

Order Plans @

MECHANICAL LEGEND

SYMBOL	DESCRIPTION	ABBR.
G	NATURAL GAS PIPING	G
D	CONDENSATE DRAIN	D
PD	PUMPED CONDENSATE DRAIN	PD
RV	PRESSURE REDUCING/REGULATING VALVE	
GC	GAS COCK	
TS	THERMOSTAT / TEMP SENSOR (4'-0" AFF)	
TS	TEMP SENSOR INTERFACE W/BAS (4'-0" AFF)	
SA	SUPPLY AIR DIFFUSER (4-WAY)	
SLD	SUPPLY AIR LINEAR DIFFUSER	
RA	RETURN AIR GRILLE	
EA	EXHAUST AIR GRILLE	
DL	DOUBLE LINE DUCTWORK	
SL	SINGLE LINE DUCTWORK	
20/14	20"x14" FLAT OVAL DUCT	
20x14	20"x14" RECTANGULAR DUCT	
8"	8" DIAMETER ROUND DUCT	
DS	DUCT MOUNTED SMOKE DETECTOR W/ ACCESS DOOR	
+	POINT OF EXISTING TO NEW CONNECTION	
M.C.	MECHANICAL CONTRACTOR	
E.C.	ELECTRICAL CONTRACTOR	
P.C.	PLUMBING CONTRACTOR	
N.I.C.	NOT IN CONTRACT	
EX	EXISTING	
AFF	ABOVE FINISHED FLOOR	
DN	DOWN	
UP	UP	
UD	UNDERCUT DOOR (BY G.C.)	
MVD	MANUAL VOLUME DAMPER	

EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 7 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS. PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED.

(ALPHABETICAL ORDER)

PACKAGED ROOFTOP UNITS (UNDER 25 TONS): CARRIER, TRANE, YORK/JOHNSON, DIKIN, AARON

FANS: COOK, GREENHECK, PENN, TWIN CITY, CAPTIVE-AIRE

AIR DISTRIBUTION: CARNES, METAL-AIRE, NAILOR, PRICE, TITUS, KELLER

SPIRAL DUCTWORK: EASTERN SHEET METAL, LINDAB, UNITED MCGILL, BURNHAM

DDC CONTROLS: ALERTON (EXISTING BUILDING)

KITCHEN HOODS: CAPTIVE-AIRE, GREENHECK, SELECT AIR SYSTEMS

NOTE:
ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE SUBSTITUTED EQUIPMENT. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

VENTILATION CALCULATIONS (NCMC 2018, SECT 403):

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
DINING ROOMS	7.500000	0.180000	70	0.000000	1,700	119	893	306	0
KITCHENS (COOKING)	0	0.000000	0	0.700000	1,000	0	0	0	700
OFFICE SPACES	5	0.060000	5	0.000000	75	0	2	5	0
MAIN ENTRY LOBBIES	5	0.060000	10	0.000000	915	9	46	55	0
TOILET ROOMS - PUBLIC	0	0.000000	0	70.000000	4	(FIXTURES)	0	0	280
STORAGE ROOMS	0	0.120000	0	0.000000	170	0	0	20	0
BLDG TOTAL OUTSIDE AIR REQ'D (E _z =0.8, CFM)								1,657	
BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)								1,900	
BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)								980	
BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)								5,900	

2018 NORTH CAROLINA ENERGY CONSERVATION CODE
COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

C401 METHOD OF COMPLIANCE

2018 NCECC CHAPTER 4 COMCHECK PROVIDED (2018 NCECC)

ASHRAE 90.1-2013 PRESCRIPTIVE COMCHECK PROVIDED (90.1-2013)

ASHRAE 90.1-2013 PERFORMANCE ENERGY MODELING DATA PROVIDED

N/A (EXISTING LIGHTING, HVAC, AND DOM. WATER HEATING SYSTEMS TO REMAIN)

C408 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

C408.2 EFFICIENT MECH EQUIPMENT C408.5 ON-SITE RENEWABLE ENERGY

C408.3 REDUCED LTG DENSITY C408.6 DEDICATED OAS SYSTEM

C408.4 ENHANCED LTG CONTROLS C408.7 SERVICE WATER HEATING

C301 CLIMATE ZONE

3A - RICHMOND COUNTY, NORTH CAROLINA

DESIGN CONDITIONS

EXTERIOR (ASHRAE 90.1-2013 TABLE D-1)

winter dry bulb 18° F

summer dry bulb 91° F

summer wet bulb 74° F

INTERIOR (2018 NCECC SECTION C302.1)

winter dry bulb 72° F

summer dry bulb 75° F

C403.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING

BUILDING HEATING LOAD 135,600 BTUH (peak)

