

TEE-ON-TAPER (DUST COLLECTION ONLY)

DUCT ELBOW UP

DUCT ELBOW DN

MECHANICAL NOTES

INCH OR INCHES

LINEAR DIFFUSER

LINEAR FEET

MINIMUM

NEW

MER

MOD

PSIA

PSIG

TDH

TEMP

TRANS

T-STAT

LEAVING AIR TEMPERATURE

LEAVING WET BULB TEMPERATURE

LEAVING WATER TEMPERATURE

MECHANICAL EQUIPMENT ROOM

THOUSAND BTU PER HOUR

MOTOR OPERATED DAMPER

NORMALLY CLOSED

NOT IN CONTRACT

NORMALLY OPEN

NOT TO SCALE

OUTSIDE AIR

OUTSIDE AIR INTAKE

POUNDS PER SQUARE INCH

OPEN END DUCT

PSI ABSOLUTE

PSI GAUGE

RETURN AIR

REFRIGERANT

RETURN FAN

RETURN GRILLE

REHEAT COIL

RELATIVE HUMIDITY

RUNNING LOAD AMPS

RETURN REGISTER

SUPPLY AIR

SMOKE DAMPER

STATIC PRESSURE

SUPPLY FAN

SQUARE FEET

SPECIFICATION

TEMPERATURE

TOP REGISTER

TRANSITION

THERMOSTAT

UNIT HEATER

WET BULB

WATER COLUMN

WATER GAUGE

WATER HEATER

WIRE MESH SCREEN

VOLUME DAMPER

VARIABLE FREQUENCY DRIVE

VARIABLE AIR VOLUME

VARIABLE INLET VANES

TYPICAL

TRANSFER GRILLE

TOTAL DYNAMIC HEAD

REVOLUTIONS PER MINUTE

EXISTING TO BE REMOVED

ROOFTOP AIR HANDLING UNIT

AND RETURN TO OWNER

RELOCATED EXISTING

NUMBER

- 1. PRIOR TO SUBMITTING A BID THE CONTRACTOR SHALL EXAMINE BECOME ACQUAINTED WITH THE CONSTRUCTION AND THE MEASUREMENTS, CLEARANCES, POTENTIAL CONFLICTS WITH EXISTING CONDITIONS OR THAT OF OTHER TRADES ON THE JOB.
- DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE, WHETHER SPECIFIED OR IMPLIED.
- 4. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE
- 6. DO NOT SCALE THE DRAWINGS FOR EXACT DIMENSIONS. THE DESIGN DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LAYOUT AND CONNECTIONS. CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS, ETC. AT THE JOB SITE.
- 7. CONTRACTOR SHALL REVIEW THE WORK OF OTHER TRADES TO PREVENT INTERFERENCE BETWEEN BEAMS, STRUCTURES, PIPING,
- 8. CONTRACTOR SHALL GUARANTEE THE ENTIRE JOB AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE. THIS GUARANTEE SHALL BE BINDING REGARDLESS OF MANUFACTURER'S GUARANTEE AND CONTRACTOR SHALL REMOVE AND REPLACE ALL DEFECTIVE MATERIAL REGARDLESS OF CAUSE (EXCEPT FOR DEFECTS TRACEABLE TO IMPROPER MAINTENANCE OR MALICIOUS DESTRUCTION OCCURRING AFTER THE SYSTEM HAS BEEN TURNED OVER).
- 9. ALL MATERIALS USED ANYWHERE IN THE WORK SHALL HAVE NFPA RATING AS FOLLOWS:
- A. FLAME SPREAD- NOT OVER 25 B. SMOKE DEVELOPED- NOT OVER 50 C. FUEL CONTRIBUTED— NOT OVER 25
- SHEETS OF ALL EQUIPMENT SUPPLIED OR INSTALLED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- A. AIR CONDITIONING UNITS B. GRILLES, REGISTERS, AND DIFFUSERS
- E. INSULATION
- 12. ALL MECHANICAL EQUIPMENT AND APPLIANCES INSTALLED SHALL BEAR THE LABEL OF AN APPROVED AGENCY.
- 13. EQUIPMENT AND MATERIALS ARE SPECIFIED TO ESTABLISH A LATEST MODEL OR DESIGN AVAILABLE.
- 15. CONTRACTOR SHALL PROVIDE 1-INCH THICK (R-5) FOAM BOARD INSULATION PAINTED TO MATCH THE ROOM'S FINISH FOR ALL THERMOSTAT'S MOUNTED ON MASONRY WALLS.
- 18. MAXIMUM ALLOWABLE LENGTH FOR FLEXIBLE DUCT IS SIX (6')
- AND PATCHING EITHER ENGAGING HIS OWN GENERAL SUBCONTRACTOR OR ONE QUALIFIED BY THE OWNER.
- 20. CONTRACTOR SHALL INFORM THE ENGINEER OF ANY QUESTIONS OR DISCREPANCIES PRIOR TO PRECURSOR AND/OR FABRICATION OF ANY MATERIALS AND INSTALLATION.
- 21. INSTALL ALL EQUIPMENT IN ACCORDANCE TO THE MANUFACTURER'S WRITTEN GUIDELINES.

- ALL DRAWINGS AND SPECIFICATIONS AND VISIT THE SITE TO EXTENT OF THE WORK. NO EQUIPMENT OR MATERIAL IS TO BE ORDERED OR FABRICATED PRIOR TO FIELD VERIFICATION OF ALL
- 2. CONTRACTOR SHALL PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE
- 3. CONTRACTOR SHALL VISIT THE JOB PRIOR TO SUBMITTING A
- LATEST APPLICABLE INTERNATIONAL BUILDING CODE, MECHANICAL CODE, FUEL GAS CODE, PLUMBING CODE, NEC CODE AND ALL OTHER STATE AND LOCAL AUTHORITIES HAVING JURISDICTION.
- 5. CONTRACTOR SHALL GIVE ALL NOTICES, OBTAIN AND PAY FOR ALL PERMITS, DEPOSITS AND FEES NECESSARY.
- LIGHTING FIXTURES ETC. BEFORE PROCEEDING WITH NEW WORK.
- ALL MATERIALS SHALL BE "SELF-EXTINGUISHING"
- 10. CONTRACTOR SHALL SUBMIT 1/4" SCALE SHEET METAL SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- 11. SUBMIT TO THE ARCHITECT FOR APPROVAL, SPECIFICATION
- C. CONTROLS D. PIPING
- F. FANS
- STANDARD OF QUALITY. ALL MATERIALS AND EQUIPMENT USED FOR THIS CONTRACT SHALL BE NEW AND UNUSED AND OF THE
- 14. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT INSULATION IS APPLIED.
- 16. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURAL STEEL, SUPPORTS, BRACES, HANGERS, ETC., REQUIRED FOR HIS CONTRACT UNLESS OTHERWISE NOTED. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT SUPPORT LOCATION AND INSTALLATION WITH ROOFING AND STRUCTURAL CONTRACTORS.
- 17. ALL DUCT SIZES SHOWN ARE INSIDE CLEAR.
- 19. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR ALL CUTTING
- 22. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONNECTIONS, SUPPORTS, TERMINATIONS & ACCESSORIES ASSOCIATED WITH AIR HANDLING UNITS, FANS, ETC.

