**COM*check* Software Version COMcheckWeb**

# Mechanical Compliance Certificate

## Project Information

Energy Code: 2018 IECC
Project Title: CLARKS - DURHAM, NC
Location: Durham, North Carolina
Climate Zone: 4a
Project Type: Alteration

Construction Site: Owner/Agent: Designer/Contractor:

## Mechanical Systems List

**Quantity** **System Type & Description**

1 RTU-1(N)_HEAT PUMP (Single Zone):
Single Package Heat Pump
Heating Mode: Capacity = 44 kBtu/h,
Proposed Efficiency = 8.50 HSPF, Required Efficiency = 8.00 HSPF
Cooling Mode: Capacity = 46 kBtu/h,
Proposed Efficiency = 16.80 SEER, Required Efficiency = 14.00 SEER
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00
Fan System: None

1 RTU-1(N)_6 KW HEATER (Single Zone):
Heating: 1 each - Other, Electric, Capacity = 21 kBtu/h
No minimum efficiency requirement applies
Fan System: None

1 WH:
Electric Instantaneous Water Heater, Capacity: 0 gallons
No minimum efficiency requirement applies

## Mechanical Compliance Statement

*Compliance Statement:* The proposed mechanical alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2018 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title Signature Date



**COM*check* Software Version COMcheckWeb**

# Inspection Checklist

Energy Code: 2018 IECC

Requirements: 100.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

| Section # & Req.ID | Plan Review | Complies? | Comments/Assumptions |
|---|---|---|---|
| C103.2 [PR2][1] | Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C103.2 [PR3][1] | Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Footing / Foundation Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C403.12.2, C403.12.3 [FO9][1] | Snow/ice melting system and freeze protection systems have sensors and controls configured to limit service for pavement temperature and outdoor temperature. future connection to controls. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Plumbing Rough-In Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C404.5, C404.5.1, C404.5.2 [PL6][1] | Heated water supply piping conforms to pipe length and volume requirements. Refer to section details. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C404.6.3 [PL7][1] | Pumps that circulate water between a heater and storage tank have controls that limit operation from startup to <= 5 minutes after end of heating cycle. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C404.7 [PL8][1] | Demand recirculation water systems have controls that start the pump upon receiving a signal from the action of a user of a fixture or appliance and limits the temperature of the water entering the cold-water piping to 104°F. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Mechanical Rough-In Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C402.2.6 [ME41][1] | Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.8.1 [ME65][1] | HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. *See the Mechanical Systems list for values.* |
| C403.8.3 [ME117][2] | Fans have efficiency grade (FEG) >= 67. The total efficiency of the fan at the design point of operation <= 15% of maximum total efficiency of the fan. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.12.1 [ME71][2] | Systems that heat outside the building envelope are radiant heat systems controlled by an occupancy sensing device or timer switch. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.2.2 [ME59][1] | Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.7.1 [ME59][1] | Demand control ventilation provided for spaces >500 ft2 and >25 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.7.2 [ME115][3] | Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.7.6 [ME141][3] | HVAC systems serving guestrooms in Group R-1 buildings with > 50 guestrooms: Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2). | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.7.4 [ME57][1] | Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2). | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.7.5 [ME116][3] | Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.11.1, C403.11.2 [ME60][2] | HVAC ducts and plenums insulated in accordance with C403.11.1 and constructed in accordance with C403.11.2, verification may need to occur during Foundation Inspection. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Mechanical Rough-In Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C403.4.3.3.2 [ME121][3] | Closed-circuit cooling tower within heat pump loop have either automatic bypass valve or lower leakage positive closure dampers. Open-circuit tower within heat pump loop have automatic valve to bypass all heat pump water flow around the tower. Open- or closed-circuit cooling towers used in conjunction with a separate heat exchanger have heat loss by shutting down the circulation pump on the cooling tower loop. Open- or closed circuit cooling towers have a separate heat exchanger to isolate the cooling tower from the heat pump loop, and heat loss is controlled by shutting down the circulation pump on the cooling tower loop. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C403.4.1.4 [ME63][2] | Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C408.2.2.1 [ME53][3] | Air outlets and zone terminal devices have means for air balancing. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.5, C403.5.1, C403.5.2 [ME123][3] | Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.5.1 and refrigeration compressor systems that comply with C403.5.2. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Rough-In Electrical Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C405.6 [EL26][2] | Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C405.7 [EL27][2] | Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist). | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.8.2, C405.8.2.1 [EL28][2] | Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C405.9 [EL29][3] | Total voltage drop across the combination of feeders and branch circuits <= 5%. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Final Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C303.3, C408.2.5.3 [FI8][3] | Furnished O&M manuals for HVAC systems within 90 days of system acceptance. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.2.2 [FI27][3] | HVAC systems and equipment capacity does not exceed calculated loads. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.2.4.1 [FI47][3] | Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.2.4.1.1 [FI42][3] | Heat pump controls prevent supplemental electric resistance heat from coming on when not needed. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.4.1.2 [FI38][3] | Thermostatic controls have a 5 °F deadband. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.2.4.1.3 [FI20][3] | Temperature controls have setpoint overlap restrictions. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.2.4.2 [FI39][3] | Each zone equipped with setback controls using automatic time clock or programmable control system. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C403.2.4.2.1, C403.2.4.2.2 [FI40][3] | Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C404.3 [FI11][3] | Heat traps installed on supply and discharge piping of non-circulating systems. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C404.4 [FI25][2] | All piping insulated in accordance with section details and Table C403.11.3. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C408.1.1 [FI57][1] | Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



Property of KY Engineers

CLOUDSTEPPERS

COMcheck Mechanical Compliance (1 OF 2)

M0.1

| Section # & Req.ID | Final Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C408.2.1 [FI28][1] | Commissioning plan developed by registered design professional or approved agency. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| C408.2.3.1 [FI31][1] | HVAC equipment has been tested to ensure proper operation. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| C408.2.3.2 [FI10][1] | HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| C408.2.4 [FI29][1] | Preliminary commissioning report completed and certified by registered design professional or approved agency. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| C408.2.5.1 [FI7][3] | Furnished HVAC as-built drawings submitted within 90 days of system acceptance. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| C408.2.5.3 [FI43][1] | An air and/or hydronic system balancing report is provided for HVAC systems. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |
| C408.2.5.4 [FI30][1] | Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy. | ☐Complies<br>☐Does Not<br>☐Not Observable<br>☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



Property of NY Engineers

CLOUDSTEPPERS

COMcheck
Mechanical
Compliance
(2 OF 2)

M0.2

## MECHANICAL SYMBOLS LIST

### AIR DEVICES

| | |
|---|---|
| ⊠ | CEILING DIFFUSER SUPPLY |
| ⧅ | CEILING DIFFUSER RETURN / EXHAUST |

### DUCT ACCESSORIES

| | |
|---|---|
|  | BACK DRAFT DAMPER |
|  | VOLUME DAMPER W/ ACCESS DOOR |
|  | POINT OF CONNECTION |
|  | EXISTING TENANT SPECIFIC DUCTWORK |
|  | EXISTING LL DUCTWORK TO REMAIN |
|  | DUCTWORK TO BE DEMO |

### CONTROLS AND SENSORS

| | |
|---|---|
| T | THERMOSTAT |
| $T_S$ | TEMPERATURE SENSOR |
| S | DUCT SMOKE DETECTOR |

### DUCTWORK

| | |
|---|---|
|  | AIR DUCT W/ 1.5" ACOUSTICAL LINING |
|  | FLEXIBLE DUCT |
|  | FLEXIBLE CONNECTION |
| 24X12 | RECTANGULAR DUCT (WIDTH X DEPTH) |
| Ø12 | ROUND DUCT (DIAMETER) |
|  | ROUND DUCT CROSS SECTION |
|  | SUPPLY AIR RECTANGULAR DUCT CROSS SECTION |
|  | RETURN AIR RECTANGULAR DUCT CROSS SECTION |

## MECHANICAL ABBREVIATIONS

| | |
|---|---|
| RTU | ROOF TOP UNIT |
| CFM | CUBIC FEET OF AIR PER MINUTE |
| OA | OUTSIDE AIR |
| EF | EXHAUST FAN |
| EX | EXHAUST |
| FA | FRESH AIR |
| BD | BACKDRAFT DAMPER |
| SA | SUPPLY AIR |
| RA | RETURN AIR |
| COP | COEFFICIENT OF PERFORMANCE |
| EER | ENERGY EFFICIENCY RATIO |
| SEER | SEASONAL ENERGY EFFICIENCY RATIO |
| HSPF | HEATING SEASONAL PERFORMANCE FACTOR |
| MCA | MINIMUM CIRCUIT AMPACITY |
| MOP | MAXIMUM OVERCURRENT PROTECTION |

## CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

A. 2018 NORTH CAROLINA ENERGY CONSERVATION CODE
B. 2018 NORTH CAROLINA MECHANICAL CODE (NCMC) WITH LATEST AMENDMENTS
C. 2018 NORTH CAROLINA PLUMBING CODE
D. 2020 NORTH CAROLINA ELECTRICAL CODE NEC (NFPA70) WITH STATE AMENDMEMNTS
E. 2018 NORTH CAROLINA BUILDING CODE.

## MECHANICAL DRAWING LIST



| | |
|---|---|
| M0.1 | COMCHECK MECHANICAL COMPLIANCE (1 OF 2) |
| M0.2 | COMCHECK MECHANICAL COMPLIANCE (2 OF 2) |
| M1.0 | MECHANICAL GENERAL NOTES, SYMBOLS AND ABBREVIATION |
| M1.1 | MECHANICAL NOTES & SPECIFICATIONS (1 OF 2) |
| M1.2 | MECHANICAL NOTES & SPECIFICATIONS (2 OF 2) |
| M2.0 | MECHANICAL REFLECTED CEILING PLAN & ROOF PLAN |
| M3.0 | MECHANICAL DETAILS |
| M4.0 | MECHANICAL SCHEDULES |



## NORTH CAROLINA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF NORTH CAROLINA BUILDING CODE 2018 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.
2. 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 2018 INTERNATIONAL BUILDING CODE .
3. 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.
4. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION OF THE 2018 NORTH CAROLINA MECHANICAL CODE:
   A. VENTILATION SYSTEM BALANCING - 2018 NCMC 403.3.1.1
5. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
   A. STANDARDS OF HEATING - 2018 NCMC 309.1
   B. DUCT CONSTRUCTION AND INSTALLATION- 2018 NCMC 603
   C. AIR INTAKES, EXHAUSTS AND RELIEFS - 2018 NCMC 401.5
   D. AIR FILTERS - 2018 NCMC 605
6. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
7. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2018-NCMC 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 2018-NCMC 403.3
9. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
10. 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 CODES.
11. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
12. SMOKE DETECTOR SHALL MEET UL268A.

## 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.
3. 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 DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
7. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL 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 IN MAKING UP THE WORK PROPOSAL.
8. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
9. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.
10. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POINT OF CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.
11. 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.
12. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO 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.
13. 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).
14. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
15. 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.
16. 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. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
17. 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.
18. 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.
19. UNLESS OTHERWISE SPECIFICALLY 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.
20. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
21. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
22. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
25. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
26. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
27. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.
28. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
29. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
30. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
31. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

DEFINITIONS:

1) "PROVIDE": TO SUPPLY, 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.

## SCOPE OF WORK

1. AIR CONDITIONING AND VENTILATION OF THE SPACE IS DONE BY NEW RTU-1(N).
2. PROVIDE (1) NEW CEILING EXHAUST FAN FOR EXISTING RESTROOM AND (1) NEW EXHAUST FAN FOR NEW FITTING ROOM.
3. 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.
4. 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.
5. 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.

Property of Cloudstepper

CLOUDSTEPPERS

Mechanical General notes, symbols & Abbreviation

M1.0

## GENERAL HVAC NOTES

GENERAL:

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 AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING 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, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.

12. WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.

13. 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.

14. 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.

15. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.

16. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.

17. ALL DUCTWORK, PIPING, 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.

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, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.

20. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.

21. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

22. 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 10'-0" FROM ALL AC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.

5. RE-INSULATE ALL DUCTWORK AND PIPING 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. ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.

9. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.

10. 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.

11. COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.

12. ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.

13. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.

14. 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.

15. UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.

16. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.

17. 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.

18. PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.

19. PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.

20. 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.

21. 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.

22. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.

23. EXTERIOR LOUVERS ARE INDICATED FOR SIZE, GENERAL LOCATION AND PERFORMANCE ONLY. DETAILED LOUVER DESCRIPTIONS ARE PROVIDED IN THE ARCHITECTURAL SPECIFICATIONS.

## 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 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 ASTM E 2174.

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:

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

a. LATEX SEALANT
b. SILICONE SEALANT
c. INTUMESCENT PUTTY
d. MORTAR
h. SILICONE FOAM
i. PILLOWS/BAGS
j. INTUMESCENT WRAP STRIPS
k. INTUMESCENT COMPOSITE SHEET

### SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND 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 PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.

2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND

### SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

1.1 SLEEVE-SEAL SYSTEMS

A. FIELD-ASSEMBLED, MODULAR SEALING-ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE.

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 FITTINGS

A. MANUFACTURED PLASTIC, SLEEVE-TYPE, PLASTIC OR RUBBER WATER-STOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.

1.3 GROUT

A. NON-SHRINK, FACTORY PACKAGED.

1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. USE SLEEVES AND SLEEVE SEALS FOR THE FOLLOWING PIPING-PENETRATION APPLICATIONS:

1. INTERIOR PARTITIONS:
   a. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES, PVC-PIPE SLEEVES.
   b. PIPING NPS 6 (DN 150) AND LARGER: GALVANIZED-STEEL-SHEET SLEEVES.

END OF SECTION 230517

### 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.

PART 3 - EXECUTION

3.1 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 TYPE.
   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 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND 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 PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.

2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND

3. DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND 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 PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL

B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL

C. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE

D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER

E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE

F. THERMAL-HANGER SHIELD INSERTS:

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

H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB-MOUNTED TYPE

I. EQUIPMENT SUPPORTS.

END OF SECTION 230529

### SECTION 230548 - VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 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 TYPE.

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.

10. PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.

11. RESILIENT PIPE GUIDES.

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.

1.2 FIELD QUALITY CONTROL

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

Property of Engineers

CLOUDSTEPPERS

Mechanical Notes & Specifications (1 of 2)

M1.1

PART-2 PRODUCTS

1.1 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. HILTI, INC.
5. ISOLATION TECHNOLOGY, INC.
6. KINETICS NOISE CONTROL.
7. LOOS & CO.; CABLEWARE DIVISION.
8. MASON INDUSTRIES.
9. TOLCO INCORPORATED; A BRAND OF NIBCO INC.
10. UNISTRUT; TYCO INTERNATIONAL, LTD.

END OF SECTION 230548

## SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:

1. AIR SYSTEMS: CONSTANT-VOLUME SYSTEMS.
2. EXISTING SYSTEMS

1.2 QUALITY ASSURANCE

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 AND HYDRONIC 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 REVIEW.

B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC 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 HAVE 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 S3ECTION 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-5 |
| WITHIN BUILDING ENVELOPE ASSEMBLY: | R-8 |
| OUTSIDE OF BUILDING: | R-8 |

1.4 ITEMS NOT INSULATED:

1. FIBROUS-GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/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

A. 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 1 INCH WG PRESSURE, SEAL CLASS "A".

B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:

1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH. USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.
2. SHEET STEEL SHALL COMPLY WITH ASTMA653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY-COATED (GALVANINEALED) BY HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR SHEET METALLIC-COATED BY HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90° ELBOWS.
3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT-RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.
4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33 00.
5. PROVIDE EXPANDED TAKE-OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90-DEGREE TAKE-OFF FITTINGS OR TRAIGHT TAPS WILL NOT BE ACCEPTED.
6. BUTTON PUNCH SNAP-LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.
7. ROUND DUCTS MAY BE SUBSTITUTED FOR RECTANGULAR DUCTS IF SIZED IN ACCORDANCE WITH ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY WRITTEN PERMISSION OF THE ENGINEER.

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:

| USG | MAX. SIDE INCHES BRACING | TRANSVERSE JOINTS AND |
|---|---|---|
| 22 | UP TO 12 | S SLIP, DRIVE SLIP, ONE INCH POCKET LOCK ON 8 FOOT CENTERS |
| 22 | 13 TO 24 | 1"X1"X1/8" ANGLES ON 4 FOOT CENTERS |
| 20 | 25 TO 35 | 1"X1"X1/8" ANGLES ON 2 FOOT CENTERS |

D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:

1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.

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.

F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.

1.2 MATERIALS

A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS.

B. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS.

C. SHEET METAL MATERIALS:

1. GALVANIZED SHEET STEEL.
2. STAINLESS-STEEL SHEETS.
3. ALUMINUM SHEETS.
4. FACTORY-APPLIED ANTI-MICROBIAL COATING.

D. DUCT LINER:

1. FIBROUS GLASS, TYPE I, FLEXIBLE.
   a. WITH ANTI-MICROBIAL EROSION-RESISTANT COATING.
2. FLEXIBLE ELASTOMERIC.
3. NATURAL FIBER.

E. 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.

1.3 DUCT CLEANING

A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING, ADJUSTING, AND BALANCING.

B. CLEAN THE FOLLOWING ITEMS:

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

1.4 DUCT SCHEDULE

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

8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

END OF SECTION 233113

## SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

1.1 PRODUCTS

B. 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 NOTED IN BAKED WHITE ENAMEL.

C. MANUFACTURERS: TITUS

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.

D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713

503.2.4.1 THERMOSTATIC CONTROLS

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, AT LEAST ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

EXCEPTION: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES OR GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED:

THE PERIMETER SYSTEM INCLUDES AT LEAST ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN +/- 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15.2 M); AND

THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY A THERMOSTAT(S) LOCATED WITHIN THE ZONE(S) SERVED BY THE SYSTEM.

503.2.4.1.1 HEAT PUMP SUPPLEMENTARY HEAT

HEAT PUMPS HAVING SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT, EXCEPT DURING DEFROST, PREVENT SUPPLEMENTARY HEAT OPERATION WHEN THE HEAT PUMP CAN MEET THE HEATING LOAD.

503.2.4.2 SET POINT OVERLAP RESTRICTION

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL PROVIDE A TEMPERATURE RANGE OR DEADBAND OF AT LEAST 5°F (2,8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS CAPABLE OF BEING SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTION: THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.

503.2.4.3 OFF-HOUR CONTROLS

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

EXCEPTIONS:

ZONES THAT WILL BE OPERATED CONTINUOUSLY.

ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A READILY ACCESSIBLE MANUAL SHUTOFF SWITCH.

503.2.4.3.1 THERMOSTATIC SETBACK CAPABILITIES

THERMOSTATIC SETBACK CONTROLS SHALL HAVE THE CAPABILITY TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).

503.2.4.3.2 AUTOMATIC SETBACK AND SHUTDOWN CAPABILITIES

AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR AT LEAST 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

Property of NY Engineers

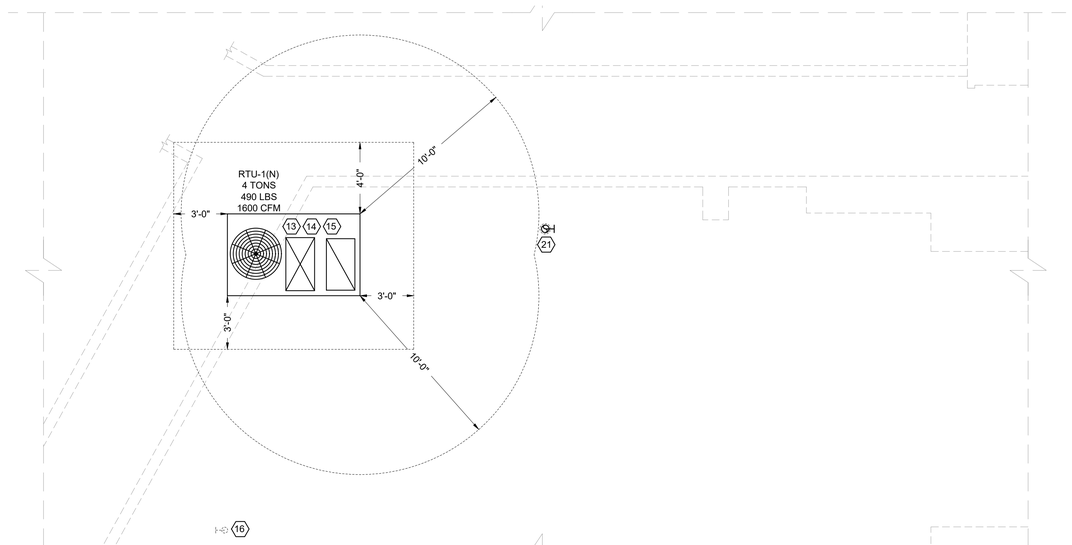
CLOUDSTEPPERS

V
B

Mechanical Notes & Specifications (2 of 2)



M1.2




MECHANICAL ROOF PLAN

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

0 1' 2' 4' 8'

## MECHANICAL GENERAL NOTES:

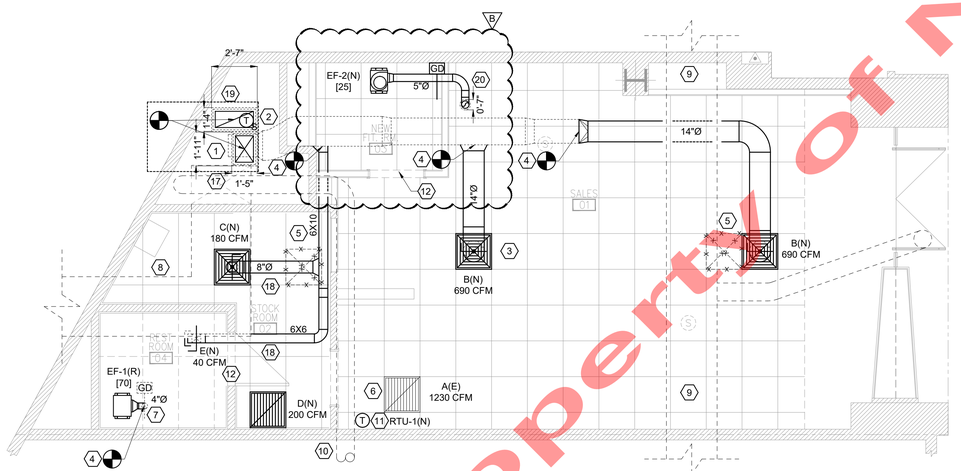
1. GENERAL CONTRACTORS MUST COMPLY AND CONFORM TO THE PROGRAM, INCLUDING WITHOUT LIMITATION, THE AUTHORITY HAVING JURISDICTION (AHJ) FOR SAFETY, HEALTH, AND ENVIRONMENTAL COMPLIANCE.
2. GENERAL CONTRACTORS SHALL COMPLY WITH ANY EXISTING OR FUTURE CITY, STATE, COUNTY OR FEDERAL STATUTES, ORDINANCES, REGULATIONS, CODES, INSURANCE RATING BOARDS, OR LEGISLATION REGARDING THE CONTROL OF POLLUTION.
3. ALL EQUIPMENT AND MATERIALS WILL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND ACCORDING TO THE BEST PRACTICE.
4. ALL DUCTWORK SHALL BE COORDINATED WITH OTHER TRADES.
5. CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN ON PLAN.
6. PROVIDE PROGRAMMABLE THERMOSTATS WITH SUB-BASE AND REMOTE TEMPERATURE SENSOR.
7. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF THE WALLS.
8. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
9. ALL DUCT SIZES SHOWN ON MECHANICAL FLOOR PLANS ARE CLEAR INSIDE DIMENSIONS. INTERNAL INSULATION THICKNESS OF DUCTS SHALL BE CONSIDERED SEPARATELY.
10. PROVIDE ACOUSTICAL LINING FOR THE FIRST 10 FT OF SUPPLY AND RETURN DUCTWORK.

