

# AppHealthCare

Appalachian District Health Department www.AppHealthCare.com

Caring for our Community



April 22, 2024

#### **Request for Bids Notice**

Pursuant to 45 CFR § 74.44, Appalachian District Health Department dba AppHealthCare is issuing this request for bids for the completion of minor alteration/renovation of the Sparta Elementary School Based Health Center located at 450 N. Main Street Sparta, NC 28675. This project is funded by the Health Resources and Services Administration through a competitive grant that has been awarded to allow for improved access to school-based healthcare through the AppHealthCare –Sparta Elementary School Based Health Center location. Interested parties may submit a letter of interest detailing qualifications to meet requirements.

- i) Requirements for bidders
  - i. The selected Architecture/Engineer firm or general contractor must be licensed to practice in the State of NC.
  - ii. The executed final agreement for the scope of work shall be for this project only and is not "open-ended."
  - iii. The project will be designed and constructed in accordance with all requirements imposed on federally-assisted construction projects by specific laws enacted by Congress, Presidential Executive Orders, or Departmental Policy. Such standards include, but are not limited to, the following as applicable:
    - 1. The project design will also meet all applicable program standards, State codes, and local codes and ordinances.
    - 2. Equipment tracking 45 CFR Part 74.34 and 92.32.
    - 3. Procurement requirements 45 CFR Part 74.40-48 and Part 92.36.
    - 4. ADA Accessibility Guidelines for Building and Facilities (28 CFR Part 36)
    - 5. Uniform Relocation Assistance, 45 CFR Part 15
    - 6. Real Property and Federal Interest 45 CFR Part 74.32, 74.37, and 92.31
    - 7. AIA Guidelines for Design and Construction of Hospital and Health Care Facilities (current edition, as applicable)
    - 8. NFPA 99 Health Care Facilities Code, (current edition, as applicable)
    - 9. NFPA 101 Life Safety Code (current edition, as applicable)

#### ii) Scope of work

- a. Redesign, demolition, and completion of the following and additional noted changes in the plans attached to this request for bids:
  - i. Secure the separate external entrance with keypad.
  - ii. Redesign the existing classrooms into a registration area, three examination rooms, laboratory, and health center staff work stations.
  - iii. Willingness for work to be completed by all contract and sub-contracted staff in order to minimize impact to normal operations of school operations clinic which may require early hours, evening, or weekend work. It is expected that work will be focused during school summer season. Staff from AppHealthCare and Alleghany County Schools will discuss an appropriate arrangement in consultation with the selected firm.
- iii) Timeline of work: It is expected that the renovation would be scheduled to limit undue interference with school operations at the facility and be finalized with the awarded contract. There is expectation that the work would begin within 30 days of award notice and completed as soon as is practically feasible. Staff will discuss an appropriate timeline in accordance with grant guidelines, as applicable.
- Selection considerations: A firm that includes a licensed contractor with construction is preferred based on the size and scope of work. In addition, prior experience in Alleghany County School locations, medical or dental facility renovations or construction is preferred.
- v) Timeline:

<u>April 22, 2024:</u> Request for sealed bids will be published at <u>www.apphealthcare.com</u> and in local newspapers.

<u>May 21, 2024:</u> Sealed bids are due by close of business at 4:45pm to AppHealthCare Business Office Attn: Sparta Elementary School Based Health Center Renovation Bid Submission at P.O. Box 309 Sparta, NC 28675

June 4, 2024: Selected contractor/firm will be notified electronically/in writing

Contact information: To request an appointment for a tour or ask additional questions, please contact:

Laurie Phillips, Executive Assistant Email: <u>laurie.phillips@apphealth.com</u> Office: 336.372.5641 ext. 3224

BUSINESS OFFICE 157 Health Services Road PO Box 309 Sparta, NC 28675 336-372-5641 336-372-7793 Fax ALLEGHANY CO. HEALTH CENTER 157 Health Services Road PO Box 309 Sparta, NC 28675 336-372-5641 336-372-7793 Fax

ASHE CO. HEALTH CENTER 413 McConnell Street PO Box 208 Jefferson, NC 28640 336-246-9449 336-246-8163 Fax WATAUGA CO. HEALTH CENTER 126 Poplar Grove Connector PO Box 307 Boone, NC 28607 828-264-4995 828-264-4997 Fax

A1.0	COVER SHEET
A1.1	PLAN BUILDING CO
	UL DETAIL
A1.2	ACCESSIBILIT
A2.0	FLOOR & DEM
	TYPES
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	SCHEDULES &
P1 0	PLUMBING SC
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P2.0	PLUMBING FL
P3.0	PLUMBING FL
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# SCHOOL BASED HEALTH CENTER SPARTA ELEMENTARY SCHOOL ALLEGHANY COUNTY SCHOOLS SPARTA, NC

# & LIFE SAFETY

# DE SUMMARY &

**TY REQUIREMENTS 10 PLAN, WALL** 

CEILING PLAN, **& CASEWORK** 

CHEDULES &

**LOOR PLAN - DEMO** OOR PLAN NEW E **LOOR PLAN NEW** ER PECIFICATIONS

**SCHEDULES** DETAILS FLOOR PLAN -

FLOOR PLAN -

**PIPING PLAN** SPECIFICATIONS SPECIFICATIONS

SYMBOLS &

DEMOLITION

RENOVATION

**SPECIFICATIONS SPECIFICATIONS** SPECIFICATIONS







# PINNACLE ARCHITECTURE PROFESSIONAL ASSOCIATION

P.O. BOX 187, 630 TEAM ROAD, SUITE 200 MATTHEWS, NORTH CAROLINA 28106 PH: (704) 847-9851 FAX: (704) 847-9853

701 EAST BAY STREET, SUITE 302 CHARLESTON, SOUTH CAROLINA 29403 PH: (843) 872 - 5345 FAX: (843) 872 - 5374





EMERGENCY LIGHTING FIRE ALARM AND SMOKE DETECTION

EMERGENCY EXIT DISCHARGE LIGHTING

EX. STG. EX. SRO (20m)  $\otimes$ 

DOOR 32 0.2 160 10





A1.0

	FIRE PROTECTION REQUIREMENTS	ENERGY SUMMARY
Except 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES) (Reproduce the following data on the building plans sheet 1 or 2)	BUILDING ELEMENT     FIRE SEPARATION DISTANCE (FEET)     RATING     DETAIL # AND     DESIGN # FOR     SHEET # FOR     SHEET # FOR       BUILDING ELEMENT     DISTANCE (FEET)     PROVIDED (W/* REQD     DETAIL # AND     DESIGN # FOR     SHEET # FOR     SHEET # FOR	EXISTING - NO CHAN ENERGY REQUIREMENTS: The following data shall be considered minimum and any special attribute required to meet the energy code shall ale
Name of Project: _SPARTA ELEM. SCHOOL BASED HEALTH CENTER	Structural frame	provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design versus the annual energy cost proposed design.
Address:       450 N. MAIN STREET, SPARTA, NC       Zip Code: 28675         Owner/Authorized Agent:       RANDY BAKER       Phone: (104) 517-0172       E-Mail: randy@pinnaclearchitecture.net         Owner/Authorized Agent:       City (County       Residue       State	trusses N/A Bearing Walls	Existing building envelope complies with code:
Code Enforcement Jurisdiction: City  Code Enforcement Jurisdiction: City  Code Enforcement Jurisdiction: City  County _ALLEGHANY State	Exterior     North     N/A     N/A	Exempt Building: No Yes (Provide code or statutory reference):
ONTACT: FRANK M. WILLIAMS, AIA	East     N/A     N/A       West     N/A     N/A	Method of Compliance:
SIGNER FIRM NAME LICENSE # TELEPHONE # E-MAIL	South     N/A     N/A       Interior     N/A	ASHRAE 90.1: Performance Prescriptive Other: Performance (specify source)
chitectural PINNACLE ARCHITECTURE, P.A. FRANK M. WILLIAMS 1611 (704) 847-9851 jennifer@pinnaclearchitecture.net	Nonbearing walls and partitions       Exterior walls	THERMAL ENVELOPE (Prescriptive method only)
MSWG ENGINEERS, INC.     MATTHEW D. KNOTTS     36875     (704) 5272112     matthew@mswg.com       Alarm     MSWG ENGINEERS, INC.     MATTHEW D. KNOTTS     36875     (704) 5272112     matthew@mswg.com       Alarm     MSWG ENGINEERS, INC.     MATTHEW D. KNOTTS     36875     (704) 5272112     matthew@mswg.com	East     N/A     N/A       West     N/A     N/A	Roof/ceiling Assembly (each assembly) Description of assembly:
mbing     MSNG ENGINEERS, INC.     J. CRAIG CHAMPION     11200     (104) 5212112     cchampion@mswg.com       chanical     MSWG ENGINEERS, INC.     J. CRAIG CHAMPION     17250     (104) 5272112     cchampion@mswg.com       rinkler-Standpipe     N/A	South     N/A     N/A       Interior Walls and partitions	R-Value of insulation: Skylights in each assembly:
Jctural N/A	Floor Construction Including supporting beams and joists	U-Value of skylight: total square footage of skylights in each assembly:
("Other" should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)	Floor Ceiling Assembly     N/A       Columns Supporting Floors     N/A	Exterior Walls (each assembly) Description of assembly: U-Value of total assembly:
2018 NC BUILDING CODE: New Construction 1st Time Interior Completions	Roof Construction, including supporting beams and joists N/A	R-Value of insulation: Opening (windows or doors with glazing) U-Value of assemblu:
Renovation Phased Construction - Shell Core - <u>contact local inspection jurisdiction for possible</u> additional procedures and requirements	Roof Ceiling Assembly     N/A       Columns Supporting Roof     N/A	Solar heat gain coefficient: projection factor: Door B-values:
2018 NC EXISTING BUILDING CODE: Prescriptive Alteration Level I Historic Property Repair Alteration Level II Change of Use Chapter 14 Alteration Level II	Shaft Enclosures - Exit     N/A       Shaft Enclosures - Other     N/A	Walls below grade (each assembly)
CONSTRUCTED: (date)       1995       CURRENT OCCUPANCY(S) (Ch. 3):       EDUCATION         RENOVATED: (date)       N/A       PROPOSED OCCUPANCY(S) (Ch. 3):       BUSINESS	Occupancy/Fire Barrier Separation     2 HR.     0L# 0405 (EXISTING)       Partu/Fire Wall Separation     4 HR     UL# 0405 (EXISTING)	U-Value of insulation:
RISK CATEGORY (Table 1604.5): Current: $\Box \ I \ \Box \ I \ I$	Smoke Barrier Separation     N/A       Smoke Partition     N/A	Floors over unconditioned space (each assembly) Description of assembly:
	Tenant/Dwelling Unit/     N/A	U-Value of total assembly: R-Value of insulation:
onstruction Type:  I-A II-A III-A III-A IV IV-A	Incidental Use Separation N/A N/A Indicate section number permitting reduction	Floors slab on grade Description of assembly: U-Value of total assemblu:
eck all that apply)       □ I-B       □ II-B       □ V-B         rinklers:       ■ No       □ Partial       □ YES       □ NFPA 13       □ NFPA 13R       □ NFPA 13D         and places       ■ No       □ YES       □ NFPA 13       □ NFPA 13D       □ NFPA 13D		R-Value of insulation: Horizontal/vertical requirement:
Indpipes:       NO       TES       Class       T	FIRE SEPARATION     DEGREE OF OPENINGS       DISTANCE (FEET) FROM     PROTECTION       PROPERTY LINES     (TABLE 705.8)   ALLOWABLE AREA (%) PLANS (%)	
oss Building Area Table:	EXISTING - NO CHANGE	
FLOOR     EXISTING (SQ FT)     NEW (SQ FT)     SUB-TOTAL       3rd Floor     3rd Floor     SUB-TOTAL		
2nd Floor Mezzanine		
1st Floor     18,341 S.F. (EXISTING - NO CHANGE)     2,043 S.F. (RENOVATION - CHANGE OF USE)     18,341 S.F. (EXISTING - NO CHANGE)       Basement	LIFE SAFETY SYSTEM REQUIREMENTS	
TOTAL 18,341 S.F. (EXISTING - NO CHANGE) 2,043 S.F. (RENOVATION - CHANGE OF USE) 18,341 S.F. (EXISTING - NO CHANGE)	Emergency Lighting: Yes I No Exit Signs: Yes No Fire Alarm: Yes No	
ALLOWABLE AREA	Smoke Detection Systems:  Yes  No  Partial Carbon Monoxide Detection:  Yes  No	BXUV - Fire Resis
rimary Occupancy Classification(s):		BXUV7 - Fire Re See General Information for Fire-resistance Ratings - ANSI/UL 263 Certified for United States Design Criteria and Allowable Variances
Business Educational	LIFE SAFETT FLAN REQUIREMENTS Life Safety Plan Sheet #:	See General Information for Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada Design Criteria and Allowable Variances
Factory       Image: F-1 Moderate       Image: F-2 Low         Hazardous       Image: H-1 Detonate       Image: H-2 Deflagrate       Image: H-3 Combust       Image: H-4 Health       Image: H-5 HPM	Fire and/or smoke rated wall locations (Chapter 7)	
Institutional $\square -1$ $\square -2$ $\square -3$ $\square -4$ I-1 Condition $\square 1$ $\square 2$ I-2 Condition $\square 1$ $\square 2$	<ul> <li>Exterior wall opening area with respect to distance to assumed property lines (705.8)</li> <li>Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)</li> </ul>	April 14, 2023
I-3 Condition 1 2 3 4 5 Mercantile	<ul> <li>Occupant load for each area</li> <li>Exit access travel distances (1017)</li> <li>Common path of travel distances [Table 1006 2.1 \$ 1006 3.2(1)]</li> </ul>	
Residential R-1 R-2 R-3 R-4 Storage S-1 Moderate S-2 Low High-Piled Parking Garage Open Enclosed Repair Garage	<ul> <li>Dead end lengths (1020.4)</li> <li>Clear exit widths for each exit door</li> </ul>	
Utility and Miscellaneous	<ul> <li>Maximum calculated occupant load capacity each exit door can accommodate based on egress</li> <li>width (1005.3)</li> <li>Actual occupant load for each exit door</li> </ul>	This design was evaluated using a load design method other than the Limit States Design load restrictio
ccessory Occupancy Classification(s): <u>N/A</u> icidental Uses (Table 509): <u>N/A</u>	A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation	* Indicates such products shall bear the UL or cUL Certifica
pecial Uses (Chapter 4 - List Code Sections): <u>N/A</u>	<ul> <li>Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)</li> <li>Location of doors with electromagnetic egress locks (1010.1.9.9)</li> </ul>	The second
ixed Occupancy: $\Box$ No $\blacksquare$ Yes Separation <u>2 HR</u> . Hr. Exception: <u>N/A</u>	<ul> <li>Location of doors equipped with hold-open devices</li> <li>Location of emergency escape windows (1030)</li> </ul>	
applying the height and area limitations for each of the applicable occupancies	<ul> <li>The square footage of each fire area (202)</li> <li>The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)</li> <li>Note any code exceptions or table notes that may have been utilized regarding the items above</li> </ul>	3 + 4 4
determined, shall apply to the entire building. Separated Use (508.4) - See below for area calculations for each story, the area of the occupancy shall		1. Concrete Blocks* — Various designs. Classification D-2 (2 hr).
be such that the sum of the rations of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.	ACCESSIBLE DWELLING UNITS (SECTION 1107)	See <b>Concrete Blocks</b> category for list of eligible manufacturers.
Select one	TOTAL UNITS         REQUIRED         PROVIDED         REQUIRED         PROVIDED         REQUIRED         PROVIDED         REQUIRED         PROVIDED         N/A	2. Mortar — Blocks laid in full bed of mortar, nom. 3/8 in. thick, of not less than 2-1/4 and not mo lime (by cement volume). Vertical joints staggered.
Actual Area of Occupancy A + Actual Area of Occupancy B <1		3. <b>Portland Cement Stucco or Gypsum Plaster</b> — Add 1/2 hr to classification if used. Where con 1-1/2 hr. Attached to concrete blocks (Item 1).
Allowable Area of Occupancy A Allowable Area of Occupancy D 2,043 S.F. (BUS.) + 16,298 S.F. (EDUC.) + 0.70	ACCESSIBLE PARKING (SECTION 1106)	4. Loose Masonry Fill — If all core spaces are filled with loose dry expanded slag, expanded clay to classification
$36,000 \text{ S.F. (BUS.)} \qquad \qquad 25,500 \text{ S.F. (EDUC.)} \qquad \qquad$	LOT OR PARKING AREA REQUIRED PROVIDED REGULAR WITH 5' VAN SPACES WITH ACCESSIBLE ACCESS AISLE 120" ACCESS AISLE & PROVIDED	5. Foamed Plastic* — (Optional-Not Shown) — $1-1/2$ in. thick max, 4 ft wide sheathing attached
(A) (C) (D) BEDGAREA (B) AREA FOR ALLOWARDE	EXISTING - NO CHANGE	ATLAS ROOFING CORP — EnergyShield Pro Wall Insulation, EnergyShield Pro 2 Wall Insulation, EnergyShi
STORY NO. DESCRIPTION AND USE PER STORY (ACTUAL) TABLE 506.2 <sup>4</sup> AREA FOR ALLOWABLE FRONTAGE AREA PER STORY (ACTUAL) AREA AREA OR UNLIMITED <sup>2, 3</sup>	TOTAL	DUPONT DE NEMOURS, INC. — Types Thermax Sheathing, Thermax Light Duty Insulation, Thermax Heav Insulation, Thermax IH Insulation, Thermax Plus Liner Panel, Thermax Heavy Duty Plus (HDP), TUFF-R™ ci Ir
1st Floor         Educ./ Business         18,341 S.F.         25,500 S.F.         N/A         25,500 S.F.	PLUMBING FIXTURE REQUIREMENTS (TABLE 29021)	FIRESTONE BUILDING PRODUCTS CO L L C — "Enverge™ CI Foil Exterior Wall Insulation" and "Enverge™
	USE WATERCLOSETS URINALS LAVATORIES SHOWERS/ DRINKING FOUNTAINS	HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Types "Xci-Class A", "
<ul> <li><sup>1</sup> Frontage area increases from Section 506.2 are computed thus:</li> <li>a. Perimeter which fronts a public way or open space having 20 feet minimum width = N/A (F)</li> </ul>	MALE         FEMALE         UNISEX         MALE         FEMALE         UNISEX         TUBS         REGULAR         ACCESSIBLE           BUSINESS         EXISTING         0         0         1         0         0         1         0	RMAX, A BUSINESS UNIT OF SIKA CORPORATION — Types "TSX-8500", "ECOMAXci FR", "TSX-8510", "E
c. Ratio $(F/P) = N/A$ $(F/P)$ d. W = Minimum width of public way = N/A (W)	NEW         O         O         O         O         O         O         O         O         I         I           REQUIRED         O         O         I         O         I	JOHNS MANVILLE — Type "AP Foil-Faced Foam Sheathing"
e. Percent of frontage increase $I_F = 100 [F/P - 0.25] \times W/30 = N/A (%)$ <sup>2</sup> Unlimited area applicable under conditions of Sections 507		5A. Building Units* — As an alternate to Items 5, min. 1-in thick polyisocyanurate composite foar
<sup>3</sup> Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2). <sup>4</sup> The maximum area of open parking garages must comply with Table 406.5.4. The maximum area of air traffic	* URINALS SUBSTITUTED FOR WATER CLOSETS PER SECTION 403 853 OF NOSPO	ATLAS ROOFING CORP — EnergyShield® Ply HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — "Xci NB", "Xci Ply"
control towers must comply with Table 412.3.1. <sup>5</sup> Frontage increase is based on the unsprinklered area value in Table 506.2.	** URINALS SUBSTITUTED FOR WATER CLOSETS PER SECTION 419.2 OF NCSPC (EDUCATIONAL / ALL OTHER OCCUPANCIES)	RMAX, A BUSINESS UNIT OF SIKA CORPORATION — "Thermasheath-SI", "ECOBASEci", "ThermaBase-CI
ALLOWABLE HEIGHT	SPECIAL APPROVALS	* Indicates such products shall bear the UL or cUL Certificat
ALLOWABLE SHOWN ON PLANS CODE	Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, ICC, etc., describe below)	
Building Height in Feet (Table 504.3) EXISTING - NO CHANGE		
Duilding Height in Stories (Table 504.4)         1 Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.		
		A1.1 NO SCALE
		$\sim$

X

## NO CHANGE

rgy code shall also be an data sheet. If annual energy cost for the

s section is not applicable.)

## EXIT REQUIREMENTS BUSINESS PORTION ONL' NUMBER AND ARRANGEMENT OF EXITS

	MINI	MUM <sup>2</sup> OF EXITS	TRAVEL DISTAN	NCE	EXIT ACCESS DOORWAY CONFIGURATION <sup>1,3</sup> (SECTION 10				
FLOOR, ROOM OR SPACE DESIGNATION	REQUIRED	SHOWN ON PLANS	ALLOWABLE TRAVEL DISTANCE (TABLE 1017.2)	ACTUAL TRAVEL DISTANCE SHOWN ON PLANS	REQUIRED DISTANCE BETWEEN EXIT DOORS	ACTUAL DISTANCE SHOMN ON PLANS			
BUSINESS	1	2	200'	50'	N/A	N/A			
	1								

<sup>2</sup>Stories with single exits (Table 1006.3.2(2); Spaces with one means of egress (Table 1006.2.1) <sup>3</sup>Common Path of Travel (Section 1006.2.1)

EXIT WIDTH BUSINESS PORTION ONLY

	(a)	(b)		(	c)		EXIT MIL	7TH (in)2,5	3,4,5,6	
USE GROUP OR SPACE DESCRIPTION	AREA <sup>1</sup> sq. ft.	AREA <sup>1</sup> PER OCCUPANT (TABLE 1004 12)	CALCULATED OCCUPANT LOAD	EGRES PER OC (100	5 WIDTH CUPANT 05.3)	REQUIRE (SECTION (a ÷ I	ED WIDTH N 1005.3) b) x c	ACTUA SHOP PL	l WID NN ON ANS	
BUSINESS			(a÷b)	STAIR	LEVEL	STAIR	LEVEL	STAIR	LEV	
BUSINESS	2,043 S.F.	100 S.F. GR055	21	0.3	0.2	N/A	32"	N/A	64	
								1		
								a - unt		
					1					

<sup>1</sup> See Table 1004.1.2 to determine whether net or gross area is applicable.
<sup>2</sup> Minimum stairway width (Section 1011.2); min. corridor width (Section 1020.2); min. door width (Section 1010.1.1)

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Minimum width of exit passageway (Section 1024.2)
See Section 1005.6 for converging exits.
The loss of one means of egress shall not reduce the available capacity to less than 50 percent of the total required (Section 1005.5)
Assembly occupancies (Section 1029)

BXUV - Fire Resistance Ratings - ANSI/UL 263 Certified for United States BXUV7 - Fire Resistance Ratings - CAN/ULC-S101 Certified for Canada Design No. U905 Bearing Wall Rating - 2 HR. Nonbearing Wall Rating — 2 HR imit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7 UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively. 7.5/8" MIN. Horizontal Section an 2-1/4 and not more than 3-1/2 parts of clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 50 percent hydrated n if used. Where combustible members are framed in wall, plaster or stucco must be applied on the face opposite framing to achieve a max. Classification of slag, expanded clay or shale (Rotary Kiln Process), water repellant vermiculite masonry fill insulation, or silicone treated perlite loose fill insulation add 2 hr sheathing attached to concrete blocks (Item 1). II Insulation, EnergyShield CGF Pro, EnergyShield Ply Pro, EnergyShield @ CGF, EnergyShield @ PanelCast, EnergyShield @ and "EnergyShield @ XR ulation, Thermax Heavy Duty Insulation, Thermax Metal Building Board, Thermax White Finish Insulation, Thermax ci Exterior Insulation, Thermax XARMOR ci Exterior is (HDP), TUFF-R™ ci Insulation, Thermax Butler Stylwall Insulation Board and Thermax Morton Heavy Duty Insulation Board lation" and "Enverge™ CI Glass Exterior Wall Insulation" - Types "Xci-Class A", "Xci Foil (Class A)", "Xci 286"

(ci FR", "TSX-8510", "ECOMAX xi FR White", "ECOMAXci", "ECOMAXci FR Air Barrier", "Thermasheath-XP", "Thermasheath", "Durasheath"

urate composite foamed plastic insulation boards, nom. 48 by 48 or 96 in.

SEci", "ThermaBase-CI", "ECOMAXci FR Ply", "ECOMAXci Ply".

UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively. Last Updated on 2023-04-14





# NOTES FOR GENERAL CONTRACTOR:

GENERAL CONTRACTOR IS RESPONSIBLE FOR TOTAL COMPLIANCE WITH THE RENOVATION, REPAIR AND PAINTING RULE (RRP RULE) FINALIZED IN APRIL 2008 UNDER THE RESIDENTIAL LEAD-BASED PAINT HAZARD REDUCTION ACT OF 1992. REFER TO www.epa.gov/lead FOR ADDITIONAL INFORMATION.

THE ARCHITECT HAS ENDEAVORED TO LOCATE AND NOTE ALL ITEMS NEEDING TO BE DEMOLISHED AND REMOVED FOR THE PURPOSE OF THE PLACEMENT OF RENOVATED OR NEW CONSTRUCTION. THIS DOES NOT RELIEVE THE GENERAL CONTRACTOR FROM HIS RESPONSIBILITY TO THOROUGHLY FAMILIARIZE HIMSELF WITH THE DEMOLITION PHASE OF THIS PROJECT. ANY ITEM NOT SHOWN AND/ OR NOTED HEREIN WILL BE REMOVED AT NO ADDITIONAL PROJECT COST.

REFER TO OTHER DISCIPLINE DRAWINGS FOR FURTHER INSTRUCTIONS REGARDING DEMOLITION.

# TYPICAL SELECTIVE DEMOLITION NOTES:

- (RESPONSIBILITY OF THE GENERAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE) REMOVE AND LEGALLY DISPOSE OF ITEMS EXCEPT THOSE AS INDICATED FOR REUSE.
- 2. ITEMS NOTED AS SALVAGE ARE TO REMAIN THE PROPERTY OF THE OWNER. 3. ITEMS NOTED FOR REMOVAL AND REINSTALLATION ARE TO BE CLEANED AND
- REPAIRED TO AS LIKE NEW CONDITION.
- 4. PROTECT ALL ITEMS AND REMAINING CONSTRUCTION AGAINST DAMAGE.
- 5. THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS WILL COMPLY WITH ALL GOVERNING EPA REGULATIONS AT ALL TIMES.
- 6. IF OWNER IS OCCUPYING PORTIONS OF THE EXISTING BUILDING ADJACENT TO SELECTIVE DEMOLITION AND NEW CONSTRUCTION ALL WORK WILL BE CARRIED OUT AS TO NOT DISRUPT THE OWNERS OPERATIONS. THE G.C. WILL PROVIDE 12 HOURS NOTICE TO BOTH THE OWNER AND ARCHITECT WITH ANY ACTIVITIES AFFECTING OWNER OPERATION.
- RESTORE EXPOSED FINISHES OF PATCHED AREAS EXTENDING FINISH RESTORATION TO ADJOINING CONSTRUCTION IN A MANNER TO ELIMINATE EVIDENCE OF CUTTING AND PATCHING.
- 8. PATCH AND REPAIR FLOOR AND WALL SURFACES TO PROVIDE A FLUSH AND EVEN SURFACE.
- 9. USE ONLY MATERIALS WHEN INSTALLED THAT EQUAL OR SURPASS THE PERFORMANCE OF THOSE EXISTING.
- 10. PRIOR TO SELECTIVE DEMOLITION THE G.C. WILL VERIFY THAT ALL EXISTING UTILITIES HAVE BEEN CAPPED OR DISCONTINUED AS INDICATED
- 11. G.C. TO PROVIDE AND MAINTAIN BRACING AND SHORING FOR STRUCTURAL SUPPORT TO MAINTAIN STABILITY AND PREVENT MOVEMENT, SETTLEMENT OR COLLAPSE OF ADJACENT REMAINING STRUCTURES. 12. REMOVE EXISTING CONSTRUCTION ONLY TO THE EXTENTS AS REQUIRED FOR NEW
- CONSTRUCTION. 13. SYSTEMATICALLY PROCEED WITH SELECTIVE DEMOLITION FROM HIGH TO LOW.