- 23. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR WHO WILL PROVIDE POWER WIRING TO ALL MECHANICAL EQUIPMENT. MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROL AND INTERLOCK WIRING AND ALL THERMOSTATS AND ACCESSORIES.
- 24. SUPPORT ALL EQUIPMENT, PIPING AND DUCTWORK WITH VIBRATION ISOLATION HANGERS AS REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.
- 25. ALL EXTERIOR WALL OPENINGS SHALL BE SLEEVED, PROPERLY CAULKED AND SEALED WITH A HIGH QUALITY SEALANT TO PREVENT INFILTRATION OF MOISTURE AND OUTSIDE AIR.
- 26. PROVIDE VOLUME DAMPERS AT ALL DUCT BRANCHES AND RUNOUTS. PROVIDE OPPOSED BLADE VOLUME DAMPERS AT ALL REGISTERS, GRILLES AND DIFFUSER NECKS IN SUPPLY, RETURN AND EXHAUST DUCTWORK WHETHER SHOWN ON DRAWINGS OR
- 27. PROVIDE AT MINIMUM 10 GAUGE STEEL SLEEVES FOR ALL DUCT PENETRATIONS THROUGH FIRE WALLS, FLOORS AND PARTITIONS. PROVIDE PIPE SLEEVES FOR ALL MECHANICAL PIPING PENETRATING THROUGH FIRE WALLS, FLOORS AND PARTITIONS. SEAL ALL ANNULAR SPACE BETWEEN SLEEVES AND DUCTWORK OR PIPING WITH A FIRE BARRIER MATERIAL.
- 28. PROVIDE FLEXIBLE CONNECTIONS ON ALL DUCTS AND PIPING CONNECTIONS TO ANY MOTOR DRIVEN MECHANICAL EQUIPMENT (I.E. FANS, AIR HANDLERS, PUMPS, ETC.) INSTALL FLEXIBLE COPPER GROUNDING STRAPS ACROSS ALL FLEXIBLE CONNECTIONS.
- 29. THE INSIDE OF ALL DUCTWORK VISIBLE THROUGH A GRILLE OR DIFFUSER SHALL BE PAINTED FLAT BLACK.
- 30. ACCESS PANELS SHALL BE PROVIDED TO SERVICE ALL VALVES. DAMPERS, HEATERS, CONCEALED MECHANICAL EQUIPMENT, TRAPS, CLEANOUTS AND DISCHARGE SIDE OF ELECTRIC
- 31. FINAL LOCATIONS FOR MOUNTING ALL THERMOSTATS SHALL BE COORDINATED WITH THE ENGINEER PRIOR TO INSTALLING ANY CONTROL WORK. ALL COMMON AREA THERMOSTATS SHALL BE EQUIPPED WITH A LOCKING COVERS. MOUNT ALL THERMOSTATS TO COMPLY WITH ADA REQUIREMENTS.
- 32. UPON COMPLETION OF THE WORK, REMOVE ALL EXCESS MATERIAL, DEBRIS, TOOLS AND EQUIPMENT FROM THE SITE, AND LEAVE THE PREMISES IN A BROOM CLEAN CONDITION.
- 33. CONTRACTOR SHALL PROVIDE THREE (3) COMPLETE SETS OF BOUND OPERATING AND MAINTENANCE INSTRUCTIONS. CONTRACTOR SHALL INSTRUCT THE OWNER OR HIS AGENT WITH REGARD TO THE PROPER USE OF THE SYSTEM UNTIL SUCH INSTRUCTION IS COMPLETE TO THE OWNER'S SATISFACTION.
- 34. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC OR NEBB STANDARDS.
- 35. CONTRACTOR SHALL ENSURE THAT ALL MECHANICAL DEVICES WILL BE INSTALLED IN LOCATIONS WHICH AFFORD ACCESSIBILITY FOR MAINTENANCE AND REPAIR. COORDINATE INSTALLATION AMONG ALL TRADES TO AVOID INTERFERENCES AND LOCATE EQUIPMENT TO PROVIDE CLEARANCES WHICH EXCEED THOSE RECOMMENDED BY THE EQUIPMENT MANUFACTURER.
- 36. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE SAFETY OF EXISTING STRUCTURE.
- 37. THERMOSTAT WIRING SHALL BE INSTALLED IN CONCEALED SPACE, WALL OR CHASE - COORDINATE WITH THE OWNER REPRESENTATIVE.
- 38. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION SCHEDULING AND ASSOCIATED HOISTING STAGING AND ERECTING OF MATERIALS. ALL ELEMENTS OF THE EXISTING PROPERTY SHALL BE PROTECTED AGAINST DAMAGE RESULTING FROM THESE ACTIVITIES.
- 39. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICES. COMPLETE INSTALLATION AND STARTUP CHECKS SHALL BE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND STARTUP REPORTS SHALL BE PROVIDED TO ARCHITECT/ENGINEER FOLLOWING COMPLETION. STARTUP SHALL BE PROVIDED FOR ALL EQUIPMENT SUPPLIED OR INSTALLED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- A. AIR CONDITIONING UNITS
- B. HEATERS C. PUMPS
- D. FANS
- E. BOILERS
- F. CHILLERS G. CONDENSERS & HEAT PUMPS H. CONTROLS

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MCF PROJECT #21177

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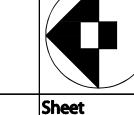
Al-13618