## MECHANICAL DEMOLITION NOTES:

1. BEFORE STARTING DEMOLITION, PROVIDE NECESSARY PROTECTIVE DEVICES WHERE REQUIRED AND IN STRICT ACCORDANCE WITH APPLICABLE CODES AND BUILDING REGULATIONS.
2. TAKE NECESSARY PRECAUTIONS TO PREVENT DUST AND DIRT MIGRATING TO OCCUPIED AREAS OF THE BUILDING.
3. KEEP ALL ADJOINING AREAS ADJACENT TO THE WORK AREAS CLEAN AND FREE OF DEBRIS.
4. ALL DEMOLISHED MATERIALS SHALL BE REMOVED AND DISPOSED OF OFF SITE.
5. REPAIR/ REPLACE EXISTING EQUIPMENT/ MATERIALS NOT SCHEDULED OR NOTED TO BE DEMOLISHED BUT BECOME DAMAGED DURING THE PROGRESS OF THE WORK. MAKE ANY AND ALL SUCH REPAIRS, REPLACEMENTS, MODIFICATIONS TO RESTORE THE DAMAGED ITEMS TO THEIR ORIGINAL CONDITIONS AT THE TIME OF DAMAGE, TO THE SATISFACTION OF AND AT NO ADDITIONAL COST TO THE OWNER.
6. EXISTING CONDITIONS AND LOCATIONS OF EQUIPMENT WORK SHALL BE FIELD VERIFIED PRIOR TO COMMENCING WORK.
7. COORDINATE CUTTING, PATCHING OF EXISTING ROOF, WALLS, CEILINGS, AND FLOORS AFFECTED BY MECHANICAL DEMOLITION WITH GENERAL CONTRACTOR.

## # MECHANICAL PLAN KEY NOTES:

1. COORDINATE THE EXACT LOCATION OF THE NEW RTU-1(N) SUPPLY AND RETURN AIR DUCT DROPS FROM THE ROOF AND CONNECT TO THE EXISTING DUCTWORK. PROVIDE NEW ROOF CURB ADAPTOR AT THE EXISTING ROOF CURB AS SHOWN. MODIFY PROPOSED AND EXISTING DUCTWORK AS REQUIRED TO SUIT ACTUAL SITE CONDITIONS, AVOID FIELD CONFLICTS, AND COORDINATE WITH THE STRUCTURAL ENGINEER OF RECORD. REPORT ANY FIELD DISCREPANCIES TO THE ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE REMOTE TEMPERATURE SENSOR IN RETURN AIR PATH AND WIRED BACK TO T-STAT.
3. REMOVE THE EXISTING SUPPLY AIR DIFFUSER INCLUDING ASSOCIATED FLEXIBLE DUCT, CONNECTIONS, AND ALL ANCILLARY ACCESSORIES. PROVIDE AND INSTALL A NEW SUPPLY AIR DIFFUSER WITH BALANCING DAMPER AT THE SAME LOCATION WITH NEW DUCTWORK AND CONNECT TO THE EXISTING SUPPLY AIR DUCTWORK AT THE INDICATED POINT OF CONNECTION. CONTRACTOR SHALL FIELD VERIFY EXISTING DUCT SIZE, LOCATION, AND SITE CONDITIONS PRIOR TO COMMENCING WORK.
4. CONNECT THE NEW SUPPLY/RETURN/EXHAUST AIR DUCT TO THE EXISTING SUPPLY/RETURN/EXHAUST AIR DUCTWORK AT THE INDICATED LOCATION AS SHOWN. EXACT LOCATION & DUCT SIZE OF THE EXISTING SUPPLY/RETURN/EXHAUST DUCTWORK & POINT OF CONNECTION TO BE DETERMINED IN FIELD. PROVIDE ALL THE NECESSARY DUCT TRANSITIONS AS PER THE EXISTING DUCT SIZES. FINAL DUCT RUN OF THE PROPOSED SUPPLY/RETURN/EXHAUST DUCTWORK SHALL BE DETERMINED IN FIELD AS PER THE SITE CONDITIONS.
5. REMOVE THE EXISTING SUPPLY AIR DIFFUSER INDICATED FOR DEMOLITION ALONG WITH ALL THE ASSOCIATED ANCILLARY ACCESSORIES. EXACT LOCATION AND SCOPE OF THE DEMOLITION TO BE DETERMINED IN FIELD.
6. EXISTING RETURN AIR GRILLE TO BE RELOCATE AT THE LOCATION INDICATED AND TO BE REUSED ALONG WITH ALL THE ASSOCIATED ACCESSORIES AS INDICATED. CONTRACTOR SHALL FIELD-VERIFY THAT THE EXISTING AIR TERMINAL CAN ACCOMMODATE THE SPECIFIED AIRFLOW AND RE-BALANCE THE EXISTING AIR TERMINALS TO ACHIEVE THE SPECIFIED AIR FLOWS. MAKE ALL THE NECESSARY UPDATES/MODIFICATIONS AS REQUIRED BASED ON ACTUAL SITE CONDITIONS. REPORT ANY DISCREPANCIES IDENTIFIED IN FIELD TO THE ENGINEER OF RECORD.
7. CONTRACTOR REPLACE THE EXISTING TOILET EXHAUST FAN WITH A NEW ONE AS SCHEDULED. REUSE EXISTING STRUCTURAL SUPPORTS & EXISTING EXHAUST DUCTWORK AS MUCH AS POSSIBLE. CONNECT THE NEW EXHAUST DUCTWORK TO THE EXISTING DUCTWORK AS INDICATED. EXACT POINT OF CONNECTION TO BE DETERMINED IN FIELD. ROUTE THE NEW 4" TOILET EXHAUST DUCT THROUGH THE EXISTING ROOF PENETRATION. THE EXACT LOCATION OF THE EXISTING ROOF OPENING SHALL BE FIELD-VERIFIED. ADJUST THE PROPOSED EXHAUST DUCT ROUTING AS REQUIRED TO ALIGN WITH THE ACTUAL LOCATION OF THE EXISTING ROOF PENETRATION.
8. EXISTING DUCT FROM THE MALL @14'-5" AFF TO REMAIN. EXACT LOCATION AND ELEVATION OF THE DUCT TO BE DETERMINED IN FIELD. CONTRACTOR TO COORDINATE ALL THE PROPOSED DUCTWORK WITH THE EXISTING MALL DUCT.
9. EXISTING DUCT FROM THE MALL @13'-10" AFF TO REMAIN. EXACT LOCATION AND ELEVATION OF THE DUCT TO BE DETERMINED IN FIELD. CONTRACTOR TO COORDINATE ALL THE PROPOSED DUCTWORK WITH THE EXISTING MALL DUCT.
10. EXISTING OUTSIDE AIR DUCT FROM THE MALL @14'-6" AFF TO REMAIN. EXACT LOCATION AND ELEVATION OF THE DUCT TO BE DETERMINED IN FIELD. CONTRACTOR TO COORDINATE ALL THE PROPOSED DUCTWORK WITH THE EXISTING MALL SUPPLY AIR DUCT.
11. CONTRACTOR TO PROVIDE AND INSTALL A NEW ELECTRONIC 7-DAY PROGRAMMABLE THERMOSTAT AND COORDINATE FOR THE EXACT LOCATION WITH ARCHITECT/OWNER.
12. PROVIDE 1/2" DOOR UNDER CUT.
13. INSTALL NEW HEAT PUMP RTU-1(N) ON THE ROOF. CONTRACTOR SHALL FIELD VERIFY THE LOCATION PRIOR TO BIDDING. FIELD VERIFY EXISTING DUCT PENETRATIONS & REUSE AS MUCH AS POSSIBLE. PROVIDE A NEW CURB ADAPTER AFTER FIELD VERIFICATION OF THE EXISTING ROOF CURB, ENSURING THAT THE EXISTING DUCTWORK IS REUSED TO THE MAXIMUM EXTENT FEASIBLE.
14. ROUTE THE NEW RTU-1(N) CONDENSATE DRAIN TO THE SAME LOCATION AS THE EXISTING RTU DRAIN. CONTRACTOR TO ENSURE THAT THE EXISTING CONDENSATE TERMINATION IS DISCHARGED TO AN APPROVED LOCATION PER LOCAL CODES AND LANDLORD GUIDELINES.
15. CONTRACTOR TO FIELD VERIFY THAT ANY EXHAUST SOURCE IS LOCATED A MINIMUM OF 10 FEET HORIZONTALLY AWAY OR 3 FEET VERTICALLY ABOVE FROM THE RTU-1(N) OUTSIDE AIR INTAKE.
16. EXISTING TOILET EXHAUST TERMINATION SHALL BE REUSED, INCLUDING ALL ASSOCIATED ACCESSORIES SUCH AS THE BACKDRAFT DAMPER, GOOSENECK TERMINATION, INSECT/BIRD SCREEN, ETC. IF THE EXISTING COMPONENTS ARE FOUND TO BE UNSUITABLE FOR REUSE, PROVIDE NEW. CONTRACTOR SHALL VERIFY THAT THE EXHAUST TERMINATION COMPLIES WITH CODE REQUIREMENTS, INCLUDING MAINTAINING A MINIMUM OF 10'-0" HORIZONTAL SEPARATION OR 3'-0" VERTICAL SEPARATION FROM OUTDOOR AIR INTAKES, 3'-0" FROM OPERABLE OPENINGS INTO THE BUILDING, AND 10'-0" HORIZONTAL SEPARATION FROM PROPERTY LINES.
17. ANY ADDITIONS OR MODIFICATIONS TO EXISTING WALLS OR ADDITION OF NEW WALLS MUST BE COORDINATED WITH THE EXISTING HVAC UNIT/ACCESSORIES/DUCTWORK INDICATED FOR REUSE. THE ARCHITECT OF RECORD/STRUCTURAL ENGINEER OF RECORD/CONTRACTOR SHALL ENSURE THAT THE PROPOSED WALLS DO NOT INTERFERE WITH THE CURRENT HVAC DESIGN. ANY CONFLICTS IDENTIFIED, SHALL BE RESOLVED BY MODIFYING THE EXISTING DUCTWORK AS NEEDED. THE EXTENT OF SUCH MODIFICATIONS SHALL BE DETERMINED ON SITE BY THE CONTRACTOR.
18. CONTRACTOR TO FIELD-VERIFY THE LOCATION OF THE EXISTING PIPING AND COORDINATE THE NEW DUCT RUN TO AVOID CLASHES. PROVIDE ALL THE REQUIRED OFFSETS & MODIFY THE PROPOSED DUCTWORK AS/IF REQUIRED PER ACTUAL SITE CONDITIONS. REPORT BACK TO EOR IF ANY DISCREPANCIES ARE IDENTIFIED.
19. PROVIDE NEW WIRE MESH SCREEN TO THE RETURN DUCT FROM RTU-1(N) IN PLENUM IF THE EXISTING SCREEN IS NOT PRESENT OR IS DAMAGED BEYOND REPAIR. CONTRACTOR TO FIELD DETERMINE THE RETURN AIR DUCT CONFIGURATION IN FIELD AS PER ACTUAL SITE CONDITIONS.
20. NEW FITTING ROOM EXHAUST DUCTWORK GOING UP TO THE ROOF. COORDINATE EXACT LOCATION, ROOF PENETRATIONS AND DUCT ROUTING IN FIELD AS PER ACTUAL SITE CONDITIONS.
21. PROVIDE NEW FITTING ROOM EXHAUST TERMINATION ALONG WITH ALL ASSOCIATED ACCESSORIES SUCH AS THE BACKDRAFT DAMPER, GOOSENECK TERMINATION, INSECT/BIRD SCREEN, ETC. CONTRACTOR SHALL FIELD DETERMINE THE EXACT POINT OF TERMINATION ENSURING THAT THE EXHAUST TERMINATION COMPLIES WITH CODE REQUIREMENTS, INCLUDING MAINTAINING A MINIMUM OF 10'-0" HORIZONTAL SEPARATION OR 3'-0" VERTICAL SEPARATION FROM OUTDOOR AIR INTAKES, 3'-0" FROM OPERABLE OPENINGS INTO THE BUILDING, AND 10'-0" HORIZONTAL SEPARATION FROM PROPERTY LINES.




MECHANICAL REFLECTED CEILING PLAN

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

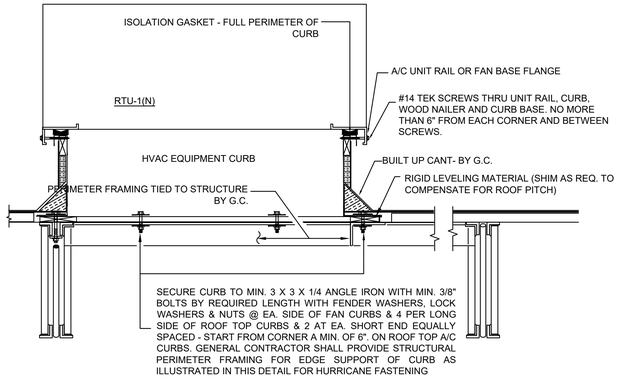
0 1' 2' 4' 8'

Property of NY Engineers

CLOUDSTEPPERS

Mechanical Reflected ceiling Plan & Roof Plan

M2.0




1 / M3.0 ROOF TOP UNIT INSTALLATION DETAILS
N.T.S

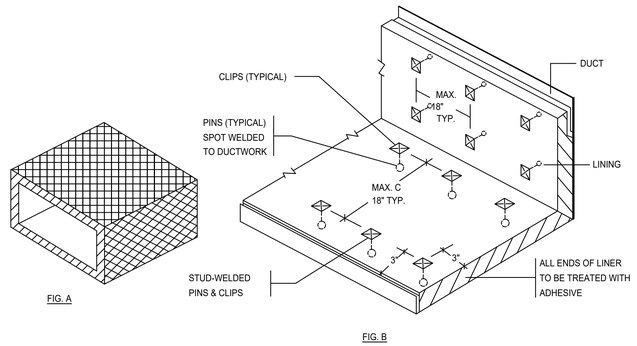
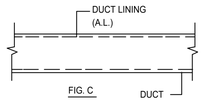


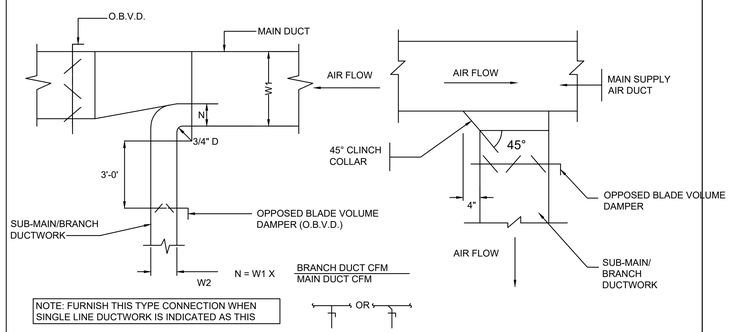

FIG. A

FIG. B

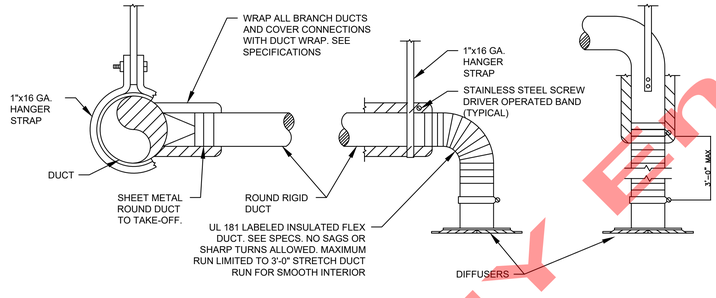
NOTES:
DUCTS TO BE ACOUSTICALLY LINED SHALL BE DESIGNATED BY THE SYMBOL IN FIG. "C" TO THE EXTENT OF LINING. THICKNESS SHALL BE AS SPECIFIED. DUCTS LINED WITH ACOUSTICAL MATERIAL SHOULD BE FASTENED WITH CLIPS, ADHESIVE, OR PINS.




4 / M3.0 ACOUSTICAL TREATMENT DUCT LINING
N.T.S

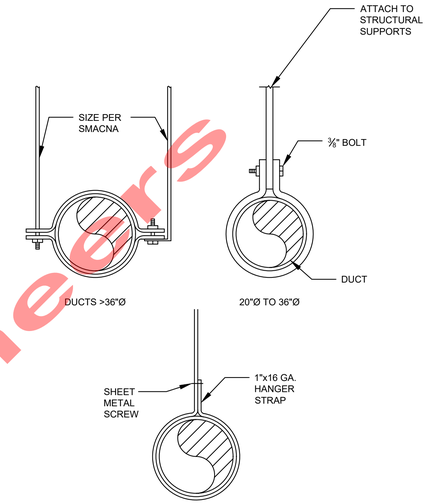



2 / M3.0 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
N.T.S

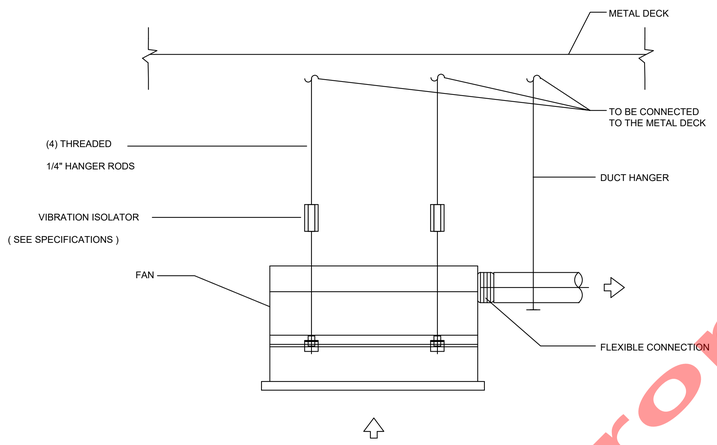



5 / M3.0 TYPICAL DIFFUSER CONNECTION DETAIL
N.T.S

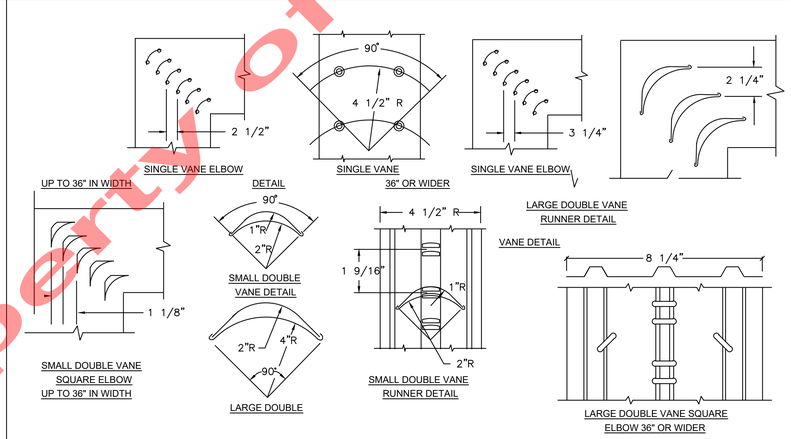
HANGERS MUST NOT DEFORM DUCT SHAPE



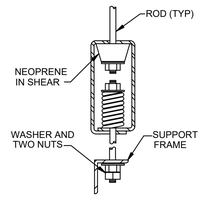

7 / M3.0 ROUND DUCT SUPPORT DETAIL
N.T.S




3 / M3.0 CEILING FAN HANGING SUPPORT DETAIL
N.T.S




6 / M3.0 LOW VELOCITY DUCTWORK ELBOWS
N.T.S




8 / M3.0 VIBRATION ISOLATOR DETAIL
N.T.S

Property of NY Engineers

CLOUDSTEPPERS

Mechanical Details

M3.0

**ROOF TOP UNIT HEAT PUMP WITH ELECTRIC HEAT SCHEDULE**

| UNIT ID | MANUFACTURER | MODEL | AREA SERVED | NOMINAL TONS | SUPPLY FAN | | | COOLING CAPACITY | | | | HEATING CAPACITY | | | ELECTRICAL DATA | | | | | EER | EER2 | SEER | SEER2 | HSPF | HSPF2 | COP2 | OPERATING WEIGHT (LBS.) | DIMENSIONS (HXWXL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SUPPLY AIR CFM | OUTSIDE AIR CFM | MAX. ESP (IN. OF W.G.) | TOTAL MBH | SENSIBLE MBH | AMBIENT TEMP. DB (°F) | ENTERING TEMP. DB / WB (°F) | HEAT PUMP MBH | ELECTRIC HEATING KW | ELECTRIC HEATING MBH | VOLTS | PH | HZ | MCA (A) | MOCP (A) | | | | | | | | | |
| RTU-1(N) | TRANE | WSK048A4S0B | SEE PLAN | 4 | 1600 | 170 | 1.0 | 45.97 | 36.64 | 95 | 77.12/64.40 | 44.05 | 6 | 20.49 | 460 | 3 | 60 | 26 | 30 | 13.5 | 12.8 | 16.8 | 16.2 | 8.5 | 7.2 | 3.74 | 1024 | 51X54X89 |

**NOTES:**

1. EQUIPMENT MUST BE HIGH EFFICIENT, MEETING OR EXCEEDING THE BRANDS MINIMUM REQUIREMENTS.
2. ELECTRICAL CONNECTION TO BE SINGLE POINT AND TO BE THROUGH THE BOTTOM OF THE UNIT.
3. PROVIDE DISCONNECT SWITCH AND AN UNPOWERED GFIC RECEPTACLE.
4. CONTRACTOR TO VERIFY EXISTING CURB & PROVIDE NEW CURB ADAPTOR CDI PART # 1-4000-3105.
5. CONDENSATE DRAIN SHALL DISCHARGE TO AN APPROVED DISPOSAL LOCATION. THE EXACT POINT OF DISCHARGE SHALL BE DETERMINED BY THE CONTRACTOR UPON FIELD VERIFICATION.
6. PROVIDE CABINET WITH 1/2" FIBERGLASS INSULATION.
7. PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT.
8. REMOTE TEMP. SENSORS SHALL BE PROVIDED IN RETURN AIR DUCT AND WIRED BACK TO PROGRAMMABLE, 24 HOUR, 7 DAY, THERMOSTATS.
9. PROVIDE WITH ANTI SHORT CYCLE TIMER.
10. PROVIDE WITH THROWAWAY 2" FILTERS (MERV 8).
11. THE 6.0 KW HEATER SHALL BE TO BE FACTORY PROVIDED. THE MECHANICAL CONTRACTOR SHALL VERIFY THAT THE HEATER IS PROPERLY POWERED, OPERATING AS INTENDED AND INSTALLED IN ACCORDANCE WITH TRANE'S INSTALLATION GUIDELINES AND RECOMMENDATIONS. CONTRACTOR REMAINS RESPONSIBLE FOR PROPER INSTALLATION/OPERATION OF THE HEATER.

VENTILATION CALCULATIONS AS PER - CHAPTER 4 VENTILATION: 2018 NCMC
PROJECT NAME: CLARKS DURHAM, NC

| ROOM NAME | AREA SQ.FT. | OCCUPANCY PER 1000 SQFT AS PER NCMC 2018 | SELECTED OCCUPANCY AS PER NCMC 2018 | FINAL OCCUPANCY | MINIMUM OUTSIDE AIR AS PER NCMC 2018 | | REQUIRED OA AS PER NCMC 2018 | PROVIDED OA | REQUIRED EXHAUST AS PER NCMC 2018 | PROVIDED EXHAUST | SELECTED SPACE AS PER NCMC 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CFM/PERSON | CFM/SQ.FT | CFM | CFM | CFM/FIXTURE | CFM | |
| 01 SALES | 559 | 15 | 8 | 10 | 7.5 | 0.12 | 142 | 150 | 0 | 0 | RETAIL STORES, SALES FLOORS AND SHOWROOM FLOORS - SALES |
| 02 STOCK ROOM | 95 | 0 | 0 | 0 | 0 | 0.12 | 11 | 20 | 0 | 0 | RETAIL STORES, SALES FLOORS AND SHOWROOM FLOORS - STORAGE ROOMS |
| 03 NEW FIT. RM. | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.25 CFM/SQ.FT | 25 | RETAIL STORES, SALES FLOORS AND SHOWROOM FLOORS - DRESSING ROOM |
| 04 REST ROOM | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 70 | PUBLIC SPACES - TOILET ROOMS |
| TOTAL | 744 | TOTAL | | 10 | TOTAL | | 153 | **170** | 70 | **95** | |

EXHAUST FAN SCHEDULE

| TAG | QUANTITY | TYPE | FLOW RATE | STATIC PRESSURE EXTERNAL | ELECTRICAL DATA FLA | V/PH/HZ | MAXIMUM LOUDNESS | WEIGHT | BASIS OF DESIGN | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CFM | IN W.G. | AMPS | | SONES | LBS | MANUFACTURER | MODEL |
| EF-1(R) | 1 | CEILING MOUNTED FAN | 70 | 0.7 | 0.46 | 115/1/60 | 4.5 | 24 | GREENHECK | SP-A200 |
| EF-2(N) | 1 | CEILING MOUNTED FAN | 25 | 0.5 | 0.16 | 115/1/60 | 2 | 9 | GREENHECK | SP-B80 |

**NOTES:**

(N): NEW; (R): REPLACEMENT

1. AMCA SEAL & UL CERTIFIED.
2. EXHAUST FAN SHALL BE INTERLOCKED WITH RTU-1(N).
3. PROVIDE VIBRATION ISOLATORS, CANVAS CONNECTION.
4. PROVIDE BACK-DRAFT DAMPER.
5. EXISTING TOILET EXHAUST FAN TO BE REPLACED WITH THE NEW FAN AS SPECIFIED IN THE SAME LOCATION. REUSE EXISTING STRUCTURAL SUPPORTS & DUCTWORK AS MUCH AS POSSIBLE.

