4"C	0.40	E	BEER TOWER(#49)		20	2
23	20	GFI RECEPTACLE		R	0.36	2#12, #12G, 3/4"C			0.90	2#12, #12G, 3/4"C	0.54	R	GFI RECEPTACLE		20	24
25	20	EXTERIOR SIGNAGE		L	0.30	2#12, #12G, 3/4"C	0.60			2#12, #12G, 3/4"C	0.30	М	MOTORIZED & SMOKE DA	MPER	20	2
27	20	HOOD LIGHTING		L	0.30	2#12, #12G, 3/4"C		0.80		2#12_#12G_3/4"C	0.50	4	EM.LIGHT		20_	2
29	20	HOOD LIGHTING		L	0.30	2#12, #12G, 3/4"C			2.10		1.80	O				3
31	20	SPARE					1.80		\	3-12 + 1#12G, 3/4"C.	1.80	0	WALK-IN FREEZER (CONDI	ENSER) 2	0/3P	3
33	20	SPARE						1.80			1.80	La				3,
35	20	SPARE							0.00				SPARE		20	3
37	20	SPARE					0.00						SPARE		20	38
39	20	SPARE						0.00					SPARE		20	40
41	20	SPARE							0.00				SPARE		20	42
		TOTAL CONNECT	ED LOAD (K	(VA)			6.76	6.40	8.64	·						
		LOAD CLASSIFICATION	1		CONNEC	TED LOAD (KVA)	DEMA	ND FACTOR		DEMAND LOAD (KVA)			PANEL TOTAL L	OAD		
	TC	TLA LIGHTING	L			1.40		125%		1.75			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
	тот	AL RECEPTACLE	R			6.69		100%		6.69		то	TAL CONNECTED LOAD		1.79	ΚV
	•	TOTAL HVAC	н			0.00		100%		0.00		Т	OTAL DEMAND LOAD	1	9.34	KV
	T	OTAL MOTOR	М			0.30		100%		0.30		TOTA	AL CONNECTED CURRENT	- 6	0.55	A٨
	TOTAL KI	TCHEN/EQUIPMENTS	E			8.00		65%		5.20		TO	TAL DEMAND CURRENT		3.75	ΑN

100%

100%

21.80

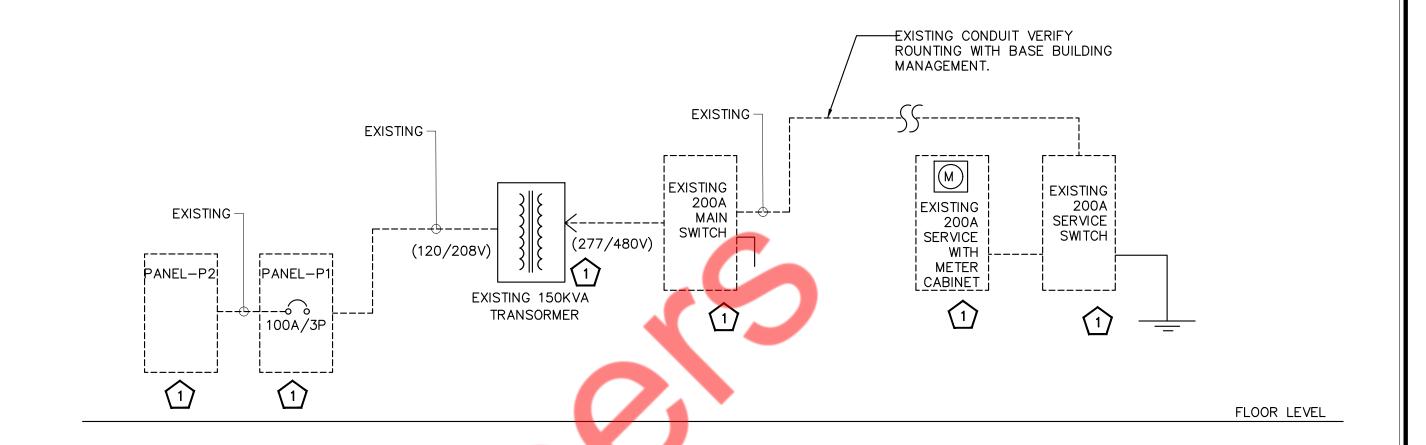
21.80

SYSTEM VOLTAGE

SYSTEM VOLTAGE

120/208 Wye

TOTAL OTHER/MISCILLANEOUS



ELECTRICAL GENERAL NOTES:

1. ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (Isc) RATING WITH UTILITY COMPANY AND AHJ PRIOR TO COMMENCING ANY WORK

ELECTRICAL RISER KEYED WORK NOTES:

E.C. SHALL VERIFY ELECTRICAL RATING, LOCATION AND THE OPERABLE CONDITION OF EXISTING EQUIPMENT IN FIELD. E.C. SHALL INFORM TO ENGINEER/OWNER FOR ANY DISCREPANCY BEFORE COMMENCING ANY WORK.

RISER NOTES:

- 1. ALL SHUTDOWN AND TIES ARE TO BE COORDINATE WITH BUILDING MANAGEMENTS.
- ELECTRICAL CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF THE EXISTING ELECTRICAL EQUIPMENT.
- 3. CONTRACTOR TO FIELD VERIFY EXISTING TELECOM CONDUIT RISER AND RUN CONDUIT UP TO TELE/DATA POINT. BASE BID ACCORDINGLY.
- 4. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. ALL CONDUIT ROUTING, OFFSETS, DROPS, AND RISES OF RUNS ARE NOT SHOWN ON THE PLANS AND ARE SHOWN DIAGRAMMATICALLYIN THE RISERS. THE CONTRACTOR SHALL ACCOUNT FOR THE PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTION. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED BY THE CONTRACTOR. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- 5. ALL BRANCH CIRCUITS HOMERUNS ASSIGN INDICATED ON THIS PLAN SHALL BE CIRCUITED TO THE RESPECTIVE PANEL, CIRCUIT NUMBER INDICATED, U.O.N.
- ELECTRICAL CONTRACTOR TO FILED VERIFY AND TEST EXISTING EQUIPMENT FOR CONTINUED USE.

 GENERAL NOTES:
- REFER TO SHEET A4.0 ON ARCHITECTURAL DRAWING FOR KITCHEN EQUIPMENT SCHEDULE. NOTIFY ENGINEER IF ANY DISCREPANCY BETWEEN MANUFACTURER CUTSHEET AND ENGINEER'S PANEL SCHEDULE BEFORE BID.