NEW MAINTENANCE BUILDING ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY

> 5080 ATLANTIC AVE. MAYS LANDING, NJ 08330

MECHANICAL COVER SHEET

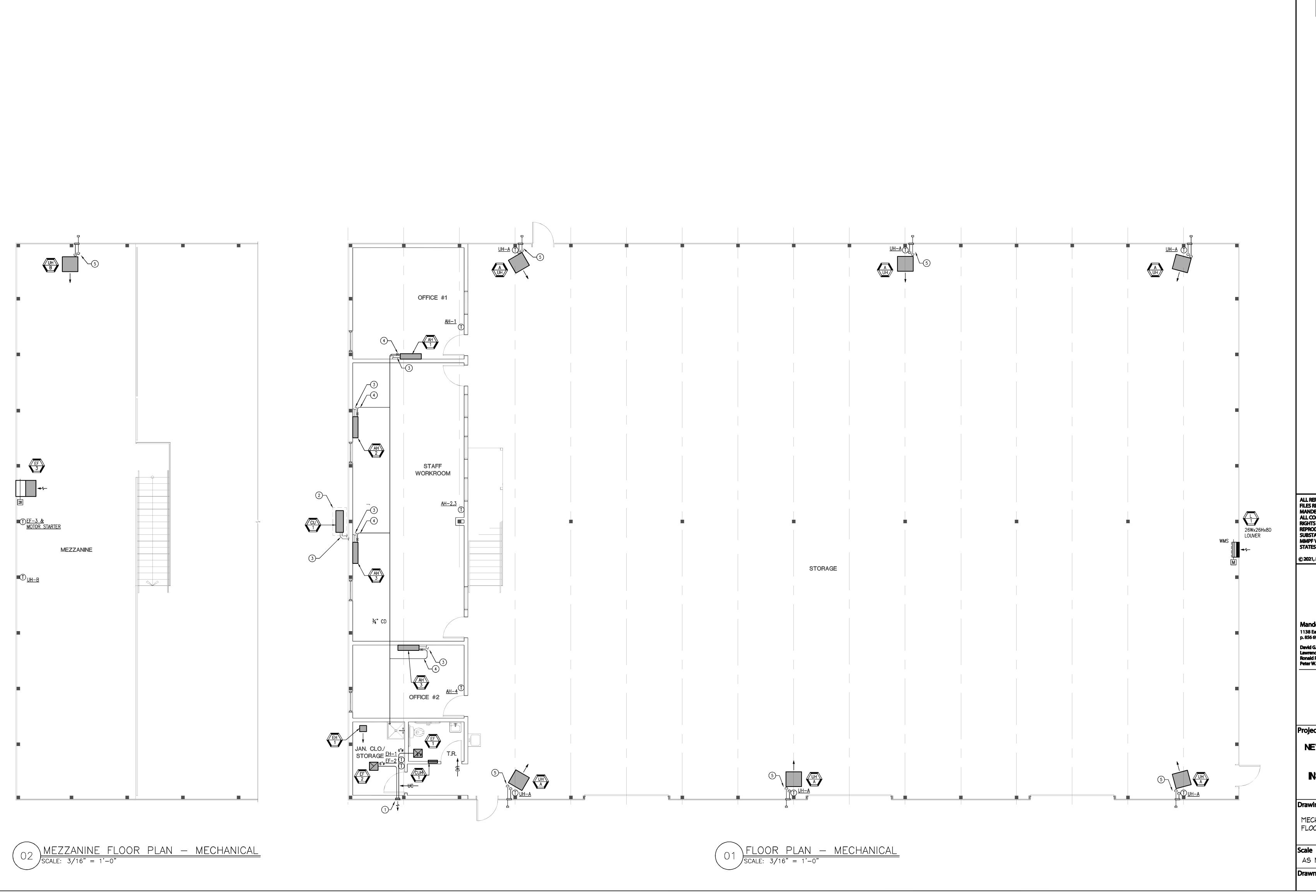
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GENERAL FIRESTOPPING NOTE

CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR EXCEEDING WALL/CEILING/FLOOR ASSEMBLY RATINGS FOR ALL PENETRATIONS. CONTRACTOR SHALL VERIFY LOCATION AND RATING OF ALL FIRE ASSEMBLIES AND PROVIDE INTUMESCENT COLLARS AT ALL PENETRATIONS AND FIRE RATED CAULKING AS REQUIRED.



KEY NOTES:

DRAWING NOTES:

INTERFERENCES ENCOUNTERED. REFER TO STRUCTURAL

EQUIPMENT LOCATIONS AS REQUIRED.

TO AVOID CONFLICTS.

ROOF EDGE.

2. CONTRACTOR SHALL PROVIDE MANUFACTURER'S

RECOMMENDED CLEARANCES AND ACCESS TO ALL

3. ALL EXHAUST SHALL TERMINATE ON EXTERIOR A MINIMUM

OF 3 FEET FROM ALL OPERABLE WINDOWS AND OTHER OPENINGS TO BUILDING AND 25 FEET FROM ANY INTAKES.

4. MAINTAIN ALL EQUIPMENT A MINIMUM OF 10'-0" FROM ANY

5. COORDINATE ALL EQUIPMENT, DUCTWORK, VENTING AND

PENETRATIONS WITH BUILDING STRUCTURE.

DRAWINGS FOR LOCATIONS OF NEW AND EXISTING BEAMS, TRUSSES AND LINTELS. COORDINATE DUCTWORK AND

EQUIPMENT. COORDINATE LOCATIONS WITH OTHER TRADES

- 1) DOUBLE EXHUAST BOX DUAL 6" PORT MFG. XVENT 1. DRAWINGS ARE DIAGRAMMATIC. PROVIDE ADDITIONAL OFFSETS, TRANSITIONS, ETC. AS REQUIRED TO AVOID MODEL DHEB-66-FC. COLOR SELECTED BY ARCHITECT.
 - 2 COORDINATE ELEVATION AND SUPPORT OF OUTDOOR UNITS WITH ARCHITECT, CIVIL AND STRUCTURAL CONTRACTOR. PROVIDE 4" CONCRETE EQUIPMENT PAD AND PROVIDE RAISED BASE SUPPORT, OR WALL MOUNT SUPPORT, SECURE ALL EQUIPMENT AND SUPPORTS TO MEET WINDSPEED REQUIREMENTS AND RAISED 24" ABOVE
 - 3 ROUTE REFRIGERATION LINES TO ASSOCIATED CONDENSING UNIT. PROVIDE HIDE LINE CHANNELS FOR EXPOSED
 - PROVIDE CONDENSATE PUMP AND ROUTE 3/4" CONDENSATE PIPING TO MOP SINK IN JANITOR CLOSET, TERMINATE 1" ABOVE SINK.
 - 5 EXTEND 4" COMBUSTION AIR INTAKE AND 4" EXHAUST TO SIDE WALL CONCENTRIC VENT KIT.

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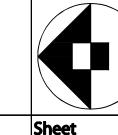
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NEW MAINTENANCE BUILDING FOR ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY 5080 ATLANTIC AVE. MAYS LANDING, NJ 08330

MECHANICAL FLOOR PLANS



DUCTL	ESS MINI SPLIT	UNIT SCHEDULE														AH -
			BASIS OF		NOMINAL			FAN DA	ГА	INDOOR N	IOM. CAP.	ELE	CTRICA	L DATA		
TAG	SERVICE	TYPE	DESIGN MANUF.	INDOOR MODEL NO.	TONNAGE CAPACITY	CFM HI	OA	E.S.P. IN W.G.	SOUND LEVEL (INDOOR)	TOTAL COOLING (MBH)	TOTAL HEATING (MBH)	VOLTAGE	AMPS	MCA	МОСР	REMARKS
AH-1	OFFICE#1	WALL-MOUNTED	TRANE/MITSUBISHI	TPKFYP012LM140A	1.00	297	-	-	43 dB(A)	12	13.5	208/1Ø/60	0.04	0.24	15	ALL
AH-2	STAFF WORK ROOM	WALL-MOUNTED	TRANE/MITSUBISHI	TPKFYP008LM140A	0.66	237	-	-	43 dB(A)	8	9.0	208/1Ø/60	0.03	0.24	15	ALL
AH-3	STAFF WORK ROOM	WALL-MOUNTED	TRANE/MITSUBISHI	TPKFYP008LM140A	0.66	237	-	-	43 dB(A)	8	9.0	208/1Ø/60	0.03	0.24	15	ALL
AH-4	OFFICE#2	WALL-MOUNTED	TRANE/MITSUBISHI	TPKFYP006LM140A	0.50	191	-	-	43 dB(A)	6	6.7	208/1Ø/60	0.02	5.63	15	ALL

NOTES/ACCESSORIES:

- 1. PROVIDE BLUE DIAMOND CONDENSATE PUMP AND DRAIN PAN LEVEL SENSOR/CONTROL AND FASCIA KIT MOUNT PUMP UNDER UNIT. 2. PROVIDE MANUFACTURER'S MODEL TAR-40MAAU WIRED PROGRAMMABLE LOCAL THERMOSTAT WITH CLEAR LOCKABLE COVER.
- 3. PROVIDE FACTORY START-UP AND TRAINING. 4. PROVIDE MOUNTING ACCESSORIES AS REQUIRED FOR MOUNTING TYPE.
- 5. DISCONNECT SWITCH PROVIDE BY ELECTRICAL CONTRACTOR.
- 6. COORDINATE POWER & WIRING REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
- PROVIDE WASHABLE FILTER.