14. CUT ALL NEW OPENING(S) NEAT, PLUMB, SQUARE, AND TRUE TO REQUIRED DIMENSIONS. 15. ALL DEMOLITION EQUIPMENT TO BE LOCATED SO AS NOT TO IMPOSE EXCESSIVE LOADS ON SUPPORTING FRAMING, WALL, OR FLOORS.

16. REMOVE, DRAIN, COLLECT, PURGE, AND DISPOSE OF ALL DANGEROUS MATERIALS PRIOR TO SELECTIVE DEMOLITION.

# DEMOLITION PLAN NOTES:

(RESPONSIBILITY OF THE GENERAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE) (1.) REMOVE EXISTING CABINETRY, AND WALLS AS INDICATED. CLEAN AND REPAIR REMAINING

- ADJACENT AREAS IN PREPARATION FOR NEW CONSTRUCTION TO MATCH EXISTING. (2.) REMOVE EXISTING PLUMBING FIXTURES. CAP ALL REMAINING PLUMBING LINES TO BE
- ABANDONED. (3.) REMOVE EXISTING CEILING, GRID AND LIGHTING (INCLUDING SUPPORTS AND HANGERS) AS
- INDICATED IN PREPARATION FOR NEW WORK.
- (4.) REMOVE EXISTING FLOORING AND BASE. CLEAN SUBFLOOR IN PREPARATION FOR NEW FLOORING.













		R	COM FINIS	SH SCHEDULE		
	ALL FINISHES	TO BE CHOSEN B	Y OWNER, ALL MATER	IALS MUST MEET OR EXCEED O	CHAPTER 8 OF 2018 NCSBC	5.
NO.	NAME	FLOOR	BASE	WALL / FINISH	CEILING / HEIGHT	COMMENTS
100	TOILET	RESIL. SHEET	INTEGRAL BASE	CMU/ MMMR PAINT	ACOUS / 9'-0"	
101	LABORATORY	RESIL. SHEET	INTEGRAL BASE	CMU/ MMMR PAINT	ACOUS / 9'-0"	
102	STUDENT ENTRY	RESIL. SHEET	INTEGRAL BASE	CMU/ PAINT	ACOUS / 9'-0"	
103	STORAGE	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ PAINT	ACOUS / 9'-0"	1
104	EXAM #2	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ MMMR PAINT	ACOUS / 9'-0"	
105	EXAM #1	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ MMMR PAINT	ACOUS / 9'-0"	
106	TRIAGE	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ MMMR PAINT	ACOUS / 9'-11"	
107	ORAL/ VISION	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ MMMR PAINT	ACOUS / 9'-11"	1
108	MENTAL HEALTH	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ PAINT	ACOUS / 9'-0"	
109	WAITING / EXIT	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ MMMR PAINT	ACOUS / 9'-11"	
110	NURSE/ MED. ASST.	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ PAINT	ACOUS / 9'-0"	
111	PROVIDER	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ PAINT	ACOUS / 9'-0"	
112	NURSE	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ PAINT	ACOUS / 9'-0"	
113	REGISTRATION	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ MMMR PAINT	ACOUS / 9'-11"	1
114	AFTER HOURS ENTRY	RESIL. SHEET	INTEGRAL BASE	CMU/ DW/ PAINT	ACOUS / 9'-0"	





13.	VERIFY ALL OVERALL ROOM DIMENSIONS PRIOR TO SHOP DRAWING SUBMITTALS.
14.	ALL SHELVING TO BE MAXIMUM 36" OR FOR EXAMPLE A 48" UNIT WOULD HAVE (2) 24
	SHELVES.



## ROOM FINISH SCHEDULE ABBREVIATIONS : DW - DRYWALL ACOUS - SUSPENDED ACOUSTICAL CEILING RESISTANT EPOXY PAINT

3. CMU - CONCRETE MASONRY UNIT 4. MMMR - MOISTURE/ MOLD/ MILDEW 5. RESIL. SHEET - HOMOGENEOUS RESILIENT SHEET VINYL





## INTERIOR WINDOW STYLE NOTES

1. GLAZING CONTRACTOR WILL PROVIDE TEMPERED GLASS IN ALL OPENINGS REQUIRED BY CODE. TEMPERED LITES WILL BE SHOWN ON SHOP DRAWINGS. 2. ALL WINDOWS SHALL BE IN COMPLIANCE WITH 2018 NCSBC.



## DOOD SCHEDINE

				200r			-				
		NOTE: ALL DO	DORS SHA	ALL HAVE	ELEVER	TYPE AD	DA COMPLIAN	NT HANDLES.			
	ROOMNANE	6175	DO	OR	FR	AME	TURFOUR			PANIC	
JOR NUMBER		SIZE	STYLE	MATL	STYLE	MATL	THRESHOLD	FIRE RATING	CLOSER	HDWR	REMARKS
100A	TOILET	3'-0" x 7'-0"	D1	WOOD	F1	НМ	NO	<del></del>	YES	NO	SEE NOTE #1
102A	STUDENT ENTRY	3'-0" x 7'-0"	D2	MOOD	F1	НМ	NO	90 MIN.	YES	NO	SEE NOTE #2
103A	STORAGE	З'-0" х 7'-0"	D1	NOOD	F1	нм	NO		NO	NO	SEE NOTE #2
104A	EXAM #2	3'-0" x 7'-0"	D1	MOOD	F1	НМ	NO		NO	NO	SEE NOTE #1
105A	EXAM #1	3'-0" x 7'-0"	D1	WOOD	F1	нм	NO		NO	NO	SEE NOTE #1
106A	TRIAGE	3'-0" x 7'-0"	D1	WOOD	F1	нм	NO		YES	NO	
108A	MENTAL HEALTH	3'-0" x 7'-0"	D1	MOOD	F1	нм	NO		NO	NO	SEE NOTE #1
110A	NURSE/ MED. ASST.	3'-0" x 7'-0"	D1	MOOD	F1	нм	NO		NO	NO	SEE NOTE #1
111A	PROVIDER	3'-0" x 7'-0"	D1	MOOD	F1	нм	NO		NO	NO	SEE NOTE #1
112A	NURSE	3'-0" x 7'-0"	D1	MOOD	F1	НМ	NO		NO	NO	SEE NOTE #1
114A	AFTER HOURS ENTRY	3'-0" x 7'-0"	D1	NOOD	F1	НМ	NO		YES	NO	SEE NOTE #3

ARROFVIATIONS. UN \_ HOLLOW METAL SE\_ ALLIMINUM STODEEDONT



ADJUSTABLE FOOT ANCHORS

3. THREE JAMB ANCHORS PER JAMB

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

8

A2.1

FRAME STYLES

(T) = TEMPERED GLASS, TYP. DOOR STYLE NOTES: HOLLOW METAL DOORS SHALL BE THE FLUSH SEAMLESS TYPE. ALL WOOD DOORS SHALL MATCH IN GRAIN COLOR, WITH CENTER BALANCE MATCH, BOOK MATCH FLITCH. ALL DOORS IN SAME AREA TO BE SIMILAR IN GRAIN "SHADE". ALL WOOD DOORS SHALL NOT HAVE DARK GRAIN PATTERNS. 3. 4.

ALL PAIRED DOORS WILL BE FROM SAME FLITCH AND BALANCED.



PROVIDE JOINTS IN GYPSUM WALL BOARD TO CEILING @ ALL WINDOW & DOOR FRAMES. TAPE & FINISH IN PREPARATION FOR PAINTING.





## TYPICAL CEILING NOTES: SEISMIC DESIGN CATEGORY "C"

BASIC CONNECTIONS, PERIMETER AND BRACING

60 LB. MINIMUM INTERSECTION STRENGTH LIMITS @MT/CT.

- 2. VERTICAL HANGER WIRE 12 GA. @ 4'-O" O.C. 3. INTERMEDIATE OR HEAVY DUTY MAIN TEE'S.
- 4. 1 IN 6 MAXIMUM PLUMB OF VERTICAL HANGER WIRES PER ASTM C635. 5. PERIMETER VERTICAL HANGER WIRES NOT MORE THAN 8" FROM
- WALL UNLESS MOLDING IS LESS THAN 7/8". 6. 3/8" MINIMUM GRID END/WALL CLEARANCE.
- 7. MINIMUM 7/8" PERIMETER CLOSURE MOLDING WIDTH UNLESS USING PERIMETER WIRES.
- 8. GRID CONNECTION TO PERIMETER ATTACHED ON TWO WALLS NOT PERMITTED. 9. PERIMETER TEE ENDS REQUIRED TO BE TIED TOGETHER.
- 10. PARTITION ATTACHMENT ALLOWED ONLY IF CEILING IS CAPABLE OF MOVING LATERALLY.

LIGHTING FIXTURE ATTACHMENT

- 1. LIGHT FIXTURE (ALL TYPES) MECHANICALLY ATTACHED TO GRID NEC 410-16 (TWO PER FIXTURE UNLESS INDEPENDENTLY SUPPORTED). 2. PENDENT HUNG FIXTURES DIRECTLY SUPPORTED FROM STRUCTURE
- WITH 9 GA. WIRE (OR APPROVED ALTERNATE).
- 3. RIGID LAY-IN OR CAN LIGHT FIXTURES:
  - \* < 10 LBS. ONE WIRE TO STRUCTURE (MAY BE SLACK). \* 10-56 LBS. - TWO WIRES FROM HOUSING TO STRUCTURE (MAY BE SLACK).
  - \* > 56 LBS. SUPPORTED DIRECTLY TO STRUCTURE BY
  - APPROVED ALTERNATE.
  - \* < 20 LBS. POSITIVELY ATTACHED TO GRID. \* 20-56 LBS. - POSITIVELY ATTACHED TO GRID AND TWO WIRES
  - TO STRUCTURE (MAY BE SLACK). \* 56 LBS. - DIRECTLY SUPPORTED TO STRUCTURE.

SERVICE APPLICATIONS

- LESS THAN 20 LBS. POSITIVELY ATTACHED TO GRID. 2. 20 TO 56 LBS. POSITIVELY ATTACHED TO GRID AND TWO WIRES TO
- STRUCTURE (CAN BE SLACK).
- 3. MORE THAN 56 LBS. MUST BE DIRECTLY SUPPORTED TO STRUCTURE. 4. MINIMUM 3/8" ON ALL SIDES PERTAINING TO SPRINKLER HEADS AND OTHER PENETRATION CLEARANCES.







		ALL PLU	F MBING FI	PLUM XTURES	BING MUST BE	FIXTURE SCHEDULE REVIEWED AND APPROVED BY OWNER PRIOR TO ORDERING.						
SYM	DESCRIPTION	CW	нพ	w	v	MODEL NUMBER	REMAR					
P–1	WATER COOLER	1/2"	_	2"	2"	DASIS MODEL PG8ACSL, PROVIDE ACCESSORY APRON ON UNIT PROVIDE STOP AND TRAP. ALL STAINLESS STEEL FINISH.						
P-2	SINGLE CMPT. SINK	1/2"	1/2"	2"	2"	ELKAY LR-2219 W/LK-335 STRAINER; CHICAGO 786-GN8AE3ABCP; KOHLER K-7608-CP SUPPLY, K-9000 TRAP	1,2,10					
PLUMB PF 3. PR 5. PR 6. C 4. EQ 5. EQ 6. EQ 7. OL 9. EQ 10. EQ 11. EQ 12. EQ 13. EQ 14. EQ 14. EQ 15. BE 16. EQ 17. EQ 18. AC 19. EQ	EREX MODEL PRO- REWRAPPED CAST OVIDE CARRIERS I OR LAVATORIES: S ARRIERS (CONCEA UAL CHINA FIXTUI UAL TOILET SEAT UAL FLUSH VALVE P OF FLUSH VALVE P OF FLUSH VALVE P OF FLUSH VALVE P OF FLUSH VALVE DAL FAUCETS BY UAL STAINLESS S JAL SHOWER STAI UAL SHOWER TRIN N 417.4 & 417.5; UAL WATER COOLI UAL SHOWER TRIN N 417.4 & 417.5; UAL WATER COOLI UAL SHOWER TRIN COW SLAB TO FLU UAL FAUCETS BY NGLE SINK = RIGI UAL CAST IRON L CESSORY APRON OVIDE INTEGRAL C UAL SPECIALTY F	-2000 ( P-TRAF FOR ALL SINGLE H LED OR RE BY A BY BEN ES BY Z /E SHAL EQUIRED ANISM S SYMMOI TEEL SIN L BY A 1 BY ZU SEE AF ER/DRIN BY SWAN OOR DR/ CHICAG D SPOU AVATORI MAY BE CHECK S IXTURE 1	DR McGU P ASSEM WALL I HANGER EXPOSE MERICAI IIS, OLS URN & L BE LC HALL BE NS, CHIC IK BY F MERICAN RN, LEC RCH DW KING FC ISTONE, X IS US AIN. O FAUCI T; DOUE ISS BY C OMITTE TOPS A BY OATE	JIRE PW MBLY KIT MOUNTEL FOR BL TOR BL D PER N STANE ONITE & TOTO. DCATED E LOCAT CAGO FA RANKE N STANE D NARD & GS/SPEC DUNTAIN E.L.MUS ED, PRC ETS, T& BLE SINK CECO & D IF WA T ALL W EY, SIOU	V8902 ON AL D FIXTUL OCK WA MFR'S F DARD, Z BENEK MINIMUM ED OPP AUCETS, & JUST DARD, CI ARD, CI CS FOR BY HAL STEE. OVIDE TR S, ELKA CS FOR S, ELKA CS FOR S, ELKA CS FOR CS CS FOR CS FOR C	L HANDICAP ACCESSIBLE LAVATORIES AND/OR SINKS. RES. ALLS; FOR GYPBOARD WALL, PROVIDE FLOOR-MOUNT ARM REQUIREMENTS). JURN & SLOAN. IE. 4 3" BELOW BOTTOM OF GRAB BAR. P.C. TO CUT POSITE OF HAND RAIL AS PER ADA REQUIREMENT. DELTA, MOEN, ZURN & AMERICAN STANDARD. RANE, AQUATIC, MAAX, AQUA GLASS & AQUARIUS. (MAN (PROVIDE SHOWER PAN AS REQ'D PER CODE DETAILS). JSEY TAYLOR, SUNROC, HAWS & ELKAY. RAP PRIMER AND PIPE 1/2" LINE Y, ZURN & AMERICAN STANDARD. STRICTED SPOUT. OLER IS RECESSED. UCETS.						
	PLUMBING SPECIALTIES SCHEDULE											

	PLUM	BING SPECIAL HES SCHEDULE	
SYM	DESCRIPTION	MODEL NUMBER	REMARKS
WCO	WALL CLEANOUT	ZURN Z-1446 W/STAINLESS STEEL COVER	1, 8
1. EQU 2. EQU 3. PRO 4. EQU 5. PRO 6. EQU PROVIE 7. AT CONNE 8. PRO	ALS BY JOSAM, JA JALS BY JOSAM, JA OVIDE INTEGRAL CHE JALS BY OATEY, SIO OVIDE WITH NB FRAN JALS BY JOSAM, JA DE AT QUICK-CLOSI EACH FLOOR DRAIN CTION (SUFFIX -P) OVIDE WCO AT BASE	Y R. SMITH, ZURN, MIFAB, WATTS. Y R. SMITH. ECK STOPS AT ALL WALL FAUCETS. DUX CHIEF. MING GRATE Y R. SMITH, WATTS – ASSE 1010 APPROVED. NG FIXTURES PER IPC 604.9. I & FLOOR SINK, PROVIDE WITH TRAP PRIMER AND INCLUDE PRIMER OPTION "TP" NOTED ABOVE. E OF EACH WASTE STACK PER IPC 708.3.4.	

	PLUMBIN(	GLEGEND	CONTRACTOR TO VERIFY ALL DIMENSIONS.	TECTURE OCIATION BAY STREET, SUITE 302 'BAY STREET, SUITE 302 'No, SOUTH CAROLINA 29403 'No, SOUTH CAROLINA 29403 'No
SYMBOL	ABBREVIATION	DESCRIPTION		HIISSS SSS ARLEST : (843)
	CW	COLD WATER		C C CH <sub>1</sub> CH <sub>1</sub>
	HW	HOT WATER		<b>A R</b> <b>A L</b> 200 8106 853
	HW-140	HOT WATER 140		E SUITE INA 28 (NA 28
	HWR	HOT WATER RETURN		<b>L S I C</b> <b>R</b> 0AD, (AR0L) X: (704
	G	GAS		A C E S – I TEAM I TH C 851 FA
	W	WASTE		<b>F R B F B S</b> 7, 630 WS, NC 847-9
	GW	GREASE WASTE		<b>L N</b> <b>R C</b> BOX 1 TTHEV (704)
	V	VENT		<b>P P P P P P P P P P</b>
	RL	ROOF LEADER		
	EQUIPMENT	PLUMBING EQUIPMENT	HTECT.	
	EXREMA	EXISTING TO REMAIN	THE ARCH	
	EXREMO	EXISTING TO BE REMOVED	ENT OF 1	
	EXRELO	EXISTING TO BE RELOCATED	EN CONS	2.15.23 07.JP 335/JC
	VTR	VENT THRU ROOF	T WRITTI	аты: 12 ву: B1 D ву: B1 7. 2,
		GLOBE VALVE	WITHOU	ISSUE D DRAWN CHECKE PROJEC
		BALL VALVE	ODUCED	
		BACKFLOW PREVENTER (RPZ/DCVA)	OR REPR	
			SPOSES	A A T A
		PRESSURE REDUCING VALVE		С С С
<u> </u>	FPH	FROST PROOF HYDRANT	NSTRUC1	О И И И И И И И
+	НВ	HOSE BIBB	FOR CON	
		SHOCK ABSORBER	JE USED	
0	RD	ROOF DRAIN	AN NOT E	
$\bigcirc$	FCO	FLOOR CLEANOUT	S AND C/	
$\square$	FC0/YC0	FLOOR OR YARD CLEANOUT	CHITECTI	
	FD	FLOOR DRAIN	THE ARC	
		VACUUM BREAKER	ERTY OF	
	S.A(?)	SHOCK ABSORBER	IE PROPE	REVISION SCHEDULE
		AQUASTAT	NG IS TH	
			S DRAWI	
		CUNNEUT TO EXISTING	H	P1.0

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0,16





NOTE: THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS. SUBMISSION OF BIDS IS CONSIDERED VERIFICATION THAT THE CONTRACTOR HAS VISITED THE SITE. NO EXTRAS WILL BE ALLOWED DUE TO LACK OF KNOWLEDGE OF THE EXISTING CONDITIONS.



EXTEND NEW 2" WASTE AND VENT PIPE AS REQUIRED FOR RELOCATED SINK.



NOTE: THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS. SUBMISSION OF BIDS IS CONSIDERED VERIFICATION THAT THE CONTRACTOR HAS VISITED THE SITE. NO EXTRAS WILL BE ALLOWED DUE TO LACK OF KNOWLEDGE OF THE EXISTING CONDITIONS.

# ) PLUMBING FLOOR PLAN - NEW WORK - WASTE SCALE: 1/8" = 1'-0" 1







NOTE: THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS. SUBMISSION OF BIDS IS CONSIDERED VERIFICATION THAT THE CONTRACTOR HAS VISITED THE SITE. NO EXTRAS WILL BE ALLOWED DUE TO LACK OF KNOWLEDGE OF THE EXISTING CONDITIONS.

# 1 PLUMBING FLOOR PLAN – NEW WORK – WATER SCALE: 1/8" = 1'-0"







<u>SCOPE</u>

THE CONTRACTOR SHALL COORDINATE THE WORK AND EQUIPMENT OF THIS DIVISION WITH THE WORK AND EQUIPMENT SPECIFIED ELSEWHERE IN ORDER TO ASSURE A COMPLETE AND SATISFACTORY INSTALLATION. WORK SUCH AS EXCAVATION, BACKFILL, CONCRETE, FLASHING, WIRING, ETC., WHICH IS REQUIRED BY THE WORK OF THIS SECTION SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE SECTION OF THE SPECIFICATIONS.

IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION. WHENEVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE".

THE WORD "PROVIDE" MEANS FURNISH, FABRICATED, COMPLETE, INSTALL, ERECT, INCLUDING LABOR AND INCIDENTAL MATERIALS NECESSARY TO COMPLETE IN PLACE AND READY FOR OPERATION OR USE THE ITEM REFERRED TO OR DESCRIBED HEREIN AND/OR SHOWN OR REFERRED TO ON THE CONTRACT DRAWINGS.

#### EQUIPMENT APPLICATION AND PERFORMANCE

THE CONTRACTOR AND/OR EQUIPMENT SUPPLIER SHALL BE RESPONSIBLE TO SEE THAT EQUIPMENT SUPPLIED IS CORRECT FOR THE INTENDED APPLICATION AND WILL PERFORM WITHIN THE LIMITS OF CAPACITY, NOISE, LIFE EXPECTANCY, PRESSURE DROP AND SPACE LIMITATIONS INTENDED FOR THAT EQUIPMENT AS SHOWN ON THE PLANS OR DESCRIBED IN THE SPECIFICATIONS. THE SHOP DRAWINGS SHALL SHOW THE CAPACITY AND OPERATING CHARACTERISTICS OF THE EQUIPMENT.

WHERE THE CONTRACTOR PROPOSES TO USE AN ITEM OF EQUIPMENT OTHER THAN THAT SPECIFIED OR DETAILED ON THE DRAWINGS, WHICH REQUIRES ANY REDESIGN OF THE STRUCTURE, PARTITIONS, FOUNDATIONS, PIPING, WIRING OR ANY OTHER PART OF THE MECHANICAL, ELECTRICAL, OR ARCHITECTURAL LAYOUT, ALL SUCH REDESIGN, AND ALL NEW DRAWINGS AND DETAILING REQUIRED THEREFORE, SHALL BE PREPARED BY THE SUBCONTRACTOR AT HIS OWN EXPENSE AND SUBMITTED FOR APPROVAL BY THE ARCHITECT.

WHERE SUCH APPROVED DEVIATION REQUIRES A DIFFERENT QUANTITY AND ARRANGEMENT OF PIPING, WIRING, CONDUIT, AND EQUIPMENT FROM THAT SPECIFIED OR INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL FURNISH AND INSTALL ANY SUCH PIPING, STRUCTURAL SUPPORTS, INSULATION, CONTROLLERS, MOTORS, STARTERS, ELECTRICAL WIRING AND CONDUIT, AND ANY OTHER ADDITIONAL EQUIPMENT REQUIRED BY THE SYSTEM, AT NO ADDITIONAL COST TO THE OWNER.

#### DIELECTRIC CONNECTIONS

DIELECTRIC CONNECTIONS SHALL BE USED AT ANY POINTS WITHIN THE PIPING SYSTEMS WHERE DISSIMILAR METALS MEET. CAREFUL ATTENTION SHALL BE GIVEN TO SUPPORT BRACKETS AND HANGERS TO SELECT PROPER MATERIALS TO AVOID DISSIMILAR METAL CONTACT AT THESE POINTS.

#### DUTIES OF CONTRACTOR

CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS CALLED FOR IN THESE SPECIFICATIONS AND ACCOMPANYING DRAWINGS, AND MUST FURNISH THE APPARATUS COMPLETE IN EVERY RESPECT. ANYTHING CALLED FOR IN THE SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS OR SHOWN ON THE DRAWINGS AND NOT CALLED FOR IN THE SPECIFICATIONS MUST BE FURNISHED BY THE CONTRACTOR.

#### CONTRACTOR IS RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH THE DETAILS OF THE CONSTRUCTION OF THE BUILDING. WORK UNDER THESE SPECIFICATIONS INSTALLED IMPROPERLY OR WHICH REQUIRES CHANGING DUE TO IMPROPER READING OR INTERPRETATION OF BUILDING PLANS SHALL BE CORRECTED AND CHANGED AS DIRECTED BY THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.

CONDITIONS SOMETIMES OCCUR WHICH REQUIRE CERTAIN CHANGES IN DRAWINGS AND SPECIFICATIONS. IN THE EVENT THAT SUCH CHANGES IN DRAWINGS AND SPECIFICATIONS ARE NECESSARY, THE SAME ARE TO BE MADE BY THE CONTRACTOR WITHOUT EXPENSE TO THE OWNER, PROVIDING SUCH CHANGES DO NOT REQUIRE FURNISHING MORE MATERIALS, OR PERFORMING MORE LABOR THAN THE TRUE INTENT OF THE DRAWINGS AND SPECIFICATIONS DEMANDS. IT IS UNDERSTOOD THAT WHILE THE DRAWINGS ARE TO BE FOLLOWED AS CLOSELY AS CIRCUMSTANCES WILL PERMIT, THE CONTRACTOR IS HELD RESPONSIBLE FOR THE INSTALLATION OF THE SYSTEM ACCORDING TO THE TRUE INTENT AND MEANING OF THE DRAWINGS. ANYTHING NOT ENTIRELY CLEAR IN THE DRAWINGS AND SPECIFICATION WILL BE FULLY EXPLAINED IF APPLICATION IS MADE TO THE ARCHITECT. SHOULD, HOWEVER, CONDITIONS ARISE WHERE IN THE JUDGMENT OF THE CONTRACTOR CERTAIN CHANGES WILL BE ADVISABLE, THE CONTRACTOR WILL COMMUNICATE WITH THE ARCHITECT AND SECURE HIS APPROVAL OF THESE CHANGES BEFORE GOING AHEAD WITH THE WORK.

THE RIGHT TO MAKE ANY RESPONSIBLE CHANGE IN LOCATION OF APPARATUS, EQUIPMENT, ROUTING OF PIPING UP TO THE TIME OF ROUGHING IN, IS RESERVED BY THE ARCHITECT WITHOUT INVOLVING ANY ADDITIONAL EXPENSE TO THE OWNER.

IT SHALL BE THE DUTY OF PROSPECTIVE CONTRACTORS TO VISIT THE JOB SITE AND FAMILIARIZE THEMSELVES WITH JOB CONDITIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF ADDITIONAL WORK NECESSITATED BY, OR CHANGES IN PLANS REQUIRED BECAUSE OF EVIDENT JOB CONDITIONS, THAT ARE NOT INDICATED ON THE DRAWINGS.

#### CODES, RULES, PERMITS AND FEES

ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL COMPLY WITH THE NATIONAL FIRE CODES OF THE NATIONAL FIRE PROTECTION ASSOCIATION. AND WITH THE REQUIREMENTS OF ALL GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION.

ALL MATERIALS AND EQUIPMENT FOR THE ELECTRICAL PORTION OF THE PLUMBING SYSTEM SHALL BEAR THE APPROVAL LABEL, AND SHALL BE LISTED BY THE UNDERWRITERS' LABORATORIES, INC.

ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NORTH CAROLINA STATE BUILDING CODE, AND REQUIREMENTS OF GOVERNMENTAL AGENCIES HAVING JURISDICTION.

#### COOPERATION WITH OTHER TRADES

THIS CONTRACTOR SHALL GIVE FULL COOPERATION TO OTHER TRADES AND SHALL FURNISH ANY INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH THE LEAST POSSIBLE INTERFERENCE OR DELAY.

WHERE THE WORK OF THE CONTRACTOR WILL BE INSTALLED IN CLOSE PROXIMITY TO, OR MAY INTERFERE WITH THE WORK OF OTHER TRADES. HE SHALL ASSIST IN WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT. IF SO DIRECTED BY THE ARCHITECT, THE CONTRACTOR SHALL PREPARE COMPOSITE WORKING DRAWINGS AND SECTIONS AT A SUITABLE SCALE NOT LESS THAN 3/8" = 1'-0", CLEARLY SHOWING HOW HIS WORK IS TO BE INSTALLED IN RELATION TO THE WORK OF OTHER TRADES. IF THE CONTRACTOR INSTALLS HIS WORK BEFORE COORDINATION WITH OTHER TRADES. OR SO AS TO CAUSE ANY INTERFERENCE WITH WORK OF OTHER TRADES, HE SHALL MAKE THE NECESSARY CHANGES IN HIS WORK TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.

THE CONTRACTOR SHALL FURNISH TO OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS, AND SHOP DETAILS FOR THE PROPER INSTALLATION OF WORK AND FOR THE PURPOSE OF COORDINATING ADJACENT WORK.

#### SAFETY REQUIREMENTS

ALL SYSTEMS SHALL BE INSTALLED SO AS TO BE SAFE OPERATING AND ALL MOVING PARTS SHALL BE COVERED WHERE SUBJECT TO HUMAN CONTACT. ALL ROUGH EDGES OF EQUIPMENT AND MATERIALS SHALL BE MADE SMOOTH.

ALL SAFETY CONTROLS SHALL BE CHECKED UNDER THE SUPERVISION OF THE ARCHITECT'S REPRESENTATIVE AND EIGHT (8) COPIES OF TEST DATE SHOWING SETTING AND PERFORMANCE OF SAFETY CONTROLS SHALL BE SUBMITTED TO THE ARCHITECT. ALL PRESSURE VESSELS SHALL BE ASME STAMPED AND SHALL HAVE STAMPED RELIEF VALVES. WATER HEATERS SHALL BE PROVIDED WITH ASME STAMPED T & P RELIEF VALVE.

#### CONCEALED PIPE

IN GENERAL, ALL PIPES IN FINISHED SPACES SHALL BE RUN CONCEALED IN FLOORS, WALLS, PARTITIONS AND ABOVE CEILINGS. UNLESS OTHERWISE NOTED, ALL PIPE SHALL RUN INSIDE THE INSULATED PERIMETER OF THE BUILDING.

#### PROTECTION

THE CONTRACTOR SHALL PROTECT ALL WORK AND MATERIAL FROM DAMAGE, AND SHALL BE LIABLE FOR ALL DAMAGE DURING CONSTRUCTION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR WORK AND EQUIPMENT UNTIL ALL CONSTRUCTION IS FINALLY INSPECTED, TESTED AND ACCEPTED. THE CONTRACTOR SHALL PROTECT WORK AGAINST THEFT, INJURY OR DAMAGE AND SHALL CAREFULLY STORE MATERIAL AND EQUIPMENT RECEIVED ON SITE WHICH IS NOT IMMEDIATELY INSTALLED. THE CONTRACTOR SHALL CLOSE OPEN ENDS OF WORK INCLUDING PIPE OR EQUIPMENT WITH TEMPORARY COVERS OR PLUGS DURING STORAGE AND CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIALS OR DUST AND DEBRIS.

PROVIDE A PROTECTIVE COVERING OF NOT LESS THAN 0.004" THICK VINYL SHEETING (OR A SIMILAR APPROVED MATERIAL) TO BE USED IN COVERING ALL ITEMS OF EQUIPMENT, IMMEDIATELY AFTER THE EQUIPMENT HAS BEEN SET IN PLACE, (OR IF IN A PLACE OF STORAGE WITHIN THE BUILDING UNDER CONSTRUCTION) TO PREVENT THE ACCUMULATION OF DIRT, SAND, CEMENT, PLASTER, PAINT OR OTHER FOREIGN MATERIALS FROM COLLECTING ON THE EQUIPMENT AND/OR FOULING WORKING PARTS.

### <u>CLEANING</u>

CLEAN FROM ALL EXPOSED INSULATION AND METAL SURFACES GREASE, DEBRIS OR OTHER FOREIGN MATERIAL

CHROME PLATED FITTINGS, FIXTURES, PIPING AND TRIM SHALL BE POLISHED UPON COMPLETION.

#### EQUIPMENT SERVICEABILITY

ALL EQUIPMENT SHALL BE INSTALLED SO THAT IT CAN BE SERVICED AND/OR REMOVED WITHOUT DISMANTLING ANY OTHER BUILDING OR EQUIPMENT COMPONENTS. ALL EQUIPMENT IN OR CONNECTED TO PIPING SYSTEMS SHALL HAVE VALVES TO ISOLATE THIS EQUIPMENT FROM THE PIPING SYSTEM. THIS INCLUDES, BUT NOT NECESSARILY LIMITED TO CONTROL VALVES, WATER HEATERS, SENSORS, SWITCHES, PUMPS, TRAPS AND STRAINERS. UNIONS (SCREWED OR FLANGED) SHALL BE PROVIDED SO THAT ALL EQUIPMENT IS REMOVABLE.

#### ACCEPTANCE OF EQUIPMENT

CONTRACTOR SHALL MAKE ALL NECESSARY TESTS, TRIAL OPERATION BALANCING AND BALANCE TESTS, ETC., AS MAY BE REQUIRED AS DIRECTED BY THE ENGINEER TO PROVE THAT ALL WORK UNDER THESE PLANS AND SPECIFICATION IS IN COMPLETE SERVICEABLE CONDITION AND WILL FUNCTION AS INTENDED.

UPON COMPLETION OF ALL WORK THE SYSTEM SHALL BE TESTED TO DETERMINE IF ANY EXCESS NOISE OR VIBRATION IS APPARENT DURING OPERATION OF THE SYSTEM. IF ANY SUCH OBJECTIONS ARE DETECTED IN THE SYSTEM OR NOISY EQUIPMENT FOUND, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING SAME. EQUIPMENT SHALL BE WIPED CLEAN WITH ALL TRACES OF OIL, DUST, DIRT AND PAINT SPOTS REMOVED. BEARINGS SHALL BE LUBRICATED AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER. ALL CONTROL VALVES AND EQUIPMENT SHALL BE ADJUSTED TO SETTING INDICATED.

#### <u>GUARANTEE</u>

THE CONTRACTOR SHALL GUARANTEE THE COMPLETE PLUMBING SYSTEM AGAINST DEFECT DUE TO FAULTY MATERIALS, FAULTY WORKMANSHIP OR FAILURE DUE TO NEGLIGENCE OF THE CONTRACTOR. THIS GUARANTEE WILL EXCLUDE NORMAL WEAR AND TEAR, MAINTENANCE

LUBRICATION, REPLACEMENT OF EXPENDABLE COMPONENTS, OR ABUSE. THE GUARANTEE PERIOD SHALL BEGIN ON THE DATE OF THE FINAL ACCEPTANCE AND SHALL CONTINUE FOR A PERIOD OF 12 MONTHS DURING WHICH TIME THE CONTRACTOR SHALL MAKE GOOD SUCH DEFECTIVE WORKMANSHIP AND MATERIALS AND ANY DAMAGE RESULTING THERE FROM, WITHIN A REASONABLE TIME OF NOTICE GIVEN BY THE OWNER.

#### <u>TEST</u>

ALL PIPING SHALL BE TESTED BEFORE COVERING IS APPLIED OR WORK CONCEALED, AND ALL LEAKS CORRECTED BY REMOVAL OF DEFECTIVE MATERIAL AND/OR MAKING UP NEW JOINTS. EQUIPMENT SHALL BE PROTECTED FROM TEST PRESSURE BY CAPPING LINES OR WITH VALVES DURING TEST. CAULKING OF PIPING WILL NOT BE PERMITTED AND WHERE EVIDENT OF CAULKING IS NOTED, THE JOINTS SHALL BE REMOVED FORM THE PIPING SYSTEM REGARDLESS OF WHETHER OR NOT IT IS LEAKING.

#### TEST ALL WATER PIPING AT 125 PSI.

#### TEST ALL WASTE AND VENT PIPING WITH A 10 FOOT HEAD.

STERILIZATION OF WATER PIPING SHALL BE IN ACCORDANCE WITH AWWA SPECIFICATION 0601. AFTER THE PRESSURE TESTS HAVE BEEN MADE, THE SYSTEM SHALL BE FLUSHED WITH WATER. THE CHLORINATING MATERIAL SHALL BE LIQUID CHLORINE-WATER MIXTURE CALCIUM HYPOCHLORITE, SODIUM HYPOCHLORITE, OR CHLORINATED LIME-WATER MIXTURE. THE SOLUTION SHALL HAVE NOT LESS THAN 50 PPM AVAILABLE CHLORINE. THE DISINFECTING SOLUTION SHALL BE ALLOWED TO REMAIN IN THE SYSTEM FOR A MINIMUM PERIOD OF 24 HOURS. AFTER DISINFECTION, THE SYSTEM SHALL BE FLUSHED WITH CLEAN WATER UNTIL RESIDUAL CHLORINE CONTENT IS NOT GREATER THAN .02 PPM. AFTER THE SYSTEM IS FLUSHED, WATER SAMPLES SHALL BE TAKEN AND TESTED AT THE CONTRACTOR'S EXPENSE BY AN INDEPENDENT TESTING LAB AND REPORTS SHALL BE FURNISHED TO THE ENGINEER'S FOR APPROVAL. IF THE WATER IS FOUND UNSAFE FOR HUMAN CONSUMPTION, THE DISINFECTION PROCEDURE SHALL BE REPEATED.

#### SOIL, WASTE, VENT AND DRAIN PIPING (PVC)

SOIL, WASTE, VENT AND DRAIN PIPING SHALL BE SOLID WALL PVC PLASTIC PIPE AND FITTINGS CONFORMING TO ASTM D 2665. JOINTS FOR PVC PIPE SHALL BE SOLVENT CEMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

#### DOMESTIC WATER PIPING

ALL DOMESTIC WATER PIPING SHALL BE HARD DRAWN COPPER TUBING ASTM B 88 TYPE "L" ABOVE GRADE, TYPE "K" BELOW GRADE

FITTINGS FOR COPPER TUBING SHALL BE ANSI B16.18 OR B16.22 SOLDER JOINT FITTINGS. ENDS OF PIPE SHALL BE REAMED. PIPE AND FITTINGS CLEANED. FOR PIPE SIZES 1-1/4" AND SMALLER USE ONLY 95-5 (95% TIN AND 5% ANTIMONY) SOLDER WITH NON-CORROSIVE FLUX. FOR PIPE SIZES 1-1/2" AND LARGER USE ONLY HARD SOLDER SUCH AS "SIL-FOS" OR "SILVER SOLDER."

#### EXCAVATING AND BACKFILLING

IN BACKFILLING PIPE TRENCHES, APPROVED FILL SHALL FIRST BE COMPACTED FIRMLY AND EVENLY ON BOTH SIDES OF PIPE IN 6" LAYERS TO A DEPTH OF 12" OVER THE TOP OF THE PIPE. REMAINDER OF TRENCH SHALL BE BACKFILLED TO ESTABLISHED GRADE IN 6" LAYERS. COMPACT BETWEEN EACH LAYER WITH A HIGH-FREQUENCY VIBRATOR TAMPER SUCH AS DART SOIL COMPACTOR (AS MANUFACTURED BY DART MANUFACTURING COMPANY, DENVER, COLORADO), FILL SHALL BE COMPACTED TO DENSITY SPECIFIED UNDER EARTH WORK SECTION OF SPECIFICATIONS FOR SPECIFIED AREA THROUGH WHICH TRENCH PASSES. COMPACT FILL TO 95% MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT ALL OTHER AREAS. EARTH BEARING PRESSURE AS INDICATED SHALL BE VERIFIED BY A TESTING LABORATORY, WHICH FOLLOWING THE CRITERIA SPECIFIED FOR FOUNDATION WALL TRENCH, ETC. IN THE EARTH WORK SECTION OF THE SPECIFICATIONS. THE REPORTS SHALL BE FORWARDED TO THE ARCHITECT FOR APPROVAL UNLESS OTHERWISE SPECIFIED. THE COST WILL BE BORNE BY THIS CONTRACTOR, BEFORE ANY WORK IS PERFORMED. IF THE EARTH BEARING PRESSURE IS LESS THAN THAT REQUIRED, THE CONTRACTOR SHALL NOT BEGIN ADDITIONAL WORK UNTIL NOTIFIED BY THE ARCHITECT TO DO SO. A COPY OF THE REPORT SHALL BE FORWARDED TO THE ARCHITECT IN TRIPLICATE.

#### HANGERS

ALL PIPING SHALL BE SUPPORTED ON NOT LESS THAN 10' CENTERS AND WITHIN 30" OF EACH CHANGE OF DIRECTION EXCEPT THAT PIPING 1 1/4" SIZE AND SMALLER SHALL BE SUPPORTED ON 8' 0" CENTERS.

PIPE HANGERS SHALL BE SUPPORTED BY MEANS OF IRON HANGER RODS FROM THE BUILDING CONSTRUCTION OR FROM STRUCTURAL STEEL MEMBERS, AND IN AN APPROVED MANNER. WHERE REQUIRE, PIPING SHALL BE HUNG FROM ANGLE IRON CLIPS OR SUITABLE BRACKETS ATTACHED TO SIDES OF MASONRY CONSTRUCTION.

#### PIPE INSULATION

ALL WATER PIPING SHALL BE INSULATED WITH AN APPROVED MINIMUM 1" THICK MATERIAL HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 BTU PER INCH/HxFT<sup>2</sup>xF, PER SECTION C404.4 OF THE 2018 NCECC.

APPROVED MATERIALS FOR PIPE INSULATION:

a) HEAVY DENSITY FIBERGLASS WITH AN ALL-SERVICE JACKET COMPOSED OF AN OUTER LAYER OF VINYL, FIBERGLASS SCRIM CLOTH, ALUMINUM FOIL, AND KRAFT PAPER, IN THAT ORDER, FROM OUTSIDE TO INSIDE OF PIPE COVERING. b) FLEXIBLE ELASTOMERIC FOAM INSULATION.

#### VALVE TAGS AND SCHEDULE

EACH VALVE SHALL BE PROVIDED WITH AN ENGRAVED BLACK FINISH, PHENOLIC VALVE TAG INDICATING VALVE SERVICE AND VALVE NUMBER. TAG LETTERING SHALL BE AT LEAST 1/4" HIGH ETCHED WHITE LETTERS AND BEVELED WHITE TRIM. TAGS TO BE ATTACHED USING BRASS CHAINS. PROVIDE STEEL COLOR CODED 3/4 INCH DIAMETER CEILING TACKS IN ACOUSTICAL TILE CEILINGS OR COLOR CODED TAPE APPLIED TO CEILING GRID TO LOCATE EQUIPMENT OR VALVES THAT ARE INSTALLED ABOVE CEILING.

#### <u>VALVES</u>

BALL VALVES SHALL BE CAST RED BRONZE WITH TWO PIECE BODY, FULL PORT. WHEN INSTALLED IN INSULATED PIPING FURNISH EXTENDED TEE HANDLE. ALL ISOLATION VALVES INSTALLED ABOVE CEILINGS SHALL BE BALL VALVES.

SEISMIC DESIGN FOR NONSTRUCTURAL COMPONENTS:

AS REQUIRED BY LOCAL CODES.

COMPONENT IMPORTANCE FACTOR OF 1.5 SHALL APPLY TO LIFE SAFETY SYSTEMS SUCH AS FIRE SPRINKLER SYSTEMS AND COMPONENTS CONVEYING EXPLOSIVE SUBSTANCES SUCH AS NATURAL GAS DISTRIBUTION SYSTEMS.

SEISMIC DESIGN CATEGORY "A" & "B" REQUIREMENTS: HANGING, BRACING & RESTRAINT OF PLUMBING EQUIPMENT SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL & STATE BUILDING CODES AND ARE EXEMPT FROM THE REQUIREMENTS OF ASCE-10 CHAPTER 13, SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL COMPONENTS.

SEISMIC DESIGN CATEGORY "C" REQUIREMENTS: HANGING, BRACING & RESTRAINT OF **PLUMBING** EQUIPMENT SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL & STATE BUILDING CODES AND ARE EXEMPT FROM THE REQUIREMENTS OF ASCE-10 CHAPTER 13, SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL COMPONENTS PROVIDED THAT THE COMPONENT IMPORTANCE FACTOR IS EQUAL TO 1.0.

SEISMIC DESIGN CATEGORY "D", "E", OR "F" REQUIREMENTS: HANGING, BRACING & RESTRAINT OF PLUMBING EQUIPMENT SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL & STATE BUILDING CODES AND ARE EXEMPT FROM THE REQUIREMENTS OF ASCE-10 CHAPTER 13, SEISMIC DESIGN REQUIREMENTS FOR NONSTRUCTURAL COMPONENTS PROVIDED THAT THE COMPONENT IMPORTANCE FACTOR, IS EQUAL TO 1.0, THE COMPONENT IS POSITIVELY ATTACHED TO THE STRUCTURE, AND FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT; AND EITHER

ADJACENT FLOOR LEVEL; OR

II. THE COMPONENT WEIGHTS 20 LB OR LESS OR, IN THE CASE OF A DISTRIBUTED SYSTEM, 5 LB/FT OR LESS.

THE PLUMBING CONTRACTOR SHALL PROVIDE SEISMIC SHOP DRAWINGS THAT INCLUDE LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH DETAILS AND CALCULATIONS. THE PLUMBING CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL TO THE DESIGN ENGINEER OF RECORD PRIOR TO SUBMITTING TO THE AUTHORITY HAVING JURISDICTION.

REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING SEISMIC DESIGN CATEGORY AND CODE INFORMATION

THE COMPONENT WEIGHS 400 LB OR LESS AND HAS A CENTER OF MASS LOCATED 4 FT OR LESS ABOVE THE



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REVISION SCHEDULE

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			GR	ILLE &	DIFFUS	SER SCH	EDULE												00	UNI		NTILA	TORS	SCHE	DULE	(2-PIPE	E SYST	EM)									
SYM	ΤΥΡΕ	USE	CFM RANGE	NECK SIZE	OVER- ALL	FINISH	FRAME	PRICE MODEL	REMARKS	Unit	Area Served	CF	М	ESP		Moto	or				Со	oling Per	formance	2		-			Н	eating P	erformar	nce	1	Pipe Siz	zes (in)	Trane	Remarks
		CUDDIV			SIZE	055		NO	1.0	Tag		Unit	Min.		HP \	Watts	Volts	Phs	EAT	LAT	MBH	MBH	GPM	EWT	Fluid $\Delta$	Max. Wa	ter EAT		MBH	GPM	EWT	Fluid Δ	Max. Water	DTS/R	CD	Model	
A	FACE	4-WAY	& RMK 5	RIMK 5		WHITE	RIMK 3	SMDA	1-6	UV-B-2	SEE PLANS	750	130	0.05"	1	135	120	1	80/67	DB/ WB	19.12	15.62	3.81	45	(F)	PD (jt.	54	(F)	52	2.6	180	(F)	10			HUVC0751	1-12
В	PERF.	RETURN/	SEE PLANS	RMK 7	RMK 4	OFF	RMK 3	PDDR	1-4, 7-10	UV-B-3	SEE PLANS	750	140	0.05"	1	135	120	1	80/67		19.12	15.62	3.81	45			54		52	2.6	180		10			HUVC0751	1-12
C- 5	IDEWALL	SUPPLY	SEE PLANS	SEE	RMK 4	RMK 12	SEE	520D	1-4, 9, 11-13	UV-B-8	SEE PLANS	750	90	0.05"	1	135	120	1	80/67		19.12	15.62	3.81	45			54		52	2.6	180		10			HUVC0751	1-12
D- 5	IDEWALL	RETURN/ EXHAUST	SEE PLANS	PLANS SEE PLANS	RMK 4	RMK 12	PLANS SEE PLANS	530	1-4, 9, 12, 13	1. REFER TO 2. CONTRO	ER TO APPROVED MFR'S. LIST FOR EQUALS. NTROL VALVE MAX. PD = 10'. CONTROL VALVE TO SEAT						5. FIBROU 6. PROVID	S MEDIA FILTER E CONTROL VAL	S (TA) M LVE SETU	IOUNTED JP (2- OR	INSIDE U 3-WAY) <sup>-</sup>	JNIT. THAT M	ATCHES		9. U 10. I	NIT SHALL PROVIDE N	. BE FULLY VITH SIDE	RECESSI CONVEF	ED ABOV	'E CEILING RAIN PAN	CONNECTIONS.						
<u>REMARKS</u> 1. EQUALS:	METALAIR	E. TITUS. KRU	JEGER. TUTTL	E & BAILEY	. NAIL-		8. NO NECK	SIZE INDICATES N	ON-	<ul> <li>AGAINS</li> <li>3. ENSURE</li> <li>VALVE.</li> </ul>	T THE MAXIMUM SYS NEW THERMOSTAT IS	COMPAT	SSURE. FIBLE WIT	H NEW CO	ONTRO	)L.			EXISTIN 7. PROVID 8. PROVID	g for each un E with ecm mo E 3-speed cont	NIT. OTOR. TROL SW	ИТСН СО	ORDINA	TF FAN S	SPEED		11. F 12. F DEV	PROVIDE N PROVIDE U	VITH CUST JNIT CONT PROGRAM	OMER S ROLLER	UPPLIED THAT IS ANGUAC	O TERMINA COMPATI	AL INTERFACE (CS BLE WITH THE E	STI) PRE-WIR XISTING BUIL	ED CONTRO DING AUTO	DL. DMATION SYSTE	М

OR, CARNES. SCHEDULE IS GENERAL, SOME MAY NOT BE USED. PAINT ALL INSIDE VISIBLE SURFACES FLAT BLACK.

2. SYMBOL EXPLANATION: XXX/CFM = SYMBOL, FRAME (RMK 3), NECK (RMK 5,7)/CFM

3. FRAME TYPES: T = T-BAR

S = FLUSH SURF. MTD..

PLASTER FRAME FOR

E = DUCT MOUNTED: V-BEVELED DROP SURF. (TYPE "A" DIFFUSER) D = DROPPED FRAME

CEILING MOUNTING. NOTE: VERIFY FRAME/CEILING COMPATIBILITY.

4. OVERALL SIZE: LAY-IN = 2'x2', OTHER GRILLES = NECK + 2''+/-.

					1
5.	LOUVER	FACE	SUPPLY	NECK	S

5. LOUVER FACE SUPPLY NECK SIZES									
<u>NO.</u>	<u>ROUND</u>	<u>CFM</u>	<u>NO.</u>	<u>SQUARE</u>	<u>CFN</u>				
	<u>NK SIZE</u>			<u>NK SIZE</u>					
А	6"	100	Н	6x6	125				
В	8"	175	1	9x9	280				
С	10"	275	J	12x12	500				
D	12"	400	К	15x15	780				
Е	14"	535	L	18x18	112				
F	16"	700	М	21x21	153				
G	18"	885	Ν	24x24	200				
		-							

NOTE: VERIFY CFM / NECK SIZE.

6. ADJUSTABLE: HORIZONTAL/VERTICAL - "PIANO HINGE" DEVICE.

				MECHANI	CAL SYSTEM	IS, SERVICE	E SYSTEMS			
CFM / N	NECK SIZE.		N	22x46	2600					
NOTE: \	/ERIFY		Μ	22x22	1680					
F	16"	700	L	18x18	1125					
Е	14"	535	К	16x16	885					
D	12"	400	J	14x14	680					
С	10"	275	I	12x12	500					
В	8"	175	Н	10x10	345					
А	6"	100	G	8x8	220					
	<u>NK SIZE</u>			<u>NK SIZE</u>						
<u>NO.</u>	ROUND	<u>CFM</u>	<u>NO.</u>	<u>SQUARE</u>	<u>CFM</u>					
<u>7. "B" 8</u>	<u>"B" &amp; "E" EXH/RETURN NECK SIZES ("E" = SQ. NK. ONLY)</u>									

DUCTED, LAY-IN PANEL.

9. OBD IF USED AS SUPPLY OR EXHAUST. 10. ALL ALUM. CONSTRUCTION (INCLUDING

BACKPAN) IF SHOWN ON PLANS. 11. VOLUME EXTRACTOR WHERE

SHOWN ON PLANS.

12. PAINT TO MATCH WALL. 13. VERTICAL FRONT BLADES.

# AND EQUIPMENT METHOD OF COMPLIANCE Prescriptive Energy Cost Budget Thermal Zone: Alleghany County, North Carolina (5A) Exterior Design Conditions

Winter Dry Bulb:	7.7
Summer Dry Bulb:	86.9

Interior Design Conditions

Unitary:

Winter Dry Bulb:	70
Summer Dry Bulb:	75
Relative Humidity:	50%
Building Heating Load:	156 MBH
Building Cooling Load:	57.36 MBH
Mechanical Space Cond	ditioning System

Refer to HVAC Equipment Schedules Description of Unit:

Refer to HVAC Equipment Schedules

Heating Efficiency: Cooling Efficiency: Heat Output of Unit: Cooling Output of Unit:

List Equipment Efficiencies:

Equipment Schedules with Motors (Mechanical Systems) Motor Horsepower: Comply w/ 2018 NC Energy Code Number of Phases: Comply w/ 2018 NC Energy Code Minimum Efficiency: Comply w/ 2018 NC Energy Code Motor Type: Comply w/ 2018 NC Energy Code Number of Poles: Comply w/ 2018 NC Energy Code

Designer Statement:

To the best of my knowledge and belief, the design of this building complies with the 2018 North Carolina Energy Code. The requirements of Section C406 is met through the Subsection C406.3 (Reduced Lighting Power Density).

4. MFGR'S FAN DATA INCLUDES UNIT CASING, WET COIL & CLEAN FILTER. ESP IN SCHEDULE INCLUDES ALL OTHER PRESSURE DROPS.

CONTROL SWITCH STYLE WITH OWNER PRIOR TO ORDERING. INSTALL NEW SWITCH IN LOCATION SHOWN ON PLANS.