PLUMBING SYMBOLS LIST

	SANITARY PIPING
— SAN EX. —	EXISTING SANITARY PIPING
— G SAN EX. —	EXISTING GREASE SANITARY PIPING
——— G ———	GAS PIPING
	VENT PIPING
	EXISTING VENT PIPING
	EXISTING COLD WATER PIPING
	FILTERED WATER PIPING
	HOT WATER PIPING
	HOT WATER RETURN PIPING
∞	P-TRAP
o	PIPE UP
	PIPE DROP
 II	PLUGGED OUTLET/CLEANOUT
	SHUT-OFF VALVE
—— — ——	SOLENOID VALVE
¥	GAS SHUTOFF VALVE
- Z-	BALANCING VALVE
•	POINT OF DISCONNECTION
•	POINT OF CONNECTION
Z	BACKFLOW PREVENTOR

PLUMBING ABBREVIATIONS

CODP	CLEAN OUT DECK PLATE
CW	COLD WATER
FCW	FILTERED COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
٧	VENT
W	WASTE
G	GAS
MS	MOP SINK
TYP.	TYPICAL
DN	DOWN
EXIST.	EXISTING
AFF	ABOVE FINISH FLOOR
FD	FLOOR DRAIN
HWHT	HOT WATER HEATER
FS	FLOOR SINK

BUILDING DEPARTMENT PLUMBING NOTES:

- 1. ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT & WATER DISTRIBUTION SYSTEMS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF NEW YORK STATE ENERGY CONSERVATION CODE 2020 (NYSECC 2020), INTERNATIONAL PLUMBING CODE 2018 (IPC 2018).
- 2. INSTALLATION OF UNDERGROUND SANITARY DRAINAGE AND VENT PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION IPC 2018 SECTION 702.2
- 3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION IPC 2018 SECTION 305.
- 4. RODENT PROOFING AS PER IPC 2018 SECTION 304.
- 5. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 SECTION 303, 605, 702, 902, 1102
- 6. EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND
- 7. TRAPS FOR FIXTURES SHALL BE PROVIDED AS PER IPC 2018 SECTION 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 SECTION 708
- 8. DRAINAGE PIPE CLEANOUTS AS PER IPC 2018 SECTION 708.
- 9. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 SECTION 308
- 10. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 CHAPTER 6 SECTION PC 601, 602, 603, 604, 606, 607, 608, 610.
- 11. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 CHAPTER 7 SECTIONS 701 THROUGH PC 712.
- 12. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 CHAPTER 9.
- 13. INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH IPC 2018 SECTION 312.
- 14. GAS PIPING INSTALLATION SHALL IN IN ACCORDANCE WITH 2020 FGCNYS CHAPTER 4.
- 15. PIPING FROM MULTIPLE GAS METER INSTALLATION SHALL BE MARKED WITH AN APPROVED LABEL AS PER SECTION 401.7 OF 2020 FGCNYS.
- 16. ALL BACKFLOW PREVENTER DEVICES SHALL BE ACCEPTANCE TESTED BY A NYS DEPARTMENT OF HEALTH APPROVED TESTING AGENT, THE RESULTS RECORDED ON THE DOH FORM SIGNED BY THE TESTING AGENT AND DESIGN ENGINEER.
- 17. MECHANICAL SYSTEMS SHALL BE COMMISSIONED PER 2020 IECC C408.2.4 & C408.2.4.2. AND A PRELIMINARY COMMISSIONING REPORT CERTIFIED BY THE DESIGNER OF RECORD SHALL BE PROVIDED TO THE OWNER AND AHJ.

PLUMBING SPECIFICATIONS:

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS

1.01 SCOPE

- A. PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
- B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
- C. OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
- D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
- E. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK.BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.
- F. IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.
- G. ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.
- H. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
- I. MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.
- J. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.
- K. THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.
- L. NOT ALL FLOOR DRAIN PIPING SHOW. WHERE FLOOR DRAINS ARE INDICATED ON PLANS, PIPE TO NEAREST BRANCH PER CODE REQUIREMENTS.

PLUMBING DRAWING LIST

- PO.1 PLUMBING SYMBOLS, ABBREVIATIONS, NOTES, DRAWING LIST AND SPECIFICATIONS (1 OF 2)
- PO.2 PLUMBING SPECIFICATIONS (2 OF 2)
- P1.0 PLUMBING SANITARY PLAN
- P1.1 PLUMBING WATER PLAN
- P1.2 PLUMBING ROOF PLAN
- P2.0 PLUMBING DETAILS
- P3.0 PLUMBING SCHEDULES
 P3.1 PLUMBING RISER DIAGRAMS

1.02 SUBMITTALS

- A. SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.
- 1. PIPE AND FITTINGS
- VALVES
 HANGERS AND SUPPORTS
 PLUMBING PIPING LAYOUT
- 5. TESTS
- 6. PLUMBING FIXTURES
 7. WATER HEATERS & ACCESSORIES
- 8. FLOOR DRAINS9. MIXING VALVES
- 10. BACKFLOW PREVENTER11. ALL SCHEDULED PLUMBING EQUIPMENT
- B. SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.
- C. THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
- D. REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA. IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.
- E. SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.
- F. SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND
- G. FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS—BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.

CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.

H. RECORD AS—BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.

1.03 SUBSTITUTIONS

- A. ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
- B. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.
- 1.04 DEFINITIONS
- A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.
- B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
- C. PROVIDE: TO FURNISH AND INSTALL.
- D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.
- E. REFER TO THE NATIONAL STANDARD PLUMBING CODE FOR ADDITIONAL DEFINITIONS.

1.05 DRAWINGS

- A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.
- B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.
- C. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
- D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.
- E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.
- F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

1.06 PRODUCTS

- A. SANITARY, VENT & STORM PIPING:
- 1. ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM 4 BANDS PER COUPLING.
- 2. BELOW GRADE PIPING SHALL BE CAST-IRON PIPE WHICH COMPLIES WITHASTM A 74; ASTM A 888; CISPI 301
- 3. SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). FOR PIPE SIZE GREATER THAN 8" (I.D.), SLOPE SHOULD BE 1/16". REFER TO FLOOR PLANS FOR SLOPE CHANGES, IF REQUIRED. VENT PIPING SHALL BE PITCHED TO DRAIN.

- 4. PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE USED.
- 5. ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL

B. DOMESTIC WATER PIPING:

- 1. ABOVE GRADE WATER PIPING SHALL BE TYPE "L" HARD-DRAWN AND COMPLY WITH ASTM F2855
- 2. ALL PIPE FITTINGS AND JOINTS SHOULD BE PROVIDED AS COMPATIBLE FOR PIPE MATERIALS AND SHOULD FULFILL REQUIREMENTS OF NYS PLUMBING CODE 2020.
- 4. PER IPC 2018 SECTION 605.4, HOT WATER DISTRIBUTION PIPE & TUBING SHALL HAVE PRESSURE RATING NOT LESS THAN 100PSI AT 180°F
- 3. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES. FITTINGS. ETC.
- 4. COMPLY WITH NSF 61 FOR MATERIALS FOR WATER—SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
- 5. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE—RETARDANT, FACTORY—APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY—APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH NYS ENERGY CONSERVATION CODE 2020 (NYS ECC 2020)AS ADOPTED WITH AMENDMENTS IN INTERNATIONAL ENERGY CONSERVATION CODE 2018 SECTION C403.11.3 REFER BELOW TABLE.