AIR COC	LED HEAT PU	MP SCHEDULE																HP :
TAG	SERVICE	BASIS OF DESIGN MANUF.	MODEL NO.	NOMINAL TONNAGE CAPACITY	NOMINAL SYSTEM CONNECTED CAPACITY (%)	TOTAL (MBH)	CAPACITY CORRECTED COOLING TOTAL CAP. (BTUH)		CAPACITY CORRECTED HEATING TOTAL CAP. (BTUH)	I	MCA	MOCP	SOUND PRESS. dBA	COOLIN	NG EFF. SEER	AHRI COP	APPROX. WEIGHT (LBS.)	REMARKS
HP-1	OFFICES	TRANE MITSUBISHI	TUMYH0361AK4	3.0	94%	36	35464.6	42	41,969.6	208/1Ø/60	36	44	65	13.2	18.7	4	278	ALL

NOTES/ACCESSORIES:

- 1. DISCONNECT SWITCH PER MODULE PROVIDED BY ELECTRICAL CONTRACTOR. 2. HYPER HEAT PUMP CONDENSER.
- 3. PROVIDE WITH COLD WEATHER STAND OR WALL MOUNTED. COORDINATE LOCATION WITH ARCHITECT.
- 4. PROVIDE WITH HEADER FOR 4 BRANCHES. 5. PROVIDE DRAIN PAN AND DEFROST HEATER.

FAN	SCHEDULE												EF _
TAG	SERVICE	BASIS OF DESIGN MANUF.	MODEL NO.	TYPE	CFM	SP. IN. W.G.	FRPM	HP/WATTS	FL (AMPS)	VOLTAGE	NOISE LEVEL (SONES)	CONTROL	REMARKS
EF-1	TOILET	PANASONIC	FV-0511VKS2	CEILING	80	0.25	1113	13.4 WATTS	0.2	120/1φ/60	0.5	SEE NOTES	1 – 4
EF-2	JANITOR CLOSET	PANASONIC	FV-0511VKS2	CEILING	80	0.25	1113	13.4 WATTS	0.2	120/1φ/60	0.5	SEE NOTES	1 – 4
EF-3	STORAGE	GREENHECK	SBE-1H20-4	WALL	2,000	0.25	893	1/4 HP	5.8	115/1ゅ/60	14.2	SEE NOTES	2,5,6,7,8

- NOTES/ACCESSORIES:

 1. PROVIDE WITH INTEGRAL BACKDRAFT DAMPER, DISCONNECT AND HANGER KIT. 2. PROVIDE CONTROLS, RELAYS, TRANSFORMERS AND WIRING AS REQUIRED TO OPERATE SYSTEM. 3. SWITCH AND WIRING PROVIDED BY ELECTRICAL CONTRACTOR.
- 4. PROVIDE BUILT-IN FAN CONTROL MOTION SENSOR FV-MSVK1 AND WALL SWITCH FOR FAN ON/OFF FV-WCSW11-W/A. 5. PROVIDE FAN WALL HOUSING, BURGLAR BARS, WIRE MESH SCREEN, MOTORIZED DAMPER.
- PROVIDE THERMOSTAT.
- 7. PROVIDE MOTOR STARTER OPERATE FAN, INTERLOCK WITH THERMOSTAT, FAN AND MOTORIZED DAMPERS. 8. DISCONNECT BY ELECTRICAL CONTRACTOR.

EL	ECTRIC HEATER S	SCHEDULE								EH CUH
TAG	LOCATION	TYPE	BASIS OF DESIGN	MODEL	AIRFLOW	HEATING (APACITY	ELECTRICAL [)ATA	REMARKS
170	LOCATION	111 6	MANUF.	WODEL	CFM	BTUH	KW	VOLTAGE	AMP	ILIMANIS
EH-1	JANITOR CLOSET / STORAGE	ELECTRIC UNIT HEATER	INDEECO	ULIR-925U03000VA	300	_	2.25	208/1φ/60	11.2	1–5
CUH-1	TOILET	WALL HEATER	INDEECO	WRI-930U00500B	40	_	0.50	120/1¢/60	4.6	1,4,5,6

- NOTES/ACCESSORIES:

 1. MOUNT FROM WALL OR CEILING AS REQUIRED, PROVIDE MOUNTING ACCESSORIES AS REQUIRED FOR MOUNTING TYPE.

 2. DISCONNECT BY E.C., M.C. TO COORDINATE.

 3. PROVIDE WITH REMOTE THERMOSTAT WITH CLEAR LOCKABLE COVER AND INSULATED WALL MOUNT PLATE.
- 4. PROVIDE AUTOMATIC RESET THERMAL CUTOUT.
- 5. FINAL COLOR SELECTION BY OWNER/ARCHITECT
- 6. PROVIDE WITH SINGLE-POLE TAMPERPROOF THERMOSTAT AND BUILT-IN DISCONNECT SWITCH.

_												
	GAS	-FIRED U	NIT HE	ATER	SCHI	EDUL	E					UH _
	TAG	BASIS OF DESIGN MANUFACTURER	MODEL	INPUT (MBH)	OUTPUT (MBH)	STAGE HEATING	FAN HP/(WATTS)	WEIGHT (LBS)	ELECTR VOLTAGE	RICAL DAT	TA MOCP	REMARKS
	UH-A	REZNOR	UDZ 75	75	62.25	2	0.06	77	115/1φ/60	3.7	15	ALL
	UH-B	REZNOR	UDZ 30	30	24.60	1	0.02	58	115/1φ/60	1.9	15	ALL

- NOTES/ACCESSORIES:
- HORIZONTAL THROW. 3. PROVIDE WITH REMOTE THERMOSTAT WITH CLEAR LOCKABLE COVER AND INSULATED WALL PLATE.
- 4. PROVIDE WITH DISCONNECT SWITCH AND SUSPENSION KIT TO MATCH STRUCTURE. MOUNT FROM WALL OR CEILING AS REQUIRED, PROVIDE MOUNTING ACCESSORIES AS REQUIRED FOR MOUNTING TYPE.
 COORDINATE FINAL MOUNTING HEIGHT WITH OWNER AND ARCHITECT.
- RECOMMEND HEIGHT BOTTOM OF UNIT AFF UH-A 16FT AND UH-B 6.5FT.
- 7. PROVIDE TWO STAGE GAS VALVE FOR UH-A. 8. PROVIDE REZNOR HORIZONTAL THRU WALL CONCENTRIC VENT KITS.
- 9. REFER TO PLAN FOR QUANTITIES.