BUILDING COOLING LOAD 216,500 BTUH (peak)

INSTALLED HEATING CAPACITY 267,400 BTUH

INSTALLED COOLING CAPACITY 255,830 BTUH

C403.2.3 & C408.2 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

SYSTEM DESCRIPTION - SINGLE ZONE DX ROOFTOP UNITS

MINIMUM HVAC EQUIP EFFICIENCY COMPLIANCE - TABLE C403.2.3

INCREASED HVAC EQUIP EFFICIENCY COMPLIANCE - TABLE C403.2.3

EQUIP. TYPE

SIZE CATEGORY (BTUH)	C403.2 MINIMUM EFFICIENCY (EER, CoP)	10% INCREASED EFFICIENCY (EER, CoP)	DESIGN
AIR COND. < 65,000	13.0 EER	14.0 EER	SEE SCHEDULE
AIR COOLED (<= 5 TONS) SPLIT SYSTEM & SINGLE PACKAGE	13.0 EER	14.1 EER	SEE SCHEDULE
AIR COND. 65,000 & 135,000	11.0 EER	12.3 EER	SEE SCHEDULE
AIR COOLED 135,000	12.0 EER	14.1 EER	SEE SCHEDULE

a. DUCTWORK SHALL BE THE REQUIRED SECTIONS FOR UNITS WITH A HEATING SECTION OTHER THAN ELECTRIC RESISTIVE HEAT OR NO HEAT.

C403.2.4 THRU C403.2.5

HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.

C403.2.12 - AIR SYSTEM DESIGN AND CONTROL

ALL FANS INSTALLED ON THE PROJECT ARE 5 HP OR LESS AND ARE EXEMPT FROM THESE REQUIREMENTS.

C403.3 - ECONOMIZERS (PRESCRIPTIVE)

PROJECT INCLUDES AN AIR OR WATER ECONOMIZER COMPLIANT WITH C403.3

PROJECT MEETS AN ECONOMIZER EXCEPTION LISTED IN C403.3

C403.4 - HYDRONIC AND MULTIPLE-ZONE HVAC SYSTEMS CONTROL AND EQUIPMENT (PRESCRIPTIVE)

PROJECT CONSISTS OF ONLY SINGLE ZONE DX SYSTEMS, EXEMPT FROM THE PRESCRIPTIVE REQUIREMENTS OF C403.4.

PROJECT CONSISTS OF HVAC SYSTEMS FULLY COMPLIANT WITH THE PRESCRIPTIVE REQUIREMENTS OF C403.4.

C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS)

ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.8, EXCEPT WHERE EXEMPT.

NOT APPLICABLE.

C408 - SYSTEM COMMISSIONING

BUILDING IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.

BUILDING IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.