	MINIMUM PIPE INSULATION THICKNESS										
FLUID OPERATING		CONDUCTIVITY	I		AL PIPE ZE (IN)				
FEMPERATURE RANGE AND USAGE (*F)	CONDUCTIVITY BTU· IN./ (H· FT ² · *F)	MEAN RATING TEMPERATURE, *F	<1	1 to < 1½	1½ to < 4	4 to < 8	<8				
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5				
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0				

- 6. WATER DISTRIBUTION SYSTEM AS PER NYS ENERGY CONSERVATION CODE 2020 C404.7, A WATER DISTRIBUTION SYSTEM HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED—WATER SUPPLY PIPE BACK TO THE HEATED—WATER SOURCE THROUGH A COLD—WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
 - a. THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE.
 - b. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD—WATER PIPING TO 104°F (40°C).
- 9. AS PER NYS ENERGY CONSERVATION CODE 2020 C404.6.1
 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A
 CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED
 RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING
 HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE
 IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE
 CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN
 THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE
 IS NO DEMAND FOR HOT WATER.
- 10. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE—RETARDANT, FACTORY—APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY—APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH ASHRAE 90.1 2016 TABLE 6.8.3—1 & TABLE 6.8.3—2.REFER BELOW TABLE.

NOMINAL PIPE SIZE	MAXIMUM PIPING LENGTH (FEET)					
(INCHES)	PUBLIC LAV	OTHER FIXTURES				
½"	2'	43'				
3/4"	0.5'	21'				
1"	0.5'	13'				
11/4"	0.5'	8'				
1½"	0.5'	6'				
2" OR LARGER	0.5'	4'				

- 11. AS PER ASHRAE 90.1 2016 SECTION 7.4.4.1. TEMPERATURE CONTROLS SHALL BE PROVIDED THAT ALLOW FOR STORAGE TEMPERATURE ADJUSTMENT FROM 120°F OR LOWER TO A MAXIMUM TEMPERATURE COMPATIBLE WITH THE INTENDED USE.
- 12. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.
- 13. AS PER NYSECC 2020 C404.3 STORAGE TANK TYPE WATER HEATERS AND HOT WATER STORAGE TANKS THAT HAVE VERTICAL WATER PIPES CONNECTING TO THE INLET AND OUTLET OF THE TANK SHALL BE PROVIDED WITH INTEGRAL HEAT TRAPS AT THOSE INLETS AND OUTLETS OR SHALL HAVE PIPE CONFIGURED HEAT TRAPS IN THE PIPING CONNECTED TO THOSE INLETS AND OUTLETS.
- 14. AS PER ASHRAE 90.1 2016 SECTION 7.4.4.4. WHEN USED TO MAINTAIN STORAGE TANK WATER TEMPERATURE, RECIRCULATING PUMPS SHALL BE EQUIPPED WITH CONTROLS LIMITING OPERATION TO A PERIOD FROM THE START OF THE HEATING CYCLE TO A MAXIMUM OF FIVE MINUTES AFTER THE END OF THE HEATING CYCLE.
- 15. AS PER ASHRAE 90.1 2016 SECTION 7.4.4.2. SYSTEMS DESIGNED TO MAINTAIN USAGE TEMPERATURES IN HOT-WATER PIPES, SUCH AS RECIRCULATING HOT-WATER SYSTEMS OR HEAT TRACE, SHALL BE EQUIPPED WITH AUTOMATIC TIME SWITCHES OR OTHER CONTROLS THAT CAN BE SET TO SWITCH OFF THE USAGE TEMPERATURE MAINTENANCE SYSTEM DURING EXTENDED PERIODS WHEN HOT WATER IS NOT REQUIRED.
- 16. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.
- 17. AS PER ASHRAE 90.1 2016 SECTION 7.4.4.3 OUTLET TEMPERATURE CONTROLLING MEANS SHALL BE PROVIDED TO LIMIT THE MAXIMUM TEMP. OF WATER DELIVERED FROM LAVATORY FAUCETS IN PUBLIC FACILITY RESTROOMS TO 110° F.

C. MIXING VALVES

- 13. MASTER WATER MIXING VALVES SHALL BE OF THE THERMOSTATIC TYPE WITH LIQUID—FILLED THERMAL MOTOR. THEY SHALL HAVE BRONZE BODY CONSTRUCTION WITH REPLACEABLE CORROSION—RESISTANT COMPONENTS.
- 14. VALVE CONSTRUCTION SHALL EMPLOY A SLIDING PISTON CONTROL MECHANISM. SLIDING PISTON AND LINER SHALL BE OF STAINLESS STEEL MATERIAL. VALVES SHALL COME EQUIPPED WITH UNION END STOP AND CHECK INLETS WITH REMOVABLE STAINLESS STEEL STRAINERS.
- 15. VALVES SHALL PROVIDE PROTECTION AGAINST HOT OR COLD SUPPLY LINE FAILURE AND THERMOSTAT FAILURE.

D. VALVES:

- 1. PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
- 2. ALL FIXTURES WITH THE EXCEPTION O FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
- 3. ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
- 4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
- 5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- 6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

E. SLEEVES AND ESCUTCHEONS:

- 1. SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS ON GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GAGE GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USG THERMAFIBER SAFING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.
- 2. PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GAGE STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.

F. DRAINAGE ACCESSORIES

1. GENERAL:

- a. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
- b. SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.

2. DEVICES:

- a. CLEANOUT & CLEANOUT PLUG
- THREADED PIPE FITTING OR CAST IRON FERRULE WITH GAS TIGHT CLEANOUT PLUG
- PLUG SHOULD BE CAST BRASS OR BRONZE, WITH THREADED END, AND RAISED OR COUNTERSUNK HEAD.
- LUBRICATE THREADS OF CLEANOUT PLUG WITH ANTI-SEIZE LUBRICANT BEFORE FINAL INSTALLATION.
- b. CLEANOUT WALL PLATE
- IT SHOULD BE ROUND, STAINLESS STEEL OR POLISHED CHROME PLATED BRONZE COVER PLATE WITH STAINLESS STEEL VANDAL RESISTANT FASTENER TO SECURE TO CLEANOUT PLUG.
- c. CLEANOUT DECK PLATE
- IT SHOULD BE STANDARD DUTY FLOOR CLEANOUT FITTING WITH COATED CAST IRON BODY; ROUND, POLISHED NICKEL BRONZE SCORIATED TOP SECURED TO CLEANOUT PLUG WITH STAINLESS STEEL VANDAL RESISTANT FASTENER; THREADED HEIGHT ADJUSTMENT, CAST IRON HEAD, GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.