LOUVI	ER SCHEDUL	E (INT.	AKE)			
TAG	SERVICE	AIRLFOW CFM	BASIS OF DESIGN MANUF.	MODEL	SIZE (LxWxD)	REMARKS
L-1	OUTSIDE AIR INTAKE	2,000	GREENHECK	EHH-601DE	26x26x6	ALL

NOTES/ACCESSORIES:

1. PROVIDE LOUVER WITH 1/2" MESH SCREEN AND BURGLAR BARS.

- 2. COORDINATE LOUVER LOCATION, SIZES AND DEPTH WITH ARCHITECT.
- 3. FINISH/COLOR OF ALL LOUVERS SHALL BE DETERMINED BY OWNER/ARCHITECT.
 4. LOUVER BLADES ARE HORZIONTAL.
- 5. INTERLOCK MOTORIZED DAMPER, LOUVER TO OPEN WHEN EF-3 IS ON AND CLOSE WHEN FAN IS OFF.

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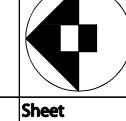
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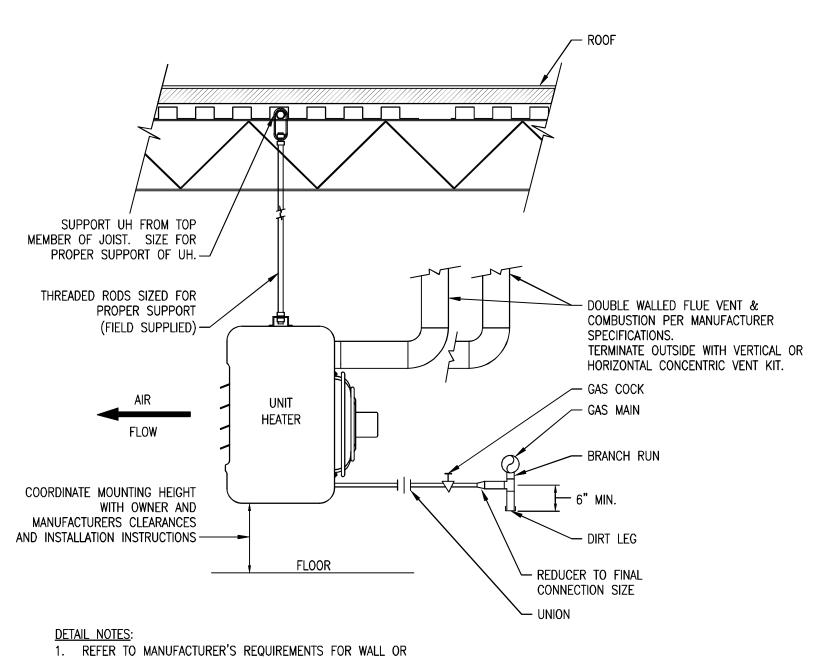
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MECHANICAL SCHEDULES



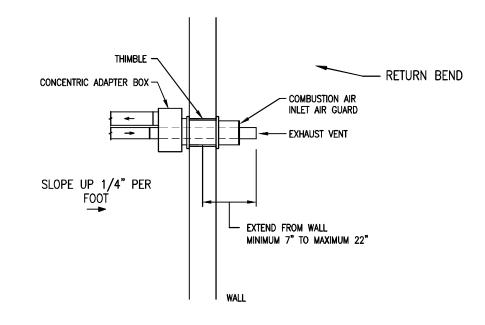
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1. REFER TO MANUFACTURER'S REQUIREMENTS FOR WALL OR ROOF TERMINATIONS FOR VENT AND COMBUSTION KITS.

GAS FIRED UNIT HEATER DETAIL



NOTES:

1. INSTALL AND SEAL PIPE ADAPTER BOX PER MANUFACTURER DIRECTION.

2. PROVIDE AND INSTALL FLUE EXHAUST AND AIR INTAKE CONCENTRIC KIT FOR EACH APPLIANCE PER MANUFACTURER'S DIRECTION.

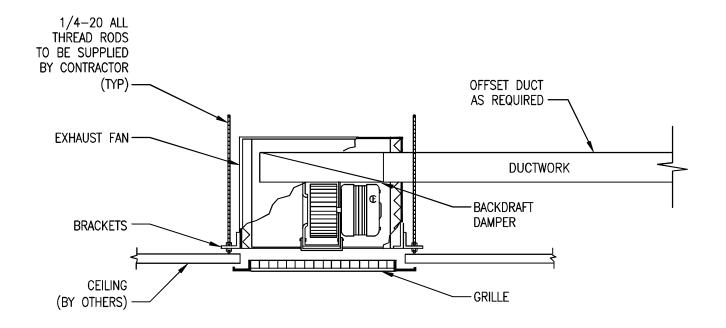
3. SUPPORT MUST BE FIELD INSTALLED TO SECURE TERMINATION KIT TO STRUCTURE.

4. TWO OR MORE DIRECT VENT TERMINATIONS ARE VENTED NEAR EACH OTHER, THEY SHALL BE A MINIMUM 18" APART TO AVOID RECIRCULATION OF FLUE GASES OR AS DIRECTED BY MANUFACTURER'S DIRECTION.

5. PROVIDE INSULATION FOR ALL PIPING RUNS WITHIN UNHEATED SPACES AS REQUIRED PER MANUFACTURERS INSTALLATION INSTRUCTIONS.

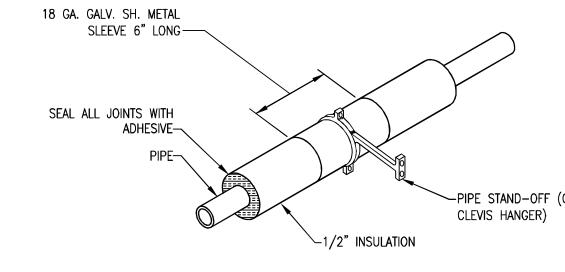
6. PROVIDE COMBUSTION AIR PIPE PITCH TO DRAIN OUTSIDE, SEE MANUFACTURER INSTALLATION GUIDELINES.



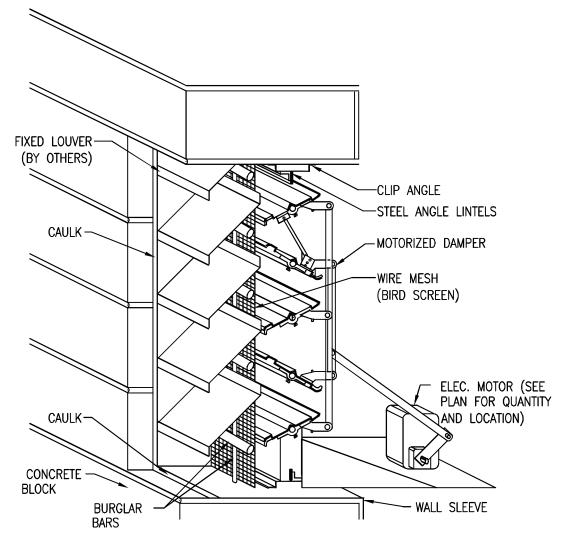


<u>DETAIL NOTES:</u>
1. COORDINATE RATED CEILING LOCATIONS WITH ARCHITECT PLANS AND PROVIDE MANUFACTURER'S RADIATION DAMPERS WHERE REQUIRED.