SCHEDULE OF GRILLES

| TAG | TYPE | CFM RANGE | DEFLECTION (DEGREE) | DIMENSION (IN) | MODEL NO. | MAX NC dBA | MAKE |
|---|---|---|---|---|---|---|---|
| A(E) | RETURN GRILLE | S.A.E | S.A.E | S.A.E | S.A.E | S.A.E | S.A.E |
| D(N) | RETURN GRILLE | 375-1875 | 0 | 24X24 | 350R | 18 | TITUS |
| E(N) | SUPPLY GRILLE | 0-152 | 0 | 6X6 | 300R | 24 | TITUS |

NOTES FOR GRILLES

1. ALL GRILLES : CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS TO ENSURE PROPER AIR DEVICE BORDER SELECTION.
2. COORDINATE COLOR/FINISH WITH ARCHITECT.
3. #(E) - TAG(EXISTIING)
   #(N) - TAG(NEW)
   S.A.E - SAME AS EXISTING

SCHEDULE OF DIFFUSERS — BASIS OF DESIGN: TITUS

| TAG | TYPE | AIRFLOW RANGE (CFM) | NECK SIZE (IN) | DIMENSION (IN) | MAX STATIC PRESSURE | MODEL NO. | MAX NC dBA |
|---|---|---|---|---|---|---|---|
| B(N) | SUPPLY AIR | 428-855 | 14 | 24X24 | 0.116 | TMSA | 23 |
| C(N) | SUPPLY AIR | 140-279 | 8 | 24X24 | 0.073 | TMSA | 21 |

NOTES:

1. ALL DIFFUSERS : CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO ENSURE PROPER AIR DEVICE BORDER SELECTION.
2. REFER ARCHITECTURAL DRAWINGS FOR CEILING TYPE.
3. COORDINATE COLOR/FINISH WITH ARCHITECT/OWNERSHIP.
4. #(N) - TAG(NEW)

AIR BALANCE

| UNIT | AREA SERVED | SUPPLY AIR (CFM) | OUTSIDE AIR (CFM) | RETURN AIR (CFM) | EXHAUST AIR (CFM) |
|---|---|---|---|---|---|
| RTU-1(N) | SEE PLAN | 1600 | 170 | 1430 | 0 |
| EF-1(N) | SEE PLAN | - | - | - | 70 |
| EF-2(N) | SEE PLAN | - | - | - | 25 |
| TOTAL: | | 1600 | 170 | 1430 | 95 |
| BUILDING PRESSURE: | | | 75 | POSITIVE | |

NOTES:

1. CONTRACTOR TO ADJUST MANUAL DAMPER ON FRESH AIR TAP TO PROVIDE OUTSIDE AIR AS MENTIONED IN ABOVE TABLE.

**System Name: RTU-1(N)**

System Type: Constant Volume (CV)
Number of Zones 4
Number of Rooms 4

| Component | Quantity |
|---|---|
| Cooling Coils | 4 |
| Heating Coils | 4 |
| Fans | 6 |

**Cooling Coils**

| System | Zone | Type | Sizing Method | Time of Peak Mo/D/Hr | Total capacity (tons) | Total capacity (MBh) | Sensible capacity (MBh) | Vent Load (MBh) | Ov/undr sizing (MBh) | Airflow (cfm) | Vent (cfm) | Enter DB/WB (°F) | Leave DB/WB (°F) | Flow (gpm) | Enter Temp (°F) | Leave Temp (°F) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Coil Location | | Coil Selection at Design | | | | | Airflow Conditions at Design | | | | Water Flow Conditions | | |
| SCC-1 | 01 SALES | DX | Peak | | 2.2 | 26.5 | 15.5 | 6.1 | N/A | 519 | 150 | 80.4 | 65.86 | 51.0 | 50.35 | N/A | N/A | N/A |
| SCC-1 | 02 STOCK ROOM | DX | Peak | | 0.3 | 3.5 | 2.3 | 0.9 | N/A | 86 | 20 | 80.5 | 65.38 | 54.4 | 53.38 | N/A | N/A | N/A |
| SCC-1 | 03 NEW FIT. RM. | DX | Peak | | 0.1 | 1.2 | 1.0 | 0.0 | N/A | 47 | 0 | 76.4 | 61.93 | 55.9 | 53.85 | N/A | N/A | N/A |
| SCC-1 | 04 RESTROOM | DX | Peak | | 0.1 | 1.1 | 0.9 | 0.0 | N/A | 42 | 0 | 76.1 | 61.86 | 55.7 | 53.67 | N/A | N/A | N/A |

*Values do not include effects of plenum loads, heat exchangers such as evaporative cooling devices and similar components.

**Heating Coils**

| System | Zone | Type | Sizing Method | Time of Peak Mo/D/Hr | Total capacity (MBh) | Vent Load (MBh) | Ov/undr sizing (MBh) | Airflow (cfm) | Vent (cfm) | Enter DB (°F) | Leave DB (°F) | Flow (gpm) | Enter Temp (°F) | Leave Temp (°F) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Coil Location | Coil Selection at Design | | | | | Airflow Conditions at Design | | | | Water Flow Conditions | | |
| SHC-1 | 01 SALES | Electric | Peak | 1/21 24:00 | 25.8 | 25.8 | N/A | 519 | 150 | 55.3 | 104.9 | N/A | N/A | N/A |
| SHC-1 | 02 STOCK ROOM | Electric | Peak | 1/21 24:00 | 4.0 | 4.0 | N/A | 86 | 20 | 58.2 | 104.2 | N/A | N/A | N/A |
| SHC-1 | 03 NEW FIT. RM. | Electric | Peak | 1/21 24:00 | 1.5 | 1.5 | N/A | 47 | 0 | 70.0 | 101.2 | N/A | N/A | N/A |
| SHC-1 | 04 RESTROOM | Electric | Peak | 1/21 24:00 | 1.3 | 1.3 | N/A | 42 | 0 | 70.0 | 101.2 | N/A | N/A | N/A |

**Alternative: Primary** — **Calculated at: Mar 12, 2026 - 04:13 PM**
**File: Clarks - Cloudsteppers.mdf** — **TRACE 3D Plus 7.00**

Property of CNU Engineers

CLOUDSTEPPERS

Mechanical Schedules

## SPRINKLER GENERAL NOTES

1. ALL SPRINKLER WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA-13 2013, 2018 NORTH CAROLINA BUILDING CODE AND ALL LOCAL LAWS AND AUTHORITIES.
2. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AND SHALL INSTALL NEW WORK TO CLEAR DUCTWORK AND LIGHTING FIXTURES.
3. ALL SPRINKLER WORK SHALL COMPLY WITH BUILDING STANDARDS AND REQUIREMENTS.
4. ALL SPRINKLER HEADS SHALL BE INSTALLED AT CENTER OF TILE WHEREVER APPLICABLE.
5. GENERAL CONTRACTOR SHALL COORDINATE FINAL FURNITURE/EQUIPMENT HEIGHT ELEVATIONS AND LOCATIONS WITH SPRINKLER INSTALLATION. ENGINEER SHALL BE NOTIFIED WHEN FURNITURE/EQUIPMENT IS LESS THAN 18" TO UNDERSIDE OF CEILING.
6. PIPES SIZES SHOWN ARE BASED ON DESIGN PIPING LAYOUTS ONLY. ACTUAL PIPE SIZES SHALL BE DETERMINED BY CONTRACTORS HYDRAULIC CALCULATIONS BASED ON HIS INSTALLATION DRAWINGS. CONTRACTOR SHALL ALLOW FOR THIS AND INCLUDE THIS IN HIS CONTRACT PRICE.
7. DRAWING INDICATES SPRINKLER SYSTEM DESIGN ONLY. CONTRACTOR RESPONSIBLE FOR OFFSETS, DROPS AND RISES FOR COORDINATION WITH OTHER TRADES.
8. G.C. SHALL BE RESPONSIBLE FOR ALL FINAL TESTS AND INSPECTIONS OF COMPLETED WORK REQUIRED BY THE BUILDING MANAGEMENT PRIOR TO OCCUPANCY OF SPACE.
9. ALL SPRINKLER WORK SHALL BE TESTED AND MADE OPERATIONAL PRIOR TO CARPET AND FURNITURE INSTALLATION. G.C. SHALL REPAIR AND/OR REPLACE ALL FINISHES DAMAGED BY DEFECTIVE SPRINKLER WORK AT HIS EXPENSE.
10. ALL BURNING, CUTTING, SOLDERING AND WELDING SHALL BE COORDINATED WITH BUILDING FIRE SYSTEMS WITH BUILDING MANAGEMENT, AS REQUIRED.
11. REFER TO ENGINEERING DRAWINGS FOR SPRINKLER HEADS AND FIRE DETECTION DEVICES.
12. ALL WORK TO BE DONE DURING THE HOURS DESIGNATED BY OWNER.
13. UPON COMPLETION OF ALL SPRINKLER WORK, CONTRACTOR SHALL TEST AND INSPECT ENTIRE SPRINKLER SYSTEM. ENTIRE SYSTEM SHALL BE FULLY OPERATIONAL AND APPROVED IN COMPLIANCE WITH ALL AHJ.
14. UPON SUCCESSFUL COMPLETION OF ALL TESTING, CONTRACTOR SHALL PRIME AND PAINT ALL EXPOSED SPRINKLER PIPING. COLOR AND FINISH SHALL BE AS PER ARCHITECT.
15. CONTRACTOR SHALL INCLUDE IN HIS BID THE COST TO PROVIDE (10) TEN ADDITIONAL SPRINKLERS INSTALLED. EXACT LOCATIONS OF THESE SPRINKLER HEADS SHALL BE DETERMINED IN FIELD.
16. THE SPRINKLER SYSTEMS ARE TO BE HYDROSTATIC TESTED FOR A (2) HOUR MINIMUM AT 200 PSI. PRESSURE AND ARE TO BE WITNESSED BY AUTHORIZED BUILDING PERSONNEL. COORDINATE ALL TESTING WITH BUILDING MANAGER.
17. ALL SERVICE SHUTDOWNS SHALL BE BY BASE BUILDING ENGINEERS. MINIMUM OF 48 HOURS NOTICE IS REQUIRED TO THE BUILDING OFFICE PRIOR TO SHUT DOWN.
18. ALL SPRINKLER WORK SHALL COMPLY WITH BUILDING STANDARDS AND REQUIREMENTS.
19. PIPES SIZES SHOWN ARE BASED ON SCHEDULE OF PIPE SIZE PIPING LAYOUTS ONLY. ACTUAL PIPE SIZES SHALL BE DETERMINED BY CONTRACTORS HYDRAULIC CALCULATIONS BASED ON HIS INSTALLATION DRAWINGS. CONTRACTOR SHALL ALLOW FOR THIS AND INCLUDE THIS IN HIS CONTRACT PRICE.
20. PROVIDE AUXILIARY DRAINS AT TRAPPED SECTIONS OF PIPING AS REQUIRED BY NFPA-13-2013.
21. COMPOSITE DRAWINGS

    CONTRACTOR SHALL BE GIVEN A SEPIA TRANSPARENCIES TO IMPOSE THEIR WORK FOR A COORDINATED ALLOCATION OF SPACE. PROCEDURE SHALL INCLUDE HVAC CONTRACTOR TO INDICATE DUCT WORK, PIPING, STRUCTURAL AND ARCHITECTURAL DETAILS. SEPIAS SHALL BE GIVEN TO PLUMBING, SPRINKLER AND ELECTRICAL TRADES WHO WILL DRAW HIS WORK ON DRAWINGS. HVAC CONTRACTORS SHALL HOLD A COORDINATION MEETING WITH ALL CONTRACTORS TO ELIMINATE INTERFERENCE OR CONFLICTS IN INSTALLING WORK. IF UNABLE TO EACH AGREEMENT ISSUE, ARCHITECT SHALL MAKE BINDING DECISION.
22. CONTRACTOR SHALL COORDINATE SPRINKLER MAIN AND BRANCHES WITH NEW CONSTRUCTION TO AVOID CONFLICTS WITH CEILING HEIGHTS, DUCTWORK, LIGHTING FIXTURES, BEAMS. CONTRACTOR TO ADJUST PIPING ACCORDINGLY TO ACCOMMODATE NEW CONSTRUCTION.
23. WET SPRINKLER SYSTEM SUBJECTED TO FREEZING SHOULD COMPLY WITH NFPA 13-2013 SEC. 8.16.4.1.
24. CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY SPRINKLER SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.

## BUILDING DEPARTMENT SPRINKLER NOTES

1. THE INSTALLATION, COMPONENTS, SIZING, SPACING, CLEARANCES, POSITION AND TYPE OF SYSTEMS SHALL CONFORM TO THE 2018 NORTH CAROLINA BUILDING CODE.
2. DIRECT CONNECTION OF SPRINKLERS TO THE PUBLIC WATER SYSTEM SHALL CONFORM TO NFPA 13-2013 CHAPTER 24.
3. AUTOMATIC SPRINKLER SYSTEMS SHALL COMPLY WITH SECTION 903 OF 2018 NORTH CAROLINA BUILDING CODE.
4. INSPECTION AND TESTS OF SPRINKLERS SHALL BE CONDUCTED AS SEC. 903.5 OF 2018 NORTH CAROLINA BUILDING CODE.
5. THE OCCUPANCY OF THE AREAS TO BE SPRINKLERED IN ACCORDANCE WITH SECTION 903.2.6 OF 2018 NORTH CAROLINA BUILDING CODE.
6. FIRE HOSE THREADS AND FITTINGS USED IN CONNECTION WITH AUTOMATIC SPRINKLER SYSTEMS SHALL BE IN ACCORDANCE WITH 903.3.6 OF 2018 NORTH CAROLINA BUILDING CODE.
1. STOCK OF EXTRA SPRINKLERS WILL BE FURNISHED AS REQUIRED BY INTERNATIONAL BUILDING CODE (REQUIRED FOR EACH TEMPERATURE RATING).
2. SPRINKLER ALARM SHALL BE IN ACCORDANCE WITH 2018 NORTH CAROLINA BUILDING CODE SEC 903.
3. ALL BLIND SPACES EXCEEDING 6" IN WIDTH OR DEPTH WHICH CONTAIN COMBUSTIBLE MATERIAL WILL BE SPRINKLERED.
4. ALL PIPE PASSING THROUGH WALLS WILL COMPLY WITH SECTION SEC. 714 2018 NORTH CAROLINA BUILDING CODE.
5. PROVIDE DEPARTMENT OF WATER SUPPLY LETTER WITH FLOW TEST DATE IF THERE IS A DIRECT CONNECTION TO THE STREET WATER SUPPLY.
6. ALL VALVES ON CONNECTIONS TO WATER SUPPLIES TO SPRINKLER SHALL BE APPROVED O.S. & Y. OR APPROVED INDICATOR TYPE.
7. HANGERS SHOULD BE SUPPORTED BY WROUGHT IRON U TYPE OR APPROVED ADJUSTABLE HANGERS. HANGERS SHALL BE OF THE TYPE APPROVED FOR USE WITH TH PIPE OR TUBE INVOLVED, AS PER CHAPTER 9 INTERNATIONAL BUILDING CODE 2015.
8. HYDRAULICALLY DESIGNED SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 903.3.8.5 OF INTERNATIONAL BUILDING CODE 2015.
9. MINIMUM BRANCH PIPE SIZE TO BE ONE INCH (1").
10. THIS APPLICATION IS MADE ONLY FOR WORK INDICATED ON THE 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 CODES.
11. FIRE PROTECTION SYSTEM SHALL BE MAINTAINED IN ACCORDANCE WITH SECTION 901.2 OF 2018 NORTH CALORINA BUILDING CODE.
12. FIRE PROTECTION SYSTEMS SHALL BE INSPECTED, TESTED AND MAINTAINED IN ACCORDANCE WITH THE REFERENCED STANDARDS LISTED IN TABLE 901.6.1 OF 2018 NORTH CALORINA BUILDING CODE.
13. AUTOMATIC SPRINKLER SYSTEMS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH SECTIONS 903.3.1 THROUGH 903.3.5 OF 2018 NORTH CALORINA BUILDING CODE.
14. SHOP DRAWINGS FOR THE FIRE PROTECTION SYSTEM SHALL BE SUBMITTED TO INDICATE CONFORMANCE TO CHAPTER 9, ANY OTHER APPLICABLE PROVISION OF THE UNIFORM CODE, AND THE CONSTRUCTION DOCUMENTS PER IBC SECTION 106.2.2 & CHAPTER 23, NFPA 13-2013. SUCH SHOP DRAWINGS SHALL BE APPROVED PRIOR TO THE START OF SYSTEM INSTALLATION. SHOP DRAWINGS SHALL CONTAIN ALL INFORMATION AS REQUIRED BY THE REFERENCED INSTALLATION STANDARDS IN CHAPTER 9 OR IN ANY OTHER APPLICABLE PROVISION OF THE UNIFORM CODE.
15. PROVIDE FLUSHING TO SPRINKLER SYSTEM AS PER NFPA 13 SECTION 16.6 AND TESTING PER NFPA 13 SECTION 6.10.2.2 WITNESSED BY THE AHJ. FLUSHING & TESTING SHALL BE DOCUMENTED ON THE REQUIRED NFPA FORMS AND A COPY PROVIDED TO THE AHJ. CO-ORDINATE FLUSHING DRAIN REQUIREMENT WITH PLUMBING CONTRACTOR.

### CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE BUILDING DEPARTMENT OF TOWN OF DURHAM. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

A. 2018 NORTH CAROLINA STATE BUILDING CODE.
B. 2018 NORTH CAROLINA STATE MECHANICAL CODE.
C. 2018 NORTH CAROLINA STATE ENERGY CONSERVATION CODE.
D. 2018 NORTH CAROLINA STATE PLUMBING CODE.
E. 2020 NATIONAL ELECTRICAL CODE (NFPA 70).
F. 2018 NORTH CAROLINA STATE FIRE CODE.

## SPRINKLER SYMBOLS LIST

| | |
|---|---|
| SP | NEW SPRINKLER PIPING |
| EX.SP | EXISTING SPRINKLER PIPING |
| EX.DR | EXISTING DRAIN PIPING |
| | RECESSED PENDENT SPRINKLER HEAD |
| | RELOCATED RECESSED PENDENT SPRINKLER HEAD |
| | SPRINKLER CAPPED OUTLET |
| | SHUT-OFF VALVE |
| | PIPE THRU RATED WALL |
| WFS | WATER FLOW SWITCH |
| TS | TAMPER SWITCH |
| SP | SPRINKLER |
| FCA | FLOOR CONTROL VALVE ASSEMBLY |
| | POINT OF CONNECTION |

## SPRINKLER DRAWING LIST


SP1.0 SPRINKLER NOTES, ABBREVIATIONS & SYMBOLS.

SP1.1 SPRINKLER SPECIFICATIONS

SP2.0 SPRINKLER FLOOR PLAN

SP3.0 SPRINKLER DETAILS


## SPACING BETWEEN SPRINKLER HEADS

ORDINARY HAZARD: 15' MAX

NOTE: MAXIMUM DISTANCE BETWEEN SPRINKLER HEADS & WALLS IS ½ THE DISTANCE BETWEEN HEADS.

## PROTECTION AREA OF SPRINKLER HEADS

ORDINARY HAZARD : 130 SQ. FT.

## GENERAL NOTES

1. FOR SPRINKLER WORK ONLY.
2. ALL SPRINKLER HEADS MEET DESIGN CRITERIA PER COVERAGE.

## FIRE PROTECTION SYSTEM INTENT

1. ALL WORK SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 13 2013.
2. PERFORM A NEW FLOW TEST OR OBTAIN A RECENT FLOW TEST AND USE THE RESULTS WHEN PREPARING HYDRAULIC CALCULATIONS.
3. PROVIDE A COMPLETE WET SPRINKLER SYSTEM, IN ACCORDANCE WITH NFPA 13-2013.

## SCOPE OF WORK

1. THE SPRINKLER SYSTEM IS DESIGNED AS PER NFPA 13 - 2013.

## DESIGN CRITERIA SUMMARY

HYDRAULIC CALCULATIONS FOR RESTAURANT SERVING AREA BASED ON THE FOLLOWING:

OCCUPANCY: ORDINARY I (MERCANTILE)
MINIMUM DESIGN DENSITY: 0.15 GPM/SQ. FT.
DESIGN AREA OF APPLICATION: 1500 SQ. FT.

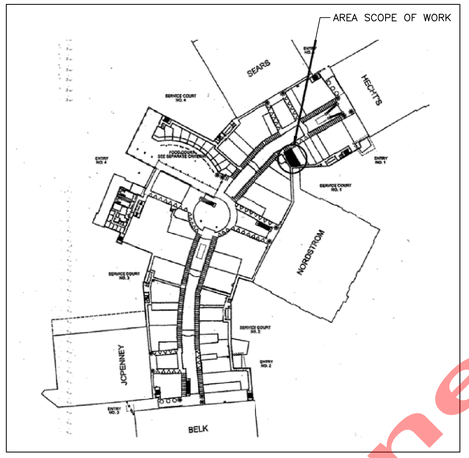
## PERFORMANCE SPECIFICATION CRITERIA

SPRINKLER PLANS AS SHOWN ARE FOR BIDDING PURPOSES ONLY.

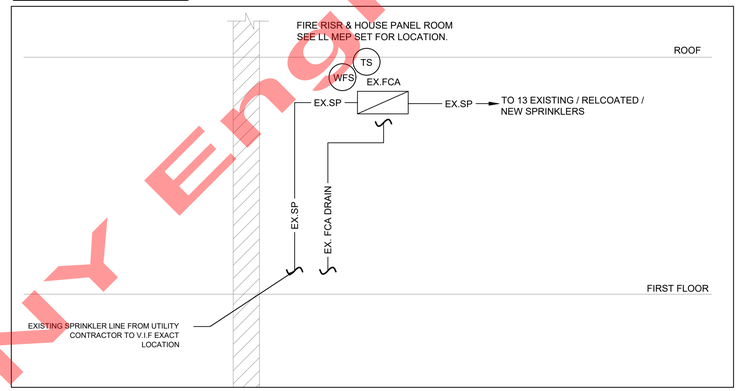
SPRINKLER CONTRACTOR IS TO OBTAIN CURRENT HYDRANT FLOW TEST DATA AND PROVIDE HYDRAULIC CALCULATIONS FOR SYSTEM PIPE SIZING IN ACCORDANCE WITH NFPA 13-2013.

CONTRACTOR IS TO SUBMIT SHOP DRAWINGS INDICATING HYDRAULIC CALCULATIONS, PIPING LAYOUT AND SIZING. ALL WORK IS TO BE DONE IN ACCORDANCE WITH ALL STATE,LOCAL, GOVERNING AND APPLICABLE CODES.

KEY PLAN:




SPRINKLER RISER DIAGRAM




## SPRINKLER SCHEDULE

| SYMBOL | NAME | COVERAGE | AREA | METAL | TEMPERATURE (°F) | RESPONSE | K-FACTOR | NPT | MFG | MODEL# | APPROVALS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| O | RECESSED PENDANT | STANDARD | LH/OH AREAS WITH CEILING | BRASS | 155 | STANDARD | 5.6 | ½" | TYCO | TYCO / SERIES TY3251 | UL |

NOTE: 1. COORDINATE ALL SPRINKLER COLOR FINISHES WITH ARCHITECT.
2. NEW SPRINKLER HEADS SHOULD BE SAME AS EXISTING OR AS MENTIONED IN THE SECHDULE

Property of NY Engineers

CLOUDSTEPPERS

Sprinkler Notes Abbreviations & Symbols



SP1.0

## SPRINKLER SPECIFICATIONS

PART 1 - GENERAL

1.01 REQUIREMENTS

A. THE SPRINKLER CONTRACTOR SHALL BE A LICENSED, AUTHORIZED INSTALLER OF SPRINKLER SYSTEMS AND SHALL HAVE HAD A MINIMUM OF FIVE YEARS EXPERIENCE IN THE INSTALLATION OF SPRINKLER SYSTEMS IN THE CITY OF DURHAM/NORTH CAROLINA.