3. INDIRECT WASTE FUNNEL

- a. IT SHOULD BE COMBINATION OF FUNNEL DRAIN AND P TRAP WITH POLISHED CHROME PLATED CAST BRASS CONSTRUCTION WITH 4" TOP DIA., 4" DEEP WITH THREADED OUTLET.
- G. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.
- H. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.
- I. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- J. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL. REMOVE PROTECTIVE COATINGS PRIOR TO INSTALLATION.
- K. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE—PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- L. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.
- M. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
- N. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

- O. PROVIDE ACCESS PANELS AT TOP AND LOWER FLOORS FOR SNAKING SANITARY RISERS.
- P. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE OR AS PER LOCAL LAWS.
- Q. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.
- R. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.
- S. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.
- T. WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.
- U. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- V. INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.
- W. PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK-CLOSING VALVES.
- X. UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR DRAINS SHALL BE MAINTAINED BY AN APPROVED TRAP PRIMING DEVICE.
- Y. MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.
- Z. MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN ALL PLUMBING V.T.R.S AND ALL OUTDOOR AIR INTAKES. OFFSET VENT STACKS AND STACK VENTS IF AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFSET IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.

2. INSTALLATION

2.01 GENERAL

- A. ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
- B. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- C. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- D. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- E. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- F. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- G. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.
- H. COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
- I. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED
- J. PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.
- K. THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.
- L. WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.
- M. ALL PENETRATION FOR FIRE RATED PARTITIONS/ASSEMBLIES (FLOOR/CEILING)TO BE PROVIDED WITH UL LISTED/APPROVED FIRE STOPPING MATERIAL.

2.02 INSULATION:

COVER ALL COLD WATER, HOT WATER AND HOT WATER RECIRCULATION PIPE WITH MANVILLE MICRO-LOK AP-T PLUS FIBERGLASS INSULATION. FITTINGS AND VALVES SHALL BE INSULATED WITH MANVILLE ZESTON 2000 PVC INSULAT-ED FITTING COVERS. INSTALL ALL INSULATION AS PER MANUFACTURERS RECOMMENDATIONS. ALL PIPE INSULATION SHALL COMPLY WITH 2020 NYS ENERGY CONSERVATION CODE.

2.03 ABOVE GRADE

A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.

B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT—OFF VALVES AND ALL LOW POINTS IN PIPING.

C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

3. TESTING

- A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.
- B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
- C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM
- D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
- E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.
- F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.
- G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.
- H. ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.
- J. ALL EQUIPMENT WILL BE FACTORY TESTED.
- I. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
- K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.

L. TESTING REQUIREMENTS

- a. TEST ALL DOMESTIC WATER PIPING HYDROSTATICALLY TO
- b. HYDROSTATIC TEST PRESSURES SHALL REMAIN CONSTANT WITH NO VARIATION FOR 120 MINUTES.
- c. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.

 d. THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND ADJACENT TENANT OR SPACES.
- M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION AS STIPULATED.
- N. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.

4. WARRANTY

A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROMPTLY CORRECT AND REPAIR ANY AND ALL BREAKS, FAILURES OR WEAR DUE TO FAULTY MATERIALS, WORKMANSHIP OR EQUIPMENT. ALL SETTLEMENTS OF SURFACES THAT MAY OCCUR WITHIN THAT PERIOD SHALL ALSO BE PROMPTLY REPAIRED.

GAS FIRED HOT WATER HEATER HWHT-1 SEQUENCE OF OPERATION

THE FOLLOWING IS A BRIEF EXPLANATION OF THE SEQUENCE FOR THIS MODE OF OPERATION. FOR A DETAILED EXPLANATION OF CONTROLLER SET—UP PLEASE REFER TO THE OPERATION MANUAL PROVIDED WITH EACH HEATER.

INSTALLED AND CONFIGURED FOR A MULTIPLE WATER HEATER APPLICATION PER THE INSTALLATION AND OPERATION INSTRUCTIONS.

2. DOMESTIC HOT WATER, (DHW) DEMAND IS DETECTED BY THE MASTER CONTROLLER (FIELD SELECTABLE BUT ONLY ONE HEATER IN THE SERIES CAN BE SET AS MASTER) VIA A STORAGE TANK MOUNTED

1. POWER AT EACH WATER HEATER IS ON AND THEY HAVE BEEN

TEMPERATURE INSTRUMENT.

3. THE MASTER CONTROLLER SELECTS THE HEATER TO RUN BASED ON PRE-PROGRAMED AND FIELD SELECTABLE PARAMETERS SUCH AS RUN TIME, LAST RUN ETC. WHEN DHW DEMAND IS DETECTED THE HOT

a. START THE CIRCULATOR PUMP FOR THE SELECTED HEATER.
FLOW THROUGH THE WATER HEATER SHALL BE CONFIRMED VIA

WATER HEATER CONTROL SYSTEM SHALL:

- FLOW SWITCH.

 b. A WATER HEATER SYSTEM SAFE START CHECK SHALL BE
- PERFORMED AND THE BLOWER FAN STARTED.

 c. THE WATER HEATER SHALL PERFORM A PRE—PURGE SEQUENCE.
- d. THE IGNITION AND GAS VALVE ARE COMMANDED ON AND A SEQUENCED COMBUSTION SHALL BEGIN.
- e. CONTROLLERS SHALL PROVIDE VERIFICATION OF FLAME. (THE CONTROL SYSTEM HAS A BUILT IN IGNITION RETRY, ALLOWING THE SYSTEM TO TRY THREE TIMES BEFORE LOCKING OUT.)
- f. ONCE SYSTEM IS IN RUN (A SLOW START CAN BE PRESENT PRIOR TO RUN DEPENDING ON THE SETTING FOR THE DHW LOW START ENABLE PARAMETER.) THE FIRING RATE WILL MODULATE BASED ON HEAT LOAD REQUIREMENT.

4. THE CONTROL SYSTEM SHALL MONITOR FOR CONTINUED DHW REQUEST, AND IF ADDITIONAL HEATERS ARE REQUIRED ON LINE. IF THE NEED EXISTS, AN ADDITIONAL WATER HEATER IS BROUGHT ON PER STEP 3 ABOVE, REPEATING THE PROCESS UNTIL THE CURRENT HEAT LOAD REQUIREMENTS ARE MET. (CONTROLLERS CAN BE CONFIGURED SUCH THAT AN INTER—STAGE DELAY OF CASCADING WATER HEATERS CAN BE SET TO A MINIMUM OF 5 SECONDS.)