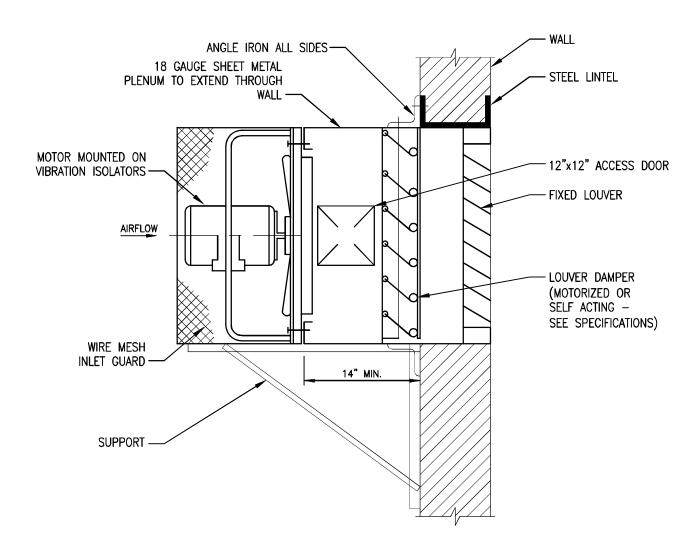


PIPE INSULATION SUPPORT DETAIL



- 1. LOUVER MOUNTED WITHIN CONCRETE BLOCK WALL. OVERALL SIZE OF OPENING SHOULD BE 1/4" GREATER THAN SIZE OF LOUVER IN BOTH DIRECTIONS. 2. LOUVER BLADÉS SHOULD NOT EXCEED 5 FT. IN WIDTH. USE MULLION
- CONNECTED SECTIONS FOR GREATER WIDTHS. 3. COORDINATE WITH ARCHITECT'S SET FOR CAULKING AS SPECIFIED.
- 4. PROVIDE BURGLAR BARS BETWEEN LOUVER AND BIRD SCREEN SO AS NOT TO
- INTERFERE WITH DAMPER OPERATION. 5. PROVIDE DAYTON OR EQUAL FOR INTAKE LOUVER AND MOTORIZED DAMPER.





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Description

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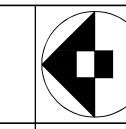
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MECHANICAL DETAILS



GENERAL

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS
- B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE
- C. INVESTIGATE EACH SPACE THOROUGHLY WHERE EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL
- D. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED.
- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75 PERCENT OF RATED INSERT CAPABILITY WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER. PROVIDE SEISMIC RESTRAINTS AS REQUIRED BY CODE.
- F. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT APPROVAL.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.
- H. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.
- I. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE
- J. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.
- PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- ALL PRESENT MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- M. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- N. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- O THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE
- P. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR.
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR; EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A
- HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- U. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- V. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- W. DEFINITIONS
- 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES
- AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION. 5) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN
- FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES. 6) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED
- 7) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND
- EFFICIENCY OF SPECIFIED PRODUCT AS DETERMINED BY THE ENGINEER AND ARCHITECT.

- A. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE
- B. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN TWO YEARS FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
- PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT PROVIDE COMPLETE SET OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, DUCTWORK, PIPING AND CONTROL SYSTEMS INDICATING CAPACITY DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

SHOP DRAWINGS

- INDICATE ON EACH SUBMISSION: PROJECT NAME AND LOCATION, ARCHITECT AND ENGINEER, ITEM IDENTIFICATION AND APPROVAL STAMP OF PRIME CONTRACTOR.
- B. SUBMISSIONS
- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
- 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT THREE PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD TWO PRINTS TO THE ENGINEER. C. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

- 1) DUCTWORK LAYOUT DRAWINGS AND SHEET METAL DESIGNS.
- SHEETMETAL CONSTRUCTION STANDARDS.
- 3) AIR OUTLETS.
- AIR BALANCE REPORT.
- 5) AC UNITS AND FANS.
- 6) PIPING LAYOUT.
- OPERATING SEQUENCES. 8) VIBRATION ISOLATION AND SEISMIC RESTRAINTS

D. COORDINATION

- 1) THE CONTRACTOR SHALL ASSURE FULL COOPERATION OF ALL TRADES AND SHALL FURNISH IN WRITING ALL INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH LEAST POSSIBLE INTERFERENCE OR DELAY.
- PREPARE COORDINATED COMPOSITE DRAWINGS AT A SUITABLE SCALE NOT LESS THAN 1/4-INCH EQUALS ONE FOOT, ZERO INCHES, CLEARLY SHOWING HOW THE WORK OF THIS DIVISION IS TO BE INSTALLED IN RELATION TO THE WORK OF ALL TRADES. ANY WORK INSTALLED IN CONFLICT WITH THE WORK OF OTHER TRADES
- SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR MAY, SUBJECT TO THE ACCEPTANCE OF THE ARCHITECT AND WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF ALL TRADES OR FOR THE PROPER EXECUTION OF THE WORK.
- GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THI CONTRACT COORDINATE WITH THE ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT 5) THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYOUT WORK AND SHALL COORDINATE ALL TRADES TO VERIFY SPACES IN WHICH WORK SHALL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM OR SPACE CONDITIONS. WHERE SPACE CONDITIONS APPEAR INADEQUATE, THE

ARCHITECT SHALL BE NOTIFIED BEFORE INSTALLATION. DO NOT PROCEED

4) MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE

WITH THE INSTALLATION UNTIL RECEIVING CLARIFYING INSTRUCTIONS. 4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH IN ELECTRONIC FORMAT ALL SUBMITTED SHOP DRAWINGS AND THE INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