	OUTSIDE AIR CALCULATION - UV-B-2											
ROOM	AREA	FLOOR AREA	OA	EA	EA	EA	DEFAULT OCCUPANT	DEMAND CONTROL	# OF PEOPLE	PEOPLE OUTDOOR AIRFLOW	OUTSIDE AIR	EXHAUST AIR
NAME	TYPE	(SQ FT)	CFM/SQFT	CFM/SQFT	CFM PER	NUMBER OF DENSITY #/1000 SQ FT VENTIL		VENTILATION	PER SPACE	RATE IN BREATHING ZONE	PER SPACE (CFM)	PER SPACE (CFM)
					FIXTURE	FIXTURE		REQUIRED?		(CFM/PERSON)		
103 STORAGE	STORAGE ROOMS	60	0.12	0	0		0	NO	0	0	10	0
107 ORAL HEALTH & VISION	OFFICE SPACES	159	0.06	0	0		10	NO	2	5	20	0
108 MENTAL HEALTH	OFFICE SPACES	80	0.06	0	0		10 NO		1	5	10	0
EX. STORAGE	STORAGE ROOMS	80	0.12	0	0		0	NO	0	0	10	0
									TOTAL OL	JTSIDE AIR CALCULATON $(V_{bz}) =$	50	0
									ZONE DIST	RIBUTION EFFECTIVENESS $(E_z) =$	0.8	
									ZONE O	UTDOOR AIRFLOW RATE (V <sub>OZ</sub> ) =	60	

						OUTSIDE	AIR CALCULATION - UV-E	3-3	
ROOM	AREA	FLOOR AREA	OA	EA	EA	EA	DEFAULT OCCUPANT	DEMAND CONTROL	# OF PE
NAME	ТҮРЕ	(SQ FT)	CFM/SQFT	CFM/SQFT	CFM PER	NUMBER OF	DENSITY #/1000 SQ FT	VENTILATION	PER SP.
					FIXTURE	FIXTURE		REQUIRED?	
100 TOILET	TOILET ROOMS - PUBLIC	110	0	0	50	1	0	NO	0
101 LABORATORY	CONFERENCE/MEETING ROOM	170	0.06	0	0		50	NO	9
104 EXAM #2	OFFICE SPACES	90	0.06	0	0		10	NO	1
105 EXAM #1	OFFICE SPACES	90	0.06	0	0		10	NO	1
106 TRIAGE	MAIN ENTRY LOBBIES	266	0.06	0	0		10	NO	3

ΤΟΤΑ ZONE ZOI

	OUTSIDE AIR CALCULATION - UV-B-8											
ROOM	AREA	FLOOR AREA	OA	EA	EA	EA	DEFAULT OCCUPANT	DEMAND CONTROL	# OF PEOPLE	PEOPLE OUTDOOR AIRFLOW	OUTSIDE AIR	EXHAUST AIR
NAME	ТҮРЕ	(SQ FT)	CFM/SQFT	CFM/SQFT	CFM PER	CFM PER NUMBER OF DENSITY #/1000 SQ FT V		VENTILATION	PER SPACE	RATE IN BREATHING ZONE	PER SPACE (CFM)	PER SPACE (CFM)
					FIXTURE	FIXTURE		REQUIRED?		(CFM/PERSON)		
109 WALKING/EXIT	CORRIDORS	271	0.06	0	0		0	NO	0	0	20	0
110 NURSE/MED. ASST.	OFFICE SPACES	64	0.06	0	0	0 10 NO		NO	1	5	10	0
111 PROVIDER	OFFICE SPACES	64	0.06	0	0	0 10		10 NO		5	10	0
112 NURSE	OFFICE SPACES	64	0.06	0	0		10	NO	1	5	10	0
113 REGISTRATION	RECEPTION AREAS	187	0.06	0	0		30	NO	6	5	40	0
114 AFTER HOURS ENTRY	MAIN ENTRY LOBBIES	96	0.06	0	0		10	NO	1	5	10	0
									TOTAL OU	JTSIDE AIR CALCULATON $(V_{bz}) =$	100	0
									ZONE DIST	RIBUTION EFFECTIVENESS $(E_z) =$	0.8	
									ZONE C	OUTDOOR AIRFLOW RATE (V <sub>oz</sub> ) =	130	

# **APPROVED MANUFACTURER LISTING - MECHANICAL**

THE FOLLOWING MANUFACTURER'S LISTING (ALPHABETICALLY ORDERED) IS PROVIDED FOR BIDDING PURPOSES AND DOES NOT IMPLY OR PROVIDE A GUARANTEE OF SUBMITTAL APPROVAL. ALL ITEMS SUBMITTED SHALL MEET OR EXCEED THE MINIMUM SPECIFIED DESIGN AND QUALITY CRITERIA IN THIS SET OF CONSTRUCTION DOCUMENTS. ANY BIDDER THAT INTENDS TO SUBMIT USING A MANUFACTURER NOT LISTED BELOW MAY REQUEST A PRIOR APPROVAL IN ACCORDANCE WITH THE ENTIRETY OF THE PROJECT BID DOCUMENTS, REFER TO THE ARCHITECT'S GENERAL CONDITIONS AND BIDDING REQUIREMENTS.

THE BIDDER IS RESPONSIBLE FOR INCLUDING ALL COSTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT, INCLUDING BUT NOT LIMITED TO, CODE AND MANUFACTURER'S REQUIRED MAINTENANCE AND ACCESS CLEARANCE, COORDINATION WITH ALL OTHER BUILDING TRADES, AND INSTALLATION OF DUCTWORK, PIPING, ETC. BIDDER SHALL BEAR RESPONSIBILITY FOR ALL ASSOCIATED COSTS AND ADDITIONAL COSTS RESULTING FROM SUBSTITUTED ITEMS SHALL NOT BE CONSIDERED FOR APPROVAL AFTER BIDS ARE AWARDED.

ITEM AIR DISTRIBUTION HORIZONTAL FAN COIL UNITS

MANUFACTURER'S CARNES, METAL\*AIRE, NAILOR, PRICE, TITUS, TUTTLE & BAILEY CARRIER, DAIKIN-MCQUAY, JCI/YORK, TRANE

PLE	PEOPLE OUTDOOR AIRFLOW	OUTSIDE AIR	EXHAUST AIR
CE	RATE IN BREATHING ZONE	PER SPACE (CFM)	PER SPACE (CFM)
	(CFM/PERSON)		
	0	0	50
	5	60	0
	5	10	0
	5	10	0
	5	30	0
L OL	JTSIDE AIR CALCULATON $(V_{bz})$ =	110	50
DIST	RIBUTION EFFECTIVENESS (E <sub>z</sub> ) =	0.8	
NE C	OUTDOOR AIRFLOW RATE (V <sub>OZ</sub> ) =	140	
PLE	PEOPLE OUTDOOR AIRFLOW	OUTSIDE AIR	EXHAUST AIR



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ISSUE DATE: 12.15.23 DRAWN BY: BD/JP CHECKED BY: BSC/JCC PROJECT: 2335

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# MECHANICAL FLOOR PLAN – NEW WORK SCALE: 1/8" = 1'-0"

















THE CONTRACTOR SHALL COORDINATE THE WORK AND EQUIPMENT OF THIS DIVISIO WITH THE WORK AND EQUIPMENT SPECIFIED ELSEWHERE IN ORDER TO ASSURE A COMPLETE AND SATISFACTORY INSTALLATION. WORK SUCH AS EXCAVATION, BACKFILL, CONCRETE, FLASHING, WIRING, ETC., WHICH IS REQUIRED BY THE WORK OF THIS SECTION SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE SECTION OF THE SPECIFICATIONS.

IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO CALL FOR DELAY. FINISHED WORK, TESTED AND READY FOR OPERATION. WHENEVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE AND READY FOR USE".

THE WORD "PROVIDE" MEANS FURNISH, FABRICATED, COMPLETE, INSTALL, ERECT INCLUDING LABOR AND INCIDENTAL MATERIALS NECESSARY TO COMPLETE IN PLACE AND READY FOR OPERATION OR USE THE ITEM REFERRED TO OR DESCRIBED HEREIN AND/OR SHOWN OR REFERRED TO ON THE CONTRACT DRAWINGS.

#### EQUIPMENT APPLICATION AND PERFORMANCE

THE CONTRACTOR AND/OR EQUIPMENT SUPPLIER SHALL BE RESPONSIBLE TO SEE THAT EQUIPMENT SUPPLIED IS CORRECT FOR THE INTENDED APPLICATION AND WILL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS, AND SHOP DETAILS FOR THE PERFORM WITHIN THE LIMITS OF CAPACITY, NOISE, LIFE EXPECTANCY, PRESSURE PROPER INSTALLATION OF WORK AND FOR THE PURPOSE OF COORDINATING DROP AND SPACE LIMITATIONS INTENDED FOR THAT EQUIPMENT AS SHOWN ON THE ADJACENT WORK. PLANS OR DESCRIBED IN THE SPECIFICATIONS. THE SHOP DRAWINGS SHALL SHOW THE CAPACITY AND OPERATING CHARACTERISTICS OF THE EQUIPMENT

WHERE THE CONTRACTOR PROPOSES TO USE AN ITEM OF EQUIPMENT OTHER THAN THAT SPECIFIED OR DETAILED ON THE DRAWINGS, WHICH REQUIRES ANY REDESIGN OF THE STRUCTURE, PARTITIONS, FOUNDATIONS, PIPING, WIRING OR ANY OTHER PART OF THE MECHANICAL, ELECTRICAL, OR ARCHITECTURAL LAYOUT, ALL SUCH REDESIGN, AND ALL NEW DRAWINGS AND DETAILING REQUIRED THEREFORE, SHALL BE PREPARED BY THE SUBCONTRACTOR AT HIS OWN EXPENSE AND SUBMITTED FOR APPROVAL BY THE ARCHITECT.

WHERE SUCH APPROVED DEVIATION REQUIRES A DIFFERENT QUANTITY AND ARRANGEMENT OF DUCTWORK, PIPING, WIRING, CONDUIT, AND EQUIPMENT FROM THAT SPECIFIED OR INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL FURNISH AND INSTALL ANY SUCH DUCTWORK, PIPING, STRUCTURAL SUPPORTS, INSULATION, CONTROLLERS, MOTORS, STARTERS, ELECTRICAL WIRING AND CONDUIT, AND ANY OTHER ADDITIONAL EQUIPMENT REQUIRED BY THE SYSTEM, AT NO ADDITIONAL COST TO THE OWNER.

#### **DIELECTRIC CONNECTIONS**

DIELECTRIC CONNECTIONS SHALL BE USED AT ANY POINTS WITHIN THE PIPING PROTECTION SYSTEMS WHERE DISSIMILAR METALS MEET. CAREFUL ATTENTION SHALL BE GIVEN TO SUPPORT BRACKETS AND HANGERS TO SELECT PROPER MATERIALS TO AVOID DISSIMILAR METAL CONTACT AT THESE POINTS.

#### DUTIES OF CONTRACTOR

SPECIFICATIONS AND ACCOMPANYING DRAWINGS, AND MUST FURNISH THE STORE MATERIAL AND EQUIPMENT RECEIVED ON SITE WHICH IS NOT IMMEDIATELY APPARATUS COMPLETE IN EVERY RESPECT. ANYTHING CALLED FOR IN THE INSTALLED. HE SHALL CLOSE OPEN ENDS OF WORK INCLUDING PIPE, DUCT, OR SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS OR SHOWN ON THE DRAWINGS EQUIPMENT WITH TEMPORARY COVERS OR PLUGS DURING STORAGE AND AND NOT CALLED FOR IN THE SPECIFICATIONS MUST BE FURNISHED BY THE CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIALS OR DUST AND CONTRACTOR.

CONTRACTOR IS RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH THE DETAILS OF PROVIDE A PROTECTIVE COVERING OF NOT LESS THAN 0.004" THICK VINYL THE CONSTRUCTION OF THE BUILDING. WORK UNDER THESE SPECIFICATIONS INSTALLED IMPROPERLY OR WHICH REQUIRES CHANGING DUE TO IMPROPER READING OR INTERPRETATION OF BUILDING PLANS SHALL BE CORRECTED AND CHANGED AS DIRECTED BY THE ARCHITECT WITHOUT ADDITIONAL COST TO THE OWNER.

CONDITIONS SOMETIMES OCCUR WHICH REQUIRE CERTAIN CHANGES IN DRAWINGS EQUIPMENT AND/OR FOULING WORKING PARTS. AND SPECIFICATIONS. IN THE EVENT THAT SUCH CHANGES IN DRAWINGS AND SPECIFICATIONS ARE NECESSARY. THE SAME ARE TO BE MADE BY THE CONTRACTOR WITHOUT EXPENSE TO THE OWNER, PROVIDING SUCH CHANGES DO CLEANING NOT REQUIRE FURNISHING MORE MATERIALS, OR PERFORMING MORE LABOR THAN THE TRUE INTENT OF THE DRAWINGS AND SPECIFICATIONS DEMANDS. IT IS UNDERSTOOD THAT WHILE THE DRAWINGS ARE TO BE FOLLOWED AS CLOSELY AS OTHER FOREIGN MATERIAL. CIRCUMSTANCES WILL PERMIT, THE CONTRACTOR IS HELD RESPONSIBLE FOR THE INSTALLATION OF THE SYSTEM ACCORDING TO THE TRUE INTENT AND MEANING OF THE DRAWINGS. ANYTHING NOT ENTIRELY CLEAR IN THE DRAWINGS AND EQUIPMENT SERVICEABILITY SPECIFICATION WILL BE FULLY EXPLAINED IF APPLICATION IS MADE TO THE ARCHITECT. SHOULD, HOWEVER, CONDITIONS ARISE WHERE IN THE JUDGMENT OF THE CONTRACTOR CERTAIN CHANGES WILL BE ADVISABLE, THE CONTRACTOR WILL COMMUNICATE WITH THE ARCHITECT AND SECURE HIS APPROVAL OF THESE CHANGES BEFORE GOING AHEAD WITH THE WORK.

EQUIPMENT. ROUTING OF PIPING UP TO THE TIME OF ROUGHING IN, IS RESERVED REMOVABLE. BY THE ARCHITECT WITHOUT INVOLVING ANY ADDITIONAL EXPENSE TO THE OWNER.

IT SHALL BE THE DUTY OF PROSPECTIVE CONTRACTORS TO VISIT THE JOB SITE AND FAMILIARIZE THEMSELVES WITH JOB CONDITIONS. NO EXTRAS WILL BE ALLOWED BECAUSE OF ADDITIONAL WORK NECESSITATED BY, OR CHANGES IN PLANS REQUIRED BECAUSE OF EVIDENT JOB CONDITIONS, THAT ARE NOT INDICATED ON THE DRAWINGS.

### CODES, RULES, PERMITS AND FEES

ALL MATERIALS FURNISHED AND ALL WORK INSTALLED SHALL COMPLY WITH THE NATIONAL FIRE CODES OF THE NATIONAL FIRE PROTECTION ASSOCIATION. AND WITH THE REQUIREMENTS OF ALL GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION.

MECHANICAL SYSTEM SHALL BEAR THE APPROVAL LABEL, AND SHALL BE LISTED BY THE UNDERWRITERS' LABORATORIES, INC.

DUST, DIRT AND PAINT SPOTS REMOVED. TEMPORARY FILTERS SHALL BE ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NORTH CAROLINA STATE PROVIDED FOR ALL FANS THAT ARE OPERATED DURING CONSTRUCTION AND AFTER BUILDING CODE, AND REQUIREMENTS OF GOVERNMENTAL AGENCIES HAVING ALL CONSTRUCTION DIRT HAS BEEN REMOVED FROM THE BUILDING, NEW FILTERS JURISDICTION. SHALL BE INSTALLED. BEARINGS SHALL BE LUBRICATED AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER. ALL CONTROL VALVES AND EQUIPMENTS SHALL COOPERATION WITH OTHER TRADES BE ADJUSTED TO SETTING INDICATED. FANS SHALL BE ADJUSTED TO THE SPEED INDICATED BY THE MANUFACTURER TO MEET SPECIFIED CONDITIONS. FURNISH ANY INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO <u>GUARANTEE</u>

THIS CONTRACTOR SHALL GIVE FULL COOPERATION TO OTHER TRADES AND SHALL BE INSTALLED SATISFACTORILY AND WITH THE LEAST POSSIBLE INTERFERENCE OR

THE CONTRACTOR SHALL GUARANTEE THE COMPLETE MECHANICAL SYSTEM AGAINST DEFECT DUE TO FAULTY MATERIALS, FAULTY WORKMANSHIP OR WHERE THE WORK OF THE CONTRACTOR WILL BE INSTALLED IN CLOSE PROXIMITY FAILURE DUE TO NEGLIGENCE OF THE CONTRACTOR. THIS GUARANTEE WILL TO, OR MAY INTERFERE WITH THE WORK OF OTHER TRADES, HE SHALL ASSIST IN EXCLUDE NORMAL WEAR AND TEAR, MAINTENANCE LUBRICATION, REPLACEMENT WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT. IF SO OF EXPENDABLE COMPONENTS, OR ABUSE. THE GUARANTEE PERIOD SHALL DIRECTED BY THE ARCHITECT, THE CONTRACTOR SHALL PREPARE COMPOSITE BEGIN ON THE DATE OF THE FINAL ACCEPTANCE AND SHALL CONTINUE FOR A WORKING DRAWINGS AND SECTIONS AT A SUITABLE SCALE NOT LESS THAN 3/8" = PERIOD OF 12 MONTHS DURING WHICH TIME THE CONTRACTOR SHALL MAKE 1'-0", CLEARLY SHOWING HOW HIS WORK IS TO BE INSTALLED IN RELATION TO THE GOOD SUCH DEFECTIVE WORKMANSHIP AND MATERIALS AND ANY DAMAGE WORK OF OTHER TRADES. IF THE CONTRACTOR INSTALLS HIS WORK BEFORE RESULTING THERE FROM, WITHIN A REASONABLE TIME OF NOTICE GIVEN BY COORDINATION WITH OTHER TRADES, OR SO AS TO CAUSE ANY INTERFERENCE WITH THE OWNER. REFRIGERATION COMPRESSORS SHALL HAVE A FIVE (5) YEAR WORK OF OTHER TRADES, HE SHALL MAKE THE NECESSARY CHANGES IN HIS WORK WARRANTY. TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.

THE CONTRACTOR SHALL FURNISH TO OTHER TRADES, AS REQUIRED, ALL SEISMIC DESIGN FOR NONSTRUCTURAL COMPONENTS: REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR BUILDING SEISMIC DESIGN CATEGORY AND CODE INFORMATION AS REQUIRED BY LOCAL CODES.

#### SAFETY REQUIREMENTS

ALL SYSTEMS SHALL BE INSTALLED SO AS TO BE SAFE OPERATING AND ALL MOVING PARTS SHALL BE COVERED WHERE SUBJECT TO HUMAN CONTACT. ALL ROUGH EDGES OF EQUIPMENT AND MATERIALS SHALL BE MADE SMOOTH.

ARCHITECT'S REPRESENTATIVE AND EIGHT (8) COPIES OF TEST DATE SHOWING WITH APPLICABLE LOCAL & STATE BUILDING CODES AND ARE EXEMPT FROM SETTING AND PERFORMANCE OF SAFETY CONTROLS SHALL BE SUBMITTED TO THE THE REQUIREMENTS OF ASCE-10 CHAPTER 13, SEISMIC DESIGN REQUIREMENTS ARCHITECT. ALL PRESSURE VESSELS SHALL BE ASME STAMPED AND SHALL HAVE FOR NONSTRUCTURAL COMPONENTS. STAMPED RELIEF VALVES. WATER HEATERS SHALL BE PROVIDED WITH ASME STAMPED T & P RELIEF VALVE.

CONCEALED PIPE

FLOORS, WALLS, PARTITIONS AND ABOVE CEILINGS. UNLESS OTHERWISE NOTED, ALL FACTOR IS EQUAL TO 1.0. PIPE SHALL RUN INSIDE THE INSULATED PERIMETER OF THE BUILDING.

SEISMIC DESIGN CATEGORY "D", "E", OR "F" REQUIREMENTS: HANGING, BRACING & RESTRAINT OF MECHANICAL EQUIPMENT SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL & STATE BUILDING CODES AND ARE EXEMPT FROM THE CONTRACTOR SHALL PROTECT ALL WORK AND MATERIAL FROM DAMAGE AND THE REQUIREMENTS OF ASCE-10 CHAPTER 13, SEISMIC DESIGN REQUIREMENTS SHALL BE LIABLE FOR ALL DAMAGE DURING CONSTRUCTION. FOR NONSTRUCTURAL COMPONENTS PROVIDED THAT THE COMPONENT IMPORTANCE FACTOR, IS EQUAL TO 1.0, THE COMPONENT IS POSITIVELY THE CONTRACTOR SHALL BE RESPONSIBLE FOR WORK AND EQUIPMENT UNTIL ALL ATTACHED TO THE STRUCTURE, AND FLEXIBLE CONNECTIONS ARE PROVIDED HE SHALL BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT; and either

CONSTRUCTION IS FINALLY INSPECTED, TESTED AND ACCEPTED. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS CALLED FOR IN THESE PROTECT WORK AGAINST THEFT, INJURY OR DAMAGE; AND SHALL CAREFULLY DEBRIS.

> II. THE COMPONENT WEIGHTS 20 LB OR LESS OR. IN THE CASE OF A SHEETING (OR A SIMILAR APPROVED MATERIAL) TO BE USED IN COVERING ALL DISTRIBUTED SYSTEM, 5 LB/FT OR LESS. ITEMS OF EQUIPMENT, IMMEDIATELY AFTER THE EQUIPMENT HAS BEEN SET IN PLACE, (OR IF IN A PLACE OF STORAGE WITHIN THE BUILDING UNDER THE MECHANICAL CONTRACTOR SHALL PROVIDE SEISMIC SHOP DRAWINGS THAT CONSTRUCTION) TO PREVENT THE ACCUMULATION OF DIRT. SAND. CEMENT. PLASTER, PAINT OR OTHER FOREIGN MATERIALS FROM COLLECTING ON THE INCLUDE LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH DETAILS AND CALCULATIONS. THE MECHANICAL CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL TO THE DESIGN ENGINEER OF RECORD PRIOR TO SUBMITTING TO THE AUTHORITY HAVING JURISDICTION.

CLEAN FROM ALL EXPOSED INSULATION AND METAL SURFACES GREASE, DEBRIS OR

ALL EQUIPMENT SHALL BE SERVICEABLE. ALL EQUIPMENT SHALL BE INSTALLED SO THAT IT CAN BE REMOVED. ALL EQUIPMENT IN OR CONNECTED TO PIPING SYSTEMS SHALL HAVE VALVES TO ISOLATE THIS EQUIPMENT FROM THE PIPING SYSTEM. THIS INCLUDES, BUT NOT NECESSARILY LIMITED TO CONTROL VALVES, WATER HEATERS, SENSORS, SWITCHES, PUMPS, TRAPS AND STRAINERS. UNIONS THE RIGHT TO MAKE ANY RESPONSIBLE CHANGE IN LOCATION OF APPARATUS, (SCREWED OR FLANGED) SHALL BE PROVIDED SO THAT ALL EQUIPMENT IS

#### ACCEPTANCE OF EQUIPMENT

CONTRACTOR SHALL MAKE ALL NECESSARY TESTS, TRIAL OPERATION BALANCING AND BALANCE TESTS, ETC., AS MAY BE REQUIRED AS DIRECTED BY THE ENGINEER TO PROVE THAT ALL WORK UNDER THESE PLANS AND SPECIFICATION IS IN COMPLETE SERVICEABLE CONDITION AND WILL FUNCTION AS INTENDED. OIL BURNERS, GAS BURNERS, AND WATER CHILLERS SHALL BE STARTED BY A REPRESENTATIVE OF THE EQUIPMENT MANUFACTURER. ALL COSTS OF THESE PROCEDURES SHALL BE BORNE BY THIS CONTRACTOR.

UPON COMPLETION OF ALL WORK THE SYSTEM SHALL BE TESTED TO DETERMINE IF ANY EXCESS NOISE OR VIBRATION IS APPARENT DURING OPERATION OF THE SYSTEM. IF ANY SUCH OBJECTIONS ARE DETECTED IN THE SYSTEM OR NOISY ALL MATERIALS AND EQUIPMENT FOR THE ELECTRICAL PORTION OF THE EQUIPMENT FOUND, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTING SAME. DUCTS, PLENUMS AND CASINGS SHALL BE CLEANED OF ALL DEBRIS AND BLOWN FREE OF ALL PARTICLES OF RUBBISH AND DUST BEFORE INSTALLING OUTLET FACES. EQUIPMENT SHALL BE WIPED CLEAN WITH ALL TRACES OF OIL,

COMPONENT IMPORTANCE FACTOR OF 1.5 SHALL APPLY TO LIFE SAFETY SYSTEMS SUCH AS FIRE SPRINKLER SYSTEMS AND COMPONENTS CONVEYING EXPLOSIVE SUBSTANCES SUCH AS NATURAL GAS DISTRIBUTION SYSTEMS.

SEISMIC DESIGN CATEGORY "A" & "B" REQUIREMENTS: HANGING, ALL SAFETY CONTROLS SHALL BE CHECKED UNDER THE SUPERVISION OF THE BRACING & RESTRAINT OF MECHANICAL EQUIPMENT SHALL BE IN ACCORDANCE

SEISMIC DESIGN CATEGORY "C" REQUIREMENTS: HANGING, BRACING & RESTRAINT OF MECHANICAL EQUIPMENT SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL & STATE BUILDING CODES AND ARE EXEMPT FROM THE REQUIREMENTS OF ASCE-10 CHAPTER 13, SEISMIC DESIGN REQUIREMENTS FOR IN GENERAL, ALL PIPES IN FINISHED SPACES SHALL BE RUN CONCEALED IN NONSTRUCTURAL COMPONENTS PROVIDED THAT THE COMPONENT IMPORTANCE

> I. THE COMPONENT WEIGHS 400 LB OR LESS AND HAS A CENTER OF MASS LOCATED 4 FT OR LESS ABOVE THE ADJACENT FLOOR LEVEL; OR



SCOPE (CONTINUED):

## DUCTWORK

LOW-PRESSURE DUCTWORK SHALL BE CONSTRUCTED OF ZINC COATED SHEET STEEL AND SHALL CONFORM TO THE 1ST EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, 1985 AS FOLLOWS:

RECTANGULAR DUCT: 1" W.G. PRESSURE CLASS - TABLE 1-4.

ROUND DUCT: 2" W.G. PRESSURE CLASS - TABLE 3-2.

ALL DUCTWORK MUST BE SEALED IN ACCORDANCE WITH SEAL CLASS C AS DEFINED IN SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE, 1985.

DUCT HANGERS AND SUPPORTS SHALL CONFORM TO THOSE SHOWN IN TABLES 4-1 AND 4-2 OF SMACNA HVAC DUCTWORK 1985, 1ST EDITION.

DUCTWORK INSTALLATION:

ALL DUCTWORK SHALL BE PROVIDED IN A NEAT WORKMANLIKE MANNER. THE DUCTS SHALL BE PROPERLY BRACED AND REINFORCED. ALL SLIP JOINTS SHALL BE MADE IN THE DIRECTION OF FLOW. ALL DUCTS SHALL BE TRUE TO THE DIMENSION INDICATED AND SHALL BE STRAIGHT AND SMOOTH ON THE INSIDE WITH NEATLY FINISHED AIRTIGHT JOINTS. THE DUCTS SHALL BE SECURELY ANCHORED INTO THE BUILDING CONSTRUCTION IN AN APPROVED MANNER AND SHALL BE COMPLETELY FREE FROM VIBRATION UNDER ALL CONDITIONS OF OPERATION. ALL SUPPLY, RETURN FRESH-AIR AND EXHAUST SYSTEMS SHALL BE COMPLETELY BALANCED.

NO DUCT TRANSFORMATION SHALL BE OF A RATIO LESS THAN FOUR TO ONE AND WHERE POSSIBLE, SHALL BE OF A RATIO OF SIX TO ONE. NO LESS THAN THREE VERTICAL SPLITTERS SHALL BE PROVIDED WHERE THESE RATIOS CANNOT BE MET. NO ELBOW SHALL HAVE A THROAT CENTER LINE RADIUS OF LESS THAT ONE AND ONE-HALF TIMES THE DUCT WIDTH AT THE TURN. ALL TURNS OF LESS THAN THIS AMOUNT IN RECTANGULAR DUCT SHALL BE PROVIDED WITH DUCT TURNING VANES OF STANDARD DESIGN. SPLITTERS OR MULTI-BLADE VOLUME DAMPERS, WHERE INDICATED, SHALL BE PROVIDED IN ALL BRANCH.