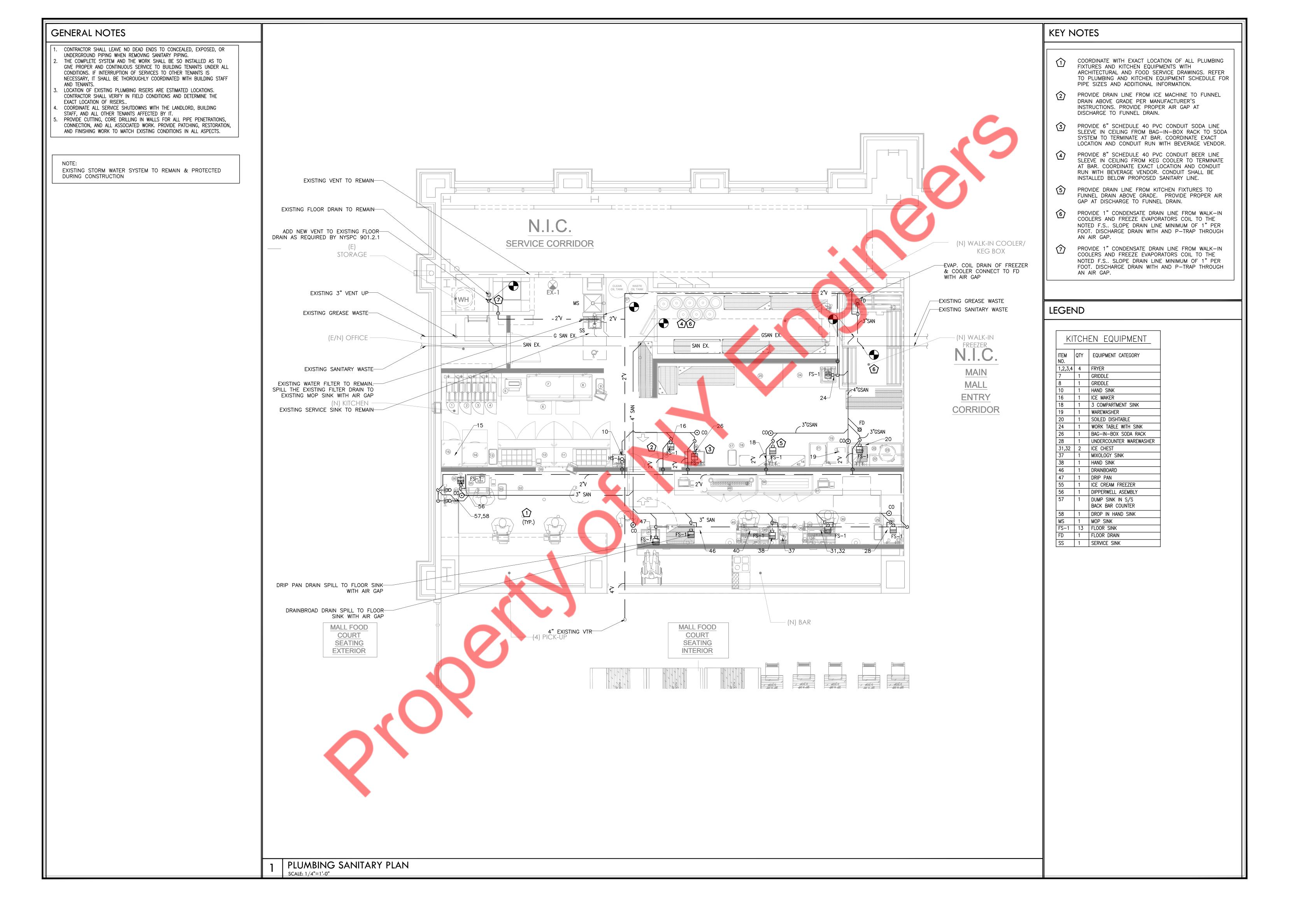
5. IF THE DWH LOAD CAN BE SATISFIED WITH FEWER THAN THE NUMBER OF HEATERS ONLINE THEN ONE HEATER WILL BE CYCLED OFF PER STEP 7 BELOW, UNTIL REQUIRED DHW DEMAND

REQUIREMENTS ARE SATISFIED.

6. IF THE DWH DEMAND FROM THE STORAGE TANK TEMPERATURE IS SATISFIED, THEN ALL WATER HEATERS SHALL CYCLE OFF PER STEP 7.

7. UPON THE COMPLETION OF AN INDIVIDUAL WATER HEATERS

- REQUEST FOR HEAT;
 a. THE BURNER IS SWITCHED OFF.
- b. THE BLOWER REMAINS ON UNTIL COMPLETING A POST PURGE
- ANY NEW HEAT REQUEST FOR THE INDIVIDUAL WATER HEATER IS BLOCKED FOR THE TIME SET BY THE ANTI—SHORT CYCLE
- d. THE CIRCULATOR REMAINS ON DURING THE PUMP OVERRUN TIME.
- e. AT THE END OF THE PUMP OVERRUN TIME THE PUMP IS SWITCHED OFF.



GENERAL NOTES

- I. CONTRACTOR SHALL LEAVE NO DEAD ENDS TO CONCEALED, EXPOSED, OR UNDERGROUND PIPING WHEN REMOVING SANITARY PIPING.
- 2. THE COMPLETE SYSTEM AND THE WORK SHALL BE SO INSTALLED AS TO GIVE PROPER AND CONTINUOUS SERVICE TO BUILDING TENANTS UNDER ALL CONDITIONS. IF INTERRUPTION OF SERVICES TO OTHER TENANTS IS NECESSARY, IT SHALL BE THOROUGHLY COORDINATED WITH BUILDING STAFF AND TENANTS.
- 3. LOCATION OF EXISTING PLUMBING RISERS ARE ESTIMATED LOCATIONS. CONTRACTOR SHALL VERIFY IN FIELD CONDITIONS AND DETERMINE THE
- EXACT LOCATION OF RISERS..

 4. COORDINATE ALL SERVICE SHUTDOWNS WITH THE LANDLORD, BUILDING STAFF, AND ALL OTHER TENANTS AFFECTED BY IT.
- PROVIDE CUTTING, CORE DRILLING IN WALLS FOR ALL PIPE PENETRATIONS, CONNECTION, AND ALL ASSOCIATED WORK. PROVIDE PATCHING, RESTORATION, AND FINISHING WORK TO MATCH EXISTING CONDITIONS IN ALL ASPECTS.