B. BEFORE SUBMITTING HIS BID, THE SPRINKLER CONTRACTOR SHALL VISIT THE SITE AND SHALL FULLY FAMILIARIZE HIMSELF WITH, AND BECOME FAMILIAR WITH THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. CONTRACTOR SHALL PERFORM THIS PRIOR TO SUBMITTING HIS PROPOSAL. 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.

C. UPON REVIEW OF THE DRAWINGS AND SPECIFICATIONS, PRIOR TO SUBMITTING HIS PROPOSAL, THE SPRINKLER CONTRACTOR SHALL INFORM ARCHITECT AND/OR ENGINEER OF ANY DISCREPANCIES OR REQUEST CLARIFICATION IN WRITING, IF NECESSARY, CONCERNING THE INTENT OF THE PLANS AND SPECIFICATIONS TO PROVIDE A COMPLETE SPRINKLER SYSTEM INSTALLATION. LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OF MATERIALS SHOULD SUCH PROCEDURE NOT BE FOLLOWED.

D. THE SCHEDULING OF THE SPRINKLER WORK SHALL BE COORDINATED WITH BUILDING MANAGEMENT, WITH OTHER CONTRACTORS AND WITH THE ENGINEER.

E. NECESSARY SHUT-DOWNS OF BASE BUILDING SPRINKLER SYSTEM MUST BE COORDINATED WITH BUILDING MANAGEMENT. SHUT-DOWNS OF BASE BUILDING SYSTEMS SHALL TAKE PLACE AFTER OR BEFORE NORMAL BUSINESS HOURS AND SHALL BE CONSIDERED OVERTIME WORK. THE CONTRACTOR MUST GIVE BUILDING MANAGEMENT AND CITY FIRE DEPARTMENT 48 HOURS NOTICE PRIOR TO SHUT-DOWN OF SPRINKLER, OR OTHER SYSTEMS.

1.02 WORK INCLUDED

A. WORK SHALL INCLUDE ALL SPRINKLER WORK FURNISHED AND INSTALLED AS INDICATED ON THE PLANS AND AS SPECIFIED HEREIN.

1. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF THE CITY BUILDING CODE, N.F.P.A. STANDARD 13-2013, NORTH CAROLINA FIRE DEPARTMENT AND OWNERS INSURANCE RATING ORGANIZATION.
2. PROVIDE COMPLETE NEW SPRINKLER SYSTEM CONNECTING TO EXISTING SPRINKLER SYSTEM ALARM CHECK VALVE ASSEMBLY.
3. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. ANY DIMENSIONS NOT SHOWN SHALL BE OBTAINED FROM FIELD MEASUREMENTS.
4. PROVIDE COMPUTER GENERATED HYDRAULIC CALCULATIONS IN ACCORDANCE WITH SC BUILDING DEPARTMENT AND NFPA STANDARDS.

1.03 SHOP DRAWINGS AND SUBMITTALS

A. THE CONTRACTOR SHALL SUBMIT, FOR APPROVAL, FULLY COORDINATED SHOP DRAWINGS, CAPACITY, DATA, AND CATALOG CUTS OF THE FOLLOWING:

1. PIPE AND FITTINGS
2. VALVES
3. HANGERS AND SUPPORTS
4. SPRINKLER PIPING LAYOUT
5. TESTS
6. SPRINKLER HEADS
7. HYDRAULIC CALCULATIONS

A. THE SPRINKLER SYSTEM SHALL BE HYDRAULICALLY DESIGNED. CONTRACTOR SHALL SUBMIT CALCULATIONS WITH SHOP DRAWINGS. CALCULATIONS SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS OF NFPA 13-2013, AND NORTH CAROLINA BUILDING CODE.

B. ADD APPROPRIATE HOSE ALLOWANCE.

C. THE SPRINKLER CONTRACTOR SHALL OBTAIN THE LATEST FIRE PUMP TEST AT THE SITE TO VERIFY THE AVAILABLE WATER SUPPLY.

1.04 BUILDING DEPARTMENT FILING, PERMITS AND CERTIFICATES

A. THE SPRINKLER CONTRACTOR SHALL FILE ALL REQUIRED DRAWINGS AND HYDRAULIC CALCULATIONS WITH THE BUILDING DEPARTMENT AND BE RESPONSIBLE FOR OBTAINING FINAL APPROVAL.

B. ARRANGE FOR INSPECTION AND TESTS OF ANY AND ALL PARTS OF THE WORK AS REQUIRED BY AUTHORITIES HAVING JURISDICTION AND PAY ALL CHARGES FOR SAME.

1.05 INSPECTION AND TESTING

A. THE SPRINKLER SYSTEM SHALL BE INSPECTED AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY BUILDING CODE FIRE DEPARTMENT INSPECTOR.

B. THE SPRINKLER SYSTEM SHALL BE SUBJECTED TO A HYDROSTATIC PRESSURE TEST FOR A PERIOD OF TWO HOURS AT A PRESSURE OF AT LEAST 200 PSIG OR 50 PSI IN EXCESS OF THE MAXIMUM PRESSURE TO BE MAINTAINED WHEN THE MAXIMUM PRESSURE IN THE SYSTEM IS IN EXCESS OF 150 PSI AS PER NFPA.

C. THE BUILDING DEPARTMENT SHALL BE NOTIFIED THAT THE SYSTEM IS READY FOR REINSPECTION AND TESTING. THE BUILDING DEPARTMENT INSPECTOR SHALL WITNESS THE TEST. FINAL APPROVAL OF THE SPRINKLER SYSTEM SHALL BE OBTAINED FROM BUILDING DEPARTMENT, AND FIRE DEPARTMENT.

PART 2 - MATERIALS

2.01 GENERAL

A. THE SPRINKLER SYSTEM SHALL BE COMPLETE WITH ALL PIPE, FITTINGS, VALVES, DRAINAGE SYSTEM AND VALVES, HANGERS AND SUPPORTS. ALSO, MISCELLANEOUS WORK ITEMS, SUCH AS, SIGNS AS REQUIRED, VALVE TAGS, ETC., AND ALL OTHER RELATED EQUIPMENT, APPARATUS AND MATERIAL ITEMS NECESSARY FOR COMPLETE, APPROVED TYPE SYSTEM, READY FOR FUTURE EXTENSION.

B. ALL PIPE, FITTINGS, HANGERS, SUPPORTS, SPRINKLER HEADS, ETC., SHALL CONFORM TO THE . CITY BUILDING CODE AND NATIONAL FIRE PROTECTION ASSOCIATION'S REQUIREMENTS AS TO TYPES OF MATERIALS, ARRANGEMENT, SIZES AND INSTALLATION. PIPING PENETRATING FIRE RATED PARTITIONS SHALL HAVE OPENING SEALED WITH U.L. APPROVED FIREPROOF SEALANT.

2.02 SPRINKLER PIPING

A. ALL SPRINKLER PIPING SHALL BE SCHEDULE 40 IN ACCORDANCE WITH NFPA 13. PIPE SHALL BE UL/FM APPROVED.

B. STEEL PIPE SHALL BE BETHLEHEM STEEL CO., ALLIED TUBE, BERGER INDUSTRIES OR APPROVED.

C. AS PER NFPA 13 MODIFIED BY APPENDIX Q, PIPE OR TUBE USED IN SPRINKLER SYSTEMS SHALL BE OF THE MATERIALS SPECIFIED IN TABLE 7.3.1.1.

D. AS PER NFPA 13, FITTINGS USED IN SPRINKLER SYSTEMS SHALL BE OF THE MATERIALS LISTED IN TABLE 7.4.1. FITTING SHALL BE UL/FM APPROVED. CONTRACTOR.

E. NONMETALLIC PIPES & FITTINGS USED IN MULTIPURPOSE PIPING SYSTEMS NOT EQUIPPED WITH A FIRE DEPARTMENT CONNECTION SHALL BE DESIGNED TO WITHSTAND A WORKING PRESSURE OF NOT LESS THAN 130PSI AT 120°F.

2.03 CUTTING AND PATCHING

DO ALL CUTTING AND CORE DRILLING NECESSARY FOR THE INSTALLATION OF SPRINKLER WORK. ACCURATELY LAYOUT WORK FOR WHICH CUTTING IS REQUIRED. PATCH AND RESTORE ANY DAMAGE WORK TO LIKE NEW CONDITION.

2.04 CUTTING AND PATCHING

1. DO ALL CUTTING AND CORE DRILLING NECESSARY FOR THE INSTALLATION OF SPRINKLER WORK. ACCURATELY LAYOUT WORK FOR WHICH CUTTING IS REQUIRED. PATCH AND RESTORE ANY DAMAGE WORK TO LIKE NEW CONDITION.
2. FOR REPLACEMENT OF THE WORK REMOVED, MATCH EXISTING IN NATURE, CONSTRUCTION AND FINISH.
3. MAINTAIN THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH COVERED BY THE WORK, REMOVE ALL SURPLUS MATERIALS, TOOLS ETC. AND LEAVE PREMISES CLEAN.

2.05 FIRE STOPPING

INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURERS PUBLISHED DIRECTIONS AND PER FIRE TESTED DESIGNS THAT HAVE BEEN ACCEPTED BY THE APPROPRIATE CODE AUTHORITY HAVING JURISDICTION.

2.06 PHASING

PHASING SHALL BE COORDINATED BETWEEN THE SPRINKLER CONTRACTOR AND GENERAL CONTRACTOR. SPRINKLER INSTALLATION SHALL BE PHASED IN A MANNER WHICH WILL ALLOW FULL OCCUPANCY OF THE EXISTING FACILITY WHILE THE INSTALLATION IS IN PROGRESS.

2.06 ALTERNATES/SUBSTITUTIONS

CONTRACTOR SHALL STATE IN THEIR PROPOSAL ANY CONTRACTOR PROPOSED SUBSTITUTIONS OF THE MATERIALS OR METHODS OF INSTALLATION FROM THAT SPECIFIED. THESE ALTERATIONS SHALL BE LISTED ON THE PROPOSAL AS CONTRACTOR ALTERNATIVE.

2.07 LEAK DAMAGE

THE SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE DURING THE INSTALLATION AND TESTING PERIODS OF THE SPRINKLER SYSTEM FOR ANY LOSS OR DAMAGE TO THE WORK OF OTHERS, TO THE BUILDING, IT'S CONTENTS ETC. CAUSED BY LEAKS IN THE EQUIPMENT. BY UNPLUGGED OR DISCONNECTED PIPES, FITTINGS ETC. OR BY OVERFLOW, AND SHALL PAY FOR THE NECESSARY REPLACEMENTS OR REPAIRS TO THE WORK OF OTHERS, DAMAGED BY SUCH LEAKAGE.

2.08 INSERTS, HANGERS, ETC.

A. ALL SPRINKLER PIPING SHALL BE SUBSTANTIALLY SUPPORTED AND SHALL COMPLY WITH THE STANDARDS FOR THE NATIONAL FIRE PROTECTION ASSOCIATION FOR THE INSTALLATION OF SPRINKLER SYSTEMS AND AS REQUIRED BY THE INTERNATIONAL BUILDING CODE.

B. HANGERS AND THEIR COMPONENTS SHALL BE FERROUS. HANGERS SHALL BE ADJUSTABLE FLAT IRON TYPE OF CLEVIS TYPE.

C. SPRINKLER PIPING OR HANGERS SHALL NOT BE USED TO SUPPORT NON-SYSTEM COMPONENTS.

D. SPRINKLER PIPING SHALL BE SUBSTANTIALLY SUPPORTED FROM THE BUILDING STRUCTURE WHICH MUST SUPPORT THE ADDED LOAD OF THE WATER-FILLED PIPE PLUS A MINIMUM OF 250 LBS. APPLIED AT THE POINT OF HANGING. CONTRACTOR SHALL SUBMIT DETAIL OF SUPPORT FOR REVIEW AND APPROVAL.

E. SPRINKLER PIPING SHALL BE SUPPORTED INDEPENDENTLY OF THE CEILING SHEATHING.

F. WHEN SPRINKLER PIPING IS INSTALLED BELOW DUCTWORK, PIPING SHALL BE SUBSTANTIALLY SUPPORTED FROM THE BUILDING STRUCTURE, NOT FROM THE DUCTWORK.

G. MAXIMUM DISTANCE BETWEEN HANGERS SHALL NOT EXCEED 12 FT. FOR 1 AND 1-1/4" SIZES NOR 15' FOR SIZES 1-1/2" AND LARGER.

H. EXPANSION SHIELDS FOR SUPPORTING PIPES UNDER CONCRETE CONSTRUCTION MAYBE USED IN A HORIZONTAL POSITION IN THE SIDES OF BEAMS. IN CONCRETE HAVING GRAVEL OR CRUSHED STONE AGGREGATE, EXPANSION SHIELDS MAY BE USED IN THE VERTICAL POSITION TO SUPPORT PIPES 4" OR LESS IN DIAMETER.

2.09 ESCUTCHEONS

PROVIDE ESCUTCHEONS ON ALL EXPOSED PIPING PASSING THROUGH WALLS, PARTITIONS, FLOORS AND CEILINGS. ESCUTCHEON SHALL BE HELD IN PLACE BY INTERNAL TENSION OR SET SCREW.

2.10 AS-BUILT DRAWINGS

PREPARE AND SUBMIT "AS BUILT" DRAWINGS AT THE COMPLETION OF THE PROJECT.

2.11 SPRINKLER HEADS

A. SPRINKLERS SHALL BE RATED FOR ORDINARY TEMPERATURES (155 DEG. F) EXCEPT AS REQUIRED NEAR HEATERS OR LOCATIONS WHERE ELEVATED TEMPERATURES MAY NORMALLY BE EXPECTED OR AS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS.

B. SPRINKLER HEADS SHALL BE BY TYCO SPRINKLER CO., INC. MANUFACTURE OR APPROVED EQUAL, UL AND FM APPROVED, AS FOLLOWS:

1. SPRINKLER HEADS IN FINISHED CEILINGS WITH RECESSED PIPING SHALL BE AUTOMATIC TYCO MODEL TY3251.
2. PROVIDE SPARE SPRINKLER EMERGENCY CABINETS CONFORMING TO NFPA 13.
3. SPRINKLER EMERGENCY CABINETS SHALL BE OF TYCO SPRINKLER CO., INC. OR APPROVED EQUAL, UL AND FM APPROVED.
4. CABINET SHALL BE CONSTRUCTED OF 22 GAUGE STEEL WITH PRIME COAT AND MANUFACTURER'S BAKED ENAMEL FINISH IN COLOR SELECTED BY THE ARCHITECT.
5. CABINET SHALL CONTAIN A MINIMUM OF 6 SPRINKLER HEADS OF EACH TYPE EMPLOYED.

2.12 PRESSURE GAUGE

A. ASHCROFT SERIES 1079, OR APPROVED OTHER, 4-1/2" DIAMETER, 0-300 P.S.I. RANGE, 5 P.S.I. INTERVALS.

PART 3 - EXECUTION

3.01 GUARANTEE

A. GUARANTEE FOR A PERIOD OF ONE (1) YEAR FORM THE DATE OF ACCEPTANCE BY THE OWNER, ALL MATERIALS, APPARATUS AND WORKMANSHIP WHETHER FURNISHED BY HIMSELF OR BY HIS SUBCONTRACTORS AND HE SHALL REPLACE OR REPAIR IN A MANNER APPROVED BY THE ARCHITECTS, WITHOUT COST TO THE OWNER, ANY PART OR PARTS OF THE WORK WHICH MAY PROVE DEFECTIVE OR UNSATISFACTORY WITH IN THE PERIOD OF THE GUARANTEE.

3.02 INSTALLATION

A. PIPING

1. INSTALL PIPING AS SHOWN ON THE CONTRACT DRAWINGS AND STRAIGHT AND DIRECT AS POSSIBLE, FORMING RIGHT ANGLES OR PARALLEL LINES WITH BUILDING WALLS, NEATLY SPACED, WITH RISERS PLUMB AND TRUE.
2. SPRINKLER PIPING SHALL BE INSTALLED SO THAT THE SYSTEM CAN BE DRAINED.
3. PIPE SHALL BE REMOVED BY REAMING.
4. BEFORE INSTALLING PIPE, THOROUGHLY CLEAN THE INSIDE FREE OF CUTTING AND FOREIGN MATTER. CUT ALL PIPE SQUARE AND SMOOTH AND MAKE UP ALL JOINTS TO REQUIRED LIMITS.

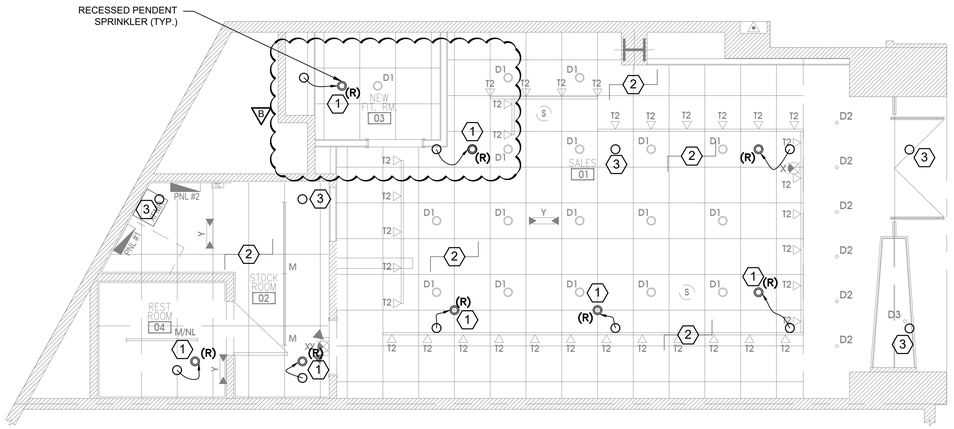
B. PIPE JOINTS

1. THREADED JOINTS SHALL BE MADE UP OF TIGHT USING PIPE JOINT TEFLON COMPOUND OR TAPE, APPLIED ON THE MALE THREADS ONLY.

Property of NY Engineers

CLOUDSTEPPERS

Sprinkler Specifications




## Sprinkler Floor Plan

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

0 1' 2'

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY TO INSTALL ALL SPRINKLER HEADS TO BE MAX. 12" FROM CEILING.
2. ALL NEW SPRINKLER HEADS LOCATION TO BE COORDINATED WITH LIGHTING AND DIFFUSERS TO AVOID CONFLICT.
3. ALL SPRINKLER HEADS & PIPING TO BE COORDINATED WITH EXISTING & NEW SERVICES.
4. ANY WORK SHOWN ON THE DRAWINGS AND NOT PARTICULARLY DESCRIBED IN THE SPECIFICATIONS OR DETAILS, OR ANY WORK WHICH MAY BE DEEMED NECESSARY TO COMPLETE THE CONTRACT SHALL BE PROVIDED BY THE CONTRACTOR AS PART OF THIS CONTRACT.
5. FOR PURPOSES OF CLEARNESS AND LEGIBILITY, SPRINKLER DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC AND SIZE AND LOCATION OF EQUIPMENT ARE DRAWN TO SCALE WHEREVER POSSIBLE. THE DRAWINGS INDICATE CONNECTION POINTS, AND ROUTED OF PIPES. IT IS NOT INTENDED, HOWEVER, THAT ALL OFFSETS, RISES AND DROPS ARE SHOWN. PROVIDE PIPING AS REQUIRED TO FIT STRUCTURE, AVOID OBSTRUCTIONS, AND RETAIN CLEARANCES, HEADROOM OPENINGS AND PASSAGEWAYS. ALL SPRINKLER PIPING AT CEILING SHALL BE ROUTED TIGHT TO EXISTING SLAB AS REQUIRED.
6. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION IF REQUIRED AS PER STRUCTURAL REQUIREMENT.
7. CONTRACTOR SHALL ENSURE THERE ARE NO COMBUSTIBLE MATERIALS IN THE ABOVE CEILING SPACE TO PREVENT THE NEED FOR SPRINKLERS IN THAT AREA AS PER NFPA 13.
8. CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND SIZE OF EXISTING SYSTEM. ALL PENDANT SPRINKLERS MUST BE SPACED AS FOLLOWS -
   1. MAXIMUM 7.5' FROM WALL
   2. MAXIMUM DISTANCE BETWEEN 2 SPRINKLER HEADS IS 15'.
   3. MINIMUM DISTANCE BETWEEN 2 SPRINKLER HEADS IS 6'.
   4. COVERAGE AREA PER SPRINKLER SHALL BE MAX. 225 SQ.FT.
9. ALL SPRINKLER HEADS MEET DESIGN CRITERIA PER COVERAGE.
10. AUXILIARY DRAIN SHALL BE PROVIDED AT THE TRAPPED SECTIONS.
11. FOR SPRINKLER WORK ONLY.
12. ALL BRANCH TAKE-OFF FOR EACH SPRINKLER TO BE MIN. 1".
13. ALL PIPE SIZES AS PER PIPE SCHEDULE METHOD

SPRINKLER KEYNOTES

(1) RELOCATE EXISTING SPRINKLER TO NEW LOCATION SHOWN ON FLOOR PLAN. CONTRACTOR TO FIELD VERIFY AND COORDINATE EXACT ROUTING, SIZING AND PIPE ELEVATION ON FIELD AND ADJUST/ MODIFY / RELOCATE AND REPLACE THE EXISTING SPRINKLER HEADS AS SHOWN IN THE PLAN FOR THE NEW LOCATIONS AS PER THE NEW PROPOSED CEILING. UPGRADE THE EXISTING PIPE SIZE / SPRINKLER HEADS IF REQUIRED.

(2) CONTRACTOR TO FIELD VERIFY EXISTING SPRINKLER MAIN HEADER PIPE WITH THE ASSOCIATED ACCESSORIES AND FITTINGS AND ENSURE THAT EXISTING PIPING, SPRINKLER, FCA / AV, TAMPER SWITCH, AND WATER FLOW SWITCH ARE IN GOOD CONDITION. REPLACE EXISTING PIPING, SPRINKLERS AND ACCESSORIES IF NOT IN GOOD CONDITION.