TURNING VANES SHALL BE PROVIDED AT ALL TEES AND SQUARE ELBOWS. TURNING VANES SHALL BE FACTORY FABRICATED AND DESIGNED IN ACCORDANCE WITH THE SMACNA OR ASHRAE GUIDE FOR FORMED VANES. THE FIRST SET OF TURNING VANES ON THE LEAVING SIDE OF FANS SHALL BE OF THE ACOUSTICAL TYPE TO AID IN THE ELIMINATION OF UNIT NOISE WITH THE EXCEPTION OF ROOM FAN COIL UNITS.

SPLITTER DAMPERS AND VOLUME EXTRACTORS SHALL BE PROVIDED IN ALL LOW VELOCITY DUCTWORK FOR PROPER AIR DISTRIBUTION. EACH DAMPER SHALL BE PROVIDED, LUBRICATED BEARINGS AT BOTH ENDS OF THE SHAFTS. ADJUSTMENTS QUADRANT, AND LOCKING DEVICES AND SHALL BE CONSTRUCTED QUANTITIES. OF GALVANIZED IRON OR STEEL SHEET ONE GAUGE HEAVIER THAN THE DUCT IN WHICH THEY ARE INSTALLED. ACCESS DOORS SHALL BE LOCATED AT ALL SPLITTER DAMPERS.

HANDHOLES OF NOT LESS THAN 6" X 6" SHALL BE PROVIDED AT ALL POINTS WHERE ACCESS IS REQUIRED. MANHOLES OF NOT LESS THAN 18" X 24" SHALL BE PROVIDED AT ALL POINTS WHERE IT IS NECESSARY TO CLEAN OR REMOVE PARTS OF EQUIPMENT. ALL ACCESS DOORS AND HANDHOLES SHALL BE RUBBER GASKETED INSULATED TYPE WITH FRAME AND LATCHES.

ALL DUCTWORK MUST BE SEALED IN ACCORDANCE WITH SEAL CLASS C AS DEFINED IN SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, 2015.

DUCT HANGERS AND SUPPORTS:

DUCT HANGERS AND SUPPORTS SHALL CONFORM TO THOSE SHOWN IN TABLES 4-1 AND 4-2 OF SMACNA HVAC DUCTWORK 1985, 1ST EDITION.

DUCT LEAKAGE TEST:

AFTER INSTALLATION AND PRIOR TO INSULATING, THE CONTRACTOR SHALL PERFORM A DUCT LEAKAGE TEST ON ALL DUCTWORK. CONTRACTOR SHALL NOTIFY THE ENGINEER 72 HOURS IN ADVANCE OF TEST. DUCT LEAKAGE TEST SHALL BE IN ACCORDANCE WITH THE CURRENT ENERGY CODE. TOTAL LEAKAGE OF THE SYSTEM SHALL NOT EXCEED THE CALCULATED LEAKAGE IN ACCORDANCE WITH THE CURRENT ENERGY CODE.

THE CONTRACTOR MAY AT HIS OPTION TEST PORTIONS OF THE DUCT SYSTEM IN LIEU OF TESTING THE ENTIRE SYSTEM AT ONCE. IF THE SYSTEM IS TESTED IN SECTIONS, THE LEAKAGE RATES SHALL BE ADDED TO GIVE THE PERFORMANCE OF THE WHOLE SYSTEM.

THE AIR LEAKAGE AT THE TEST PRESSURE SHALL BE MEASURED BY A CALIBRATED OFFICE TYPE FLOW METER. THE ORIFICE FLOW MEASUREMENT DEVICE MUST HAVE INDIVIDUALLY CALIBRATED AGAINST A PRIMARY STANDARD, AND THIS CALIBRATED CURVE PERMANENTLY ATTACHED TO THE ORIFICE TUBE ASSEMBLY.

LEAKAGE CONCENTRATED AT ONE POINT MAY RESULT IN OBJECTIONABLE NOISE

#### DUCT INSULATION

INSULATION SHALL BE OWENS-CORNING, CERTAIN-TEED/ST. GOBAIN, MANVILLE OR APPROVED EQUIVALENT. ADHESIVES SHALL BE AS MANUFACTURED BY 3-M FOSTER OR INSULATION MANUFACTURER. INSULATION SHALL HAVE COMPOSITE (INSULATION, JACKET AND ADHESIVE) FIRE AND SMOKE HAZARD RATING AS TESTED BY ASTM E-84, NOT EXCEEDING FLAME SPREAD -25 AND SMOKE DEVELOPED -50.

ALL VAPOR BARRIERS AND JOINTS SHALL BE SEALED TO PREVENT CONDENSATION. CLEAN AND DRY ALL DUCTWORK BEFORE INSTALLING INSULATION. ALL WELD JOINTS SHALL BE WIRE BRUSHED AND GIVE ONE (1) COAT OF RED LEAD BEFORE INSULATING. STAPLES WILL NOT BE PERMITTED IN INSULATION.

ALL SUPPLY AIR, RETURN AIR, AND OUTSIDE AIR DUCTS UNLESS NOTED OTHERWISE ON PLANS SHALL BE INSULATED BY WRAPPING WITH 2" THICK, MINIMUM INSTALLED R VALUE = 6.0 FIBERGLASS WITH VAPOR BARRIER JACKET WITH JOINTS OVERLAPPED A MINIMUM OF TWO INCHES. INSULATION SHALL BE ADHERED TO DUCT WITH NON-COMBUSTIBLE INSULATION BONDING ADHESIVE APPLIED IN 4" STRIPS, 8" ON CENTER. ALL JOINTS SHALL BE SECURED WITH FLARE DOOR STAPLES ON 3" CENTERS THROUGH ALL LAPS OVER DUCT TAPE.

#### <u>CONTROLS</u>

REFER TO EQUIPMENT SCHEDULES.

TESTING AND BALANCING

WORK SHALL BE PERFORMED BY TECHNICIANS COMPETENT IN THE TRADE OF TESTING AND BALANCING ENVIRONMENTAL SYSTEMS AND SHALL BE DONE IN AN ORGANIZED MANNER UTILIZING APPROPRIATE TEST AND BALANCE FORMS. ALL EQUIPMENT SHALL BE BALANCED TO WITHIN +/- 10% OF THE SCHEDULED VALUE. TEST AND BALANCE TECHNICIANS SHALL BE A SUB-CONTRACTOR TO THE HVAC CONTRACTOR AND SHALL BE CERTIFIED BY EITHER AABC OR NEBB

INSTRUMENTS FOR USE IN THE TEST AND BALANCING PROCEDURES SHALL BE OF FIRST QUALITY AND BE ACCURATELY CALIBRATED AT THE TIME OF USE. ALL FIELD INSTRUMENTS USED IN THE BALANCE SHOULD HAVE BEEN CALIBRATED AT LEAST WITHIN THE PREVIOUS THREE MONTHS.

STARTING DATE FOR MECHANICAL SYSTEM SHALL BE SCHEDULED WELL IN ADVANCE OF EXPECTED COMPLETION DATE AND SHALL BE ESTABLISHED A MINIMUM OF TWO WEEKS PRIOR TO ACCEPTANCE DATE. THE SYSTEM SHALL BE IN FULL OPERATION WITH ALL EQUIPMENT FUNCTIONAL PRIOR TO ACCEPTANCE DATE.

PERFORMANCE READINGS SHALL BE TAKEN AND RECORDED ON ALL AIR DISTRIBUTION DEVICES AND THE SYSTEM SHALL BE BALANCED OUT PRIOR TO ACCEPTANCE. BALANCING OF THE SYSTEM SHALL BE ACCOMPLISHED WITH DUCT DAMPERS AND ONLY MINOR ADJUSTMENTS MADE WITH GRILLE DAMPERS. RECORD AND SUBMIT RESULTS IN TABLE FORM ALONG SIDE OF SCHEDULED

ALL UNITS SHALL BE CHECKED OUT THOROUGHLY AND THE INFORMATION RECORDED ON EACH MACHINE. CHECK SHEETS SHALL BE INCLUDED IN OPERATING AND MAINTENANCE INSTRUCTIONAL MANUAL.

EVEN IF THE SYSTEM PASSES THE LEAKAGE RATE CRITERIA. NOISE SOURCES MUST BE CORRECTED TO THE SATISFACTION OF THE ENGINEER.

SCOPE (CONTINUED):

## CONDENSATE DRAIN PIPING

ALL DRAIN LINES SHALL BE TYPE K COPPER CONFORMING TO ASTM D 2665. ROUTE TO EXISTING CONDENSATE DRAIN LINE LOCATIONS, FIELD VERIFY. INSULATE PIPING TO MATCH EXISTING.

## DUAL TEMPERATURE HYDRONIC WATER PIPING

ALL DUAL TEMPERATURE HYDRONIC WATER PIPING UP TO 2" IN DIAMETER SHALL BE HARD DRAWN TYPE-L COPPER AND OVER 2" IN DIAMETER SHALL BE SCHEDULE 40 BLACK STEEL. PIPING SHALL PITCH DOWN IN DIRECTION OF FLOW WITH MANUAL AIR VENTS AT ALL HIGH POINTS AND 1/2" DRAIN VALVES AT ALL LOW POINTS. PROVIDE UNIONS, FLANGES AND/OR COUPLINGS AT ALL VALVE AND UNIT CONNECTIONS. DO NOT WELD OR USE THREADED CONNECTIONS. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.

DUAL TEMPERATURE HYDRONIC WATER PIPE INSULATION

ALL DUAL TEMPERATURE HYDRONIC WATER PIPING SHALL BE INSULATED WITH HEAVY DENSITY FIBERGLASS WITH AN ALL-SERVICE JACKET COMPOSED OF AN OUTER LAYER OF VINYL, FIBERGLASS SCRIM CLOTH, ALUMINUM FOIL, AND KRAFT PAPER. IN THAT ORDER. FROM OUTSIDE TO INSIDE OF PIPE COVERING. INSULATION SHALL BE 1" THICK FOR ALL PIPING.

## **HANGERS**

ALL PIPING SHALL BE SUPPORTED ON NOT LESS THAN 10' CENTERS AND WITHIN 30" OF EACH CHANGE OF DIRECTION EXCEPT THAT PIPING 1 1/4" SIZE AND SMALLER SHALL BE SUPPORTED ON 8' 0" CENTERS.

PIPE HANGERS SHALL BE SUPPORTED BY MEANS OF IRON HANGER RODS FROM THE BUILDING CONSTRUCTION OR FROM STRUCTURAL STEEL MEMBERS, AND IN AN APPROVED MANNER. WHERE REQUIRE, PIPING SHALL BE HUNG FROM ANGLE IRON CLIPS OR SUITABLE BRACKETS ATTACHED TO SIDES OF MASONRY CONSTRUCTION.

## VALVE TAGS AND SCHEDULE

EACH VALVE SHALL BE PROVIDED WITH AN ENGRAVED BLACK FINISH, PHENOLIC VALVE TAG INDICATING VALVE SERVICE AND VALVE NUMBER. TAG LETTERING SHALL BE AT LEAST 1/4" HIGH ETCHED WHITE LETTERS AND BEVELLED WHITE TRIM. TAGS TO BE ATTACHED USING BRASS CHAINS. PROVIDE STEEL COLOR CODED 3/4 INCH DIAMETER CEILING TACKS IN ACOUSTICAL TILE CEILINGS OR COLOR CODED TAPE APPLIED TO CEILING GRID TO LOCATE EQUIPMENT OR VALVES THAT ARE INSTALLED ABOVE CEILING.

## <u>VALVES</u>

BALL VALVES SHALL BE CAST RED BRONZE WITH TWO PIECE BODY, FULL PORT. WHEN INSTALLED IN INSULATED PIPING FURNISH EXTENDED TEE HANDLE. ALL ISOLATION VALVES INSTALLED ABOVE CEILINGS SHALL BE BALL VALVES.



	SYMBOL	SCHEDULE			<u>LIGH</u>	TING F	XTURE :	<u>SCHEDI</u>	<u>ILE</u>			
GENERAL	SYMBOLS	WIRING DEVICES	TYPF	DESCRIPTION		LI	<u>GHT ENGI</u>	<u>IE</u>	DRIVER		MOUNTING	MANUE CATALOG NO
SYMBOL	DESCRIPTION	SYMBOL DESCRIPTION			Q Q	TY TYPE	TEMP CF	I LUMENS	QTY TYPE			
	CONDUIT RUN CONCEALED ABOVE CEILINGS OR IN WALLS. CONDUIT RUN CONCEALED IN OR BELOW FLOORS OR UNDERGROUND.	DUPLEX RECEPTACLE, 125V, 3-WIRE GROUNDING TYPE. DUPLEX RECEPTACLE, 125V, GROUND FAULT CIRCUIT INTERRUPTING, 3-WIRE GROUNDING TYPE. LOCATE WITHIN OR BEHIND AN ELECTRIC WATER COOLER. COORDINATE WITH	A1	2'X4' VOLUMETRIC LED TROFFER. GRID TYPE FOR LAY-IN CEILING. HOUSING AND REFLECTORS ARE DIE FORMED COLD ROLLED STEEL, ACRYLIC LINEAR PRISMATIC DIFFUSER, CONTOUR SHIELDING, CURVED OPAL LENS WITHOUT TRIM. WHITE POWDER COAT FINISH.	120	LED	3500 К 8	3000	1 0–10V DIMMING	23.2	CEILING, RECESSED	LITHONIA #STACK SERIES WILLIAMS #LT SERIES DAY-BRITE #2EVG SERIES METALUX #24CZ2 SERIES OR APPROVED EQUAL
	CONDUIT TURNING UP CONDUIT TURNING DOWN SQUARE ON CONDUIT SYMBOL INDICATES THAT CIRCUIT CONTINUES BUT NOT SWITCHLEG.	$\begin{array}{c} \Rightarrow \\ \end{tabular} For exact location. \\ \end{tabular} \\ \hline \$	A1E	2'X4' VOLUMETRIC LED TROFFER. GRID TYPE FOR LAY-IN CEILING. HOUSING AND REFLECTORS ARE DIE FORMED COLD ROLLED STEEL, ACRYLIC LINEAR PRISMATIC DIFFUSER, CONTOUR SHIELDING, CURVED OPAL LENS WITHOUT TRIM. WHITE POWDER COAT FINISH. PROVIDE WITH EMERGENCY BATTERY BACKUP.	120	LED	3500 К 8	3000	1 0–10V DIMMING	23.2	CEILING, RECESSED	LITHONIA #STACK SERIES WILLIAMS #LT SERIES DAY-BRITE #2EVG SERIES METALUX #24CZ2 SERIES OR APPROVED EQUAL
	HOMERUN TO PANEL AND CIRCUIT(S) DESIGNATED. ARROW(S) INDICATE QUANTITY OF CIRCUITS JUNCTION BOX PER N.E.C. SPECIAL NOTE, NUMERALS IDENTIFY, SEE SCHEDULE.	Image: Two duplex receptacles, 125V, 3-wire grounding type, in a two-gang box with two-gang faceplate.         Image: Special purpose receptacle, with special nema configuration as noted.         Image: Special purpose receptacle, with special nema configuration as noted.	WLE	LED WALL BRACKET, 2 FOOT NOMINAL LENGTH, ROLL FORMED CODE GAUGE STEEL HOUSING, HIGH IMPACT ACRYLIC DIFFUSER, WHITE POLYESTER POWDER COAT FINISH. PROVIDE WITH EMERGENCY BATTERY BACKUP. PROVIDE WITH INTEGRAL PHOTOCEL.	120	LED	4000K 8	J 8779	1 FIXED OUTPUT DRIVER	15	WALL, SURFACE 8'0" ABOVE FINISHED FLOOR UNLESS OTHERWISE INDICATED	LITHONIA #WEDGE 3 SERIES OR APPROVED EQUAL
1	SPECIAL CONNECTION TO A SPECIFIC ITEM OF EQUIPMENT. SEE CONNECTION SCHEDULE.	<ul> <li>WALL OUTLET FOR TELECOMMUNICATIONS. PROVIDE BACKBOX, COVER PLATE AND (2)CATE CABLES IN 1"C TO DATA RACK. TERMINATE WITH PLASTIC BUSHING.</li> <li>DOT ABOVE OUTLETS INDICATES THAT THE DEVICE IS TO BE INSTALLED ABOVE COUNTER OR HIGHER THAN STANDARD HEIGHT. COORDINATE WITH ARCHITECTURAL DRAWINGS.</li> </ul>	<ul><li>♥</li><li>●</li></ul>	EXIT SIGN, WHITE METAL HOUSING, UNIVERSAL MOUNTING, RED STENCIL FACE, QUANTITY OF FACES INDICATED BY SHADING ON SYMBOL, DIRECTIONAL ARROWS AS INDICATED, WITH SELF-CONTAINED BATTERY RESERVE, CONNECT FIXTURE AHEAD OF ALL LOCAL AREA SWITCHING, FIXTURE SHALL NOT BE SWITCHED.	120	– LED DIFFUSE				5	WALL OR CEILING AS INDICATED BY SYMBOL	LITHONIA #LE SURE-LITES #CX7 HIGH-LITES #ZCLED EXITRONIX #400U LIGHTALARMS #XLD/XLED SERIES
		S LIGHT SWITCH, SINGLE-POLE,	Į		ĮĮ		I I		• •	<b>!</b>		
• • [7] [7] [7] [7] [7] [7] [7] [7] [7] [7]	LED LIGHTING FIXTURE, DRAWN TO SCALE. LED LIGHTING FIXTURE, CONNECTED TO AN EMERGENCY CIRCUIT (SWITCHED) LED LIGHTING FIXTURE, UTILIZED AS A NIGHT-LIGHT. CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT. LED LIGHTING FIXTURE, CONNECTED TO AN EMERGENCY CIRCUIT, CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT.	S4       LIGHT SWITCH, 4–WAY.         SD       DIMMER LIGHT SWITCH.         Sos       LIGHT SWITCH, DUAL TECHNOLOGY OCCUPANCY SENSOR.         IGS       OCCUPANCY SENSOR, CEILING MOUNTED. PROVIDE WITH 10 FEET WHIP TO ALLOW FIELD ADJUSTMENT OF LOCATION. COORDINATE EXACT LOCATION WITH MANUFACTURERS RECOMMENDATION.										
ю	LED LIGHTING FIXTURE. WALL MOUNTED.	FIRE ALARM SYSTEM										
	LED LIGHTING FIXTURE, WALL MOUNTED. CONNECTED TO AN EMERGENCY CIRCUIT OR EMERGENCY BALLAST.	SYMBOL         DESCRIPTION           Image: Symbol symplex combination audible/visual notification appliance device.         Fire alarm system combination audible/visual notification appliance device.           Image: Symplex combination symplex combination audible symplex combination audible visual notification appliance device.         Fire alarm system combination audible/visual notification appliance device.           Image: Symplex combination symplex combination audible symplex c										
•	LED LIGHTING FIXTURE, CONNECTED TO AN EMERGENCY CIRCUIT OR EMERGENCY BALLAST.	FIRE ALARM SYSTEM VISUAL ONLY NOTIFICATION APPLIANCE DEVICE. PROVIDE SYNCHRONIZED STROBES WHERE 2 OR MORE STROBES ARE LOCATED IN ONE ROOM OR VISIBLE FROM ONE LOCATION.										
8	EXIT SIGN, CEILING MOUNTED. SHADING INDICATES FACE ORIENTATION. CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT.											
-3	EXIT SIGN, WALL MOUNTED. SHADING INDICATES FACE ORIENTATION. BESIDE SYMBOL CONNECT TO THE UNSWITCHED LEG OF THE CIRCUIT.											
	EMERGENCY BATTERY PACK FIXTURE, WALL MOUNTED. CONNECT TO UNSWITCHED LEG OF THE CIRCUIT.											
SIMBUL												
	ELECTRICAL PANELBOARD, FLUSH MOUNTED.											
	ELECTRICAL PANELBOARD, SURFACE MOUNTED.											
	CONTROL CABINET, FLUSH OR SURFACE MOUNTED.											
	ENCLOSED CIRCUIT BREAKER											
	GROUND CONNECTION.											

### ABBREVIATIONS

A	AMPERES	LFNC	LIQUIDTIGHT FLEXIBLE NON-METALLIC CONDUIT
ACC	ARMORED CLAD CABLE	LFMC	
AFC			LOW VOLTAGE CONTROL CABINET
AFF	ABOVE FINISHED FLOOR	MCB	MAIN CIRCUIT BREAKER
AFG	ABOVE FINISHED GRADE	MCC	METAL CLAD CABLE
AHJ	AUTHORITY HAVING JURISDICTION	MLO	MAIN LUGS ONLY
ANN	FIRE ALARM ANNUNCIATOR CABINET	MID	MOUNTED
AWG	AMERICAN WIRE GAUGE	N	NEW
BLDG	BUILDING	NEC	NATIONAL ELECTRICAL CODE
C	CONDUIT	NIC	NOT IN CONTRACT
CB	CIRCUIT BREAKER	NL	NIGHT LIGHT
CD	CANDELA	NMC	NON-METALLIC CLAD CABLE
CKT	CIRCUIT	NTS	NOT TO SCALE
CLG	CEILING	P	POLE
СТ	CURRENT TRANSFORMER	PB	PULLBOX
CU	COPPER	PH	PHASE
DN	DOWN	PNL	PANELBOARD
DW	DISHWASHER	PRS	PROGRAM RAPID START
E	EXISTING	PS	PROGRAM START
EC	ELECTRICAL CONTRACTOR	PVC	POLYVINYL CHLORIDE
EGC	EQUIPMENT GROUNDING CONDUCTOR	PWR	POWER
EM	EMERGENCY	RECP	RECEPTACLE
EMT	ELECTRICAL METALLIC TUBING	RL	EXISTING TO BE RELOCATED
ENT	ELECTRICAL NON-METALLIC TUBING	EX	EXISTING TO REMAIN
EOLR	END OF LINE RESISTOR	RMC	RIGID METAL CONDUIT
EWC	ELECTRIC WATER COOLER	RP	EXISTING TO BE REPLACED
FA	FIRE ALARM	RV	EXISTING TO BE REMOVED
FACP	FIRE ALARM CONTROL PANEL	RS	RAPID START
FMC	FLEXIBLE METAL CONDUIT	SC	FIRE ALARM PULL STATION
FPN	FUSE PER NAMEPLATE	SW	SWITCH
GEC	GROUNDING ELECTRODE CONDUCTOR	SWBD	SWITCHBOARD
G,GND	GROUND	TTB	TELEPHONE TERMINAL BOARD
GFI	GROUND FAULT INTERRUPTER	TEL	TELEPHONE
HOA	HAND OFF AUTOMATIC	TR	TAMPER RESISTANT
HP	HORSEPOWER	TV	TELEVISION
HPF	HIGH POWER FACTOR	TYP	TYPICAL
НХ	HIGH REACTANCE	UO	UNLESS OTHERWISE NOTED
IG	ISOLATED GROUND	V	VOLTS
IMC	INTERMEDIATE METAL CONDUIT	VP	VAPOR PROOF
IS	INSTANT START	W	WALL MOUNTED
JB	JUNCTION BOX	WG	WIRE GUARD
KVA	KILOVOLT-AMPERES	WP	WEATHER PROOF
KW	KILOWATTS	XFMR	TRANSFORMER

## MOUNTING HEIGHTS

WALL

(DISTANCE FROM FINISHED FLOOR TO CENTER OF DEVICE UNLESS OTHERWISE NOTED) RECEPTACLE GENERAL

18" AFF. (UNLESS OTHERWISE NOTED) ABOVE COUNTER TOP MIN. 6" ABOVE COUNTER (UON) <u>LIGHT SWITCH</u> 46" AFF. (UNLESS OTHERWISE NOTED) TELECOMMUNICATIONS GENERAL 18" AFF. (UNLESS OTHERWISE NOTED) 46" AFF. (UNLESS OTHERWISE NOTED) 46" AFF. (UNLESS OTHERWISE NOTED) ABOVE COUNTER TOP <u>FIRE ALARM</u> PULL STATION 46" AFF. (UNLESS OTHERWISE NOTED) AUDIBLE/STROBE COMBINATION OR BETWEEN 80" AFF. AND 96" AFF. STROBE DEVICE ONLY

ELECTRICAL SYSTEM AND EQUIPMENT (2018 NC ENERGY CODE)
Method of Compliance:
Energy Code: 🗌 Performance 🛛 Prescriptive
ASHRAE 90.1: Performance Prescriptive
Lighting schedule (each fixture type) Lamp type required in fixture Number of lamps in fixture Ballast type used in the fixture Number of ballasts in fixture Total interior wattage 603W specified vs. 2418W allowed ( <u>whole building</u> or space by space) Total exterior wattage N/A
Additional Prescriptive Compliance
C406.2 More Efficient HVAC Equipment Performance
C406.3 Reduced Lighting Power Density
C406.4 Enhanced Digital Lighting Controls
C406.5 On-Site Renewable Energy
C406.6 Dedicated Outdoor Air System
C406.7 Reduced Energy Use In Service Water Heating
DESIGNER STATEMENT: To the best of my knowledge and belief, the design of this building complies with the electrical system and equipment requirements of the North Carolina State Building Code, NC 2018 Energy Code.



TEACHER OILET TEAM ROOM - EXISTING PANEL LB - EXISTING PANEL DB - EXISTING PANEL PB

MECH.

DEMOLITION NOTES:

1. ELECTRICAL MATERIALS WHICH ARE BEING REMOVED, UNLESS OTHERWISE INDICATED, SHALL BE COME THE PROPERTY OF THE CONTRACTOR. 2. ALL ABANDONED CONDUCTORS SHALL BE REMOVED BACK TO POINT OF SUPPLY.

3. WHERE ACCESSIBLE, ALL ABANDONED CONDUIT SHALL BE REMOVED. ALL CONDUIT REMAINING SHALL BE MECHANICALLY SECURED.

4. WHERE DEVICES ARE REMOVED, CIRCUIT WIRING AND CONDUIT SHALL BE RE-WORKED AS REQUIRED TO PERMIT REMAINING DEVICES TO CONTINUE TO

FUNCTION AS NECESSARY.

5. ALL EXISTING ELECTRICAL DEVICES AND EQUIPMENT NOT SHOWN AS BEING ABANDONED SHALL BE RECONNECTED.

6. MATERIALS NOTED TO BE REUSED IN THE NEW WORK SHALL BE CLEANED, REPAIRED, STORED AND PROTECTED ON THE SITE.

7. TEMPORARY CONNECTIONS SHALL BE PROVIDED TO ALLOW UNINTERRUPTED SERVICE DURING THE PERIOD OF CONSTRUCTION EXCEPT AS SCHEDULED. ALL INTERRUPTIONS SHALL BE SCHEDULED AND MUST HAVE PRIOR APPROVAL FROM THE OWNER.

8. RELOCATE ANY EXISTING CONDUITS, CONDUCTORS, FIXTURES AND

OUTLETS AS INDICATED BY THE DRAWINGS. 9. BACKBOXES OF OUTLETS AND SWITCHES SHOWN TO BE REMOVED FROM

WALLS AND FLOORS REMAINING SHALL BE REMOVED AND THE WALLS AND

FLOORS PROPERLY PATCHED.