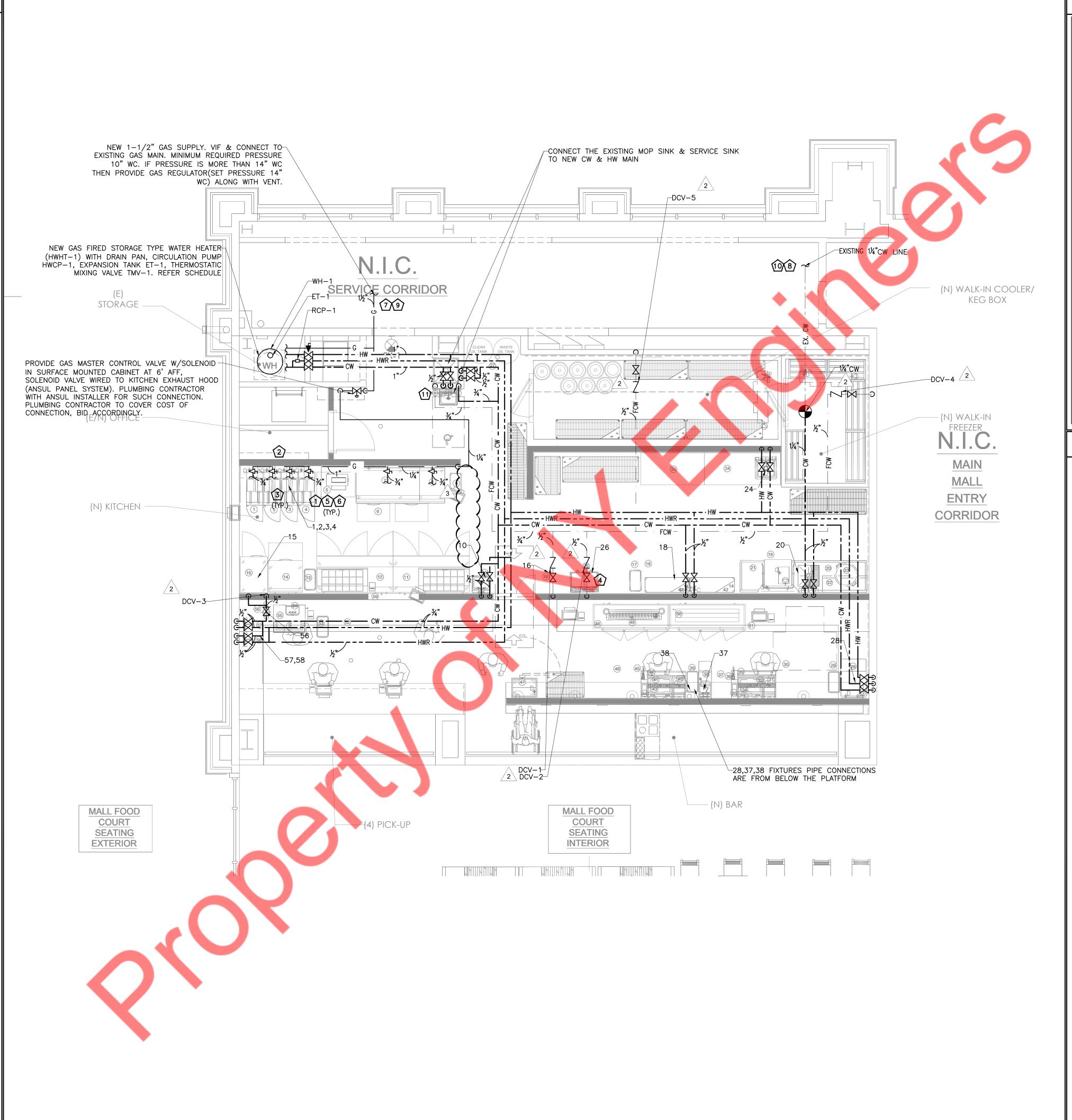
BACKFLOW	PREVENTOR	SCHEDULE

	LOCATION	TAG	MODEL	ASSE
ICE MAKER		DCV-1	WATTS SERIES 7	1024
	BAG-IN-BOX SODA RACK	DCV-2	WATTS SD - 3	1022
	DIPPERWELL ASEMBLY	DCV-3	WATTS SERIES 7	1024
WALK IN FREEZER		DCV-4	WATTS LF288A	1001
	WALK IN COOLER	DCV-5	WATTS LF288A	1001

NOTE :

VERIFY BACKFLOW VALVE REQUIREMENTS AND APPROVAL FOR ALL EQUIPMENT WITH AUTHORITIES HAVING JURISDICTION PRIOR TO INSTALLATION