SHEET METAL WORK

- EXCEPT AS OTHERWISE SHOWN OR NOTED, ALL DUCTWORK AND OTHER SHEET METAL WORK SHALL BE GALVANIZED SHEET STEEL AND SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. DUCT CONSTRUCTION STANDARDS, PRESSURE CLASSIFICATION 2 IN.
- FOR RECTANGULAR DUCTS, THE MINIMUM GAUGES SHALL BE: 24 GAUGE FOR DUCTS 30" (MAXIMUM DIMENSION) AND SMALLER. 22 GAUGE FOR DUCTS WITH A MAXIMUM DIMENSION BETWEEN 31" AND
- 20 GAUGE FOR DUCTS WITH A MAXIMUM DIMENSION BETWEEN 55" AND d. 18 GAUGE FOR DUCTS WITH A MAXIMUM DIMENSION LARGER THAN 84".
- MAXIMUM REINFORCING DISTANCES SHALL BE:
- 7'-10" FOR DUCTS WITH A MAXIMUM DIMENSION OF 30" OR SMALLER. b. 3'-9" FOR DUCTS WITH A MAXIMUM DIMENSION LARGER THAN 30".
- PROVIDE MILL PHOSPHATIZED FINISH WHERE DUCTS ARE EXPOSED. B. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.
- ALL DUCTWORK SHALL BE FREE FROM PULSATION, CHATTER AND VIBRATION. IF ANY OF THESE DEFECTS APPEAR AFTER A SYSTEM IS IN OPERATION, CORRECT BY REMOVING AND REPLACING, OR REINFORCING THE DUCTWORK AT NO ADDITIONAL COST TO THE OWNER.
- ROUND SINGLE AND DOUBLE-WALL DUCTWORK: APPROVED MANUFACTURERS: MCGILL AIRFLOW, SEMCO, LINDAB, AND EASTERN SHEET METAL. PROVIDE FACTORY-FABRICATED ROUND DUCTS. GAUGES AND CONSTRUCTION DETAILS SHALL COMPLY WITH THE REFERENCED SMACNA HVAC DUCT
- CONSTRUCTION STANDARDS AND SMACNA ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS. 2) FOR DUCTWORK DIAMETERS UP TO AND INCLUDING 60 INCHES, PROVIDE SPIRAL
- LOCK-SEAM CONSTRUCTION. FOR DUCTWORK DIAMETERS OVER 60 INCHES, PROVIDE WELDED LONGITUDINAL SEAMS.
- 3) PROVIDE DUCTS OF SPIRAL LOCK-SEAM CONSTRUCTION.
- 4) USE SLIP JOINTS, JOINTS WITH A DOUBLE-LIPPED EPDM JACKET, OR THE FOLLOWING JOINING SYSTEM FOR TRANSVERSE DUCT JOINTS AND FITTINGS. a. UP TO 20" DIAMETER: INTERIOR SLIP COUPLING BEADED AT CENTER AND FASTENED TO DUCT WITH SCREWS SHALL BE USED TO JOIN DUCTS. SEAL JOINT WITH A SEALING COMPOUND, CONTINUOUSLY APPLIED AROUND JOINT PRIOR TO ASSEMBLING AND AFTER FASTENING, MAKING CERTAIN THAT MAJORITY OF SEALANT RESIDES ON INTERIOR OF THE JOINT.
- b. 21" DIAMETER & ABOVE: INSTALL USING A THREE-PIECE, GASKETED FLANGED-JOINT CONSISTING OF TWO INTERNAL FLANGES, WITH INTEGRAL MASTIC SEALANT, AND ONE EXTERNAL CLOSURE BAND TO COMPRESS THE GASKET BETWEEN THE INTERNAL FLANGES. APPROVED SYSTEMS: DUCTMATE SPIRALMATE.
- ELBOWS FOR 3 THROUGH 12 INCH DIAMETER AND 90° BENDS SHALL BE TWO-SECTION STAMPED WITH WELDED SEAMS. ALL OTHER ELBOWS SHALL BE CONSTRUCTED OF MITERED SECTIONS WITH ALL SEAMS AND JOINTS WELDED IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:
- THRU 35 DEGREES/2 GORES
- 36 THRU 71 DEGREES/3 GORES c. OVER 71 DEGREES/5 GORES
- 6) ELBOWS SHALL BE TWO-SECTION STAMPED WITH WELDED SEAMS 7) CONSTRUCT ALL ELBOWS WITH A CENTERLINE RADIUS EQUAL TO 1.5 TIMES THE
- 8) MAKE ALL TAKE-OFF CONNECTIONS TO DUCT HEADERS USING TEE (90°), LATERAL (45°), TEE CROSS, LATERAL CROSS AND "Y" BRANCH FITTINGS OF THE CONICAL TYPE. ALL FITTINGS FABRICATED AS SEPARATE FITTINGS SHALL HAVE CONTINUOUS WELDS ALONG ALL SEAMS AND JOINTS.
- 9) THE USE OF TWO-PIECE, MITERED, VANED ELBOWS SHALL NOT BE PERMITTED. 10) THE USE OF BULLHEAD TEE FITTINGS IS NOT PERMITTED.
- 11) THE USE OF SQUARE THROAT RADIUS HEEL ELBOWS IS NOT PERMITTED. 12) SHOP-FABRICATED AND CONTRACTOR-DESIGNED FITTINGS ARE NOT PERMITTED.
- E. DUCTWORK SCHEDULE:
- SUPPLY AIR: +2", 3% LEAKAGE RETURN AIR: -2", 3% LEAKAGE EXHAUST AIR: -2", 3% LEAKAGE
- F. DUCT LEAKAGE TESTING 1) DISASSEMBLE, REASSEMBLE, AND SEAL SEGMENTS OF SYSTEMS TO ACCOMMODATE LEAKAGE TESTING AND FOR COMPLIANCE WITH TEST
 - REQUIREMENTS. SEAL ALL DUCTWORK WITH UL181 MASTIC OR APPROVED EQUAL. CONDUCT LEAKAGE TESTS, ON ALL DUCTWORK, AT STATIC PRESSURES EQUAL TO MAXIMUM DESIGN PRESSURE OF SYSTEM BEING TESTED. IF PRESSURE CLASSES ARE NOT INDICATED, TEST ENTIRE SYSTEM AT MAXIMUM SYSTEM DESIGN PRESSURE. DO NOT PRESSURIZE SYSTEMS ABOVE MAXIMUM DESIGN OPERATING PRESSURE. GIVE SEVEN DAYS' ADVANCE NOTICE FOR TESTING.
 - MAXIMUM ALLOWABLE LEAKAGE: DUCTWORK LEAKAGE SHALL NOT EXCEED 4 RCENT OF TOTAL SUPPLY AIRFLOW. REMAKE LEAKING JOINTS; APPLY ADDITIONAL SEALANT AND RETEST UNTIL LEAKAGE
 - IS EQUAL TO OR LESS THAN MAXIMUM ALLOWABLE. ALL TESTS MUST BE WITNESSED AND RESULTS VERIFIED BY THE OWNER'S REPRESENTATIVE. SUBMIT FIELD TEST REPORT CERTIFYING THAT THE DUCTWORK DOES NOT EXCEED THE MAXIMUM ALLOWABLE LEAKAGE.
- G. VOLUME DAMPERS: GALVANIZED STEEL, PER SMACNA "LOW VELOCITY MANUAL," EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCKSCREW AT THE OTHER END. FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. INSTALL WITH LEVERS ACCESSIBLE.
- H. ACCESS DOORS: INSULATED OR UNINSULATED, SAME AS DUCT PROVIDE MINIMUM 20 IN. X 14 IN. ON MAIN DUCTS, AND 12 IN. X 6 IN. ON BRANCH DUCTS, UNLESS OTHERWISE APPROVED, AT FIRE DAMPERS, AND AT ALL DUCT ACCESSORIES SUCH AS HUMIDIFIERS, DUCT SMOKE DETECTORS, AUTO DAMPERS.
- 2) ALL ACCESS DOORS TO BE HINGED, WITH LATCH SIMILAR TO VENTLOCK NO. 100. FLEXIBLE CONNECTIONS: NEOPRENE-COATED GLASS FABRIC, 30 OUNCES PER SQ. YD. WITH SEWED AND CEMENTED SEAMS, SIMILAR TO VENT FABRICS. PROVIDE WITH METAL
- COLLARS. ALLOW MINIMUM MOVEMENT OF 1 IN. J. TURNING VANES: GALVANIZED STEEL SMALL DOUBLE-THICKNESS VANES WITH 2 IN. INSIDE
- K. ALL DUCT DIMENSIONS INDICATED ON PLANS ARE INSIDE CLEAR DIMENSIONS.