10. WHERE NEW WALL FINISHES REQUIRE ADDITIONAL BOX DEPTH, PROVIDE OUTLET BOX EXTENSIONS OF THE NECESSARY DEPTH.

11. ALL ELECTRICAL PANELS AFFECTED BY THIS WORK SHALL HAVE THEIR PANEL DIRECTORIES UPDATED. ELECTRICAL CONTRACTOR SHALL PROVIDE A TYPED UPDATED PANEL DIRECTORY FOR EVERY PANEL WHERE ELECTRICAL LOAD IS REMOVED OR ADDED BY THIS WORK.

DEMOLITION LEGEND



RV - EXISTING TO BE REMOVED RL – EXISTING TO BE RELOCATED EX – EXISTING TO REMAIN



ELECTRICAL GENERAL REQUIREMENTS

#### 1.1 <u>SCOPE:</u>

a. Applicable requirements of the General Conditions of the Contract, Amendments, Supplementary General Conditions, and Special Conditions govern work under this Division.

b. Work covered by this Division consists of providing all labor, equipment, supplies, and materials; and performing all operations, including trenching, backfilling, cutting, patching, and chasing necessary for the installation of complete electrical systems in strict accordance with these specifications and the applicable drawings.

c. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as if herein specified or shown.

d. This Contractor is referred to the General and Special Conditions of the contract which shall form a part and be included in this section of the specification and shall be binding on this Contractor.

e. Some items of equipment are specified in the singular; however, the Contractor shall provide and install the 1.8 GUARANTEE number of items or equipment as indicated on the drawings, and as required for complete systems.

#### 1.2 <u>DEFINITION:</u>

a. The word "Contractor" as used in this section of the specification refers to the Electrical Contractor unless specifically noted otherwise. The word "provide" means furnish, fabricated, complete, install, erect, including labor and incidental materials necessary to complete in place and ready for operation or use the item referred to or described herein and/or referred to on the Contract Drawings.

#### 1.3 CONTRACTOR'S QUALIFICATIONS:

a. It is assumed that the Contractor has had sufficient general knowledge and experience to anticipate the needs of a construction of this nature. The Contractor shall furnish all items required to complete the construction in accordance with reasonable interpretation of the intent of the Drawings and Specifications. Any minor items required by code, law or regulations shall be provided even if not specified or specifically shown, where it is part of a major system.

#### 1.4 CONTRACT DOCUMENTS:

a. The contract drawings are diagrammatic and are not intended to indicate every detail of construction, or every item of material or equipment required, or exact locations. Indicated locations of outlets, equipment, and connections are approximate and shall be verified by reference to related documents.

b. The Contractor shall procure complete drawings and specifications on all coincident construction and fit the Electrical work in with it. He shall cooperate with other trades to achieve well-coordinated progress and results: and avoid conflicts with other trades. He shall make minor moves and changes necessary to accommodate other equipment and/or preserve symmetry without claim for extra payment. Should there be any doubt as to the spacing intent, or location of equipment, the Contractor shall have the point clarified by the Architect/Engineer before proceeding with the installation.

#### 1.5 RECORD DRAWINGS:

a. During construction of this project, the Contractor shall maintain one complete set of electrical contract drawings. on which shall be recorded all significant changes. This set of drawings shall be used for no other purpose. Upon completion of the work, the Contractor shall submit these drawings to the Architect/Engineer for approval and presentation to the Owner.

b. Upon completion of the project, the Contractor shall prepare an Operation and Maintenance Manual, which shall include catalog data, equipment information, wiring diagrams, and warranty information for the electrical installation. Submit three copies to the Architect/Engineer for approval and presentation to the Owner.

#### 1.6 REGULATIONS AND COMPLIANCE:

a. The requirements of the North Carolina State Building Code, the National Electrical Code, and of all other State and Local codes, ordinances, regulations, and interpretations by authorities having jurisdiction are binding upon this Contractor, and nothing contained in, or inferred by, these specifications or the applicable drawings may be construed as waiving those requirements. The latest edition of the National Electrical Code, referred to herein and on the drawings as "N.E.C.", forms a part of these specifications; and under no circumstances may the installation fail to meet the minimum requirements therein.

b. This Contractor shall secure and pay for all permits, fees, inspections, and licenses required. Upon completion of the project and prior to his request for final payment he shall present to the Architect/Engineer a certificate of inspection and approval from the inspection authorities.

Requirements of the Power and Telephone Utilities shall be met. The Contractor shall install and connect all Utility supplied equipment such as current transformers, cabinets, meters, and boxes. Regulations of the Utility shall govern service connections and installation of metering equipment.

d. The Contractor shall include in his work, without extra cost to the Owner, any labor, materials, service, apparatus, drawings, to comply with all applicable laws, ordinances, rules, and regulations, whether shown on drawings and/or specified.

e. All materials furnished, and all work installed shall comply with the National Fire Codes of the National Fire Protection Association, and with the requirements of all governmental departments having jurisdiction.

f. All materials and equipment shall bear the approval label, and shall be listed by the Underwriters' Laboratories, Inc., or any other third-party listing organization acceptable to the North Carolina Building Code Council. Refer to the list of acceptable testing agencies on the NC OSFM website under "Code Enforcement Resources".

q. It is the responsibility of the Contractor to notify the local electrical inspector to schedule the required inspections.

h. It is the responsibility of the Contractor to notify the Office of the State Electrical Inspector, Department of Insurance, to schedule the required inspections.

1.7 ELECTRICAL TESTING:

a. Conduct full-scale tests with all lights, equipment and appliances in operation and prove the electrical system satisfactory for operation and free from defects. Pay attention to the balancing of the single-phase loads on the three-phase system. Promptly remedy all defects.

b. All feeder phase conductors and neutrals shall be tested as installed, and before connections are made, for insulation resistance, continuity, and accidental grounds. This shall be done with a 500-volt megger. The procedures listed below shall be followed:

1. Minimum readings shall be one million or more ohms for #6 AWG wire and smaller, 250,000 ohms or more for #4 AWG wire or larger, between conductors and between conductor and the grounding conductor.

2. After all fixtures, devices and equipment are installed and all connections completed to each panel, the contractor shall disconnect the neutral feeder conductor from the neutral bar and take a megger reading between the neutral bar and the grounded enclosure. If this reading is less than 250,000 ohms, the contractor shall disconnect the branch circuit neutral wires from this neutral bar. He shall then test each one separately on the panel until the low reading is found. The contractor shall correct troubles, reconnect, and retest until at least 250,000 ohms from the neutral bar to the grounded panel can be achieved with only the neutral feeder disconnected.

3. At final inspection, the contractor shall furnish a megger and show that the panels comply with the above requirements. He shall also furnish an ammeter (hook-on type) and voltmeter to take current and voltage readings as directed.

c. Upon completion of installation of the electrical grounding and bonding systems, the ground resistance shall be tested with a ground resistance tester utilizing the IEEE fall-of-potential method of testing. Where tests show resistance-toground is over 25 ohms, appropriate action should be taken to reduce the resistance to 25 ohms, or less, by driving additional ground rods. (The compliance should be demonstrated by retesting).

d. For services 1000 amperes and larger, the following tests should be performed on the service circuit breakers and the distribution circuit breakers. Testing shall be performed by a qualified factory technician at the job site. All readings shall be tabulated.

1. Phase tripping tolerance (within 20% of U/L requirements).

- 2. Trip time (per phase) in seconds.
- Instantaneous trip (amps) per phase.

4. Insulation resistance (in megohms) tested at 1000 volts (phase to phase, and line to load).

e. If provided, ground fault protection on new circuit breakers shall be performance tested in the field and properly

calibrated and set in accordance with the coordination study. f. All tests specified shall be completely documented indicating time of day, date, temperature, and all pertinent test

h. It shall be the duty of prospective Contractors to visit the job site and familiarize themselves with job condition g. All required documentation of readings indicated above shall be submitted to Engineer prior to, and as one of the No extras will be allowed because of additional work necessitated by, or changes in plans required because of evident conditions, that are not indicated on the drawings. prerequisites for, final acceptance of the project.

i. Contractor shall leave the premises in a clean and orderly manner upon completion of the work and shall rem h. All elements of the electrical system provided, furnished, installed, or otherwise altered under this contract shall be subjected to testing required under this contract. Where test results indicate failure, the contractor shall repair, adjust, or from the premises all debris that has accumulated during the progress of the work. replace as required and repeat the testing at no extra cost.

i. Testing shall be performed by qualified testing agencies and field services companies as necessary to augment a. This Contractor shall coordinate the work of all subs and shall furnish any information necessary to permit the contractor's own capabilities. Testing and reporting methods shall comply with published standards. All test results shall be work of all trades to be installed satisfactorily and with the least possible interference or delay. published on the Contractor's or testing company's letterhead or test forms bearing the legal name and address of the company.

information.

a. The Contractor shall guarantee that the work done has been done in accordance with the Contract Documents, free of imperfect materials and defective workmanship. For a period of one year after acceptance by the Owner, the Contractor shall repair or replace, at no additional expense to the Owner, any imperfect materials or defective workmanship.

2.1 <u>GENERAL:</u>

a. Except where reuse of existing items is specifically indicated or permitted, all materials and equipment shall be new and shall conform to the standards of the National Electrical Manufacturer's Association and Underwriter's Laboratories, Inc. in every instance where such a standard has been established for the item involved.

b. Catalog numbers and trade names in these specifications and drawings are intended only to set forth and convey to bidders the general style, type, character, and guality of product desired. Similar products of other manufacturers; of equal quality, size, capacity, character, and appearance may be substituted on the written approval of the Architect/Engineer. b. Trenching and shoring shall comply with requirements of North Carolina State Department of Labor's regulat Requests for approval of substitutions shall be made after the award of the contract in accordance with the bidding entitled "Safeguards during Construction", and "Trenching and Shoring". requirements of these specifications.

c. In backfilling pipe trenches, approved fill shall first be compacted firmly and evenly on both sides of pipe layers to a depth of 12" over the top of the pipe. The remainder of trench shall be backfilled to established grade in 6" lay c. It is the intent of the drawings and specifications that the installation be complete, of finished appearance, and The Contractor shall compact between each layer with a high-frequency vibrator tamper such as Wacker Neuson ready for operation. Manufacturers' catalog numbers as used herein and on the drawings are indicative of the type of product Compactor or equals by Multiquip or Weber. Fill shall be compacted to density specified in Earthwork Section for the to be installed, and do not necessarily identify all parts and accessories required for the proper assembly, installation, and through which trench is cut. Where compaction requirements are not established for an area, the Contractor shall compact utilization of the product. All required parts and accessories shall be provided. to 95% maximum density at optimum moisture content.

d. Materials shall be inspected by the Contractor upon their arrival at the site to be sure they are correct. Material and equipment stored on the site shall be protected against physical damage, dirt and damage caused by precipitation, wind, condensation, excessive humidity, and extremes of temperature. Materials shall be stored in their original cartons within substantial, clean, and dry storage facilities provided under this Contract. Conduit, large, galvanized boxes, and lighting poles may be stored outdoors on suitable blocks or racks clear of the earth and undergrowth and pitched to drain. Large electrical equipment intended for ultimate installation outdoors may be stored in the weather on suitable blocks or platforms clear of the earth and undergrowth, and with interior lamps or space heaters continuously energized to prevent condensation. Alternate 3.5 SLEEVES, CUTTING, AND PATCHING: storage provisions may be submitted to the Architect/Engineer for approval prior to the arrival of the material. Under no circumstances shall equipment be stored in the weather under a cover of polyethylene or tarpaulin. The Architect/Engineer will be the sole judge as to the acceptability of storage facilities, and when directed by the Architect/Engineer, improperly stored or damaged material shall be removed from the site and replaced with new material.

#### 2.2 SUBMITTALS:

a. Submittal data shall be thoroughly reviewed and approved by the Contractor prior to being forwarded to the Architect/Engineer. Submittal data received from the Contractor will be considered to have been reviewed and approved by the Contractor as suitable for the application and for installation in the space allotted.

b. The submittal of shop drawings shall be with the Contractor stamp affixed. This stamp indicates that the Contractor, by approving and submitting shop drawings, represents that he has determined and verified all field measurements a. Protect all material and work from damage during construction. Equipment installed in the building prior t being closed in and dried out shall be protected from the elements in the same manner as previously specified for sto and quantities, field construction criteria, material, catalog material, and similar data that he has reviewed and coordinated materials. Protect finished surfaces from splattering mortar, paint, dirt, plaster, etc. Do not install device plates, face pla information in the shop drawings with the requirements of the work and the Contract Documents. It, also, indicates that any canopies, flush cabinet trims, or fixtures on walls or ceilings until after painting or cleaning of the surface has been compl deviation from the Contract Documents has been shown on the submittal and clearly defines the deviations from the and arrange for such items that are required to be field painted to be painted before being mounted. Repair, clean and tou specifications. up or replace all damaged material. At the completion of the project, remove all dust from finished surfaces, including ligh c. Approval rendered on shop drawings shall not be considered as a guarantee of quantities, measurements, or fixtures, lenses and lamps.

building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail. Said approval does not in any way relieve the Contractor from his responsibilities or necessity of furnishing material or performing work as required by the contract drawings and specifications.

d. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of Contract time, and no claim for extension by reason of default will be allowed.

## 2.3 EQUIPMENT DEVIATIONS:

a. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, c. In unfinished areas such as equipment rooms, exposed equipment shall be furnished with suitable factory app finishes (e.g., standard gray enamel finish for panelboards, etc.). electrical, or architectural layout, all such redesign, and all new drawings and detailing required therefore, shall be prepared by the Contractor at his own expense and submitted for approval by the Architect/Engineer.

b. Where such approved deviation requires a different quantity and arrangement of wiring, conduit, and equipment from that specified or indicated on the drawings, the Contractor shall furnish and install any such structural supports, electrical wiring and conduit, and any other additional equipment required by the system, at no additional cost to the Owner.

21	
J. I	GENERAL.

a. The Contractor shall coordinate the work and equipment of this Division with the work and equipment specified elsewhere to assure a complete and satisfactory installation. Work such as excavation, backfill, concrete, flashing, wiring, etc., which is required by the work of this section shall be performed in accordance with the requirements of the applicable section of the specifications.

b. It is the intention of these specifications and drawings to call for finished work, tested and ready for operation. Whenever the work "provide" is used, it shall mean "furnish and install complete and ready for use".

3.2 DUTIES OF CONTRACTOR:

a. Contractor shall furnish and install all materials called for in these Specifications and accompanying drawings and must furnish the apparatus complete in every respect. Anything called for in the specifications and not shown on the drawings or shown on the drawings and not called for in the specifications must be furnished by the Contractor.

b. Contractor is responsible for familiarizing himself with the details of the construction of the building. Work under these specifications installed improperly or which requires changing due to improper reading or interpretation of building plans shall be corrected and changed as directed by the Architect/Engineer without additional cost to the Owner.

c. The Contractor shall follow drawings in laying out work and check drawings or other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Architect/Engineer shall be notified before proceeding with installation.

d. While every effort has been made to accommodate the equipment necessary for the work of this contract, it is the responsibility of the Contractor to ensure that equipment supplied as a part of this contract will fit in the spaces provided for by the drawings. Any concern by the contractor regarding the adequacy of a space for the equipment supplied, shall be brought to the attention of the Architect/Engineer in a written form prior to the approval of the related equipment submittals and prior to any rough-in associated with this equipment.

Reference to "Flex" or "Flexible Conduit" indicates Flexible Metal Conduit, or, where required, Liquidtight Flex e. The plans are diagrammatic and are not intended to show each fitting or a complete detail of all the work to be done; but are for illustrating the type of system, etc., and special conditions considered necessary for the experienced Metal Conduit. mechanic to take off his materials and lay out his work. This Contractor shall be responsible for taking such measurements as 1.2 FASTENING METHODS: may be necessary at the job and adapting his work to local conditions.

a. Acceptable fastening methods include wood screws and nails on wood construction, toggle bolts on ho f. Conditions sometimes occur which require certain changes in drawings and specifications. If such changes in drawing and specifications are necessary, the same are to be made by the Contractor without expense to the Owner, providing masonry, expansion bolts and lead anchors on brick and concrete, and machine screws on metal surfaces. such changes do not require furnishing more materials, or performing more labor than the true intent of the drawings and specifications demands. It is understood that while the drawings are to be followed as closely as circumstances will permit, the b. Explosive fasteners may be used in steel and concrete in accordance with the manufacturer's recommendation Contractor is held responsible for the installation of the system according to the true intent and meaning of the drawings. c. Wire, perforated metal strap, and wooden plugs are not acceptable as fastening material. Anything not entirely clear in the drawings and specification will be fully explained if application is made to the Architect/Engineer. Should, however, conditions arise where in the judgment of the Contractor certain changes will be advisable, the Contractor will communicate with the Architect/Engineer and secure his approval of these changes before going d. Materials used shall be good quality, made of zinc or cadmium coated steel or other non-corroding material. ahead with the work.

e. Contractor shall keep on the job at all times copies of all approved shop drawings.

g. The right to make any responsible change in location of apparatus, equipment, routing of conduit up to the tim roughing in, is reserved by the Architect without involving any additional expense to the Owner.

3.3 COORDINATION:

b. Where the work will be installed near, or may interfere with the work of other trades, the Contractor shall assi working out space conditions to make a satisfactory adjustment. If directed by the Engineer, the Contractor shall prep composite working drawings and sections at a suitable scale not less than 3/8" = 1'-0", clearly showing how his work is to installed in relation to the work of other trades. If the Contractor installs his work before coordination, or to cause interference with work of any subs, he shall make the necessary changes in his work to correct the condition without e charge.

c. The Contractor shall furnish to other trades, as required, all necessary templates, patterns, setting plans, shop details for the proper installation of work and for coordinating adjacent work.

#### 3.4 EXCAVATION:

a. Required excavation for installation of all electrical work shall be provided by the Electrical Contractor. Care be taken not to disturb or damage the work of other trades.

d. Excess earth shall be deposited on the site as directed by the Architect/Engineer

e. Where ditches occur outside of the building, the surface shall be finished to match existing surfaces. Any exis work, or work of other trades, which is damaged or disturbed shall be repaired or replaced and left in good order.

a. Contractor shall place his own sleeves and advise other trades of required chases and openings, so they cal properly built in. Sleeves provided under this division shall be formed out of no less than schedule 40 galvanized rigid conduits. Where any raceway supports installed under this Contract pierce the roof, suitable pitch pockets shall be prov and coordinated with the roofing contractor as necessary to be acceptable to the Architect/Engineer. Provide suitable fitti where any raceways or equipment cross expansion joints.

b. Permitted cutting or patching necessary shall be done by Contractor. Structural members shall not be cut exc by written permission of Architect/Engineer.

3.6 **PROTECTION AND CLEAN-UP**:

b. The Contractor shall keep premises free of debris resulting from his work.

3.7 PAINTING AND FINISHING:

a. Suitable finishes shall be provided on all items of electrical equipment and materials which are exposed. shall consist of either an acceptable finish as manufactured and supplied to the job or application of suitable finishes installation

b. When installed in finished areas, exposed equipment and materials shall be supplied with prime coat and shal professionally painted or enameled as directed to match or blend with adjacent surfaces.

- d. Equipment furnished in finishes such as stainless steel and brushed aluminum shall not be painted.
- e. All finishing shall be as directed by, and shall be satisfactory to, the Architect/Engineer.

f. Paint material shall be selected from the products listed below and, insofar as practical, products of only manufacturer shall be used. Contractor shall submit to the Architect/Engineer the listed manufacturer he proposes to use in work. Should the Contractor desire to use products of a manufacturer not listed below, or products made by a list manufacturer but not scheduled herein, Contractor shall submit complete technical information on the proposed product the Architect/Engineer for approval. Only products approved by the Architect/Engineer shall be used.

#### 3.8 <u>OBSERVATION:</u>

a. The project will be observed periodically as construction progresses. The Contractor will be responsible notifying the Architect/Engineer at least 72 hours in advance when any work to be covered up is ready inspection. No work shall be covered up until after observation has been completed.

#### BASIC MATERIALS AND METHODS

1.1 <u>WIRING METHODS:</u>

a. Unless otherwise indicated or specified, the Wiring Method for this project shall consist of copper conductors 600-volt insulation installed in metal raceways.

b. The word "Raceway" and the word "Conduit" (or abbreviation "C") used herein or on the drawings indicate F Metal Conduit, and where permitted, Intermediate Metal Conduit, Electrical Metallic Tubing, Rigid Nonmetallic Conduit, Flex Metal Conduit, or Liquidtight Flexible Metal Conduit.

- c. Reference to "Rigid Conduit" or "RMC" indicates heavy-wall Rigid Metal Conduit only.
- Reference to "IMC" indicates Intermediate Metal Conduit.
- e. Reference to "PVC" indicates Rigid Nonmetallic Conduit.
- Reference to "EMT" or "Tubing" indicates Electrical Metallic Tubing.

ne of	e. Materials, whether exposed or concealed, shall be firmly and adequately held in place. Fastening and support shall afford safety factor of three or higher and shall be in full compliance with the seismic protection requirements of the N.C. State Building Code.	
ions. t job	f. Fixtures, raceways, and equipment shall be supported from the structure. Nothing may be supported on suspended ceiling unless noted so on the Drawings or specifically permitted by the Architect/Engineer.	<b>NSIONS</b> .
nove	<ul> <li>g. Equipment and raceways attached to outside walls, or interior walls subject to permanent moisture, shall be shimmed out with non-corrodible material to provide 1/4" air space between wall and equipment or raceway.</li> <li>1.3 <u>EQUIPMENT IDENTIFICATION:</u></li> </ul>	ify all dimer
t the	a. Suitable nameplates shall be provided for the identification of electrical equipment including switchboards, panelboards, dry-type transformers, motor starters, safety switches and circuit breakers.	R TO VERI
ist in	b. Nameplates shall be of engraved white core plastic laminate, not less than 1/16" thick. Nameplate identification shall include equipment name, source of power supply and voltage.	TRACTOR
pare o be	c. Nameplate engraving shall be of professional quality, with block style letters, minimum 1/4" high.	CONI
extra	d. Nameplates shall be attached with sheet metal screws. They shall be sized to allow for installation of screws without obscuring text.	
and	e. All empty conduit runs and conduit with conductors for future use shall be identified for use and shall indicate where they terminate. Identification shall be by tags with string or wire attached to conduit or outlet.	
shall	a. The Electrical Contractor shall provide sleeves and openings for his penetrations through exterior walls, interior	
tions	b. For any raceway passing through an exterior wall, above or below grade, provide appropriate sleeve and water	
in 6"	proofing. Center the conduit in the sleeve and fill the space between conduit and sleeve with appropriate compound such as lead and oakum, and then apply caulking compound - Thiocaulk or approved equal - flush with the wall surfaces.	
yers. Soil area ct fill	c. For raceways penetrating floor slabs, smoke partitions, and fire-rated walls, provide steel pipe sleeves and seal with high-temperature non-shrink grout or other material as approved by the Architect/Engineer. Materials and installation methods shall be UL listed as a Through-Penetration Firestop System suitable for use with the UL Fire Resistance Design encountered. Refer to the UL fire protection details shown on the drawings. Refer to the UL fire penetration details shown in the drawings.	
sting	d. Conduits penetrating roof surfaces for the purpose of connecting to roof-top mechanical equipment shall utilize openings and curbs provided for the equipment where possible.	
sung	e. For other raceway penetrations through the roof the Contractor shall provide appropriate prefabricated roof curb assemblies - "Pipe Portal System" as manufactured by Roof Products and System Corp., Addison, Illinois, or equal method as approved by Architect/Engineer and Roofing Subcontractor.	
n be steel ⁄ided	<ul> <li>1.5 <u>SUBMITTALS:</u></li> <li>a. Submit for approval manufacturer's data sheets for all basic materials.</li> </ul>	
tings	RACEWAYS AND FITTINGS	
cept	a. Provide complete raceway systems as indicated on the drawings, as specified herein, and as required by	
	applicable codes. b. All wiring shall be installed in raceways unless specifically noted otherwise.	
o its ored	1.2 <u>SUBMITTALS:</u>	
ates, leted ouch-	a. Submit for approval manufacturer's data sheets for all raceway system components.	
hting	2.1 <u>MANUFACTURERS:</u>	
	a. Metal raceway and components shall be manufactured by Allied, Triangle, Wheatland, Thomas & Betts, or other approved manufacturers.	
This	b. Non-metallic raceway system components shall be manufactured by Carlon, Queen City Plastics, Ipex or other approved manufacturers.	Ц.
after	2.2 MATERIALS AND APPLICATIONS:	CHITEC
all be plied	a. Rigid Metal Conduit shall be zinc-coated Schedule 40 steel or alloy 6063-T42 aluminum with threaded couplings and fittings. Termination at sheet metal enclosures shall consist of double locknuts and insulating bushings. Rigid Steel conduit shall be used for all exposed and concealed work except where other raceways are indicated or permitted. Aluminum conduit complete with aluminum fittings may be used in lieu of steel conduit except in wet locations, underground, or in poured concrete. Steel and aluminum shall not be mixed in the same run of conduit. When using aluminum conduit, Contractor shall use couplings, fittings, boxes and supports with appropriate dielectric means to prevent corrosion with dissimilar metals.	NSENT OF THE AR
	b. Intermediate Metal Conduit (IMC) with threaded couplings and fittings may be used for exposed and concealed work in lieu of rigid metal conduit except underground outside the building foundation, or where supporting lighting fixtures, or in hazardous locations, or when exposed to severe impact or injury. Termination at sheet metal enclosures shall consist of double locknuts and insulating bushings.	F WRITTEN CC
one n the isted	c. Electrical Metallic Tubing (EMT) may be used for concealed work in lieu of Rigid Metal Conduit except	/ITHOU <sup>-</sup>
ts to	above a roof, or where supporting lighting fixtures, or when exposed to severe impact or injury, or in hazardous locations, or less than 10 feet above a floor or platform in other than in electrical, mechanical, or communications closets or equipment rooms.	PRODUCED V
e for y for	d. Rigid PVC Conduit shall be Schedule 40, UL listed for use with 90°C. Conduit run underground or run in or under a poured concrete slab shall be rigid PVC. Vertical elbows and vertical extensions from underground or concrete embedded PVC conduits smaller than 3" trade size may also be of PVC if they remain concealed or otherwise protected but shall be of Rigid Steel Conduit (or IMC where permitted) where they stub up into exposed locations or trade size is 3" or larger. An insulating bushing or end bell shall be provided at each termination. Conduit run underground and not under a poured concrete slab shall have installed continuously above it a warning tape. The tape shall be 12 inches wide, centered on conduit and located 12 inches below finished grade.	ON PURPOSES OR REI
with	e. Flexible Metal Conduit shall be of zinc coated steel of minimum length and shall be used in lieu of Rigid Metal Conduit for connections to moving or vibrating apparatus, recessed lighting fixtures, dry-type transformers, and motors. Flexible Metal Conduit may be used where rigid connections are impractical due to obstructions or space limitations. Flexible Metal Conduit used in wet, damp, or corrosive location shall be PVC jacketed liquid-tight complete with liquid-tight connectors.	CONSTRUCTI
Rigid xible	f. Fittings for steel conduit and tubing shall be of zinc coated steel or malleable iron. Insulating bushings of plastic provided for Rigid and Intermediate Metal Conduits shall be rated for 150°C. Bonding bushings shall be steel or malleable iron with non-removable plastic throats rated 150°C. EMT fittings shall be of the compression type and concrete tight or rain tight as applicable. Setscrew, indenter, pressure cast and die cast fittings are not acceptable. Connectors for EMT, Flexible Metal Conduit and Liquid-tight Flexible Metal Conduit shall be the insulated throat type. Connectors for Flexible Metal Conduits shall be of the "Tite-Bite" design.	N NOT BE USED FOR
	g. Conduit expansion fittings shall be of zinc coated cast or malleable iron and steel conduit, complete with flexible bonding straps. Expansion fittings shall allow longitudinal conduit movement of 4 inches.	3 AND CA
xible	h. Minimum raceway size shall be 1/2", except Flexible Metal Conduit connections to <u>individual</u> lighting fixtures may be 3/8". Other raceway sizes, unless indicated on the drawings, shall be determined by the Contractor in accordance with NEC	HITECTS
	i. Raceway in patient care areas (as defined by NEC 517) shall comply with the requirements of NEC 517 13(A)	THE ARC
ollow	3.1 INSTALLATION:	RTY OF '
ns.	a. Rigid and Intermediate Metal Conduits shall be made up with full threads, to which a conductive pipe compound (T & B Kopr-Shield or equal) has been applied and butted in coupling. Terminations at sheet metal enclosures in indoor dry locations shall be made with double locknuts and an insulating bushing. Terminations at sheet metal enclosures in outdoor, damp, and wet locations shall be made with threaded conduit hubs of zinc coated malleable iron.	IS THE PROPE
2	b. Except when run under a concrete slab on grade, underground conduits shall be installed a minimum of 30" below grade. Trenching and backfilling shall comply with <u>Section 16010 Electrical General Requirements</u> .	THIS DRAWING



REVISION SCHEDULE

DATE REFERENCE

c. All underground conduits shall have metalized warning tape installed above the conduit that identifies the specific system buried below. The warning tape shall consist of a minimum 3.5 mil solid foil core encased in a protective plastic jacket (total thickness 5.5 mils). The tape shall be 6 inches wide with black lettering imprinted on a color-coded background that conforms to APWA color code specifications. Tape shall be installed 18 inches above the conduit and in no case less than 6 inches below grade.

d. Installation of PVC conduit shall be in accordance with the manufacturer's recommendations using solvent welded couplings and fittings. Field bends shall be made with approved heating equipment. Open flames are not permitted. An insulating bushing or end-bell shall be provided at each termination.

e. Conduits shall be rigidly supported not more than 8 feet on center and shall be concealed within walls, ceilings, and floors, except as indicated or specifically approved by the Architect/Engineer; kept at least 6" from flues and steam or hot water pipes; and protected against the entry of dirt, plaster, or trash. Raceways shall be supported independently of suspended ceiling members and suspension wires.

f. PVC conduits that turn up inside walls shall transition to EMT no greater than 60 inches above slab or at the first box encountered, whichever comes first.

g. Suspended EMT shall be provided with additional hangers at elbows and bends, and where necessary to avoid strain at couplings and connectors.

h. Exposed conduits, where permitted, shall be run parallel or perpendicular to walls, structural members, and ceilings; with right-angle turns consisting of symmetrical bends or cast metal fittings with threaded hubs. Offsets may be used where necessary if they are of minimum length.

i. Conduits crossing expansion and contraction joints shall cross perpendicular to the joint and shall be provided with expansion fittings. Conduits shall not be embedded in the concrete slabs at the expansion and contraction joints.