(3) EXISTING SPRINKLER HEAD TO REMAIN.

| SPRINKLER SCHEDULE | |
|---|---|
| EXISTING TO REMAIN RECESSED PENDENT SPRINKLER HEAD | 5 |
| RELOCATED RECESSED PENDANT SPRINKLER HEAD | 8 |
| TOTAL | 13 |

| HAZARD CLASSIFICATION AND DESIGN DENSITY | |
|---|---|
| OCCUPANCY: | ORDINARY HAZARD |
| MINIMUM DESIGN DENSITY: | 0.15 GPM/SQ. FT. |

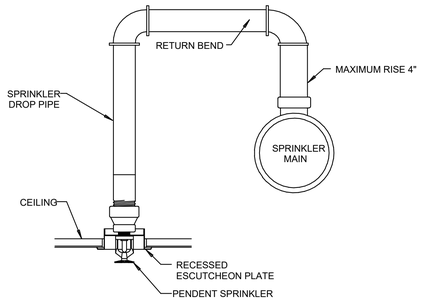
Property of NY Engineering

CLOUDSTEPPERS

Sprinkler Floor Plan

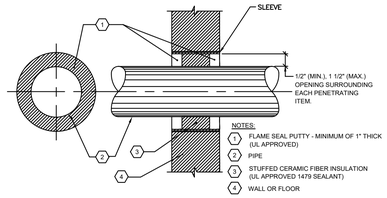


SP2.0



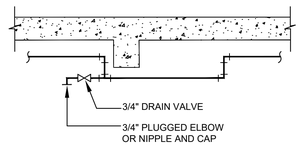

1 / SP3.0 — RECESSED PENDENT SPRINKLER HEAD DETAILS

N.T.S



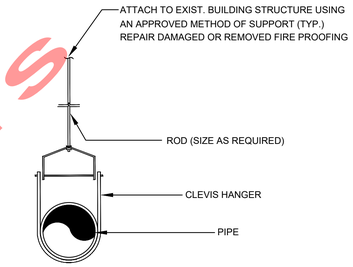

2 / SP3.0 — FIRE STOPPING DETAIL FOR FIRE/ SMOKE RATED WALL/FLOOR OPENINGS

N.T.S




3 / SP3.0 — TYPICAL DRAIN CONNECTION FOR TRAPPED LINES ON WET PIPE SPRINKLER SYSTEMS

N.T.S




4 / SP3.0 — HANGER DETAILS TYPICAL

N.T.S




5 / SP3.0 — PIPE SLEEVE THRU WALL SECTION

N.T.S




HANGER DETAIL

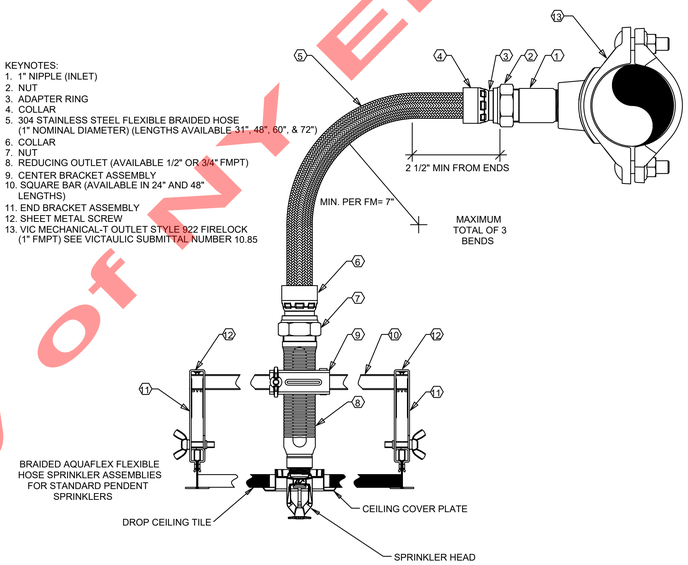
NOT TO SCALE

| ROD SCHEDULE | | |
|---|---|---|
| PIPE SIZE | ROD SIZE | SPACING |
| 1" | 3/8" | 5'-8' |
| 1 1/4" | 3/8" | 6'-10' |
| 1 1/2" | 3/8" | 8'-10' |
| 2" | 3/8" | 10'-12' |

6 / SP3.0 — TYPICAL HANGER DETAIL AND ROD SCHEDULE

N.T.S

KEYNOTES:
1. 1" NIPPLE (INLET)
2. NUT
3. ADAPTER RING
4. COLLAR
5. 304 STAINLESS STEEL FLEXIBLE BRAIDED HOSE (1" NOMINAL DIAMETER) (LENGTHS AVAILABLE 31", 48", 60", & 72")
6. COLLAR
7. NUT
8. REDUCING OUTLET (AVAILABLE 1/2" OR 3/4" FMPT)
9. CENTER BRACKET ASSEMBLY
10. SQUARE BAR (AVAILABLE IN 24" AND 48" LENGTHS)
11. END BRACKET ASSEMBLY
12. SHEET METAL SCREW
13. VIC MECHANICAL-T OUTLET STYLE 922 FIRELOCK (1" FMPT) SEE VICTAULIC SUBMITTAL NUMBER 10.85




7 / SP3.0 — FLEXIBLE HOSE SPRINKLER ASSEMBLY DETAIL

N.T.S

Property of NY Engineers

CLOUDSTEPPERS

Sprinkler Details



SP3.0

## PLUMBING SYMBOLS LIST

| | |
|---|---|
| ——— | SANITARY PIPING |
| — —V— — | VENT PIPING |
| ——CW—— | COLD WATER PIPING |
| ——HW—— | HOT WATER PIPING |
| ——SAN—— | UNGD. SANITARY PIPING |
| ———○ | P-TRAP |
| ———○ | PIPE UP |
| ———○ | PIPE DROP |
| ———‖ | PLUGGED OUTLET/CLEANOUT |
| | SHUT-OFF VALVE |
| | CHECK VALVE |
| | SLEEVE |
| | POINT OF NEW CONNECTION |
| ———○ | FLOOR CLEANOUT |

## PLUMBING ABBREVIATIONS

| | |
|---|---|
| AFF | ABOVE FINISH FLOOR |
| CW | COLD WATER |
| DN | DOWN |
| EX | EXISTING |
| ET | EXPANSION TANK |
| FCO | FLOOR CLEANOUT |
| FD | FLOOR DRAIN |
| HW | HOT WATER |
| WH | WATER HEATER |
| SAN | SANITARY |
| SQ. FT. | SQUARE FEET |
| TYP. | TYPICAL |
| V | VENT |
| VTR | VENT THRU ROOF |

| PLUMBING DRAWING LIST | |
|---|---|
| P1.0 | PLUMBING SYMBOLS, NOTES & SPECIFICATIONS |
| P2.0 | PLUMBING FLOOR PLANS, SCHEDULE & RISERS |

CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE BUILDING DEPARTMENT OF TOWN OF DURHAM. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

A. 2018 NORTH CAROLINA STATE BUILDING CODE.
B. 2018 NORTH CAROLINA STATE MECHANICAL CODE.
C. 2018 NORTH CAROLINA STATE ENERGY CONSERVATION CODE.
D. 2018 NORTH CAROLINA STATE PLUMBING CODE.
E. 2020 NATIONAL ELECTRICAL CODE (NFPA 70) WITH STATE AMMENDMENTS.
F. 2018 NORTH CAROLINA STATE FIRE CODE.

## BUILDING DEPARTMENT PLUMBING NOTES:

1. ALL PLUMBING SYSTEMS AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2018 NORTH CAROLINA STATE PLUMBING CODE.
2. UNLESS STATED OTHERWISE, SANITARY OR VENT SERVICE IS EXISTING TO REMAIN. SANITARY, VENT OR OTHER DRAINAGE NETWORK ARE EXISTING TO REMAIN.
3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION IN PC 305.
4. RODENT PROOFING AS PER IN PC 304.
5. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION IN PC 303, PC 402, PC 605, PC 702, PC 802, PC 902 & PC 1004.
6. EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
7. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
8. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610.

## 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.

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
2. VALVES
3. HANGERS AND SUPPORTS
4. PLUMBING PIPING LAYOUT
5. TESTS
6. PLUMBING FIXTURES
7. ALL SCHEDULED PLUMBING EQUIPMENT
8. WATER HEATER

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 CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.

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.

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 2018 PLUMBING CODE OF NORTH CAROLINA STATE 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. DOMESTIC WATER PIPING:

1. ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.
2. FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.
3. JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
4. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
5. COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
6. IN LIEU OF COPPER, PEX PIPE (WITH CORRESPONDING FITTINGS & SUPPORTS) MAY BE USED AS AN ALTERNATIVE. REFER 2018 NORTH CAROLINA STATE PLUMBING CODE SECTION 605.4 FOR PEX PIPE.
7. 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 2018 NORTH CAROLINA STATE ENERGY CONSERVATION CODE. SECTION C403.2.10 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS

| FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F) | INSULATION CONDUCTIVITY | | NOMINAL PIPE OR TUBE SIZE (INCHES) | | | | |
|---|---|---|---|---|---|---|---|
| | CONDUCTIVITY BTU· IN./ (H· FT2· °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 |

8. WATER DISTRIBUTION SYSTEM AS PER 2018 NORTH CAROLINA ENERGY CONSERVATION CODE SECTION, C404.7, 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. PER 2018 NORTH CAROLINA STATE ENERGY CONSERVATION CODE SECTION 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. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.

11. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

B. HANGERS AND SUPPORTS:
1

1. HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.
4. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
5. UNLESS OTHERWISE INDICATED OR REQUIRED BY AUTHORITIES HAVING JURISDICTION, THE FOLLOWING SHALL BE PROVIDED WITH SEISMIC RESTRAINTS AS REQUIRED BY THE BOCA NATIONAL BUILDING CODE, SECTION 1610.6.4: ALL EQUIPMENT AND MACHINERY, ALL NEW PIPING 2-1/2" AND LARGER (1-1/4" AND LARGER INBOILER/MECHANICAL ROOMS) WITH HANGERS GREATER THAN 12" IN LENGTH FROM THE TOP OF PIPE TO THE STRUCTURE.
6. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

C. 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.

D. 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.

E. ELECTRIC WATER HEATER

1. THE TANKLESS WATER HEATER SHALL BE UL LISTED FOR THE US.
2. UNIT SHALL BE PROTECTED BY A SHEET METAL HOUSING. HEAT EXCHANGER SHALL BE RATED FOR MAXIMUM WORKING PRESSURE NOT LESS THAN 150 PSIG.
3. ALL ASPECTS OF INSTALLATION OF WATER HEATER PLANT SHALL BE IN STRICT ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS. MATERIALS SHALL CONFORM TO ALL MANUFACTURER RECOMMENDATION INCLUDING ELECTRICAL CONNECTIONS AND WIRING.
4. WATER HEATER PIPING SHALL BE FIELD CONSTRUCTED OF MATERIALS AS SPECIFIED. WATER HEATER SHALL BE INSTALLED WITH INDIVIDUAL ISOLATING SHUTOFF VALVES FOR SERVICE AND MAINTENANCE.

F. 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.

G. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.

H. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.

I. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL. REMOVE PROTECTIVE COATINGS PRIOR TO INSTALLATION.REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.

J. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

K. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.

L. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL. REMOVE PROTECTIVE COATINGS PRIOR TO INSTALLATION.

M. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.

N. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

O. 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.

P. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.

Q. 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.

R. 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.

S. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.

T. 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.

U. PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK-CLOSING VALVES.

V. MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.

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 SPACES.

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. ELECTRICAL SERVICE BOARD(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 A 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.

2.02 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.

2.03 INSULATION

COVER ALL HOT WATER AND HOT WATER RECIRCULATION PIPE WITH 1" THICK FOR PIPE SIZE UP TO 1¼" AND 1½" THICK FOR PIPE SIZE 1½" AND GREATER WITH MANVILLE MICRO-LOK AP-T PLUS FIBERGLASS INSULATION. COVER ALL COLD WATER PIPE WITH ½" THICK FOR PIPE SIZE UP TO 1¼" AND 1" THICK FOR PIPE SIZE 1½" AND GREATER WITH 1" 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 INSULATION MATERIAL SHALL COMPLY WITH THE NEW YORK CITY BUILDING CODE REQUIREMENT OF A FLAME SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DEVELOPED RATING NOT TO EXCEED 50. ALL PIPE INSULATION SHALL COMPLY WITH 2018 NORTH CAROLINA STATE ENERGY CONSERVATION CODE.

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.

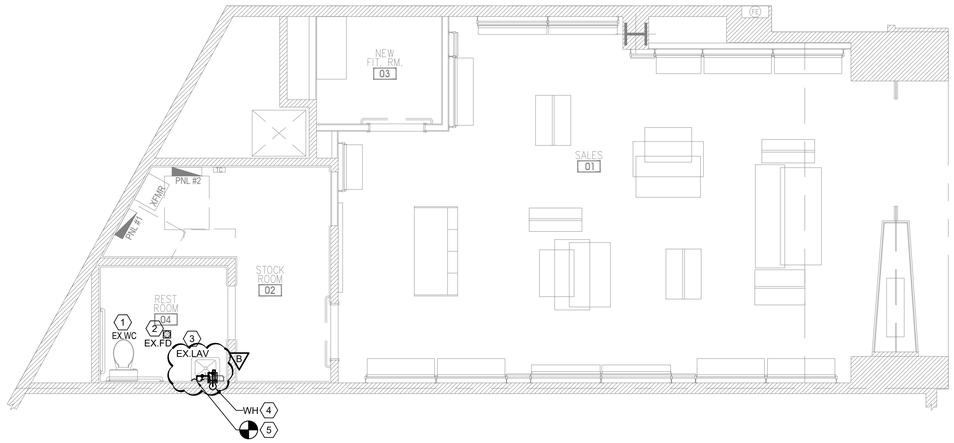
I. ALL EQUIPMENT WILL BE FACTORY TESTED.

J. 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 125 PSIG.
   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 ELECTRICAL SERVICE BOARD SPACES.

M. REFILL ENTIR




## Water Supply Floor Plan

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

0 1' 2' 8'

## GENERAL NOTES

A. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.

B. CONTRACTOR TO VERIFY ALL EXISTING PLUMBUNG UTILITY SERVICES PRIOR TO BID, NOTIFY AN ENGINEER OF RECORD IF THERE IS ANY DISCREPANCY WHILE BIDDING & CONTRACTOR SHALL BID ACCORDINGLY.

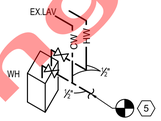
C. NEW OR REPAIRED POTABLE WATER SYSTEMS SHALL BE DISINFECTED BY CHLORINATION PRIOR TO USE ACCORDING TO THE METHOD SET IN 2018 PLUMBING CODE OF NORTH CAROLINA STATE SEC. 609.10.

D. CONTRACTOR SHALL ARRANGE AND PAY FOR ALL UTILITY METERS AND UTILITY CONNECTIONS

E. BACTERIOLOGICAL TESTING OF POTABLE WATER SYSTEM REQUIRED TO BE PERFORMED BY AN INDEPENDENT THIRD PARTY TESTING LABORATORY, 2018 PLUMBING CODE OF NORTH CAROLINA STATE SEC. 609.9 (4).

## KEYED NOTES

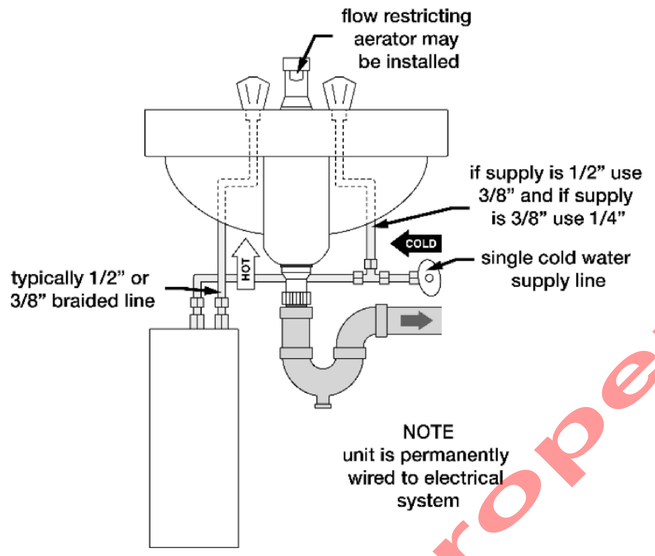
1. EXISTING WATER CLOSET (EX.WC) WITH EXISTING PLUMBING CONNECTIONS TO REMAIN.
2. EXISTING FLOOR DRAIN (EX.FD) WITH EXISTING PLUMBING CONNECTIONS TO REMAIN.
3. EXISTING LAVATORY (EX. LAV) WITH EXISTING FAUCET TO REMAIN. CONNECT TO NEW WATER HEATER (WH). EXISTING SANITARY & VENT CONNECTIONS TO REMAIN.
4. PROVIDE NEW WATER HEATER (WH). LIMIT HOT WATER TEMPERATURE AT FAUCET OUTLET TO 110 DEG F.
5. CONNECT NEW WATER HEATER TO EXISTING COLD WATER CONNECTION FOR EXISTING LAVATORY (EX.LAV).




## Water Isometric Riser

SCALE : N.T.S

0 1' 2' 4' 8'




## Water Heater Installation Detail

SCALE : N.T.S.

| PLUMBING FIXTURE SCHEDULE | | | | | | | |
|---|---|---|---|---|---|---|---|
| TAG | QUANTITY OF FIXTURES | DESCRIPTION | ROUGH-IN SIZE | | | | REMARKS |
| | | | CW | HW | SAN | VENT | |
| EX.WC | 1 | EXISTING WATER CLOSET | EX | - | EX | EX | EXISTING WATER CLOSET TO BE REMAIN. |
| EX.FD | 1 | EXISTING FLOOR DRAIN | EX | EX | EX | EX | EXISTING FLOOR DRAIN TO BE REMAIN. |
| EX.LAV | 1 | EXISTING LAVATORY | EX | 1/2" | EX | EX | CONNECT HOT WATER CONNECTION TO WATER HEATER OUTLET |
| NOTE: CONTRACTOR TO COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL PLUMBING FIXTURES SPECIFICATIONS AND MOUNTING HEIGHT INSTALLATION. | | | | | | | |

| WATER HEATER SCHEDULE | | | | | | |
|---|---|---|---|---|---|---|
| TAG | QUANTITY | FIXTURE SERVING | LOCATION | ELECTRICAL CHARACTERISTICS | FLOW RATE (GPM) | MANUFACTURER/MODEL |
| WH | 1 | EX.LAV | BELOW LAVATORY | 3.5 kW / 120V / 30 AMPS | 0.35 (@68 DEG F) | EEMAX SPEX3012T ML (LAV ADVANTAGE) |
| NOTES:<br>1. LOCATE WATER HEATER CLOSE TO SIDE WALL AND BELOW LAVATORY SINK TO KEEP IT OUT OF CUSTOMER VIEW AS MUCH AS POSSIBLE. COORDINATE EXACT LOCATION OF HEATER WITH ARCHITECT/OWNER BEFORE INSTALLATION.<br>2. WATER HEATER TO BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION WITH ALL REQUIRED ACCESSORIES. | | | | | | |

## Plumbing Schedule

SCALE : N.T.S.

Property of NY Engineers

CLOUDSTEPPERS

Plumbing Floor Plan, Schedule & Risers

P2.0

COM*check* Software Version COMcheckWeb

# Interior Lighting Compliance Certificate

## Project Information

Energy Code: 2018 IECC
Project Title: Clarks - Durham, NC
Project Type: Alteration

Construction Site: Owner/Agent: Designer/Contractor:

## Allowed Interior Lighting Power

| A Area Category | B Floor Area (ft2) | C Allowed Watts / ft2 | D Allowed Watts |
|---|---|---|---|
| 1-STOCK ROOM (Common Space Types:Storage) | 115 | 0.63 | 72 |
| 2-REST ROOM (Common Space Types:Restrooms) | 48 | 0.85 | 41 |
| 3-SALES AREA (Retail:Sales Area) | 586 | 1.22 | 715 |
| Allowance: Other retail highlighting / Fix. ID: Track Lighting | 525 (a) | 0.45 | 236 (b) |
| 4-FIT.ROOM (Retail:Dressing/Fitting Room) | 43 | 0.50 | 22 |
| | | Supplemental Allowed Watts (null) = | 628 |
| | | Total Allowed Watts = | 1714 |

(a) Area claimed may exceed total floor area when Retail Merchandise Highlighting allowance(s) are specified.
(b) Allowance is (B x C) or the actual wattage of the fixtures given in Proposed Power section, whichever is less.
(c) Supplemental watts must be associated with retail merchandise highlighting fixtures.

## Proposed Interior Lighting Power

| A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast | B Lamps/ Fixture | C # of Fixture | D Fixture Watt. | E (C X D) |
|---|---|---|---|---|
| STOCK ROOM (Common Space Types: Storage, 115 sq.ft.) | | | | |
| M: M: Other: | 1 | 2 | 40 | 80 |
| REST ROOM (Common Space Types: Restrooms, 48 sq.ft.) | | | | |
| M: M: Other: | 1 | 1 | 40 | 40 |
| SALES AREA (Retail: Sales Area, 586 sq.ft.) | | | | |
| D1: D1: Other: | 1 | 16 | 32 | 512 |
| D3: D3: Other: | 1 | 1 | 10 | 10 |
| D2: D2: Other: | 1 | 6 | 10 | 60 |
| Track Lighting: Wattage based on current limiting device capacity | 0 | 0 | 980 | 980 |
| FIT.ROOM (Retail: Dressing/Fitting Room, 43 sq.ft.) | | | | |
| LED: D1: Other: | 1 | 1 | 32 | 32 |
| | | Total Proposed Watts = | | 1714 |



COM*check* Software Version COMcheckWeb

# Inspection Checklist

Energy Code: 2018 IECC

Requirements: 100.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

| Section # & Req.ID | Plan Review | Complies? | Comments/Assumptions |
|---|---|---|---|
| C103.2 [PR4][1] | Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Rough-In Electrical Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C405.2.3, C405.2.3.1, C405.2.3.2 [EL23][2] | Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.2.4 [EL26][1] | Separate lighting control devices for specific uses installed per approved lighting plans. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.2.4 [EL27][1] | Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.3 [EL6][1] | Exit signs do not exceed 5 watts per face. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.6 [EL26][2] | Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C405.7 [EL27][2] | Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist). | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.8.2, C405.8.2.1 [EL28][2] | Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C405.9 [EL29][2] | Total voltage drop across the combination of feeders and branch circuits <= 5%. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



**Interior Lighting : Passes using retail merchandise highlighting supplemental watts.**

## Interior Lighting Compliance Statement

*Compliance Statement:* The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2018 IECC requirements in COM*check* Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Name - Title Signature Date



| Section # & Req.ID | Rough-In Electrical Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C405.2.2.2 [EL22][1] | Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Areas such as security or emergency areas that need continuous lighting. |
| C405.2.1, C405.2.1.1 [EL18][1] | Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.2.1.2 [EL19][1] | Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C405.2.1.3 [EL20][1] | Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 3) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone, and 4) are configured such that any daylight responsive control will activate space general lighting or control zone general lighting only when occupancy for the same area is detected. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | **Exception:** Requirement does not apply. |
| C405.2.2.2, C405.2.2.1, C405.2.2.2 [EL21][2] | Each area not served by occupancy sensors (per C405.2.1) have time-switch controls and functions detailed in sections C405.2.2.1 and C405.2.2.2. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



| Section # & Req.ID | Final Inspection | Complies? | Comments/Assumptions |
|---|---|---|---|
| C303.3, C408.2.5.2 [FI17][3] | Furnished O&M instructions for systems and equipment to the building owner or designated representative. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C405.4.1 [FI18][1] | Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | *See the Interior Lighting fixture schedule for values.* |
| C406.4 [FI54][1] | Enhanced digital lighting controls efficiency package: Interior lighting has following enhanced lighting controls in accordance with Section C405.2.2: Luminaires capable of continuous dimming and being addressed individually, <= 8 luminaires controlled in combination in a daylight zone, digital control system for fixtures, "Sequence of Operations" documentation, and functional testing per Section C408. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C408.1.1 [FI57][1] | Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C408.2.5.1 [FI16][3] | Furnished as-built drawings for electric power systems within 90 days of system acceptance. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |
| C408.3 [FI33][1] | Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation. | ☐Complies ☐Does Not ☐Not Observable ☐Not Applicable | Requirement will be met. |

**Additional Comments/Assumptions:**

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)