PLUMBING WATER PLAN



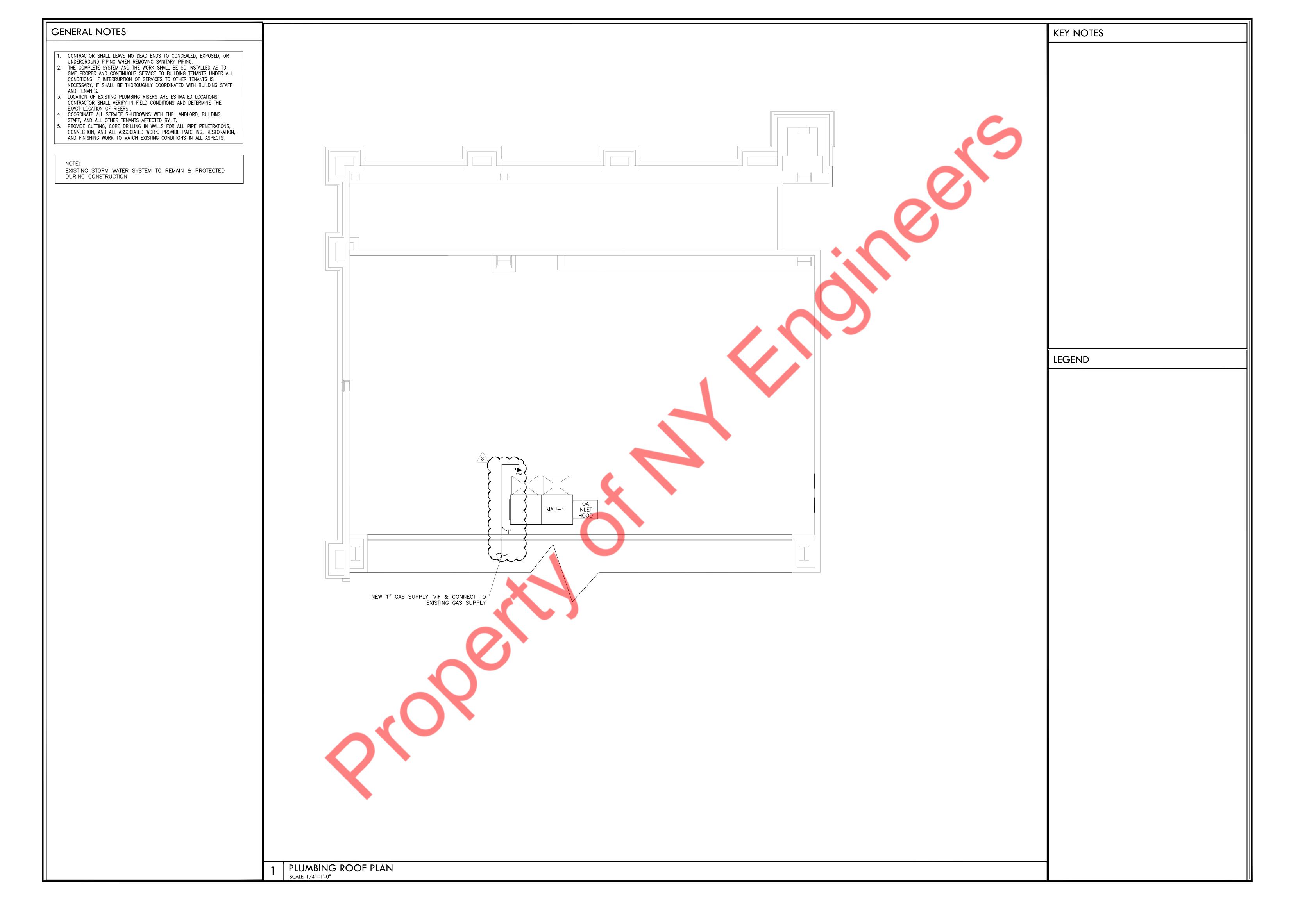
KEY NOTES

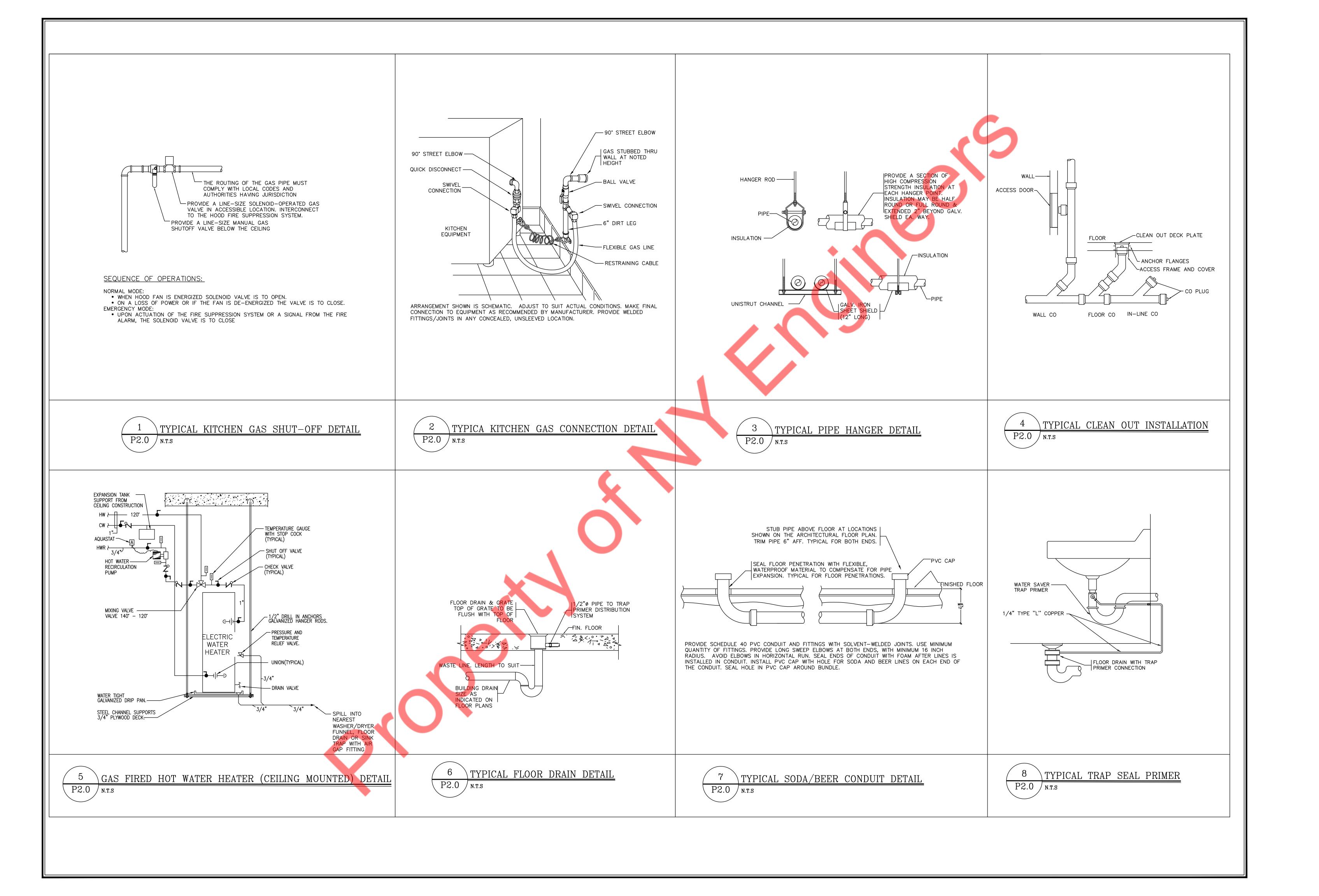
KEY NOTES:

- COORDINATE WITH EXACT LOCATION OF ALL PLUMBING FIXTURES AND KITCHEN EQUIPMENTS WITH ARCHITECTURAL AND FOOD SERVICE DRAWINGS. REFER TO PLUMBING AND KITCHEN EQUIPMENT SCHEDULE FOR PIPE SIZES AND ADDITIONAL INFORMATION.
- PROVIDE SOLENOID GAS SHUT OFF VALVE WITH MANUAL RESET 6" BELOW THE CEILING AS PER DETAIL ON DRAWING P-1 FOR KITCHEN EQUIPMENTS EMERGENCY GAS SHUT-OFF. GAS SAFETY SHUT-OFF VALVE SHALL BE INTERLOCKED WITH HOOD FIRE SUPPRESSION SYSTEM.
- PROVIDE GAS CONNECTION TO KITCHEN EQUIPMENTS AT NOTED HEIGHT AND SIZE AS PER FOOD SERVICE EQUIPMENT SCHEDULE. REFER TO DETAIL ON P-1 FOR GAS PIPE CONNECTION.
- PROVIDE WATTS 9BD DUAL CHECK VALVE ON FILTER LINE TO ICE MACHINE AND CARBONATOR.
- PROVIDE TRAP SEAL AS PER DETAIL ON DRAWING P-1. PROVIDE 1/2" PIPE TO FOR EACH FLOOR DRAIN, FUNNEL FLOOR DRAIN AND FLOOR SINK.
- PROVIDE SHUT OFF VALVE AT ALL PLUMBING AND KITCHEN EQUIPMENTS ON CW, HW AND GAS LINE.
- CONNECT NEW 1-1/2" GAS LINE TO EXISTING GAS METER. CONTRACTOR TO FIELD VERIFY SIZE AND LOCATION.
- CONNECT NEW 1-1/2" COLD WATER LINE TO EXISTING 1-1/2" DOMESTIC SERVICE LINE. CONTRACTOR TO FIELD VERIFY SIZE AND LOCATION. CONTRACTOR TO VERIFY EXISTING WATER METER & BACKFLOW PREVENTER IN FIELD.
- CONTRACTOR TO FIELD VERIFY EXISTING AVAILABLE GAS PRESSURE AND MAKE SURE TO PROVIDE ADEQUATE INLET PRESSURE REQUIRED FOR GAS FIRED WATER HEATER, KITCHEN EQUIPMENTS AND MAU-1.
- CONTRACTOR TO TAP EXISTING WATER CONNECTION STUBS PROVIDED FOR TENANT BY THE BASE BUILDING.
- CONTRACTOR TO FIELD VERIFY EXISTING SECONDARY RPZ FOR FILTER. IF RPZ NOT PROVIDED, THEN PROVIDE NEW SECONDARY RPZ TO WATER FILTER.