- MECHANICAL GENERAL NOTES**
- SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO SUPPLEMENT THE SPECIFICATIONS. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.
- DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.
 - ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 - ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTION IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK SHALL BE INSULATED AS PER SPECIFICATION. DUCT DIMENSIONS ON PLANS ARE FREE AREA SIZE.
 - ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE NORTH CAROLINA INTERNATIONAL MECHANICAL CODE, REFER TO SPECIFICATION.
 - ALL PIPING, DUCTS, VENTS, ETC., EXPOSED THROUGH WALLS AND ROOF SHALL BE FLASHED AND COUNTER FLASHED IN A PROPER MANNER.
 - ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS OF SPECIFICATIONS, TO AVOID INTERFERENCE.
 - THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TESTING AND BALANCING CONTRACTOR TO CONFIRM FILTERS ARE CLEAN AND PRIOR TO BEGINNING WORK. THE MECHANICAL CONTRACTOR SHALL REPLACE ANY DIRTY FILTERS, AS NEEDED. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.
 - UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER INSTALLATION INFORMATION INCLUDING RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS ADDRESSED) AND O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND PROGRAMMED SETPOINTS.
 - PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DAY THE SYSTEM IS COMPLETELY OPERATIONAL AND ACCEPTABLE BY THE OWNER.
 - PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND FILTER REMOVAL.
 - CONDENSATE DRAIN PIPING SHALL BE TYPE-L HARD DRAWN COPPER PIPE AND FITTINGS. DRAINS FROM AIR HANDLING UNITS SHALL BE TRAPPED. CONDENSATE DRAINS SHALL BE INSULATED WITH 1/2" THICK ARMAFLEX INSULATION. MINIMUM DRAIN SIZE SHALL BE 3/4". TERMINATE ROOFTOP UNIT DRAINS ON A CONCRETE SPLASHBLOCK.
 - ALL REFRIGERANT PIPE SHALL BE NITROGENIZED ACR COPPER TUBE. SIZE, INSULATE, AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS. REFRIGERANT PIPING INSULATED EXPOSED OUTDOORS SHALL BE COVERED WITH AN OUTER ALUMINUM JACKET. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
 - ANY DEVICE REQUIRING A THERMOSTAT FOR CONTROL SHALL BE FURNISHED WITH A THERMOSTAT WHETHER INDICATED ON THE DRAWINGS OR NOT.
 - INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR. COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION.
 - MECHANICAL CONTRACTOR SHALL VERIFY LOCATION OF ROOF PENETRATIONS FOR DUCTWORK AND PIPING WITH ARCHITECT & OWNER PRIOR TO INSTALLATION.
 - ALL ROOF CURBS SHALL EXTEND A MINIMUM OF 8" ABOVE ROOF INSULATION OR AS INDICATED ON THE DRAWINGS, WHICHEVER IS GREATER. IN ADDITION, ALL ROOF CURBS OR EQUIPMENT SUPPORT RAILS THAT SUPPORT EQUIPMENT, PIPING, CONDUIT, ETC. EXPOSED ON THE ROOF SHALL HAVE SUFFICIENT HEIGHT TO MAINTAIN A MINIMUM OF 18" CLEARANCE BELOW SUPPORTED EQUIPMENT FOR ROOF MAINTENANCE.
 - MECHANICAL CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 15'-0" FROM ANY OUTSIDE AIR INTAKE.
 - KITCHEN HOOD EXHAUST DUCT SHALL BE 16 GAUGE CARBON STEEL. ALL JOINTS AND SEAMS SHALL BE CONSTRUCTED WITH A CONTINUOUS LIQUID-TIGHT EXTERNAL WELD. ALL DUCTWORK SHALL SLOPE A MINIMUM OF 1/4 INCH PER FOOT TOWARD HOOD. PROVIDE CLEANDUTS AT EVERY CHANGE OF DIRECTION IN THE EXHAUST DUCT AND AT 20'-0" (MINIMUM) INTERVALS. THE MECHANICAL CONTRACTOR SHALL PERFORM A LIGHT TEST (AS REQUIRED BY THE MECHANICAL CODE) FOR ALL JOINTS AND SEAMS IN THE PRESENCE OF THE LOCAL AUTHORITY HAVING JURISDICTION PRIOR TO CONCEALING KITCHEN HOOD EXHAUST DUCTWORK.
 - EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK, AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER.
 - THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING RESTRAINTS TO RESIST THE EARTHQUAKE EFFECTS ON THE MECHANICAL SYSTEMS. THE REQUIREMENTS FOR THOSE RESTRAINTS ARE FOUND IN THE LOCAL BUILDING CODE AND ASCE 7. THE ANCHORAGE OF THE MECHANICAL SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE LOCAL BUILDING CODE AND ASCE 7.
 - DUCTWORK AND PIPING PASSING THROUGH/ABOVE ELECTRICAL ROOMS SHALL BE CLOSELY COORDINATED WITH THE ELECTRICAL CONTRACTOR. DUCTWORK OR PIPING SHALL NOT BE LOCATED ABOVE ELECTRICAL PANELS.

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RICHMOND COMMUNITY COLLEGE

SCO #16-15889-02A

LINDSEY-PETRIS CAFETERIA / DINING ADDITION VOL.1

BID DOCUMENTS

MECHANICAL SCHEDULES, NOTES AND LEGEND

DATE 4-5-2019
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NO	DATE	DESCRIPTION:

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NORTH CAROLINA PROFESSIONAL ENGINEERS
17228
RICHMOND Y. ALMOND
04/20/19

SHEET NUMBER 1 OF 9
OPTIMA # 17-0017

M001