Property of NV5 Engineers

CLOUDSTEPPERS

COMcheck
Interior Lighting
Compliance



E0.1

# ELECTRICAL NOTES

## GENERAL REQUIREMENTS

1. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, AND TOOLS TO PERFORM ALL WORK NECESSARY FOR THE COMPLETE EXECUTION OF THE ELECTRICAL WORK AS SHOWN ON THE DRAWINGS.
2. PROVIDE WORK NOT SPECIFICALLY SHOWN OR SPECIFIED, YET REQUIRED TO INSURE PROPER AND COMPLETE OPERATIONS OF ALL SYSTEMS AND TO SATISFY THE DESIGN INTENT IN THE WORK AND TO COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS.
3. LABOR FOR THE INSTALLATION OF MATERIALS AND EQUIPMENT FURNISHED UNDER THE ELECTRICAL CONTRACTORS' SCOPE OF WORK SHALL BE PERFORMED BY EXPERIENCED MECHANICS OF THE PROPER TRADE AND ALL WORKMANSHIP SHALL BE FIRST CLASS AND SHALL BE IN COMPLIANCE WITH THE SPECIFIC REQUIREMENTS OF THE CONTRACT DRAWINGS.
4. ALL DISCREPANCIES ON DRAWING SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN WRITING PRIOR TO SUBMISSION OF BIDS. SUBMISSION OF A BID CONSTITUTES ACCEPTANCE OF FIELD CONDITIONS.
5. ALL DIVISION 1 SPECIFICATIONS AND ARCHITECTURAL GENERAL AND SPECIAL CONDITIONS OUTLINED IN THE CONTRACT DOCUMENTS SHALL APPLY TO ELECTRICAL SYSTEMS.
6. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF ALL APPLICABLE CODES AND REGULATIONS, STANDARDS AND AUTHORITY(S) HAVING JURISDICTION.
7. ALL MATERIALS PROVIDED BY THE CONTRACTOR SHALL BE NEW AND FREE OF DEFECTS AND SHALL BE UL LISTED FOR THE INTENDED APPLICATION.
8. THE ELECTRICAL DRAWING ARE NOT TO BE SCALED. WHERE SPECIFIC DETAILS AND DIMENSIONS FOR ELECTRICAL WORK ARE NOT SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL TAKE MEASUREMENTS AND MAKE LAYOUTS AS REQUIRED FOR THE PROPER INSTALLATION AND COMPLETION OF THE WORK.
9. CONTRACTOR SHALL OBTAIN AND FURNISH ALL PERMITS, AND ARRANGE FOR ALL REQUIRED INSPECTIONS.
10. CONTRACTOR SHALL OBTAIN AND FURNISH ALL PERMITS, AND ARRANGE FOR ALL REQUIRED INSPECTIONS.
11. THE CONTRACT DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF CIRCUITS AND OUTLETS, LOCATION OF SWITCHES, PANELBOARDS, CONDUITS, AND OTHER WORK. FIELD VERIFY ALL DIMENSIONS PRIOR TO INSTALLATION OF WORK.
12. ALL DISCONNECT SWITCHES AND STARTERS FOR THE MECHANICAL EQUIPMENT SHALL BE SIZED AND PROVIDED BY THE ELECTRICAL CONTRACTOR AND INSTALLED AND CIRCUITED BY THE ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED. INSTALL SWITCHES IN ACCESSIBLE LOCATIONS. PRIOR TO INSTALLATION OF ANY ELECTRICAL WORK RELATED TO NEW HVAC CIRCUITS, THE ELECTRICAL CONTRACTOR SHALL REVIEW THE MECHANICAL SHOP DRAWINGS FOR ACTUAL CIRCUIT REQUIREMENTS.
13. THE ELECTRICAL CIRCUITS, COMPONENTS, AND CONTROLS ARE SELECTED AND SIZED FOR THE EQUIPMENT SPECIFIED AND OR SHOWN. IF SUBSTITIONS AND/OR EQUIVALENT EQUIPMENT ARE FURNISHED, IT SHALL BE THE RESPONSIBILITES OF ALL PARTIES CONCERNED, INVOLVED IN AND FURNISHING THE SUBSTITUTE AND/OR EQUIVALENT EQUIPMENT TO VERIFY AND COMPARE THE ELECTRICAL CHARACTERISTICS OF THAT FURNISHED TO THAT SHOWN.
14. FIELD COORDINATE EXACT ELECTRICAL CONNECTION POINTS TO EQUIPMENT PRIOR TO ROUGH IN OF ELECTRICAL COMPONENTS.
15. FIELD DETERMINE EXACT MOUNTING LOCATION OF DUCT MOUNTED SMOKE DETECTORS. INSTALL PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
16. COORDINATE MOUNTING LOCATIONS OF LIGHTING SWITCHES, F/A DEVICES, TV, DATA/TEL OUTLETS, AND RECEPTACLES WITH MILLWORK. PRIOR TO ROUGH-IN.
17. COORDINATE MOUNTING LOCATIONS OF RECEPTACLE AND TV AND DATA OUTLETS WITH OWNER REPRESENTATIVE PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL PLANS FOR WALL CONSTRUCTION TYPES.
18. PROVIDE A 120V RECEPTACLE AND SWITCHED LIGHTING OUTLET WITH LAMP WITHIN 3FT. OF THE SERVING SIDE OF ALL ELECTRICALLY OPERATED MECHANICAL EQUIPMENT INSTALLED IN ATTICS AND CRAWL SPACES.
19. THE CONTRACTOR SHALL PROVIDE ALL CHANNEL AND ANGLE SUPPORTING SYSTEMS, HANGERS, ANCHORS, SLEEVES, BRACKETS, FABRICATED ITEMS, AND HARDWARE AS REQUIRED TO PROVIDE SECURE SUPPORT, PER N.E.C., FOR ALL ELECTRICAL COMPONENTS FROM THE BUILDING STRUCTURE.
20. SPECIFIED CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY, FIELD COORDINATE ACTUAL ROUTING OF CONDUITS.
21. PROVIDE TEMPORARY LIGHTING AND POWER AS REQUIRED FOR ALL SUBS AND TO SUIT JOB CONDITIONS.
22. ALL MOUNTING HEIGHTS INDICATED ARE MEASURED FROM THE FINISHED FLOOR INSIDE, OR FINISHED GRADE OUTSIDE.
23. WHERE CONCEALED BY INACCESSIBLE FINISHES, PROVIDE ACCESS DOORS TO ELECTRICAL JUNCTION AND PULL BOXES, CONTROL DEVICES, AND EQUIPMENT, DISCONNECT SWITCHES AND ALL OTHER ITEMS REQUIRING MAINTENANCE, ADJUSTING, OR SERVICE. COORDINATE LOCATION OF ACCESS PANELS PANELS WITH ARCHITECT AND ALL AFFECTED TRADES.
24. PROVIDE FINAL CLEANUP AND CONDUCT FIELD TESTS AFTER INSTALLATION OF ALL ELECTRICAL WORK. ADJUST ITEMS TO THE SATISFACTION OF THE OWNER, ARCHITECT, AND ENGINEER. LEAVE PANELBOARD INTERIOR CLEAN AND FREE FROM CONSTRUCTION DEBRIS. NEATLY DRESS ALL WIRING, AND RE-TIGHTEN ALL TERMINATIONS PER MANUFACTURERS' RECOMMENDATIONS.
25. TEST RESISTANCE OF GROUNDING ELECTRODE SYSTEM TO EARTH TO ACHIEVE A MINIMUM OF 10 OHMS, PROVIDE ADDITIONAL ELECTRODE TO OBTAIN ADEQUATE READING.
26. MAINTAIN ON THE JOBSITE IN GOOD CONDITION ONE SET OF UP TO DATE AS-BUILT ELECTRICAL DRAWINGS THE LOCATION OF ALL CONCEALED CONDUIT RUNS AND ALL WORK WHICH IS INSTALLED DIFFERENTLY THAN IN THE LOCATION AND MANNER INDICATED ON THE DRAWINGS. PROVIDE A COPY OF THESE PLANS FOR THE OWNER.
27. UPON COMPLETION OF PROJECT, BALANCE PANELBOARD LOADS AMONG PHASES IN NEW PANELBOARDS WITHIN 10% OF EACH OTHER.
28. PROVIDE A FULL ONE YEAR WARRANTY ON ALL ELECTRICAL LABOR, AND MATERIALS INSTALLED IN THIS PROJECT, STARTING FROM THE ISSUACE OF THE OWNERS CERTIFICATE OF OCCUPANCY.
29. CONTRACTOR SHALL ADJUST WIRE SIZES TO ACCOUNT FOR VOLTAGE DROPPED AS REQUIRED BY APPLICABLE CODES AND REGULATIONS, LIMIT VOLTAGE DROP ON FEEDERS TO MAXIMUM OF 2%, AND BRANCH CIRCUITS TO 3%

## SUBMITTALS

1. SUBMIT MANUFACTURERS' CUT SHEETS AND CATALOG DATA CLEARLY INDICATING THE SPECIFIC PART OR PRODUCT CATALOG NUMBER(S) FOR APPROVAL.
2. SUBMIT REQUESTED INFORMATION ELECTRONICALLY. NEATLY ORGANIZED AND INDEXED PER CATEGORY FOR ANY PROPOSED MATERIAL SUBSTITUTION(S) THAT DEVIATES FROM ANY MATERIALS SPECIFIED IN THE CONSTRUCTION DRAWINGS.
3. ALLOW TWO WEEKS FOR ENGINEER TO COMPLETE REVIEW OF SHOP DRAWINGS. ENGINEER WILL NOT BE RESPONSIBLE FOR PROJECT DELAYS RELATED TO DELIVERY AND TRANSMISSION OF SHOP DRAWINGS ONCE INFORMATION HAS LEFT ENGINEER'S OFFICE. ITEMS REQUIRING LONG LEAD TIME SHOULD BE SUBMITTED AS SOON AS POSSIBLE.

## ELECTRICAL DRAWING LIST


| | |
|---|---|
| E0.1 | COMCHECK INTERIOR LIGHTING COMPLIANCE |
| E1.0 | ELECTRICAL SPECIFICATION AND SYMBOL LIST |
| E2.0 | ELECTRICAL LIGHTING PLAN |
| E2.1 | ELECTRICAL POWER & LOW-VOLTAGE SYSTEMS PLAN |
| E2.2 | ELECTRICAL OUTLETS DIMENSION PLAN |
| E2.3 | ELECTRICAL ROOF PLAN |
| E3.1 | ELECTRICAL DETAILS |
| E4.1 | ELECTRICAL RISER DIAGRAM & PANEL SCHEDULES |


## MATERIALS AND METHODS

1. ALL WIRE SHALL BE COPPER TYPE "THHN/ THWN," SOLID FOR SIZES #10 AND #12, AND STRANDED FOR #8 AND LARGER UNLESS OTHERWISE NOTES. ALUMINUM WIRE MAY ONLY BE USED WHERE SPECIFICALLY NOTED. MINIMUM ALUMINUM WIRE SIZE SHALL BE #1/0.
2. MINIMUM WIRE SIZE SHALL BE #12 AWG. FOR BRANCH CIRCUITS OVER 100' MINIMUM HOMERUN TO PANEL SHALL BE #10 AWG.
3. ALL WIRE SHALL BE INSTALLED IN CONDUIT, UNLESS OTHERWISE NOTED. MINIMUM HOMERUN SIZE SHALL BE 3/4". 1/2" CONDUIT MAY BE USED BETWEEN DEVICES. ALL CONDUIT SHALL BE RUN PARALLEL AND PERPERDICULAR TO BUILDING WALLS AND FLOORS. MINIMUM U.G. CONDUIT HOMERUN SHALL BE 3/4". MC CABLE MAY BE USED PER THE NEC, WHERE CONCEALED.
4. PROVIDE (3) SPARE 1" CONDUIT STUB-UPS FROM RECESSED PANELS TO ABOVE CEILING FOR FUTURE USE.
5. ALL CONDUITS INSTALLED IN DRY INTERIOR LOCATIONS SHALL BE ELECTRICAL METALLIC TUBING, UNLESS OTHERWISE NOTED.
6. ALL CONDUITS INSTALLED IN EXTERIOR LOCATIONS SHALL BE RIGID SCH.80 PVC. ALL CONDUITS INSTALLED UNDERGROUND SHALL BE RIGID SCH.40 PVC. BURIED PER APPLICABLE CODES AND REGULATIONS. ALL U.G. CONDUITS INSTALLED SHALL BE METAL.
7. ALL EXTERIOR EQUIPMENT SHALL BE CONNECTED WITH LIQUID TIGHT FLEXIBLE METAL CONDUIT AND WEATHERPROOF FITTINGS.
8. INSTALL ALL RACEWAYS, BOXES, ENCLOSURES, AND CABINETS AS INDICATES AND INSTALLED PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
9. OUTLET AND SWITCH BOXES SHALL BE STEEL IN DRY LOCATIONS AND CAST ALLOY WITH THREADED HUBS IN WET OR DAMP LOCATIONS AND OR OF SPECIAL CONSTRUCTION TO SUIT SPECIFIC SITUATIONS. ALL BOXES SHALL BE RECESSED FLUSH IN WALLS AND/ OR NON-READILY ACCESSIBLE AREAS.
10. INSTALL COMPONENTS AND EQUIPMENT TO PROVIDE MAXIMUM POSSIBLE HEADROOM WHERE MOUNTING HEIGHTS OR OTHER LOCATION CRITERIA ARE NOT INDICATED.
11. MAINTAIN ALL WORKING CLEARANCES AROUND EQUIPMENT AS REQUIRED BY THE N.E.C. INSTALLED PANELBOARDS WITH TOP OF TRIM AT 1.98m ABOVE FINISHED FLOOR.
12. ALL BRANCH AND FEEDER CIRCUITS SHALL CONTAIN A GROUNDING CONDUCTOR, UNLESS OTHERWISE NOTED, AND BE SIZED AND BONDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRIC CODE. ALL GROUNDING CONDUCTORS SHALL BE COPPER, U.O.N.
13. ALL PANELBOARDS, DISCONNECT SWITCHES AND SYSTEM PANELS SHALL BE SQUARE D, GE OR EQUAL AND HAVE PLASTIC LAMINATE NAMEPLATES FOR IDENTIFYING SYSTEM FUNCTION AND CHARACTERISTICS.
14. FIRE SEAL ALL CONDUIT PENETRATIONS IN FIRE RATED WALLS AND FLOORS BACK TO INTIAL RATING. FLASH ALL CONDUIT ROOF PENETRATIONS AS REQUIRED TO PROVIDE WEATHERPROOF SEALS. COORDINATED WITH OTHER TRADES AND ROOFING CONTRACTOR.
15. ALL WIRING DEVICES INSTALLED SHALL BE COMMERCIAL GRADE AND MANUFACTURED BY LEVITON, P&S OR HUBBELL. ALL DEVICES INSTALLED IN FINISHED AREAS SHALL BE WHITE WITH MATCHING NON-METALLIC FACEPLATES. FIELD VERIFY ACTUAL COLOR PRIOR TO ORDERING WITH OWNER OR TENANT.
16. ALL DISCONNECT SWITCHES SHALL BE RATED HEAVY DUTY, AND NEMA 3R WHERE INSTALLED OUTDOORS.
17. SWITCH AND OUTLET BOXES SHALL NOT BE INSTALLED WITHIN THE SAME STUD-CAVITY IN RATED PARTITIONS AND DEMISING WALLS.
18. PROVIDE SUPPLEMENTAL WIRE-TYPE SUPPORT OF ALL LAY-IN LIGHTING FIXTURES FROM BUILDING STRUCTURE. LIGHTING FIXTURES WEIGHING LESS THAN 10 POUNDS SHALL HAVE ONE #12 GAGE HANGER WIRE CONNECTED FROM THE LIGHTING FIXTURE TO THE STRUCTURE ABOVE. LIGHTING FIXTURE WEIGHING MORE THAN 10 POUNDS SHALL HAVE TWO #12 GAGE WIRES ATTACHED AT OPPOSING CORNERS OF THE LIGHTING FIXTURE.
19. PROVIDE NYLON PULLSTRINGS IN ALL RACEWAYS.
20. TELEPHONE TERMINAL BOARD SHALL BE 4'X8'X3/4" PLYWOOD PAINTED ALL SIDES WITH FIRE RESISTANT PAINT UNLESS OTHERWISE NOTED.

## ABBREVIATIONS

| | | | |
|---|---|---|---|
| A | AMPERES | LTG | LIGHTING |
| A/C | AIR CONDITIONING | MH | METAL HALIDE |
| AC | ALTERNATING CURRENT | MCM | THOUSANDS OF CIRCULAR MILS |
| AFF | ABOVE FINISHED FLOOR | | |
| AFG | ABOVE FINISHED GRADE | N | NEUTRAL |
| AHU | AIR HANDING UNIT | NA | NOT APPLICABLE |
| AWG | AMERICAN WIRE GAUGE | N.C. | NORMALLY CLOSED |
| AS | AMPERE SWITCH | NEC | NATIONAL ELECTRICAL CODE |
| AF | AMPERE FUSED | NF | NON-FUSED |
| B.C. | BELOW COUNTER | NL | NIGHT LIGHT |
| CH | COUNTER HEIGHT | NO | NUMBER |
| CATV | CABLE TELEVISION | NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION |
| CFL | COMPACT FLUORESCENT | | |
| CONC | CONCRETE | | |
| COND | CONDUIT | NEPA | NATIONAL FIRE PROTECTION ASSOCIATION |
| CT | CURRENT TRANSFORMER | | |
| CU | COPPER | N.O. | NORMALLY OPEN |
| DISC | DISCONNECT | O.C. | ON CENTER |
| ELEC | ELECTRICAL | OH | OVERHEAD |
| EM | EMERGENCY | P | POLE |
| EMT | ELECTRICAL METALLIC TUBING | PC | PHOTOCELL |
| EWC | ELECTRIC WATER COOLER | PNL | PANELBOARD |
| FACP | FIRE ALARM CONTROL PANEL | PP | POWER PANEL |
| FL | FLUORESCENT | PVC | POLYVINYL CHLORIDE |
| FS | FLOW SWITCH | RM | ROOM |
| FMC | FLEXIBLE METAL CONDUIT | RCPT | RECEPTACLE |
| G | GROUND | SN | SOLID NEUTRAL |
| GFI | GROUND FAULT CIRCUIT INTERRUPTER | SPEC | SPECIFICATION |
| | | SS | STAINLESS STEEL |
| GND | GROUND | SQ | SQUARE |
| GRC | GALVANIZED RIGID CONDUIT | SW | SWITCH |
| HID | HIGH INTENSITY DISCHARGE | TS | TAMPER SWITCH |
| | | TTB | TELEPHONE TERMINAL BOARD |
| HVAC | HEATING, VENTILATION, AIR CONDITIONING | | |
| | | TYP | TYPICAL |
| IG | ISOLATED GROUND | TF | TRANSFORMER |
| J | JUNCTION | UC | UNDER COUNTER |
| KAIC | (THOUSAND) AMPERE INTERRUPTING CAPACITY | UG | UNDERGROUND |
| | | UON | UNLESS OTHERWISE NOTED |
| KVA | KILOVOLT AMPERES | V | VOLT |
| KW | KILOWATT | W | WIRE |
| LC | LIGHTING CONTACTOR | WP | WEATHERPROOF |
| LP | LIGHTING PANEL | Y | WYE (CONNECTED) |

## CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE BUILDING DEPARTMENT OF TOWN OF DURHAM. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

A. 2018 NORTH CAROLINA STATE BUILDING CODE.
B. 2018 NORTH CAROLINA STATE MECHANICAL CODE.
C. 2018 NORTH CAROLINA STATE ENERGY CONSERVATION CODE.
D. 2018 NORTH CAROLINA STATE PLUMBING CODE.
E. 2020 NORTH CAROLINA ELECTRICAL CODE NEC (NFPA 70) WITH STATE AMENDMENTS.
F. 2018 NORTH CAROLINA STATE FIRE CODE.

## DEMOLITION GENERAL NOTES

1. BEFORE SUBMITTING BID, THE CONTRACTORS SHALL VISIT THE JOB SITE AND BECOME FULLY FAMILIAR WITH THE EXISTING CONDITIONS AND THE DOCUMENTS OF OTHER TRADES UNDER WHICH THEIR WORK WILL BE ACCOMPLISHED. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS, OMISSIONS OR ERRORS MADE AS A RESULT OF FAILURE TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS.
2. THE CONTRACTOR SHALL COORDINATE AND SCHEDULE ANY DAILY INTERRUPTIONS OR SHUTDOWNS OF THE EXISTING SYSTEMS IN ADVANCE WITH OWNER'S DESIGNATED REPRESENTATIVE. THIS SHALL INCLUDE SERVICES INTERRUPTIONS, CONNECTIONS AND DISRUPTIONS EFFECTING OTHER TRADES (MECHANICAL AND ELECTRICAL). INCLUDE ALL WORK REQUIRED TO ALLOW PHASED CONSTRUCTION WHERE NECESSARY.
3. DEMOLITION DRAWINGS (SEE ARCHITECTURAL SHEETS) ARE STRICTLY DIAGRAMMATIC AND SHOW GENERAL ARRANGEMENT AND APPROXIMATE LOCATION OF EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT. IT IS NOT THE INTENT OF THESE DRAWINGS TO SHOW ALL EQUIPMENT, PIPING OR CONDUIT TO BE REMOVED. EQUIPMENT NOT BEING REUSED SHALL BE REMOVED, INCLUDING ALL ASSOCIATED HANGERS SUPPORTS, PIPES, CONDUITS, WIRES, AND CONTROLS BACK TO THE POINT OF ORIGIN.
4. REFER TO THE ARCHITECTURAL DEMOLITION DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS. THE FULL EXTENT OF THE DEMOLITION AND RECONSTRUCTION SCOPE OF WORK SHALL BE DETERMINED BY THE ENTIRE SET OF BID DOCUMENTS.
5. THE CONTRACTORS SHALL COORDINATE THE DEMOLITION SCOPE OF WORK WITH THE GENERAL CONTRACTOR'S OR CONSTRUCTION MANAGER'S PHASING SCHEDULE PRIOR TO COMMENCEMENT OF WORK. CARE MUST BE TAKEN SO AS NOT TO DESTROY, REMOVE OR DEMOLISH ANY EQUIPMENT, APPURTENANCES OR DEVICES INTENDED TO REMAIN. PROVIDE TEMPORARY SERVICES AND SYSTEM MODIFICATIONS TO ACCOMMODATE CONTINUOUS OPERATION OF ACTIVE SYSTEM.
6. ALL EQUIPMENT, LIGHTING FIXTURES, DEVICES, AND ASSOCIATED WIRING INDICATED TO BE REMOVED OR RELOCATED, SHALL BE DISCONNECTED AND REMOVED, INCLUDING HANGERS AND OTHER COMPONENTS. NO EQUIPMENT, WIRING, OR CONDUIT SHALL BE ABANDONED IN PLACE, UNLESS SPECIFICALLY NOTED.
7. ALL SYSTEMS TO BE REMOVED SHALL BE REMOVED BACK TO THE POINT OF SOURCE. THE CONTRACTOR SHALL VERIFY WHICH SYSTEMS MUST REMAIN ACTIVE TO SERVE ADJACENT SPACES DURING CONSTRUCTION. SHOULD THE CONTRACTOR ENCOUNTER, DURING DEMOLITION OF EXISTING WALLS OR CHASES, ANY PIPING OR CONDUIT WHICH MUST REMAIN ACTIVE, HE SHALL IMMEDIATELY GIVE NOTICE TO THE ENGINEER, GENERAL CONTRACTOR OR CONSTRUCTION MANAGER.
8. ALL SALVAGEABLE MATERIALS OR EQUIPMENT TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER AT THE END OF EACH DAY. ITEMS REMOVED AND NOT REUSED OR DISCLAIMED BY THE OWNER SHALL BECOME PROPERTY OF THE TRADE CONTRACTOR AND SHALL BE TRANSPORTED FROM THE SITE. SITE STORAGE OF REMOVED ITEMS WILL NOT BE PERMITTED.
9. PROPERLY DISPOSE OF ALL DEMOLISHED EQUIPMENT IN COMPLIANCE WITH CODES AND REGULATIONS; THIS APPLIES TO HAZARDOUS MATERIALS AND CONTAMINATED ITEMS TO BE DEMOLISHED.

## SYMBOLS

### LIGHTING

- 125V AC SINGLE POLE 20 AMP SWITCH.
- a,b,c — 125V AC SINGLE POLE 20 AMP SWITCH, LIGHTING CONTROLED BY SWITCH INDICATED WITH LOWERCASE LETTER.
- D — 125V AC SINGLE POLE 20 AMP DIMMER SWITCH.
- WP — 125V AC SINGLE POLE 20 AMP SWITCH, WEATHER RESISTANT.
- OS — WALL MOUNTED OCCUPANCY SENSOR.
- T — WALL MOUNTED TIMER SWITCH.
- M — MOTOR SWITCH.

### COMMUNICATIONS

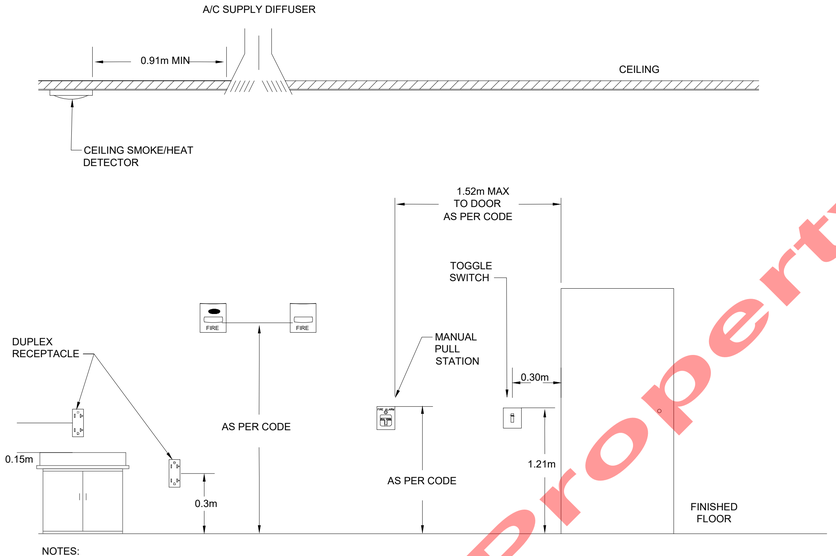
- D — TELECOMMUNICATIONS OUTLET. RECESSED DOUBLE GANG JUNCTION BOX WITH SINGLE-GANG MUD-RING AND BLANK PLATE AT 18" AFF, UON. PROVIDE 3/4" C WITH CAT-6 CABLING TO LOCATION(S) PER PLAN.