LEGEND

ITEM NO.	QTY	EQUIPMENT CATEGORY
1,2,3,4	4	FRYER
7	1	GRIDDLE
8	1	GRIDDLE
10	1	HAND SINK
16	1	ICE MAKER
18	1	3 COMPARTMENT SINK
19	1	WAREWASHER
20	1	SOILED DISHTABLE
24	1	WORK TABLE WITH SINK
26	1	BAG-IN-BOX SODA RACK
28	1	UNDERCOUNTER WAREWAS
31,32	2	ICE CHEST
37	1	MIXOLOGY SINK
38	1	HAND SINK
46	1	DRAINBOARD
47	1	DRIP PAN
55	1	ICE CREAM FREEZER
56	1	DIPPERWELL ASEMBLY
57	1	DUMP SINK IN S/S BACK BAR COUNTER
58	1	DROP IN HAND SINK
MS	1	MOP SINK
FS-1	13	FLOOR SINK
FD	1	FLOOR DRAIN
SS	1	SERVICE SINK





	KITCHEN EQUIPMENT SCHEDULE												
ITEM NO.	QTY	EQUIPMENT CATEGORY	COLD WATER SIZE (IN)	COLD WATER AFF (IN)	HOT WATER SIZE (IN)	HOT WATER GPH (IN)	HOT WATER AFF (IN)	DIRECT DRAIN (IN)	INDIRECT DRAIN SIZE (IN)	GAS SIZE (IN)	МВТUН	GAS AFF (IN)	PLUMBING REMARKS
1,2,3,4	4	FRYER	_	-	_	-	_	-	-	0.75	100	32	6" W.C. NG; FLEXIBLE QUICK-DISCONNECT GAS CONNECTORS
7	1	GRIDDLE	_	_	_	_	_	_	_	0.75	150	32	10" W.C. NG; FLEXIBLE QUICK-DISCONNECT GAS CONNECTORS
8	1	GRIDDLE	_	_	_	_	_	_	_	0.75	60	32	4" W.C. NG; FLEXIBLE QUICK-DISCONNECT GAS CONNECTORS
10	1	HAND SINK	0.5	18	0.5	_	18	1.5	_	_	_	_	_
16	1	ICE MAKER	0.375		_	_	_	_	-	-	6	-	INTERCONNECT CW W/ WATER FILTER, IW TO FS
18	1	3 COMPARTMENT SINK	0.5	18	0.5	_	18	_	1.5	_	_	_	IW TO FS 2
19	1	WAREWASHER	0.5	6		_		_	1	_	_		IW TO FS
20	1	SOILED DISHTABLE	0.5	18	0.5	_	18	<u> </u>	1.5	-	-		T&S B-0133-ADF08-B PRE RINSE FAUCET, IW TO FS
24	1	WORK TABLE WITH SINK	0.5	18	0.5	_	18		T 1.5	_	1	-	IW TO FS
26	1	BAG-IN-BOX SODA RACK	0.5	72	_	_	_	-	_	-	1	_	IW TO FS
28	1	UNDERCOUNTER WAREWASHER	_	-	0.5	-	_	1	1.5	1	ı	_	IW TO FS
31,32	2	ICE CHEST	_	-	-	-	-	1	0.5	-	1	-	IW TO FS
37	1	MIXOLOGY SINK	0.5	8	0.5	-	8	-	1.5	1	1	-	IW TO FS
38	1	HAND SINK	0.5	18	0.5	1	18	-	1.5	1	1	-	_
46	1	DRAINBOARD	_	-	-	-	_	-	1	-	1	-	IW TO FS
47	1	DRIP PAN	_	-	-	1	-	1	0.5	-	ı	-	IW TO FS
55	1	ICE CREAM FREEZER	_	-	-	1	_	-	0.5	-	1	-	IW TO FS
56	1	DIPPERWELL ASEMBLY	_	_	0.375	_	24	_	0.75	-	_	_	IW TO FS
57	1	DUMP SINK IN S/S BACK BAR COUNTER	0.5	18	0.5	_	18	1.5	_	_	-	_	-
58	1	DROP IN HAND SINK	0.5	18	0.5	_	18	1.5	_	_	-	_	-
MS	1	MOP SINK	0.5	8	0.5	_	8	1.5	_	_	_	_	-
FS-1	13	FLOOR SINK	_	-	-	_	-	3	-	-	-	-	-
FD	1	FLOOR DRAIN	_	-	-	_	_	2	_	-	1	-	-
SS	1	SERVICE SINK	0.5	18	0.5	_	18	1.5	_	-	-	_	-

	HOT WATER HEATER WITH STORAGE									
	TAG No.	QUANTITY	LOCATION	GAS. INPUT (BTU/Hr INPUT)	EFFICIENCY	STOR. CAP	RECOVERY CAP. (GPH) @100° RISE	TYPE	MANUFACTURER & MODEL NO.	REMARKS
HV	WHT-1	1	BASEMENT	45,000	96%	50	45	DIRECT VENT GAS WATER HEATER	AO SMITH GPDT 50	-DIMENSIONS 29 7/8"D X 67 1/2"H -PROVIDE EXPANSION TANK (ET-1) AS PER SCHEDULE -CEILING MOUNTED HEATER

	MASTER THERMOSTATIC MIXING VALVE										
ITEM	QUANTITY	LOCATION	SERVICE	CAPACITY (GPM)	PRESSURE DROP (PSI)	MINIMUM FLOW (GPM)	MAKE	CW INLET	HIGH TEMP. INLET	LOW TEMP. OUTLET	REMARKS
TMV-1	1	REFER PLANS	HOT WATER	30	5	0.5	ACORN MV17-3	1"	1"(140°F)	1-1/4"(110°F)	-BRONZE BODY CONSTRUCTION AND LEAD FREE CONSTRUCTION -ASSE CERTIFIED

		EXPAN	NSION TAI	VK SCHI	EDULE_		
ITEM	QUANTITY	LOCATION	SERVICE	GALLONS	MANUFACTURER & MODEL NO.	WEIGHT(LBS)	DIMENSION
EXPANSION TANK (ET-1)	1	REFER PLANS	HOT WATER	2	AMTROL ST-5	5	DIMENSIONS- 13"(H)x8"(DIA.)

	RECIRCULATING PUMP SCHEDULE								
ITEM	QUANTITY	GPM	TOTAL HEAD (FT)	MOTOR HP	MANUFACTURER & MODEL NO.				
RCP-1	1	2	7	0.025	B & G NBF 8S/LW				

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BACKFLOW PREVENTOR SCHEDULE								
LOCATION	TAG	MODEL	ASSE					
ICE MAKER	DCV-1	WATTS SERIES 7	1024					
BAG-IN-BOX SODA RACK	DCV-2	WATTS SD - 3	1022					
DIPPERWELL ASEMBLY	DCV-3	WATTS SERIES 7	1024					
WALK IN FREEZER	DCV-4	WATTS LF288A	1001					
WALK IN COOLER	DCV-5	WATTS LF288A	1001					
NOTE: VERIFY BACKFLOW VALVE REQUIREMENTS AND APPROVAL FOR ALL EQUIPMENT WITH AUTHORITIES HAVING JURISDICTION PRIOR TO INSTALLATION								