Conduit may not be installed laterally in any concrete slab where the outside diameter of the conduit, measured at a coupling, exceeds one-third the thickness of the concrete. Conduits shall occupy the middle third of the slab when practical and leave at least a 3/4-inch concrete cover. Where reinforcing bars occur at the 3/4-inch level the conduit shall be run inside them toward the center of the slab. Conduits may cross each other within the slab provided the 3/4-inch concrete cover is maintained. Conduits shall be tied to the reinforcing rods or otherwise supported when necessary to prevent sagging when concrete is poured. They shall be laterally spaced not closer than three diameters on centers to allow complete coverage.

k. Immediately after installation, conduit openings shall be covered to prevent entrance of foreign matters. Covers shall remain in place throughout the rough-in stage.

I. When installing conduit on interior surface of exterior walls, mount 1/4 inch from wall with clamp backs or strut.

# **CONDUCTORS**

1.1 <u>SCOPE:</u>

a. Furnish and install a complete system of wire and cable.

1.2 SUBMITTALS:

a. Submit for approval manufacturer's data sheets for all conductor types. All wire shall be listed by an "approved" third party testing agency.

#### 2.1 MATERIALS:

- a. Insulated conductors shall be manufactured by Encore, Southwire, General Cable or approved equal.
- b. Unless otherwise indicated, all wire and cable conductors shall be copper.

c. Conductors shall be not smaller than #12 AWG except that #10 AWG minimum is required for the entire length of 120-volt branch circuits whose distance to the center of the load exceeds 75 feet. #14 AWG may be used for signal and remote-control circuits. #16 AWG may be used for taps to individual recessed lighting fixtures on circuits protected by overcurrent devices rated at 20 amperes or less and contained within flexible metal conduits that do not exceed 6 feet in length. Conductors that are smaller than #14 AWG may be used only where specifically indicated on the drawings or specified herein.

- d. Conductors #10 AWG and smaller shall be solid, dual rated type THWN/THHN.
- e. Conductors #8 AWG and larger shall be Class B stranded, dual rated type THWN/THHN.
- f. Each conductor shall bear easily readable markings along the entire length, indicating size and insulation type.
- Insulation on conductors #10 AWG and smaller shall be suitably colored in manufacture

h. Conductors in any location subject to abnormal temperature shall be furnished with an insulation type suitable for temperature encountered.

i. Where no indication is made of wire size, the conductor shall be of N.E.C. size to match its overcurrent protective device, but in no case smaller than #12 AWG.

j. Joints in solid conductors shall be spliced using Ideal "wire-nuts", 3M Company "Scotchlock" or T&B connectors in junction boxes, outlet boxes and lighting fixtures.

k. "Sta-kon" or other permanent type crimp connectors shall not be used for branch circuit connections.

#### 3.1 SPLICES, TAPS, AND CONNECTIONS:

a. Splices in conductors #10 AWG and smaller shall be made with twist-on spring steel devices UL listed as Pressure Cable Connectors, with integral insulating covers rated 75°C at 600 volts, except that those used for connections to light fixtures and other heat-producing equipment shall comply with temperature ratings marked on the equipment but not less than 90°C.

b. Splices in copper conductors #8 AWG and larger shall be made with mechanical devices UL listed as Pressure Cable Connectors and insulated with thermoplastic tape UL listed for use as sole insulation. Tape may be omitted from connectors supplied with securely fastened insulating covers which completely enclose the connector and the conductors. Insulating covers shall be rated 75°C at 600 volts.

c. Connect solid wires to equipment, switches, and devices equipped with binding screw terminals by looping the wire under the screw head in such a manner that the loop is tightened as the screw is tightened. Straight-in wiring under screw terminals is not acceptable.

d. Stranded wires shall not be inserted into back-wiring holes on devices, nor shall they be directly connected to screw head terminals. They shall be fitted with insulated crimp-on type spade terminals for connection under the screw head.

e. Joints in stranded conductors shall be spliced by approved mechanical connectors and gum rubber tape or friction tape. Solderless mechanical connectors for splices and taps, provided with U/L-approved insulating covers, may be used instead of mechanical connectors plus tape.

f. Conductors, in all cases, shall be continuous from outlet to outlet and no splicing shall be made except within outlet or junction boxes, troughs and gutters.

g. All single-phase circuits shall be provided with individual neutral. Utilizing multi-pole breakers for single-phase circuits sharing a neutral is not allowed. No more than three current carrying conductors allowed per conduit, except three single-phase branch circuit conductors, each with individual neutrals, shall be allowed in a conduit.

#### 3.2 COLOR CODING:

All wiring shall be color-coded.

b. On 120/208V, 3-phase, 4-wire power systems, conductor insulation shall be color coded Black (Phase A), Red (Phase B), Blue (Phase C), and White (Neutral).

c. On 277/480V, 3-phase, 4-wire power systems, conductor installation shall be color coded Brown (Phase A), Orange (Phase B), Yellow (Phase C) and Gray (Neutral).

d. Insulation for grounding conductors on all systems shall be Green.

e. Conductors #4 AWG and larger may be identified with two or more bands of appropriate color plastic tape applied near each splice and termination. Painting wire will not be acceptable.

f. Phase sequence shall be "A", "B" and "C" from left to right, top to bottom or front to back when facing equipment.

type. "Handy" boxes are not permitted. g. Control and signal wiring shall not use the above-named colors except green for grounding. Any other colors or striping may be used but the coding shall provide same color or striping between any two terminals being joined. e. For concealed work, fixture outlet boxes shall be 4" octagonal minimum, provided with plaster rings in plaste surfaces. Concrete ring boxes shall be used in poured concrete. Switch and outlet boxes in plastered and dry walls shall b h. Switch legs, including "Travelers", shall be the same color as phase circuit conductors. square minimum or one-piece multi-gang with appropriate plaster rings. Switch and outlet boxes in exposed brick, block or walls shall be single or multi-gang one-piece boxes not less than 3-1/2" deep with square corners and with internal dev 3.3 BRANCH CIRCUIT RACEWAY WIRING: mounting holes, equal to Steel City Type GW. Boxes in walls finished with ceramic tile or wood paneling shall be 4" squa minimum or one-piece multi-gang boxes, fitted with appropriate tile rings having square corners and internal device moun a. Three-phase circuits shall be limited to one such circuit per raceway. They shall consist of three different phase holes. Gangable boxes are not permitted. wires, and a neutral where required. 3.1 INSTALLATION: b. A neutral shall not serve more than one circuit. Run a separate neutral for each 120 Volt circuit. a. Set recessed boxes with edges flush with finished surfaces. c. The neutral carrying all or any part of the current of any specific load shall be contained in the same raceway or enclosure with the phase wire or wires also carrying that current. b. Immediately after installation cover boxes to prevent entrance of foreign matter. d. Circuits shall be connected to panels as shown in the panel schedules. c. Scaling of plans for outlet locations is not necessarily accurate enough for the intent of these specifications. the Contractor's responsibility to comply with the evident intent for centering or symmetric arrangement in ceiling and e. Conductors supplying lighting outlets may be combined in the same raceways with conductors supplying spaces. Special attention is also directed to the location of any outlets which are built into, or located in relation to, o receptacles; but lighting outlets and receptacle outlets shall not be connected to the same circuits unless specifically indicated features such as shelving, work counters, and equipment. The Contractor shall consult plans and shop drawings on s in the drawings. features and locate outlets as thereby indicated. **GROUNDING AND BONDING** d. Mounting heights indicated herein and on the drawings are approximate dimensions of the center of the box to floor and may vary slightly to clear obstructions and match joints in masonry. References to "Horizontal" and "Vertical" appl the orientation of the long dimension of a single-gang plate and of the device mounting strap. Alignment tolerance shall be a. The electric system neutral, the neutral of each separately derived system, and all non-current-carrying metal inch. Unless otherwise indicated wall outlet boxes shall be mounted as follows: parts, raceways, and enclosures shall be permanently and effectively grounded. Receptacle and communications outlets shall be installed vertical, 18" up. b. Grounding and bonding shall be provided in strict accordance with the National Electrical Code, and as specified herein and on the drawings. 2. Outlets indicated as "counter height," as well as boxes for wall switches, fire alarm manual stations, and telephones shall be installed vertical, 46" up, clear of wall cabinets, back-splashes, and wainscot interferences. c. The Contractor shall note that the required grounding conductors and connections are not all shown on the 3. Fire alarm signal devices shall be installed with the top of the device approximately 6" below the ceilin with the bottom of the device 80" above the floor, whichever is lower. 1.2 <u>SUBMITTALS:</u> 4. Switch boxes shall be installed vertical, 46" up. Switch boxes beside doors shall be on the strike side, a. Submit for approval manufacturer's data sheets for grounding and bonding materials edge approximately 2" from door jamb or trim. e. Junction and pull boxes may be used as necessary to facilitate wiring provided, they are hidden from sight accessible), or installed in locations where exposed wiring is permitted, or flush mounted at locations approved by a. Grounding conductors shall be of THWN insulated copper, unless otherwise indicated. Architect/Engineer. WIRING DEVICES b. Grounding bus bars in distribution equipment shall be bare copper. 1.1 <u>SCOPE:</u> c. Aluminum and aluminum alloys are not acceptable as grounding materials. a. The Contractor shall furnish and completely install lighting switches, convenience outlets, and special purp d. Clamps for attaching conductors to water pipes and ground rods shall be of bronze. Ground rod clamps shall be receptacles along with appropriate outlet boxes and device plates as indicated on the drawings and as herein specified. U.L. listed for direct burial. b. When connection to an item of equipment is required under this contract, and where such equipment requir e. Clamps for attaching conductors to building steel shall be of steel, bronze, or malleable iron. receptacle for connection, the Contractor shall furnish and install the appropriate device, whether the device is specific shown or specified. f. Threaded hubs for bonding metal raceways to the contained grounding electrode conductors and to the water pipe clamps shall be of bronze or malleable iron. Similar hubs shall be used to bond the same raceways to the conductors and 1.2 SUBMITTALS: a. Submit for approval catalog data sheets for all wiring devices. g. Driven grounding electrodes shall consist of copper clad steel rods. Rods shall be 10 feet long and 3/4" diameter unless otherwise indicated. 2.1 MANUFACTURERS: h. Bonding bushings shall be of steel or malleable iron with non-removable plastic throats rated 150°C. a. Wiring devices and device plates shall be manufactured by Hubbell, Bryant, Arrow Hart, Pass and Seym Leviton, or Eagle. i. Bonding locknuts and wedges for service conduits shall be of zinc coated steel. b. Catalog numbers of one or more of the manufacturers are used herein and, on the drawings, to set a standar Grounding type insulated bonding bushings and jumpers shall be provided where conduits terminate in service quality and capacity. Equivalent products of the other named manufacturers are also acceptable, provided they are submit entrance equipment, generator feeders, transfer switches, transformers, and where concentric, eccentric, or over-sized and approved in accordance with Section 16010, Electrical General Requirements. knockouts are encountered. The jumpers shall be sized per NEC Table 250-66 for services, generator feeders, and transformers, and per Table 250-122 for branch circuits. c. All wiring devices of any one general type (e.g., all duplex receptacles or all light switches) shall be of the sa manufacturer and shall match throughout. 2.2 WIRING DEVICES AND PLATES - GENERAL: a. All non-current-carrying metal parts, raceways, and enclosures of the electrical system and of equipment supplied a. Wiring devices shall be industrial specification grade unless otherwise indicated. through the electrical system shall be permanently and effectively grounded. Receptacles shall be listed to meet the requirements of Fed Spec WC596 b. Equipment grounding conductors shall be provided for each feeder and for each branch circuit and shall be contained within the same raceways as the feeder and branch circuit conductors. The equipment grounding conductor shall be Switches shall be listed to meet the requirements of Fed Spec W-5-896E. THWN insulated copper. not smaller than #12 AWG. d. Unless otherwise indicated or directed, wiring devices shall be gray in color. c. Copper bonding strips normally included in small sizes of liquid-tight flexible metal conduit and dependent upon e. Unless otherwise indicated, plates for flush outlets shall be stainless steel (type 302) and shall be standard s herein. Those for surface cast boxes shall be of steel, of shape and finish to match the box. Screws shall be steel slotted head type to match the plate. Quantity of 2% spare cover plates of each type shall be provided to the owner. Grounding terminals on wiring devices, other than isolated ground receptacles, but including switches, shall be connected to the equipment grounding conductor included in the branch circuit raceway, and to the device box with suitable Each wiring device (including each switch) shall be equipped with a Hex-Head green grounding screw jumpers and lugs bolted to the box, not the plaster ring. "G" clips are not acceptable, and "self-grounding" type device grounding the device and plate to the outlet box and to the equipment grounding conductor run with the circuit conductor mounting screws will not be accepted as the device grounding method. "Self-Grounding" type mounting screws will not be accepted as the device grounding method. e. Where metal raceways enter sheet metal enclosures through knockouts provide bonding bushings and jumpers to 2.3 <u>SWITCHES:</u> a. Switches used for lighting control shall be listed to Fed. Spec. W-S-896E and rated 20 amps, 120-277 VAC, 1. Voltage exceeds 250 volts to ground. wired. Hubbell 1221 series. 2. Branch circuit conduit exceeds 1" in size. b. Switches used for disconnecting small single-phase motors and appliances shall be listed to Fed. Spec. V 896E and rated 20 or 30 amps to match the branch circuit rating and comply with their horsepower ratings, 120-277 VAC, 3. Feeder conduit regardless of voltage and size. wired, Hubbell 1221 and 3031 series.

1.1 <u>SCOPE:</u> drawings. NEC requirements apply. 2.1 MATERIALS AND APPLICATIONS: to sheet metal equipment enclosures. 3.1 <u>ELECTRICAL EQUIPMENT GROUNDING:</u> the terminal connectors for bonding continuity will not be accepted in lieu of the equipment grounding conductors specified the enclosure under any of the following conditions:

f. Where isolated grounds are indicated, or required to serve isolated ground type receptacles, provide two c. Weatherproof switches shall be equipped with stainless steel covers UL listed for wet locations with cover close equipment grounding conductors of equal size; one to ground raceways, boxes, and other enclosures; the other to connect to Pass and Seymour WP-1. the isolated grounding terminals on the equipment or its special receptacle. Both grounding conductors shall be provided in each branch circuit and each feeder raceway back to the point where the service neutral, or the separately derived system d. Switches with collars around the operating toggle will not be accepted neutral, is connected to ground. BOXES

1.1 <u>SCOPE:</u>

complete as shown and specified.

1.2 <u>SUBMITTALS:</u>

2.1 MATERIALS AND APPLICATIONS:

a. Unless specifically noted or approved otherwise, boxes shall be of zinc coated steel or cast ferrous alloy as d. When indicated on the drawings, weather-resistant receptacles shall consist of Ground Fault Circuit Interru manufactured by Steel City, Raco, Crouse-Hinds, Appleton, or approved equal. receptacles as specified above with a weather-resistant "WR" rating. Provide with aluminum covers UL listed for wet location while-in-use, Pass and Seymour WIUCAST1.

b. For exposed work on the exterior of the building, and in damp or wet interior locations, boxes shall be of cast metal with threaded conduit hubs and gasket sealed covers; or of zinc coated sheet steel of NEC gauge and size with screw e. When indicated on the drawings provide child proof (tamper resistant "TR" rating) receptacles. A tamper resis fastened gasket sealed covers and threaded conduits hubs of zinc coated malleable iron and no knockouts or extraneous cover is not acceptable. openings. Cover screws shall be stainless steel.

f. When indicated on the drawings provide receptacles with two USB charger devices (type 2.0 ports) rated at c. For exposed work in interior dry locations less than 8 feet above a floor or platform in other than Electrical, and 5VDC, Hubbell USB15X2 and USB20X2 for 5.15R and 5-20R respectively. Mechanical or Communications Closets or Equipment Rooms, boxes shall be of cast metal with threaded conduit hubs and matching covers; or of zinc coated sheet steel of NEC gauge and size with screw fastened covers and no knockouts or g. When indicated on the drawings or required by NEC Article 517, provide hospital grade receptacles. Receptad extraneous openings. Cover screws shall be steel. shall be listed to UL498 and Fed. Spec. W-C-596G and shall meet the requirements of NEMA WD-1 and WD-6.

d. For exposed work in interior dry locations in Electrical, Mechanical, or Communications Closets or Equipment h. When indicated on the drawings provide Isolated Ground Receptacles, Hubbell IG5262 and IG5362 series for Rooms; or, in other dry areas, 8 feet or more above a floor or platform, boxes 5" square and larger shall be NEC gauge and 15R and 5-20R respectively. size of zinc coated sheet steel. 4" octagonal, 4" square and 4-11/16" square "knockout" boxes shall be of zinc coated steel, NEC gauge and size. Box extensions are not permitted on exposed "knockout" boxes and covers shall be of the raised surface 3.1 INSTALLATION:

a. Furnish and install outlet boxes, switch boxes, pull boxes, terminal boxes, junction boxes and floor boxes

a. Submit for approval manufacturer's data sheets for all box types.

2.4 <u>RECEPTACLES:</u>

a. Receptacles shall be listed to UL498 and Fed Spec W-C-596. Unless otherwise indicated or required, recepta shall be the duplex type, side and back wired, with nylon face. On circuits supplying two or more such receptacles, they s be rated 15 amps, 125 volts, NEMA 5-15R. Duplex receptacles on individual circuits shall be rated 20 amps, 125 volts, NE 5-20R. Receptacles shall conform to NEMA WD-1. WD-6 and UL498.

b. When no other features are indicated on the drawings provide Hubbell 5262 and 5362 series for 5-15R and 5respectively.

c. When indicated on the drawings provide Ground Fault Circuit Interrupter receptacles, Hubbell GF5262 GF5362 series for 5-15R and 5-20R respectively. GFCI receptacles shall be Class A, listed to UL standard 943.

a. De its associated Caddy RLC de	evices shall be mounted tightly to boxes and be adjusted plumb and level. Devices shall be mounted flush with coverplate. Ears on flush devices shall be in uniform contact with wall surfaces, or the devices shall be fitted with evice levelers. Device plates shall not be used for support of flush devices.	N. N.	SWG neers	271 F-0595 MSWG Project 23-085
b. W c. Gi conductors.	hen two or more devices are indicated for gang installation, they shall be trimmed with gang type plates. rounding type receptacles shall be grounded with insulated copper grounding conductors routed with the circuit	ALL DIMENSIO	engi	tte, NC 28. 327–2112 com
d. Th and correctly v range of 4 thro <u>LIGHTING FIX</u>	ne Contractor shall provide suitable testers, and demonstrate, when directed, that receptacles are operational vired; and that ground fault circuit interrupter type receptacles will trip when current to ground has a value in the ugh 6 milliamperes. (TURES AND ACCESSORIES)	TOR TO VERIFY		704–5 704–5 73
1.1 <u>SCOP</u>	<u>'E:</u>	ONTRAC.		S/20
a. drawings and a	The Contractor shall furnish and completely install Lighting Fixtures and Accessories as indicated on the as herein specified.	S	CARO	CINER CINER
b. be brought to Architect/Engir	A lighting fixture shall be provided for each lighting outlet indicated. Outlets lacking fixture designations shall the attention of the Architect/Engineer before submitting proposal; otherwise, units selected by the neer shall be furnished and installed at no additional charge.		HL & O	MALIN
1.2 <u>SUBN</u>	IITTALS:			1111.
a. characteristics	Submit for approval complete manufacturer's data sheets for all fixtures. Indicate all components, , and options.		ШZ	202 29403 - 5374
b. equipped with	Submit for approval Lighting Fixture samples as requested by the Architect/Engineer. Samples shall be lamps, cords, plugs, and ballasts for 120-volt operation.		I O R	LINA 3) 872
2.1 <u>LIGHT</u>	TING FIXTURES:			X: (84
a. b	All fixtures shall be labeled by Underwriters' Laboratories, Inc.		C I C	UTH 45 FA
identified in the and hardware locations. It is hardware requ	E Lighting Fixture Schedule or Symbol Schedule; however, the Schedule does not necessarily list all accessories necessary for the complete installation, nor does it detail the construction to be encountered at the fixture s the Contractor's responsibility to properly determine and provide correct components, accessories, and ired for the installation.		S O O C	ESTON, SC 43) 872-53
c. continuous rov one per row.	Pendant Fixtures shall be equipped with swivel hangers; twin stems for individual fixtures and single stem for v fixtures, spaced according to the manufacturer's recommendations but not less than one per fixture unit plus		C H S S C H	CHARL CHARL PH: (8
d. ceilings they s removal of fixtu	Recessed tixtures in plaster and gypsum board ceilings shall be equipped with plaster frames. In other shall be equipped with plaster frames and/or other devices as approved by the Architect/Engineer, to facilitate ure and access to the concealed junction box from below.		AF AL	
e. Haas, Dupont,	Plastic materials indicated to be "acrylic" shall be of 100% virgin methyl methacrylate produced by Rohm and or Cyanamid.			, INA , INA , 4) 847
f. and schedules	Recessed Fixtures (Troffers) shall conform to the following minimum requirements unless modified by notes on the Drawings:		C L S I C	CAROL XX: (704
ribs for rigidity,	1. Housings shall be 5" maximum depth and of 22-gauge minimum steel, with deeply formed transverse primed, and finished in baked white enamel. The use of pre-painted steel is acceptable.		TES	NORTH -9851F
hinged steel or or rotary cam the door frame	2. Lenses shall be of flat clear K-12 type acrylic of .125" nominal (.115" minimum) thickness in rigid r extruded aluminum door frames finished in baked white enamel and secured with inconspicuous spring-loaded type steel latches. Lenses shall be maintained in a flat position with invisible clips and shall be removable from as using a screwdriver without damaging the lens or the frame.		R O F BOX 187.6	TTHEWS, (704) 847
invisible and in will not be acco	3. Joints between housings and door frames shall be totally free of light leaks. Gaskets, if used, shall be a compression when the door is closed. Gasket material subjected to rubbing when the door is opened or closed epted. Flexible and/or removable black baffles will not be accepted.			MA7 PH:
connected to a	4. Top access plates to facilitate wiring are optional with the Contractor. Each fixture shall be individually a concealed junction box with #16 TFN conductors in 6 feet of 3/8" flexible metal conduit.	ц.		
opening and s 12 AWG and s using sheet me	5. Troffers for inverted tee exposed grid ceilings shall be designed to be raised through the ceiling hall be supported independently of the grid system with two hangers on diagonal corners. Hangers shall be No. shall be attached to the building structural system. They shall be secured to the ceiling grid at all four corners etal screws.	FHE ARCHITEC		
	<ol> <li>Troffers for plaster and gypsum board ceilings shall be furnished with plaster frames.</li> <li>Troffers for ceilings with concealed suspension systems including plaster, gypsum board, and</li> </ol>	SENT OF -	M	
acoustical tile channels, prev	shall be equipped with suitable adjustable yokes or brackets designed to hook onto the plaster frame or ceiling rent the channels from spreading, and support the fixture.	TEN CONS	12.15.2 CAH MDK	) ) 
recognized ligh tests conducte IES standards.	8. Fixtures shall be a regularly cataloged and commonly manufactured product of an established, nting fixture manufacturer, with published photometric data and Zonal Cavity Coefficients of Utilization based on ed by an independent photometric testing laboratory. Tests and calculations shall be in accordance with current	THOUT WRIT	SUE DATE: RAWN BY: HECKED BY:	
2.2 <u>LED D</u>	DRIVERS:	JCED WI	מ מ ט מ	
a.	General 1. Provide with ten-year operational life while operating at maximum case temperature and 90 percent agreelative humidity	EPRODL	ÜS	
impairment pe	2. Drivers shall be designed and tested to withstand electrostatic discharges up to 15,000 V without or IEC801-2.	ES OR R		
temperature ra	<ol> <li>Electrolytic capacitors shall operate at least 20 degrees C below the capacitor's maximum ating when the driver is under fully loaded conditions and under maximum case temperature.</li> <li>Provide a maximum inrush current of 2 amperes for 120V and 277V drivers.</li> <li>Drivers shall withstand up to a 4 000-volt surge without impairment of performance as defined by</li> </ol>	I PURPOSE	n A A A A A A A A A A A A A A A A A A A	លិ
ANSI C62.41	Category A. 6. Drivers shall be manufactured in a facility that employ ESD reduction practices in compliance with	RUCTION	d X	Ò
ANSI/ESD S2	<ul> <li>0.20.</li> <li>7. Drivers shall have a Class A Sound Rating – Inaudible in a 27-dBA ambient.</li> <li>8. Drivers shall have no visible change in light output with a variation of plus/minus 10 percent line</li> </ul>	CONSTF		C.A.T
voltage input.	9. Drivers shall have Total Harmonic Distortion less than 20 percent and meet ANSI C82.11 maximum	ED FOR (	ບ	1 FIC
allowable THD	a. Multiple fixtures.	)T BE USE	Σ Σ Σ	С Ш С
	<ul> <li>11. Constant current drivers shall:</li> <li>a. Support from 200mA to 2.1 Amps (in 10mA steps) to ensure a compatible driver exists.</li> <li>b. Support LED arrays up to 40W or 50W (710mA to 1.05A in 10mA steps).</li> </ul>	ID CAN NC		ר ר
	<ul> <li>12. Constant voltage drivers shall:</li> <li>a. Support from 10V to 40V (in 0.5V steps) to ensure a compatible driver exists.</li> </ul>	ECTS AN	⊷∪. ∢₊∢	<b>C</b> ►
	<ul> <li>D. Support LED arrays up to 4000.</li> <li>13. Configuration tool shall be available to optimize the following for LED fixtures:</li> <li>a. Light level.</li> </ul>	ARCHITE		Ŕ
	<ul> <li>b. Efficacy.</li> <li>c. Thermal performance.</li> <li>14. Drivers shall operate properly from a supply voltage of 120 through 277\/AC at 60Hz</li> </ul>	JF THE A		С Щ
b.	LED 0-10V Dimming Drivers	PERTY (	ิต ซิ เจิ	Щ
	<ol> <li>LED Driver shall be installed inside an electrical enclosure.</li> <li>Wiring inside electrical enclosure shall comply with 600V/105°C rating or higher.</li> <li>LED Driver shall be certified by LL Class 2 for use in a dry or down location.</li> </ol>	HE PROF		
	<ol> <li>Led Driver shall have a Class A sound rating.</li> <li>LED Driver shall have a minimum operating ambient temperature of -40°C.</li> <li>LED Driver shall have a life expectancy of 50,000 hours at case temp of ≤70°C.</li> </ol>	AWING IS TI		
	<ol> <li>LED Driver shall have a life expectancy of 100,000 hours at case temp of ≤62°C.</li> </ol>	THIS DRA		
		F	<b>E</b> 4	1