### POWER AND WIRING

- PANELBOARD AS SCHEDULED
- FUSED DISCONNECT SWITCH. NEMA 1 (INDDOR) OR NEMA 3R (OUTDOOR). SWITCH MUST BE CAPABLE OF BEING LOCKED IN THE OPEN (OFF) POSITION.
- NON-FUSED (NF) DISCONNECT SWITCH. NEMA 1 (INDOOR) OR NEMA 3R (OUTDOOR). SWITCH MUST BE CAPABLE OF BEING LOCKED IN THE OPEN (OFF) POSITION.
- JUNCTION BOX. CODE SIZED FOR APPLICATION.
- RACEWAY CONCEALED ABOVE CEILING, IN WALLS OR EXPOSED.
- RACEWAY CONCEALED BELOW FLOOR, ROOF, OR GRADE.
- HOMERUN TO PANELBOARD, NUMBER OF CIRCUITS INDICATED IN LABEL. PROVIDE GREEN INSULATED GROUNDING CONDUCTOR IN ALL POWER AND LIGHTING RACEWAYS, NOT SHOWN ON PLANS.
- GROUND

### WIRING DEVICES

- 125V AC 20 AMP DUPLEX RECEPTACLE, NEMA 5-20R OR AS INDICATED IN EQUIPMENT SCHEDULE.
- WP — 125V AC 20 AMP DUPLEX RECEPTACLE, NEMA 5-20R, WITH GROUND FAULT CIRCUIT INTERRUPTER, RECEPTACLE SHALL BE LISTED AS WEATHER RESISTANT
- GFI — 125V AC 20 AMP DUPLEX RECEPTACLE, NEMA 5-20R, WITH GROUND FAULT INTERRUPTER
- 125V AC 20 AMP DUPLEX RECEPTACLE, NEMA 5-20R, FLUSH-MOUNTED IN CEILING
- 125V AC 20 AMP DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R
- M — EXHAUST FAN
- M, WP — ROOFTOP UNIT WITH WEATHER PROOF PROTECTION.
- 3 KW — WATER HEATER
- DISCONNECT SWITCH
- DS — CEILING MOUNTED DAYLIGHT SENSOR




NOTES:
1. ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT SIGNS AND FIRE ALARM STROBES
2. INSTALL ALL FIRE ALARM DEVICES PER ACCESSIBILITY REQUIREMENTS. COORDINATE FINAL MOUNTING LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION

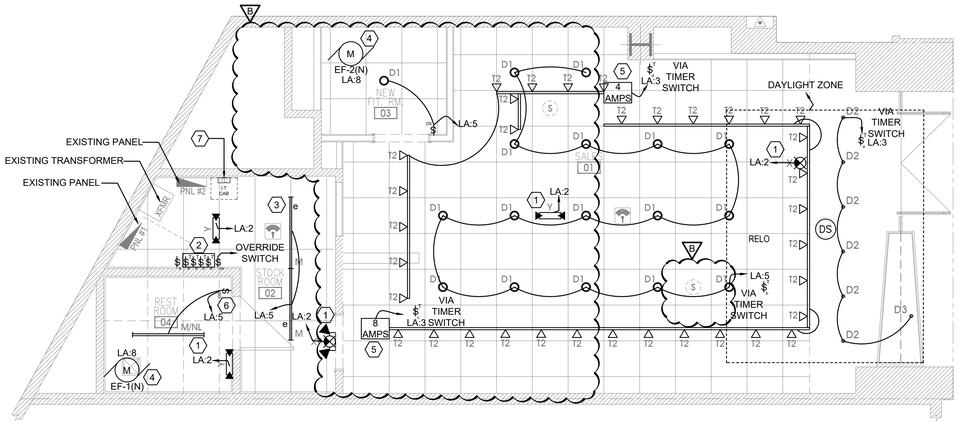
1 DEVICES MOUNTING HEIGHTS
SCALE : N.T.S.

Property of Engineers

CLOUDSTEPPERS

Electrical Specification and Symbol List

E1.0




## Electrical Lighting Plan

SCALE : 1/4" = 1'-0"  0  1'  2'  4'  8'

## GENERAL CEILING NOTES (AS APPLICABLE)

A. CONTRACTOR TO VERIFY EXISTING DIMENSIONS AND CONDITIONS.
B. REFER TO FINISH SCHEDULE ON A2.2 FOR FINISH SPECIFICATIONS.
C. MECHANICAL AND LIGHT FIXTURES FOR SUSPENDED CEILINGS ARE TO BE CONNECTED TO ONE (1) VERTICAL 12 GA. WIRE ATTACHED TO OPPOSING CORNERS ALONG THE FIXTURE'S DIAGONAL. THESE WIRES MAY BE SLACK. PROVIDE PERIMETER WIRES 8 INCHES OUT FROM THE WALL AS REQUIRED.
D. ALL EXITS SHALL BE PROVIDED WITH SELF ILLUMINATED EXIT SIGNS HAVING 6" LETTERS WITH 3/4" STROKES IN CONTRASTING COLORED LETTERS.
E. EXIT AND EMERGENCY LIGHTING TO BE INSTALLED ON SEPARATE CIRCUIT(S). REFER TO ELECTRICAL DRAWINGS.
F. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION.
G. THE LOCATION AND TYPE OF LIGHT FIXTURES SHALL BE AS INDICATED ON THE REFLECTED CEILING PLAN (THIS SHEET). REFER TO ELECTRICAL DRAWINGS FOR WIRING / CIRCUITING. CONTACT NI DESIGN IF THERE ARE ANY DISCREPANCIES.
H. ELECTRICAL CONTRACTOR TO COORDINATE MOUNTING OF LIGHT FIXTURES WITH CEILING TYPE.
I. REFER TO MECHANICAL DRAWINGS FOR MECHANICAL DUCT DISTRIBUTION SYSTEM SPECIFICATIONS.
J. ALL STRUCTURAL FRAMING, HANGERS, CHANNELS, RODS AND OTHER MISCELLANEOUS SUPPORT STEEL SHALL BE PROVIDED BY THE G.C. AS NECESSARY FOR PROPER SUPPORT OF SUSPENDED/SUPPORTED EQUIPMENT AND SHALL BE FASTENED TO STEEL, CONCRETE, OR MASONRY. G.C. TO COORDINATE THE INSTALLATION OF ALL EQUIPMENT.
K. THE G.C. SHALL SET ALL CEILING AND SOFFITS USING A LASER LEVEL TO ACHIEVE A CEILING THAT IS PLUMB, LEVEL, AND SQUARE TO ALL WALLS AND SOFFITS.
L. G.C. TO PROVIDE ANY ASSOCIATED BLOCKING & BRACING REQUIRED (INCLUDING F.R. CONCEALED BLOCKING MATERIALS, AS REQUIRED) FOR LIGHTING FIXTURE INSTALLATION AND/OR FOR ALL ELEC. COMPONENTS AS REQ'D. TO COMPLETE THE INSTALLATION OF ALL CEILING MOUNTED FIXTURES.
M. G.C. TO PROVIDE FLUSH-MOUNT ACCESS PANEL(S) AS REQUIRED THROUGHOUT SALES AREA GYP. BD. CEILING. COORDINATE SIZE(S) AND LOCATION(S) AND SIZE OF ACCESS PANELS WITH EQUIPMENT REQUIREMENTS AND ELSEWHERE AS REQUIRED BY LANDLORD AND/OR LOCAL JURISDICTION TO BE CODE COMPLIANT.

## ELECTRICAL LIGHTING PLAN KEYED WORK NOTES:

1. CONNECT ALL EMERGENCY EGRESS LIGHTING FIXTURES TO AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES.
2. COORDINATE EXACT LOCATION OF SWITCH BANK WITH OWNER/ARCHITECT.
3. LIGHTING CONTROL NEAR THE ELECTRICAL PANEL SHALL NOT BE WITH ONLY AUTOMATIC MEANS AS PER NEC 110.26(D).
4. EXHAUST FANS EF-1(N) & EF-2(N) SHALL BE INTERLOCKED WITH RTU-1(N). E.C. SHOULD COORDINATE WITH THE MECHANICAL DRAWINGS/CONTRACTOR.
5. CURRENT LIMITER SIZE OF TRACK LIGHTING IS 4AMPS AND 8AMPS.
6. NEW OCCUPANCY SWITCH SHOULD BE SUPPLIED BY THE LIGHTING VENDOR AND INSTALLED BY THE E.C.
7. E.C. SHALL VERIFY WHETHER THE EXISTING TIME CLOCK INCLUDES ASTRONOMICAL FUNCTIONALITY. IF THE EXISTING UNIT DOES NOT HAVE ASTRONOMICAL FEATURES, A NEW TIME CLOCK WITH BUILT-IN ASTRONOMICAL CAPABILITIES SHALL BE PROVIDED AND INSTALLED. PRIOR TO BASE BID.

## INTERIOR LIGHTING FIXTURE SCHEDULE

| SYMBOL | MK | DESCRIPTION | LAMPS WATTS | LAMPS TYPE | MOUNTING | VOLT | MANUFACTURER / MODEL# |
|---|---|---|---|---|---|---|---|
| | D1 | LED DOWN LIGHT W/ 6" ROUND TRIM | 32 | LED | RECESSED | MVOLT | ENVISION #LED-CADM 3M55-35K-UNV W/ CADM-6-WH (TRIM) |
| | D2 | 1" ROUND LED DOWN LIGHT | 10 | LED | RECESSED | 120V | SPECTRUM #AS01RDF-RT-935-007-D4-1-B1 W/TRIM #DL FL MW MF |
| | D3 | LED PUCK LIGHT (TBD) | TBD | LED | RECESSED | 120V | TBD |
| | M | NEW 4FT LED LINEAR LIGHTING W/ SELECTABLE POWER 20/30/40W | 40 | LED | SUSPENDED | MVOLT | ENVISION #LED-RST-4FT-3M40W-TRI |
| | T2 | NEW LED TRACK LIGHTING (LIGHT TRACK & HEADS) | 28 | LED | TRACK | 120V | SPECTRUM #TS RA31 21L 35K MD E1 BET MW (MATTE WHITE FINISH) |
| | X | NEW LED EDGE-LIT EXIT SIGN W/ BATTERY BACKUP | 3 | LED | UNIVERSAL | MVOLT | CONTECH #REXA-SF-R-EM-P (RED LETTERS & WHITE FINISH) |
| | Y | NEW 2 HEAD EMERGENCY LIGHT WITH BATTERY BACK UP | 6 | LED | SURFACE | MVOLT | MAXILUME #ELM-809-W (WHITE FINISH) |
| | XY | NEW COMBINATION LED EXIT SIGN & TWO HEAD EMERGENCY LIGHT W/ BATTERY BACK UP | 4 | LED | UNIVERSAL | MVOLT | MAXILUME #ELX-LED-703-R-W (RED LETTERS & WHITE FINISH) |

LIGHTING FIXTURE SCHEDULE NOTES:
1. LOCATE RECESSED LIGHT FIXTURES IN THE CENTER OF CEILING TILES.
2. ALL NEW LIGHTING INDICATED SHALL BE SUPPLIED BY TENANT / TENANT'S VENDOR AND INSTALLED BY G.C./E.C., UNLESS OTHERWISE NOTED.
3. PROVIDE / INSTALL EXIT SIGN(S) CONFIGURATIONS AS INDICATED ON PLANS (I.E. SINGLE OR DOUBLE FACE, DIRECTIONAL ARROWS, ETC.)
4. ALL REPLACEMENT LAMPS SHALL BE SUPPLIED BY TENANT'S VENDOR AND INSTALLED BY G.C./E.C., UNLESS OTHERWISE NOTED
5. G.C./E.C. TO VERIFY FUNCTION OF ALL EXISTING LIGHTING TO REMAIN, COORDINATE ANY REPAIRS / REPLACEMENT AS NECESSARY, V.I.F.

## CEILING SYSMBOLS LEGEND

| ALL DIMENSIONS ARE FROM FINISHED WALLS | | FURNISH | | INSTALL | |
|---|---|---|---|---|---|
| SYMBOL | DESCRIPTION | TEN. | GC. | TEN. | GC. |
| ST | TENANT 'SHOPPER TRAK' TRAFFIC COUNTER SEE ELECTRICAL DRAWINGS | X | | X | |
| | TENANT WIFI NETWORK ANTENNA SEE ELECTRICAL DRAWINGS | X | | X | |
| S | AUDIO SYSTEM SPEAKER SEE ELECTRICAL DRAWINGS | X | | X | |

## SWITCH BANK SCHEDULE

| PANEL | CIRCUIT# | SWITCH TAG. | AREA SERVING | LIGHT TYPE | SWITCH TYPE |
|---|---|---|---|---|---|
| LA | 3 | a | STORE FRONT | D2, D3 | TIMER |
| LA | 7 | b | STORE | D1 | TIMER |
| LA | 3 | c | STORE | T2 | TIMER |
| LA | 3 | d | STORE | T2 | TIMER |

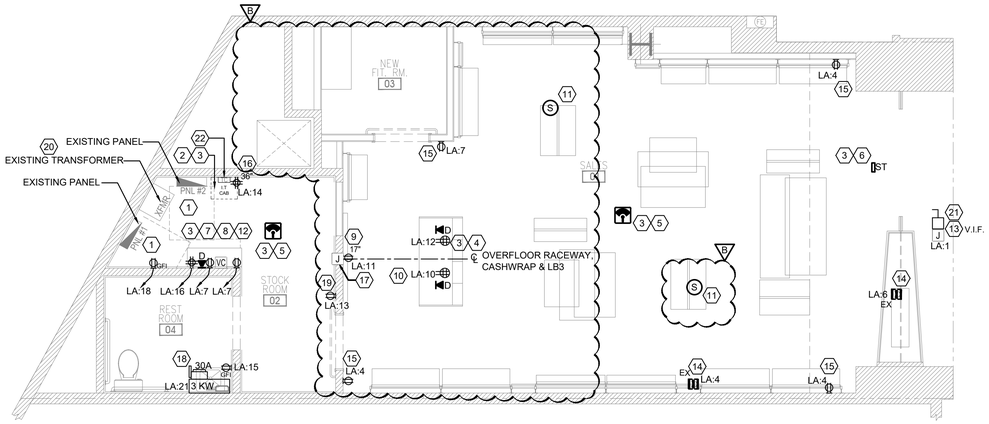
NOTE: GC / EC SUPPLY & INSTALL 24-HOUR PROGRAMMABLE TIMER SWITCH(S) EQUAL TO LEVITON 'VIZIA' #VPT24-1PZ TIMER WALL SWITCH

Property of NY Engineers

CLOUDSTEPPERS

Electrical Lighting Plan

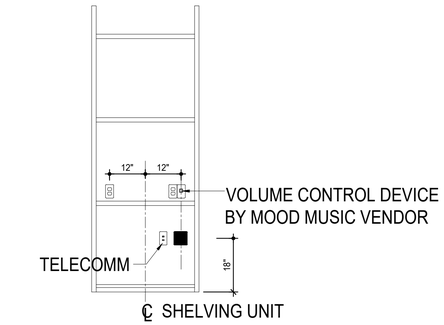
E2.0




## Electrical Power & Low Voltage Systems Plan

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

0 1' 2' 4' 8'




1 Power & Data at Shelving Unit

SCALE : 1/2" = 1'-0"

## POWER PLAN KEYED NOTES

1. EXISTING ELECTRICAL SERVICE EQUIPMENT & DISTRIBUTION PANELS. SEE PANEL SCHEDULE & POWER RISER ON SHEET E401 FOR ADD. INFO.
2. NETWORK I.T. CABINET, SUPPLIED AND INSTALLED BY TENANT VENDORS ON FRT PLYWOOD BACKER (G.C. TO SUPPLY & INSTALL NEW 4'-0" x 4'-0" FRT PLYWOOD BACKER ABOVE EXISTING TIME CLOCK , FIELD-VERIFY EXACT HEIGHT TO MOUNT PLYWOOD, V.I.F.). A
3. ALL CAT6 CABLING SHALL BE SUPPLIED AND INSTALLED BY TENANT'S VENDOR, AND ALL CAT6 CABLING SHALL BE RUN BACK TO NETWORK I.T. CABINET AT BACK-OF-HOUSE.
4. PROVIDE (1) 1" CONDUIT WITH PULL-STRING FROM NETWORK I.T. CABINET TO CASHWRAP FIXTURE FOR (2) POS DEVICES. POS DEVICES & CAT6 CABLING SUPPLIED & INSTALLED BY TENANT'S VENDOR.
5. PROVIDE (1) 3/4" CONDUIT WITH PULL-STRING FROM NETWORK I.T. CABINET TO (EACH) LOCATION(S) FLUSH-MOUNT PULL-BOX AT CEILING, PROVIDE DOUBLE-GANG J-BOX FOR EACH, ONE (1) WI-FI ACCESS POINT IN STOCK AND ONE (1) WI-FI ACCESS POINT IN SALES AREA, LOCATIONS INDICATED IN PLAN (NOTE: PROVIDE MIN. SWEEPING BENDS FOR ALL CONDUIT RUNS). ACCESS POINT DEVICES AND CAT6 CABLING SUPPLIED & INSTALLED BY TENANT'S VENDOR.
6. PROVIDE (1) 3/4" CONDUIT WITH PULL-STRING AS REQUIRED FOR "SHOPPER TRAK' (TRAFFIC COUNTER), FROM I.T. CABINET TO FLUSH-MOUNT JBOX (PULL-BOX) AT GYP. CEILING / SOFFIT ABOVE MAIN ENTRY AS INDICATED. SHOPPER TRAK DEVICE & CAT6 CABLING SUPPLIED & INSTALLED BY TENANT'S VENDOR.
7. PROVIDE (1) 3/4" CONDUIT WITH PULL-STRING FROM NETWORK I.T. CABINET TO MANAGER SHELF FOR TELECOMM. OUTLET(S). DEVICES & CAT6 CABLING SUPPLIED & INSTALLED BY TENANT'S VENDOR.
8. MOOD MUSIC VOLUME CONTROL SWITCH AT MANAGER'S SHELF, INSTALL AT LOCATION PER DETAIL. MOOD MUSIC DEVICES AND WIRING SUPPLIED AND INSTALLED BY TENANT'S VENDOR.
9. PROVIDE DUPLEX POWER RECEPTACLE AND IN-WALL ACCESSORY BOX (PEERLESS #IBA2-W OR SIMILAR) FOR LIGHTBOX, INSTALLED AT 17" AFF CENTERED BEHIND CASHWRAP AS INDICATED. FIELD-VERIFY EXACT LOCATION PRIOR TO PERFORMING WORK. WIRE LIGHTBOX WITH NEW SIGNAGE ABOVE (PER KEYNOTE #17), AND ROUTE CIRCUIT TO NEW TIMER SWITCH IN STOCKROOM. SEE SWITCH BANK SCHEDULE ON E2.0 FOR ADDITIONAL INFO
10. PROVIDE POWER TO CASHWRAP FOR NEW RECEPTACLE(S) INDICATED (MOUNTED WITHIN CASHDESK), INCLUDING NEW ADA COMPLIANT OVERFLOOR RACEWAY BY LEGRAND - WIREMOLD OFR SERIES' RACEWAY BASE & COVER #OFRBC-8, AND IN-WALL ENTRANCE END FITTING #OFR10IW. INSTALL PER MANUFACTURER INSTRUCTIONS OVER FINISH FLOORING.
11. NEW CEILING-MOUNTED AUDIO SPEAKER(S) FOR USE WITH NEW TENANT'S MUSIC SYSTEM. TENANT'S VENDOR SHALL SUPPLY & INSTALL SPEAKER WIRING AS REQUIRED TO RUN BACK TO MOOD MUSIC EQUIPMENT ON SHELF BELOW I.T. CABINET (TYPICAL).
12. PROVIDE NEW POWER AND TEL/DATA RECEPTACLES AT SHELVING UNIT PER DETAIL ON E2.1.
13. EXISTING POWER FOR STOREFRONT SIGN (ROUTED THROUGH EXISTING TIMECLOCK CONTROL), PROVIDE FOR PROPER OPERATION AND APPROVED DISCONNECT AS REQUIRED, V.I.F..
14. REUSE THE EXISTING POWER RECEPTACLES AS INDICATED, FOR SHOW WINDOW RECEPTACLE.
15. PROVIDE NEW FLUSH-MOUNT POWER RECEPTACLE(S) (IN WALLS OR GYP. SOFFITS) AS INDICATED, TYPICAL..
16. PROVIDE NEW SURFACE MOUNTED POWER RECEPTACLE INDICATED AT STOCKROOM FOR USE WITH NEW I.T. CABINET ABOVE EXIST. TIMECLOCK. FIELD-VERIFY EXACT HEIGHT TO MOUNT RECEPTACLE AT, V.I.F..
17. PROVIDE POWER FOR NEW ILLUMINATED TENANT SIGNAGE AT 9'-0" AFF, CENTERED ABOVE LIGHT BOX ON WALL BEHIND CASHWRAP. COORDINATE EXACT LOCATION AND POWER REQUIREMENTS WITH SIGN VENDOR PRIOR TO PERFORMING WORK, V.I.F.. WIRE WITH NEW LIGHTBOX BELOW SIGNAGE (PER KEYNOTE #9) AND ROUTE CIRCUIT TO NEW TIMER SWITCH FOR CONTROL IN STOCKROOM, SEE SWITCH BANK SCHEDULE ON E2.0 FOR ADDITIONAL INFO.
18. PROVIDE 30A DISCONNECT SWITCH FOR WATER HEATER AT EXISTING RESTROOM LAV-SINK. MODIFY WIRING AS REQUIRED.
19. PROVIDE DEDICATED DUPLEX POWER RECEPTACLE AS INDICATED IN STOCKROOM FOR TENANT'S USE WITH STEAMER
20. EXISTING TRANSFORMER SHOULD BE RELOCATED AS SHOWN IN THE LAYOUT. IT SHOULD BE WALL MOUNTED AT 8'-0" AFF WITH STEEL BRACKETS AS REQUIRED. E.C. TO ENSURE THE TRANSFORMER HAS CLEARANCES AS ACCORDING TO 2020 NORTH CAROLINA ELECTRICAL CODE NEC (NFPA 72) WITH STATE AMENDMENTS SECTION 110.26. IF ANY DISCREPANCIES REPORT TO E.O.R. PRIOR TO INSTALLATION. BASE BID ACCORDINGLY.
21. PROVIDE A PHOTOCELL, IF THE EXISTING TIME CLOCK IS NOT CAPABLE OF ASTRONOMICAL CAPABILITY. PRIOR TO BID.
22. E.C. SHALL VERIFY WHETHER THE EXISTING TIME CLOCK INCLUDES ASTRONOMICAL FUNCTIONALITY. IF THE EXISTING UNIT DOES NOT HAVE ASTRONOMICAL FEATURES, A NEW TIME CLOCK WITH BUILT-IN ASTRONOMICAL CAPABILITIES SHALL BE PROVIDED AND INSTALLED. PRIOR TO BASE BID.

## FIRE ALARM NOTES

1. BUILDING FIRE ALARM & DETECTION SYSTEM IS EXISTING TO REMAIN (INCLUDING TENANT DEVICES).
2. IN THE EVENT ANY MODIFICATIONS ARE NECESSARY, ALL FIRE ALARM WORK SHALL BE PERFORMED BY THE LANDLORD'S APPROVED FIRE ALARM CONTRACTOR, G.C. SHALL SUBCONTRACT & COORDINATE THIS WORK WITH F.A. CONTRACTOR. G.C. TO VERIFY FIRE ALARM CONTRACTOR'S CONTACT INFO WITH LANDLORD REP.
3. ALL FIRE ALARM WORK SHALL BE FILED UNDER SEPARATE PERMIT APPLICATION AS A DEFERRED SUBMITTAL, IN CONJUNCTION WITH THIS APPLICATION. SEPARATE DRAWINGS & CALCULATIONS PREPARED BY A LIC. FIRE PROTECTION ENGINEER SHALL BE SUBMITTED TO AUTHORITY(S) HAVING JURISDICTION FOR PERMIT REVIEW & APPROVAL. THE INSTALLING FIRE ALARM CONTRACTOR SHALL PROVIDE / COORDINATE SUCH DESIGN & DEFERRED PERMIT SUBMISSION AS PART OF THEIR OVERALL WORK SCOPE.

Property of NY Engineers

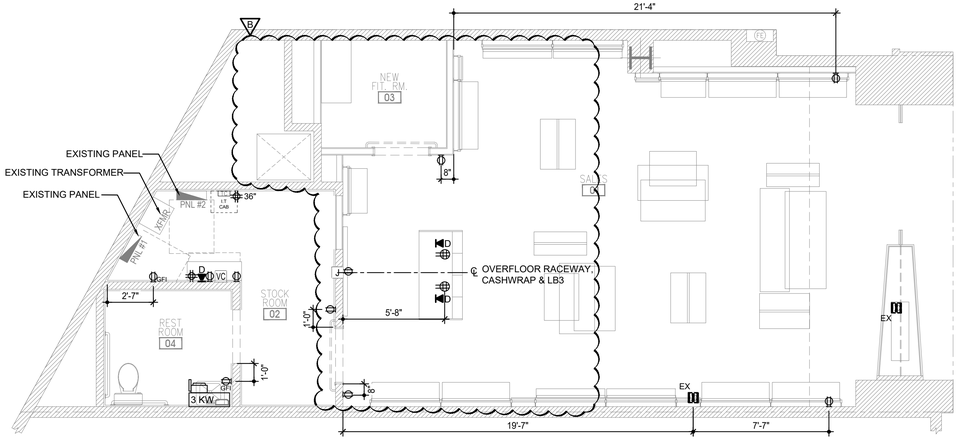
CLOUDSTEPPERS

A
B

Electrical Power & Low-Voltage Systems Plan



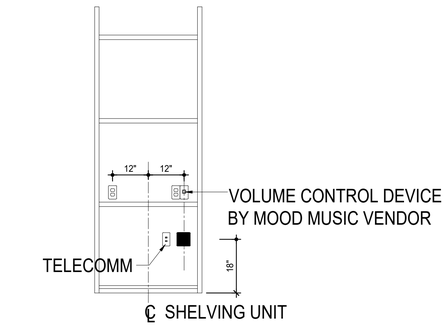
E2.1




## Electrical Outlets Dimension Plan

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

0 1' 2' 4' 8'




1 Power & Data at Shelving Unit

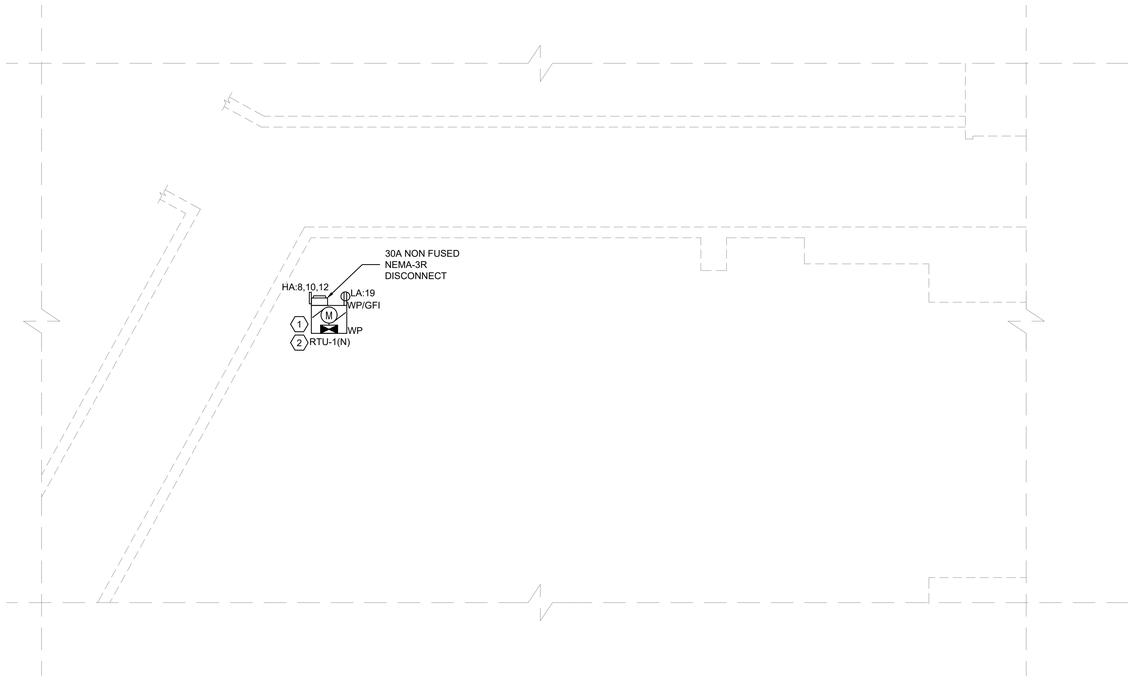
SCALE : 1/2" = 1'-0"

Property of NY Engineers

CLOUDSTEPPERS

Electrical Outlets Dimension Plan

E2.2




Electrical Roof Plan

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

0 1' 2' 4' 8'

## ROOF PLAN KEYED NOTES

1. ELECTRICAL CONTRACTOR SHALL COORDINATE FOR EXACT LOCATION OF MECHANICAL EQUIPMENTS WITH MECHANICAL DRAWINGS.
2. EXHAUST FANS EF-1 & EF 2 SHALL BE INTERLOCKED WITH RTU-1. E.C. SHOULD COORDINATE WITH THE MECHANICAL DRAWINGS/CONTRACTOR.

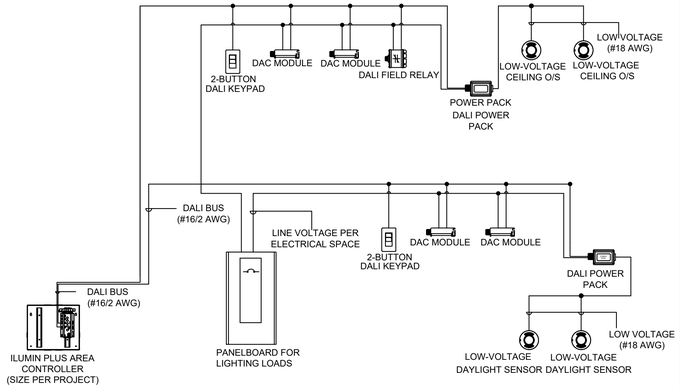
Property of NY Engineers

CLOUDSTEPPERS

Electrical Roof Plan

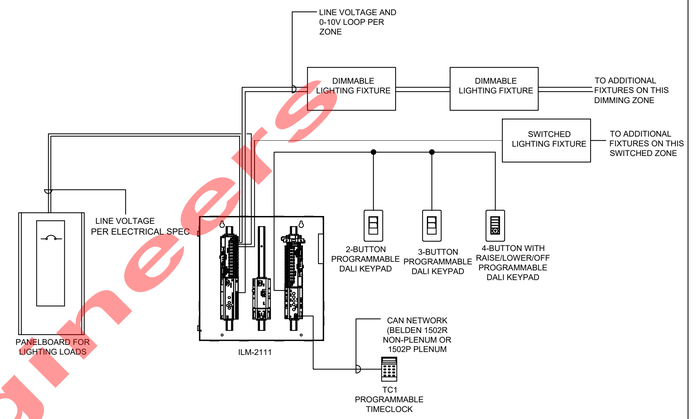


E2.3



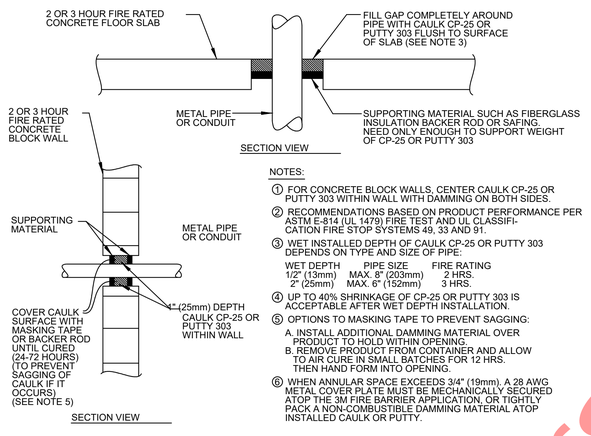

5 E3.1 DAYLIGHT SENSOR WIRING DIAGRAM - LIGHT CONTROL

N.T.S




4 E3.1 AUTOMATIC LIGHTING CONTROL DETAIL (TIME CLOCK)

N.T.S




NOTES:

1. FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
2. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFI-CATION FIRE STOP SYSTEMS 49, 33 AND 91.
3. WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:

| WET DEPTH | PIPE SIZE | FIRE RATING |
|---|---|---|
| 1/2" (13mm) | MAX. 8" (203mm) | 2 HRS. |
| 2" (25mm) | MAX. 6" (152mm) | 3 HRS. |

4. UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
5. OPTIONS TO MASKING TAPE TO PREVENT SAGGING:
   A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.
   B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
6. WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm), A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.

3 E3.1 FIRE STOP DETAIL

N.T.S

MANUAL MODE OPERATION:

1. PUSHBUTTON PRESS IS REQUIRED TO TURN LOAD ON.
2. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR BY PRESSING PUSH BUTTON.

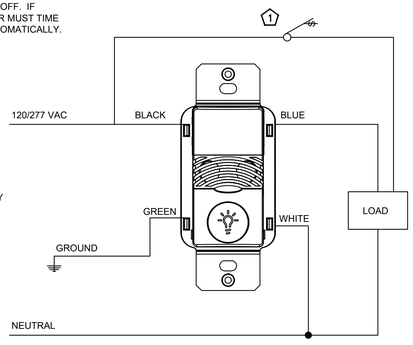
AUTOMATIC MODE OPERATION:

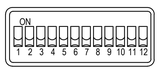
1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. PUSHBUTTON CAN BE USED TO TURN LOAD ON OR OFF. IF PUSHBUTTON IS USED TO TURN LOAD OFF, SENSOR MUST TIME OUT FIRST, BEFORE LOAD CAN TURN BACK ON AUTOMATICALLY.

SENSOR TYPES INCLUDE:

ONW-D-1001-MV-N

(1) PROVIDE SENSING CONDUCTOR TAPPED AHEAD OF ANY SWITCHES WHERE SWITCH SERVES EMERGENCY FIXTURES.

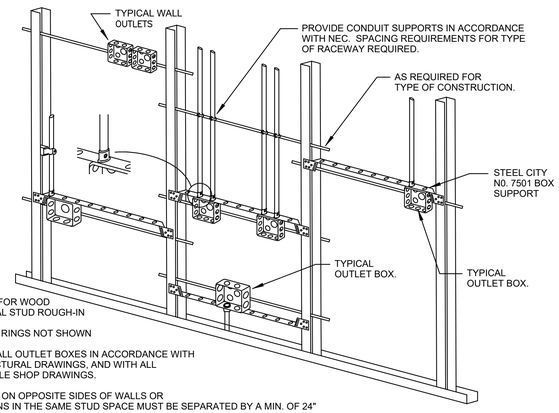



(ONW-D-1001-MV-N SENSORS)
ON (UP) = MANUAL ON
OFF (DOWN) = AUTO ON

2 E3.1 CONNECTION) OCCUPANCY/VACANCY-SINGLE LEVEL WIRING DIAGRAM-LOW VOLTAGE WALL SWITCH SENSOR(NEUTRAL)

N.T.S




NOTES:

1. TYPICAL FOR WOOD AND METAL STUD ROUGH-IN
2. PLASTER RINGS NOT SHOWN
3. LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
4. OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE.

1 E3.1 DETAIL TYPICAL ROUGH-IN REQUIREMENTS

N.T.S

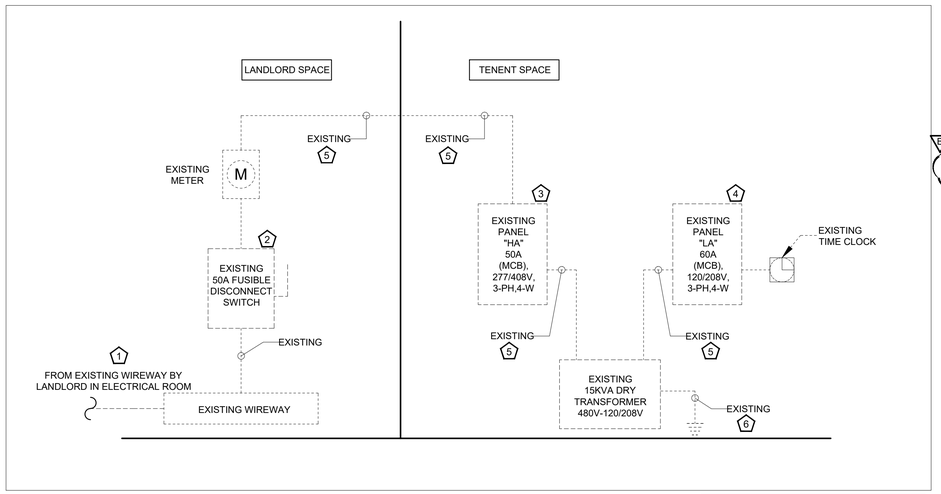
Property of NY Engineers

CLOUDSTEPPERS

Electrical Details



E3.1




## ELECTRICAL RISER KEYED NOTES:

1. EXISTING 480V-120/208V, 3-PHASE, 4-WIRE INCOMING ELECTRICAL SERVICE FROM METER/ FUSE SWITCH AT BASE BUILDING DISTRIBUTION SYATEM TO THE PROJECT SPACE SHALL REMAIN. E.C. SHALL COORDINATE WITH THE BASE BUILDING/LANDLORD/OWNER FOR EXACT POWER DISTRIBUTION. REPORT TO ENGINEER ON RECORD FOR ANY DISCREPANCIES.
2. EXISTING 50A DISCONNECT SWITCH IN LANDLORD SPACE TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE DISCONNECT, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.
3. EXISTING 50A(M.C.B), 277/408V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HA" IN TENANT SPACE TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.
4. EXISTING 60A(M.C.B), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "HA" IN TENANT SPACE TO REMAIN. E.C. TO FIELD VERIFY THE EXACT SIZE, LOCATION & OPERABLE CONDITION OF THE PANEL, REPLACE IF INOPERABLE. BASE BID ACCORDINGLY.
5. EXISTING FEEDERS SHALL REMAIN. E.C TO VERIFY OPERABLE CONDITION OF FEEDERS IN FIELD AND PROVIDE NEW IF FOUND INOPERABLE. BASE BID ACCORDINGLY.
6. EXISTING GROUNDING SHALL REMAIN. E.C TO VERIFY OPERABLE CONDITION OF GROUNDING CONDUCTORS IN FIELD AND PROVIDE NEW IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

ELECTRICAL RISER SYMBOLS:

EXISTING ITEM/FEEDER TO REMAIN

## ELECTRICAL GENERAL NOTES:

A. ABOVE RISER DIAGRAM IS FOR REFERENCE PURPOSES ONLY. E.C. SHALL VERIFY EXACT POWER DISTRIBUTION IN FIELD AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.

B. E.C. SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.

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

D. E.C. TO VERIFY OPERABLE CONDITIONS OF EXISTING DEVICES IN FIELD. REPLACE/RECTIFY IF FOUND IN OPERABLE. BASE BID ACCORDINGLY.

E. EXISTING ELECTRICAL DISTRIBUTION TO BE MAINTAINED AND UTILIZED TO SERVE PROJECT SPACE. POWER RISER DIAGRAM INDICATED FOR REFERENCE PURPOSES ONLY.

**PANEL: LA (EXSITING)** — **MOUNTING:** SURFACE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **208Y/120** | VOLTS | **3** | PHASE | **4** | WIRE | | DEMAND LOAD | 15.24 | | **PANEL LOCATION:** | STOCK ROOM |
| **MAIN CB:** | **60A** | **MLO:** | **NA** | **BUS:** | **EXISTING** | MIN, | | DEMAND CURRENT | 39.23 | | **FED FROM:** | EXISTING DISCONNECT SWITCH |

| CKT NO. | TRIP AMPS | DESCRIPTION OF LOAD | LOAD TYPE | LOAD (KVA) | WIRE SIZES | PER PHASE (KVA) A | B | C | WIRE SIZES | LOAD (KVA) | LOAD TYPE | DESCRIPTION OF LOAD | TRIP AMPS | CKT NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | EXTERIOR SIGNAGE | L | 1.20 | 2#12, #12G, #3/4"C | 1.30 | | | 2#12, #12G, #3/4"C | 0.10 | L | BATT/EMGLTG/NL | 20 | 2 |
| 3 | 20 | LIGHTING -STORE FRONT & SALES | L | 1.51 | 2#12, #12G, #3/4"C | | 2.23 | | 2#12, #12G, #3/4"C | 0.72 | R | GENERAL RECEPTACLES-SALES AREA | 20 | 4 |
| 5 | 20 | LIGHTING -SALES/STOCK ROOM/FITTING ROOM/REST RM. | L | 0.67 | 2#12, #12G, #3/4"C | | | 2.27 | 2#12, #12G, #3/4"C | 1.60 | R | SHOW WINDOW RECEPTACLES | 20 | 6 |
| 7 | 20 | GENERAL RECEPTACLES-FIT.RM./STOCK ROOM | R | 0.54 | 2#12, #12G, #3/4"C | 0.62 | | | 2#12, #12G, #3/4"C | 0.08 | R | EXHAUST FAN 1 & 2 | 20 | 8 |
| 9 | 20 | CLOCK RECEPTACLE | R | 0.18 | 2#12, #12G, #3/4"C | | 0.54 | | 2#12, #12G, #3/4"C | 0.36 | R | CASHWRAP RECEPTACLE | 20 | 10 |
| 11 | 20 | DUPLEX RECEPTACLE FOR LIGHTBOX | R | 0.18 | 2#12, #12G, #3/4"C | | | 0.54 | 2#12, #12G, #3/4"C | 0.36 | R | CASHWRAP RECEPTACLE | 20 | 12 |
| 13 | 20 | STEAMER RECEPTACLE | R | 1.00 | 2#12, #12G, #3/4"C | 1.72 | | | 2#12, #12G, #3/4"C | 0.72 | R | QUAD RECEPTACLES IT CABINET | 20 | 14 |
| 15 | 20 | REST ROOM RECEPTACLE | R | 0.18 | 2#12, #12G, #3/4"C | | 0.54 | | 2#12, #12G, #3/4"C | 0.36 | R | MANAGERS DESK QUAD RECEPTACLE | 20 | 16 |
| 17 | 20 | TIMECLOCK (EXISTING) | L | 1.00 | 2#12, #12G, #3/4"C | | | 1.18 | 2#12, #12G, #3/4"C | 0.18 | R | GENERAL RECEPTACLES-STOCK ROOM | 20 | 18 |
| 19 | 20 | GENERAL RECEPTACLE ROOFTOP | R | 0.18 | 2#12, #12G, #3/4"C | 0.18 | | | | | | SPARE | 20 | 20 |
| 21 | 30 | WATER HEATER | O | 3.00 | 2#10 + 1#10G, 3/4"C | | 3.00 | | | | | SPARE | 20 | 22 |
| 23 | 20 | SPARE | | | | | | 0.00 | | | | SPACE | | 24 |
| 25 | | SPACE | | | | 0.00 | | | | | | SPACE | | 26 |
| 27 | | SPACE | | | | | 0.00 | | | | | SPACE | | 28 |
| 29 | | SPACE | | | | | | 0.00 | | | | SPACE | | 30 |
| 31 | | SPACE | | | | 0.00 | | | | | | SPACE | | 32 |
| 33 | | SPACE | | | | | 0.00 | | | | | SPACE | | 34 |
| 35 | | SPACE | | | | | | 0.00 | | | | SPACE | | 36 |
| **TOTAL LOAD (KVA)** | | | | | | 3.82 | 6.31 | 3.99 | | | | | | |

**PANEL: HA (EXISTING)** — **MOUNTING:** SURFACE

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **480Y/277** | VOLTS | PHASE | **3** | | - | | | DEMAND LOAD | 34.83 | | **PANEL LOCATION:** | STOCK ROOM |
| **50** | **MCB** | WIRE | **4** | | - | | | DEMAND CURRENT | 41.94 | | **FED FROM:** | EXISTING DISCONNECT SWITCH |

| CKT NO. | TRIP AMPS | DESCRIPTION OF LOAD | LOAD TYPE | LOAD (KVA) | WIRE SIZES | PER PHASE (KVA) A | B | C | WIRE SIZES | LOAD (KVA) | LOAD TYPE | DESCRIPTION OF LOAD | TRIP AMPS | CKT NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20/1P* | SPARE | | | EXISTING | 3.82 | | | | 3.82 | O | | | 2 |
| 3 | 20/1P* | SPARE | | | EXISTING | | 6.31 | | EXISTING | 6.31 | O | TRANSFORMER PAN. LA | 25/3P* | 4 |
| 5 | 20/1P* | SPARE | | | EXISTING | | | 3.99 | | 3.99 | O | | | 6 |
| 7 | 20/1P* | SPARE | | | EXISTING | 6.91 | | | | 6.91 | H | | | 8 |
| 9 | 20/1P* | SPARE | | | EXISTING | | 6.91 | | 3#10 + 1#10G, 3/4"C | 6.91 | H | ROOFTOP HVAC UNIT | 30/3P* | 10 |
| 11 | 20/1P* | SPARE | | | | | | 6.91 | | 6.91 | H | | | 12 |
| 13 | 20/1P* | SPARE | | | | 0.00 | | | | | | SPARE | 20/1P* | 14 |
| 15 | | SPACE | | | | | 0.00 | | | | | SPACE | | 16 |
| 17 | | SPACE | | | | | | 0.00 | | | | SPACE | | 18 |
| 19 | | SPACE | | | | 0.00 | | | | | | SPACE | | 20 |
| 21 | | SPACE | | | | | 0.00 | | | | | SPACE | | 22 |
| 23 | | SPACE | | | | | | 0.00 | | | | SPACE | | 24 |
| **TOTAL LOAD (KVA)** | | | | | | **10.72** | **13.22** | **10.90** | | | | | | |

**ELECTRICAL SERVICE LOAD CALCULATION**

| LOAD DESCRIPTION | LOAD TAG | CONNECTED LOAD (kVA) | TOTAL kVA | D.F. | DEMAND (kVA) |
|---|---|---|---|---|---|
| | | PANEL HA | | | |
| **TOTAL LIGHTING** | L | | 0.00 | 125% | 0.00 |
| **TOTAL RECEPTACLE** | R | | 0.00 | # | 0.00 |
| **TOTAL EQUIPMENT** | E | | 0.00 | 100% | 0.00 |
| **TOTAL OTHER** | O | 14.12 | 14.12 | 100% | 14.12 |
| **TOTAL HVAC** | H | 20.72 | 20.72 | 100% | 20.72 |
| **NON COINCIDENT** | N | | 0.00 | 0% | 0.00 |
| **TOTAL MOTOR** | M | | 0.00 | 100% | 0.00 |
| **LARGEST MOTOR** | | | | 25% | 0.00 |
| **# = Demand factor 100% for first 10kVA and 50% for rest of the receptacle load** | | | | | 34.83 |

| | |
|---|---|
| SERVICE VOLTAGE (Volts) | **480Y/277** |
| DEMAND (kVA) | 34.83 |
| DEMAND (AMPS) | 41.94 |
| SPARE (%) | 16.11 |
| Std. E SERVICE AMPs | 50.00 |

## Electrical Riser Diagram

SCALE :N.T.S

0 1' 2' 3' 6' 12'

## Electrical Panel Schedule

SCALE :N.T.S

0 1' 2' 3' 6' 12'

Property of NY Engineers

CLOUDSTEPPERS

Electrical Riser Diagram & Panel Schedules