<ul> <li>8. LED Driver shall have a maximum self-rise temperature of 25°C in open air without heat sink.</li> <li>9. LED Driver shall have a maximum allowable case temperature rating of 75°C.</li> <li>10. LED Driver shall reduce output power to LEDs if maximum allowable case temperature is</li> </ul>	1.3 <u>SUBMITTALS:</u> a. Shop drawings shall be submitted for each item of
exceeded. 11. LED Driver shall have a failure rat ≤ 0.01% per 1,000 hours at case temp ≤70°C. 12. LED Driver has a failure rate of 0.01% - 0.02% per 1,000 hours at case temp of 70°C - 80°C. 13. LED Driver shall tolerate sustained open circuit and short circuit output conditions without damage. 14. LED Driver shall comply with FCC rules and regulations, as per Title 47 CFR Part 15 Non-	<ul> <li>b. Submittal shall include a complete wiring and co calculations and notification circuits voltage drop calculation manufacturer. Diagram shall indicate conductor sizes, quanti conduit sizes.</li> </ul>
Consumer (Class A). 15. The maximum available output parameters of the driver shall meet the Class 2 inherently limited	1.4 <u>CLOSEOUT DOCUMENTS:</u>
parameters. 16. When the driver is installed in the end-use application, the measured case temperature at the (Tc) location specified on the marking label shall not exceed 77.6°C.	a. Complete set of record wiring schematics, dra connections, etc. shall be provided prior to final inspection.
<ul> <li>The driver shall be installed in compliance with the requirements of the end-product standard.</li> <li>The case of the driver must be connected to Earth ground when installed in the end-use application.</li> </ul>	b. Warranty Statement from the manufacturer: War products proposed for the project, and shall include the name honor any and all warranty claims
2.3 <u>EMERGENCY EXIT LUMINARE:</u>	c. A scaled plan of the building showing the placen
a. It shall be completely self-contained, provided with maintenance-free battery, automatic charger, and other features. Luminaire must be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, N.C. Building Code, Volume X Energy Code, NFPA-101, and NEMA Standards.	raceway size and routing, junction boxes, and conductor size, on 1.5 SYSTEM FUNCTION:
b. Battery shall be sealed, maintenance-free type, with minimum of 90 minutes operating endurance. Battery shall have a normal life expectancy of 10 years. Batteries shall be high temperature type with an operating range of 0-degree C to 60 degrees C and contain a resealable pressure vent, a sintered + positive terminal and – negative terminal.	<ul> <li>a. In general, system function shall be as evidently in</li> <li>b. Activation of any manual station, smoke detector</li> <li>shall cause:</li> </ul>
c. Charger shall be fully automatic solid-state type, full wave rectifying, with current limiting. The charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated with the voltage drops below 80 percent. A low voltage disconnect switch shall be included if a lead battery is used, to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.	<ol> <li>The sounding of audible signals throughout t</li> <li>The flashing of alarm indicating signal lights.</li> <li>Indication of the alarm condition at the cont smoke detector, etc.) as well as location of init</li> </ol>
d. Pilot light shall indicate the unit is connected to AC power. The battery shall have high-rate charge pilot light unless self-diagnostic type. Tests switch shall simulate the operation of the unit upon loss of A.C. power by energizing the lamps from the battery. This simulation must also exercise the transfer relay.	<ol> <li>Release of magnetic door holders, shut-dow control functions as indicated or required.</li> <li>A local sounding device in the panel shall be Activation (Alarm Trouble, Supervisory) of the function of the panel shall be activation (Alarm Trouble, Supervisory) of the function of the panel shall be activation (Alarm Trouble, Supervisory) of the function of the panel shall be activation (Alarm Trouble, Supervisory) of the panel shall be activation (Alarm Trouble, Supervisory) of the panel shall be activation (Alarm Trouble, Supervisory) of the panel shall be activated or the panel shal</li></ol>
e. The entire unit shall be warranted for three years. The battery must have an additional two more years' pro- rated warranty. The warranty shall start from the date of project final acceptance. The warranty shall be included in the contract document.	7. All automatic programs assigned to the a appliance circuits and control relays addressed and activated. 8. Other functions as noted on the drawings or
f. The use of LED is required due to their reliable performance, low power consumption, and limited maintenance requirements. Maximum LED failure rate shall be 25% within a seven (7) year period; otherwise, if exceeded, manufacturer shall replace the complete unit at no charge to the owner.	<ul><li>c. All strobes shall be synchronized in common space</li><li>d. Provide a horn silence function with an adjustable</li></ul>
g. The Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes. The battery test shall be done 10 days prior to final inspection. Any unit which fails the test must be repaired or replaced and tested again. The test shall demonstrate that the batteries conform to the requirements of NEC 700.12 (E).	<ul> <li>a. Wiring shall be in accordance with manufacturer's</li> </ul>
2.4 <u>EMERGENCY EGRESS LUMINARE:</u>	b. Cable for monitoring and control of addressable d
a. Shall be completely self-contained, provided with maintenance-free 12-volt battery, automatic charger, two lamps, and other features. Luminaire shall be third-party listed as emergency lighting equipment, and meet or exceed the following standards: NEC, N.C. Building Code, Volume X Energy Code, NFPA-101, and NEMA Standards.	c. All wiring shall be in metal raceway, unless speci
b. Pilot light shall indicate the unit is connected to A.C. power. The battery shall have high-rate charge pilot light, unless self-diagnostic type. A test switch shall simulate the operation of the unit upon loss of A.C. power by energizing the lamps from the battery. This simulation must also exercise the transfer relay. An LED charging indicator light must be easily	d. Wall-mounted system devices shall be flush r approved by the Architect/Engineer, surface mounting enclosu
<ul> <li>visible after installation and a remote test switch shall be installed adjacent to the fixture.</li> <li>c. Battery shall be sealed, maintenance free type, with minimum of 90 minutes operating endurance. Battery shall have a normal life expectancy of 10 years. Batteries shall be a high temperature type with an operating range of 0-degree</li> </ul>	<ul><li>e. Automatic detectors shall be located at least three</li><li>f. All junction and connection boxes shall be painted</li></ul>
C to 60 degrees C and contain a resealable pressure vent, a sintered + positive terminal and – negative terminal.	g. Field connected devices must be installed and wire
d. Charger shall be fully automatic solid-state type, full wave rectifying, with current limiting. The charger shall restore the battery to its full charge within 24 hours after a discharge of 90 minutes under full rated load. The unit shall be activated when the voltage drops below 80%. A low voltage disconnect switch shall be included if LEAD battery is used, to disconnect the battery from the load and prevent damage from a deep discharge during extended power outage.	h. All auxiliary Power Supplies or other Fire Panels s
e. The entire unit shall be warranted for three years. The battery must have an additional two more years' pro- rated warranty. The warranty shall start from the date of project final acceptance. The warranty shall be included in the contract document.	i. All communications with remote fire alarm system
f. The Contractor shall perform a test on each unit after it is permanently installed and charged for a minimum of 24 hours. Battery shall be tested for 90 minutes. The battery test shall be done 10 days prior to final inspection. Any unit which fails the test must be repaired or replaced and tested again. The test shall demonstrate that the batteries conform to the	addition, the existing fire alarm system shall notify the new fire a
requirements of NEC 700.12 (F). 3.1 <u>COORDINATION:</u>	a. Final system connections shall be made by or une manufacturer, who shall verify to the Architect/Engineer that the
a. Contractor shall verify ceiling or wall type in or on which each fixture is to be mounted, and shall furnish unit with appropriate trim type, mounting hardware, and accessories to fit the construction; and feed through junction boxes as required to maintain proper access to system wiring.	b. Manufacturer shall supply a 2 year warranty from appliances.
3.2 INSTALLATION:	3.3 <u>SURGE PROTECTION AND GROUNDING:</u> a. All equipment shall be properly grounded. Mai
a. Lighting fixtures shall be installed in accordance with the manufacturer's instructions.	protection and lightning arrestors shall be installed on the AC surge protection shall be Ditek or equivalent.
b. Lighting fixtures shall be supported from the building structure using corrosion resistant steel hardware in compliance with Section 16100, <u>Basic Materials and Methods</u> .	<ol> <li>Ditek DTK-LVLP Series for low voltage data</li> <li>Ditek DTK-HW Series for hard wire AC prote</li> </ol>
c. A minimum of two No. 12 gauge wire supports attached to the structure shall be provided for each lighting fixture unless otherwise indicated or approved by the Architect/Engineer. The supports shall be located at diagonal corners of	3.4 SYSTEM TEST AND CERTIFICATION/DEMONSTRAT
<ul> <li>In addition to the supports from the structure, fixtures shall also be secured to suspended ceilings on which they are mounted, or in which they are recessed. Where fixtures are secured to suspended ceilings, the primary supports from the structure fixtures are secured to suspended ceilings.</li> </ul>	<ul> <li>a. The fire alarm system shall be fully tested in com</li> <li>72) under the supervision of a trained manufacturer's representations as specified.</li> </ul>
the building structure shall be slack. e. Where installed recessed grid type ceilings are installed, the fixtures shall be attached to the main runners of	b. The Fire Alarm System Sub-Contractor shall test:
<ul> <li>the suspended ceiling at all four corners using sheet metal screws.</li> <li>f. Conductors in fixture taps shall be #16 AWG minimum, type TFN, in 3/8" flexible metal conduit of 72" maximum length. A green insulated equipment grounding conductor shall be included.</li> </ul>	<ol> <li>Every alarm initiating device for proper response</li> <li>Every notification appliance for proper operation</li> <li>All auxiliary control functions such as elevation</li> <li>override of HVAC, ventilation, and pressurization</li> </ol>
g. Mount fixtures plumb and square. Keep rows in perfect line.	TELECOMMUNICATIONS CABLING SYSTEM
h. At the time of project completion, fixtures shall be clean and fully operational.	1.1 <u>SCOPE:</u>
EXTENSION OF EXISTING FIRE ALARM SYSTEM, ADDRESSABLE 1.1 SCOPE:	a. Provide communications wiring systems to provide voice an within conduit, wire-way, box, cable tray, cabinet or rack un placed, terminated and tested as noted on the drawings and a lubricants, tools, fittings, plywood backboard and labor require system are to be included within this work.
a. Contractor shall extend the building's existing Fire Detection and Alarm System as Indicated on the drawings and as specified herein.	1.2 WORK NOT INCLUDED AS PART OF THIS SECTION:
b. Extension shall include all devices, wiring, equipment, raceways, and connections required for a complete and satisfactorily operating system, whether or not every such item is specifically shown or mentioned.	a. <u>Voice Related</u> :
c. All initiation devices shall be analog addressable devices. The notification devices shall be installed where required to meet ADA, NFPA 72 and the North Carolina State Building Code.	<ol> <li>Incoming voice service cables.</li> <li>Cross connect cables between MDE and blocks of</li> </ol>
d. All devices and installation methods used shall match that of the existing system.	<ol> <li>Service entrance blocks.</li> </ol>
1.2 <u>CONTRACTOR QUALIFICATIONS:</u>	4. Cables and connecting hardware between entranc
a. Equipment and materials shall be provided by a factory-authorized distributor to ensure proper specification adherence, final connection, test, turnover, warranty compliance, and service. The factory-authorized distributor is required to have been in the fire alarm industry (service and installation) for a minimum of 5 years.	<ul> <li>5. Cross connect cables between Utility blocks and M</li> <li>b. <u>Data Related</u>:</li> </ul>
	5

#### or each item of equipment to be furnished.

wiring and conduit diagram overlaid on a building floor plan system battery rop calculations, prepared by an authorized representative of the system r sizes, quantities, and color coding for each conduit run, as well as required

hematics, drawn to scale; showing all device locations, wire routing and nspection.

ufacturer: Warranty statement will state the period of warranty for all of the lude the name and address of the authorized manufacturers' agent who will

ing the placement of each individual item of fire alarm equipment as well as nductor size, quantity, and color in each raceway.

as evidently intended by selection of equipment indicated herein.

moke detector, sprinkler system flow switch, or other alarm initiating device

#### s throughout the facility.

on at the control panel indicating type of alarm (e.g. whether manual station, location of initiating device. ders, shut-down of air handling systems, closing of smoke dampers and other

#### panel shall be activated.

pervisory) of the existing Fire Alarm System remaining for the existing building. ned to the alarm point shall be executed and the associated notification and activated. e drawings or as evidently intended or required.

#### common spaces.

an adjustable delay of 2 minutes to 15 minutes. Delay shall prevent silence manually activated only and shall not prevent visual alarm from flushing.

nanufacturer's recommendations for proper system operation.

addressable devices shall be not less than a #18 AWG twisted shielded pair. other conductors shall be of stranded copper not smaller than #14 AWG, with

, unless specifically shown otherwise. Raceways shall be sized for the wiring num conduit fill of 40%.

all be flush mounted where construction permits. Where necessary and Inting enclosures may be utilized. Contractor shall coordinate trim types.

l at least three feet from any HVAC diffuser

nall be painted red for easy identification.

alled and wired by a factory- trained and authorized fire alarm system Subnder direct supervision of a factory-trained and authorized fire alarm system

r Fire Panels shall be located in electrical or mechanical rooms. They shall be rom floor level. All such panels shall be "supervised" by the main Fire Alarm

e alarm system monitoring shall continue to be performed by the existing fire notify the existing system with all alarm, trouble and supervisory signals. In y the new fire alarm system with all alarm trouble and supervisory signals.

nade by or under the direct supervision of an authorized representative of the ngineer that the system has been left in full and proper operating condition.

warranty from date of manufactured Control System and Field Devices and

#### **IG**:

rounded. Main panel shall be grounded directly to 'earth ground'. Surge led on the AC supply and all initiating, notification and monitoring circuits. All

voltage data and signal line protection. wire AC protection for 120 VAC.

EMONSTRATION:

tested in compliance with Testing Procedures for Signaling Systems (NFPA cturer's representative. The system shall be demonstrated to perform all the

r proper response and program execution.

proper operation and audible/visual output. such as elevator capture, smoke door and damper release, and functional and pressurization controls.

ovide voice and data communications for the building. Cable will be installed et or rack unless otherwise indicated. All required cables will be provided, rawings and as specified herein. All termination equipment, support hardware, d labor required to install a complete and working telecommunications cabling

end blocks of voice riser and horizontal voice connection blocks.

tween entrance protection blocks and MDF connecting blocks.

y blocks and MDF blocks.

1. Hub Electronics.

- 2. Patch cables.
- 1.3 CONTRACTOR QUALIFICATIONS:

a. For the purposes of this specification section, the term "Communications Wiring Contractor" shall be interpreted any prime contractor or subcontractor that is responsible for the products and services described within this sect illustrated on the drawings associated with this section.

b. An acceptable contractor for the work within this specification section must have personnel with experience, tr and skill to install a complete and working system. The contractor will be required to furnish acceptable evidence of installed not less than three cable systems of similar size, type and complexity of this project. The systems referenced currently be in service. The proposed field superintendent must have had experience in at least three such systems.

The project references shall include a written summary of the nature and extent of the projects, the name, addres telephone number of a contact person at each project and the name of the field superintendent. The field superinten qualifications shall include a resume of the training and experience possessed by the proposed superintendent and a two of the proposed foremen. Qualifications shall be submitted with the Contractors proposal.

1.4 <u>SUBMITTALS:</u>

a. Submit the following for review prior to placing equipment or materials on order:

1. Brochures: Provide complete brochure information on all products purchased for installation on this Brochures shall be highlighted to reflect the particular part number or product used if more than one part number or product displayed on the cut sheet.

2. Shop drawings shall be submitted showing riser diagrams, panels, plates, labeling strips detailing nomenclature, engraving, finish and color.

3. Submit test procedures and list of Test Equipment to be used for cable testing within 30 days after start of co work. Test procedures shall include a description of the method used for testing and a sample of all forms used to reco test results.

#### 1.5 SYSTEM DESCRIPTION:

a. Voice service will enter building at MDF through utility provided cables. The utility will terminate a multi-pair ca telephone entrance protectors provided by the utility on contractor furnished board. From the protectors, Owner furn cables will run to MDF entrance backboard and terminate on Owner furnished cable entrance disconnect blocks. Fro MDF, voice service will be distributed to station locations as part of this contract.

Backbone data fiber optics cable will be brought into the building at MDF by Owner. Contractor shall provi required conduit from the building de-marc to the MDF.

- c. Typical telecom station bundle shall include the following cables:
- Two 4-pair, UTP, #23 AWG, Category 6 cables (one per jack).
- Typical telecom station communications faceplate will include the following jacks

Two RJ45 type, 8-position, 8-conductor, RJ45, EIA T568B.

1.6 <u>CONTRACT DRAWINGS:</u>

The intent of the drawings is to establish the type of system and functions, but not to set forth each item essential а. functioning of the system. The drawings are generally diagrammatic and show approximate location and extent of the wo case of doubt of work intended, it is the responsibility of the Communications Wiring Contractor to request instructions f A/E. The Communications Wiring Contractor shall be responsible for installing a complete functioning system, inc furnishing and installing all required brackets, supports, frames, bonding, grounding frames, and hardware required accomplish an operational system, except as otherwise noted on drawings.

- 2.1 PRODUCT REQUIREMENTS:
- a. Conditions:

Materials and equipment provided must be new products of manufacturers regularly engaged in the product such products.

- UL Listing:
- 1. Products must be UL listed where a UL test procedure is applicable.
- c. Telephone system materials and equipment shall be FCC type-accepted and certified as such by supplier.
- 2.2 <u>CONDUIT SYSTEM FOR OUTLETS:</u>
- a. Conduit shall be used to route cables from the individual communication outlets to above a nearby accessible ceili
- Provide minimum 1" conduit from outlet box to the accessible ceiling space. b.
- 2.3 EQUIPMENT BACKBOARDS:

a. Equipment boards shall be of size noted or shown on the drawings, and shall be constructed of 3/4" plywood, with grade on front. Paint board with gray fire-retardant paint.

2.4 OUTLET BOXES:

a. Outlet Boxes. Provide 4"x4"x2-1/2" steel, square cornered, in dry wall. Provide 2-gang, 2-1/2" deep box in mason Surface boxes shall be 4"x4"x3" deep cast metal type.

- b. Masonry Ring
  - 1. Surface Mount Boxes: Provide single device masonry ring with no raise.
- Boxes Mounted in Dry Construction Walls: Provide single device masonry ring with raise appropriate for finis 2. thickness.
- 2.5 VOICE AND DATA STATION CABLES:

a. Provide for each voice and data jack a 4-pair, UTP, 23-gauge (AWG), Category 6, UL listed cable meeting the foll specifications:

1. Construction. Eight 23-gauge (AWG) thermoplastic insulated solid copper conductors formed into four indivi twisted pairs and enclosed by an overall jacket (unshielded). Cable must comply with all relevant applicable local standar building and electrical materials and construction.

2. Twisted Pairs. Individual pairs to be variable twisted relative to one another within four-pair cable, with a mir of two twists per foot per each cable.

2.6 COMMUNICATIONS CABLE TERMINATION HARDWARE AT MDF:

a. Data UTP Station:

1. All data cables shall be terminated in Category 6 patch panels mounted on a free standing rack at the MDF. b. Voice UTP Station:

1. Connecting hardware used for voice-related UTP station field shall be 110 style and of the insulation displace contact (IDC) type. The construction and make-up of these devices will include an internally hard-wired connection from IDC connector used for horizontal wiring to a second, corresponding connector to be used for cross-connection purposes

2. All voice-related UTP station cables shall be terminated sequentially in four pair positions within separate related station fields on IDC-type connecting hardware mounted on backboard.

3. Voice-related Performance. Connecting hardware shall be UL listed verified/certified based on the EIA/TIA Standard for "Category 5".

4. Mounting. Mount on brackets fastened to the wall-mounted frames.

		in se ject 085
	5. Quantity. Sufficient to terminate all voice UTP wiring at MDF plus 20% spare for future additions.	C Lice F-0 G Pro 23-
	2.7 UTP COMMUNICATION STATION OUTLET ASSEMBLIES:	MSW 2271
d to be	a. The following physical specifications for UTP communications station outlets shall be met:	592 112 28
tion or	b. Voice and Data Jacks:	x 786 vx 786 527–25 com
raining, having d must	1. RJ-45 Construction: All RJ-45 type jacks contained within module jack panels will consist of WECO-style eight wire connectors with a minimum of 50 uin of hard gold on each contact surface, a minimum contact force of 100 g and with all conductors separated and aligned internally by a jack comb.	PO BC Charlo 704-f
ess and	2. RJ-45 Polarization: Each RJ-45 jack contained with modular jack panels shall be wired in accordance with the EIA/TIA T568B four-pair polarization sequence.	
ndent's at least	3. The UTP outlet requirements contained in this section are based on the EIA/TIA standard for "Category 6" O communication outlets and connection hardware.	B875 VD. KNO
	3.1 INSTALLATION REQUIREMENTS:	HIT CONTRACTOR
	a. Communications wiring contractor shall provide and pay for all labor, materials, equipment, tools, utilities and services necessary for the proper execution and completion of the communications wiring system.	Manual
oroject. oduct is	b. Install communication system as detailed by the contract drawings, details and specification. Where specific cable layout and location are detailed, it is the communications wiring contractor's responsibility to install as specified or provide complete information justifying alternatives before installation.	302 314 5374
ontract	c. Use the maximum bending radius on all cables during installation. The minimum bending radius of the cable as specified shall always be maintained. If no minimum radius is specified, the minimum bending radius shall be per manufacturer's specification	UR LIN SUITE DLINA 2 21.1NA 2 43) 872-
ord the	d. All cables routed through conduits shall be continuously lubricated during the pulling process. The maximum pulling tensions specified by the cable manufacturers shall not be exceeded. Monitor cable pulling tensions with a mechanical tension mater. Maximum public tension material tension applies to apply the tension material tension applies to apply the tension material tension.	CTJ IAJ REET, TH CAR( FAX: (8
able in	e. Cables shall be installed and connected to jacks and connectors in strict accordance with manufacturer's instructions.	E C C S345
nished om the	f. Wire twist for data and telephone shall be maintained to the termination point.	T T BA T BA T BA T BA TON,
	g. Cables shall be checked prior to and after installation for damage to insulation of shielding and conductor shorts.	HI SSS EAS" RLES (843
ide the	h. Where possible all cables shall be pulled at the same time. No splices are permitted between accepted connection	C H 701 ] CHAI
	i. Cable run exposed above accessible ceiling shall be supported (minimum of 3") above ceiling by the use of hangers at five foot intervals on horizontal spacing. These hangers shall be of an EIT/TIA 568 B approved type such as Erico CAT5 caddy fasteners attached to dedicated grid support wire. Data, telephone, and television cabling bundles would be supported separately (one bundle per outlet) with a minimum of 3" spacing between cable bundles.	AR NAL 1TE 200 28106 47-9853
	j. Cables shall be protected from construction related physical damage.	D, SUI D, SUI LINA LINA 14) 84
	k. All cable must be located at least two feet from any low level sources of EMI, and at least 40 inches from any motors of high level EMI sources. Contractor must install external shielding in areas where this is violated.	ROAI SI SARO X: (70
l to the vork. In	3.2 STATION WIRING INSTALLATION:	A C EAM RTH C 51 F A
for the cluding ired to	a. Continuous Cable Runs. No cable shall be spliced at any point along its length. Only continuous, unspliced cables may be used in the distribution system	БЕ 6307 NOF 17-98:
	b. Cable Identification. Cables shall be identified at each termination point, when the cable enters or leaves the cable tray, by its function (i.e. telephone, data) and room numbers. When there is more than one station in a room, add a numeral suffix to the room number. Use T&B E-Z coder, or equivalent, wire making system. Place markings on the cable in a permanent	<b>I N J</b> <b>R O J</b> B0X 187, TTHEWS, (704) 84
	location where they will not be removed or made unusable. Reference EIA/TIA Standard 606.	<b>Р</b> .0. МА. РН:
ction of	3.3 <u>LABELING:</u>	
	telephone, data) and room numbers. When there is more than one station in a room add a numeral suffix to the room number. Use T&B E-Z Coder, or equivalent, wire making system. Place markings on the cable in a permanent location where they will in not be removed or made unusable. Reference EIA/TIA Standard 606.	
	b. Each outlet shall also be identified as required for cables.	
ling	c. Room numbers shall be as directed by the Owner, not necessarily as shown on A/E drawings. Verify with Owner prior to ⊢ marking cables. ⊑	
ing.	3.4 <u>COMMUNICATIONS SYSTEM TESTING:</u>	5.23
h finish	a. The communications system shall be tested by contractor. Contractor shall demonstrate accuracy of test equipment to be used as well as knowledge of use of equipment prior to testing the cabling system. A communications outlet shall be considered functional if the criteria listed below are met.	ите: 12.1 3Y: САН 3BY: МDК 2335 : 2335
	1. UTP Cables: (a) Polarity	SUE DA RAWN E HECKEI ROJECT
ry wall	(b) Reversal of pairs (c) Wire transpositions	8 G D E
ry wan.	(e) Opens (f) Shorts	DΣ
	(g) AC & DC foreign voltages (h)Level 5 NEXT End-to-End from Faceplate Through 110 connecting block and/or patch panel and jumper (i) TIA/EIA-568-B wiring discrepancies	A C L C L C
sh wall	3.5 <u>COMMUNICATIONS SYSTEM REPAIRS:</u>	m ž l
llowing	a. Those cables which do not pass the required tests shall be replaced by the contractor; no cable may be spliced. Those of terminations or connectors found to be faulty shall be repaired by the contractor.	
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