- L. WIRE MESH SCREEN (WMS): NO. 16 USSG, 3/4 SQUARE MESH, IN 1 IN. WIDE GALVANIZED
- STEEL ENCLOSING FRAME. FLANGED DUCT OPENING TO RECEIVE FRAME. M. LOW-PRESSURE FLEXIBLE DUCT: SHALL BE CONSTRUCTED WITH A CPE INNER FILM LINER LOCKED TO GALVANIZED STEEL HELIX WITH 1" THICK FIBERGLASS ENCLOSED WITH A

REINFORCED FOIL/MYLAR SLEEVE. UL 181 LISTED AS CLASS 1 AIR DUCT COMPLYING WITH

- NFPA STANDARD 90A. SIMILAR TO FLEXMASTER TYPE 1M. N. FIRE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION, DYNAMIC CURTAIN TYPE, SPRING LOADED, EQUIPPED WITH FUSIBLE LINK AND SLEEVE, CONFORMING TO NFPA STANDARD 90A. SIMILAR TO RUSKIN DIBD2 OR DIBD23, RATED AS REQUIRED. SEE
- INSTALLATION ON DRAWING. COMBINATION FIRE AND SMOKE DAMPERS: UL LISTED, GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE WITH SLEEVE. EQUIPPED WITH FUSIBLE LINK CONFORMING TO NFPA STANDARD 90A. SIMILAR TO RUSKIN MODEL FSD 60.
- SMOKE DAMPERS: UNLISTED GALVANIZED STEEL CONSTRUCTION MULTI-BLADED TYPE WITH SLEEVE. EQUIPPED WITH PNEUMATIC OPERATOR AND E/P SWITCH. SIMILAR TO RUSKIN MODEL SD50.
- CLEANING NEW SYSTEMS MARK POSITION OF DAMPERS AND AIR-DIRECTIONAL MECHANICAL DEVICES BEFORE CLEANING, AND PERFORM CLEANING BEFORE AIR BALANCING.
- a. USE SERVICE OPENINGS, AS REQUIRED, FOR PHYSICAL AND MECHANICAL ENTRY AND FOR INSPECTION. CREATE OTHER OPENINGS TO COMPLY WITH DUCT STANDARDS. DISCONNECT FLEXIBLE DUCTS AS NEEDED FOR CLEANING AND INSPECTION. REMOVE AND REINSTALL CEILING SECTIONS TO GAIN ACCESS DURING THE
- VENT VACUUMING SYSTEM TO THE OUTSIDE. INCLUDE FILTRATION TO CONTAIN DEBRIS REMOVED FROM HVAC SYSTEMS, AND LOCATE EXHAUST DOWN WIND AND AWAY FROM AIR INTAKES AND OTHER POINTS OF ENTRY INTO BUILDING.
- CLEAN THE FOLLOWING METAL DUCT SYSTEMS BY REMOVING SURFACE CONTAMINANTS AND DEPOSITS AIR OUTLETS AND INLETS (REGISTERS, GRILLES, AND DIFFUSERS).
- PLENUMS (EXCEPT CEILING SUPPLY AND RETURN PLENUMS), SCROLLS, BLADES OR VANES, SHAFTS, BAFFLES, DAMPERS, AND DRIVE ASSEMBLIES AIR-HANDLING UNIT INTERNAL SURFACES AND COMPONENTS INCLUDING MIXING BOX, COIL SECTION, AIR WASH SYSTEMS, SPRAY ELIMINATORS, CONDENSATE DRAIN PANS. HUMIDIFIERS AND DEHUMIDIFIERS, FILTERS AND FILTER SECTIONS, AND CONDENSATE COLLECTORS AND DRAINS.

SUPPLY, RETURN, AND EXHAUST FANS INCLUDING FAN HOUSINGS,

- COILS AND RELATED COMPONENTS. RETURN-AIR DUCTS, DAMPERS, AND ACTUATORS EXCEPT IN CEILING PLENUMS AND MECHANICAL EQUIPMENT ROOMS. f. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
- 4) MECHANICAL CLEANING METHODOLOGY: CLEAN METAL DUCT SYSTEMS USING MECHANICAL CLEANING METHODS THAT EXTRACT CONTAMINANTS FROM WITHIN DUCT SYSTEMS AND REMOVE CONTAMINANTS FROM BUILDING. USE VACUUM-COLLECTION DEVICES THAT ARE OPERATED CONTINUOUSLY
- DURING CLEANING. CONNECT VACUUM DEVICE TO DOWNSTREAM END OF DUCT SECTIONS SO AREAS BEING CLEANED ARE UNDER NEGATIVE USE MECHANICAL AGITATION TO DISLODGE DEBRIS ADHERED TO INTERIOR DUCT SURFACES WITHOUT DAMAGING INTEGRITY OF METAL DUCTS, DUCT
- LINER, OR DUCT ACCESSORIES CLEAN FIBROUS-GLASS DUCT LINER WITH HEPA VACUUMING EQUIPMENT; DO NOT PERMIT DUCT LINER TO GET WET. CLEAN COILS AND COIL DRAIN PANS ACCORDING TO NADCA 2013. KEEP DRAIN PAN OPERATIONAL. RINSE COILS WITH CLEAN WATER TO REMOVE

LATENT RESIDUES AND CLEANING MATERIALS; COMB AND STRAIGHTEN

CLEANLINESS VERIFICATION: VISUALLY INSPECT METAL DUCTS FOR CONTAMINANTS. WHERE CONTAMINANTS ARE DISCOVERED, RE-CLEAN AND REINSPECT DUCTS.

- MARGIN TYPES, COLORS, FINISH AND METHODS OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH
- ARCHITECTURAL CEILING AND WALL DETAILS AND SPECIFICATIONS. FRAME TYPE SUITABLE FOR MOUNTING IN CEILING OR WALL CONSTRUCTION AS
- INDICATED ON ARCHITECTURAL PLANS. 3) EXACT LOCATION OF ALL AIR OUTLETS AS PER ARCHITECTURAL PLANS. SUITABLE FOR OPERATION AT 20 PERCENT EXCESS AND 20 PERCENT LESS THAN NOTED CAPACITY FOR CONSTANT VOLUME SYSTEMS AND AT 20 PERCENT EXCESS AND 60 PERCENT LESS THAN NOTED CAPACITY FOR VARIABLE VOLUME SYSTEMS. MANUFACTURER RESPONSIBLE FOR EXAMINING APPLICATION OF EACH OUTLET
- AND GUARANTEE THAT EACH WILL PROVIDE REQUIRED NC LEVELS AND COMFORT SPACE CONDITIONS WITHOUT DRAFTS THROUGHOUT OPERATING RANGE. 5) DIFFUSERS, GRILLES AND REGISTERS SHALL BE SELECTED TO ACHIEVE NC 30 OR LESS WHEN INSTALLED.
- VOLUME DAMPERS. DAMPER OPERATING LEVERS SHALL BE ACCESSIBLE AT THE FACE OF AIR OUTLETS. REFER TO DRAWING SCHEDULES FOR SPECIFIC MODELS AND REQUIREMENTS. PROVIDE SCHEDULED MANUFACTURER AND MODELS OR COMPARABLE MODELS BY

6) ALL REGISTERS AND DIFFUSERS SHALL BE PROVIDED WITH OPPOSED BLADE

MANUFACTURER APPROVED BY ENGINEER. NOISE CONTROL

- A. ALL ROOM NC LEVELS SHALL BE 35 OR LESS.
- B. PROVIDE SOUNDLINING FOR THE FOLLOWING DUCTWORK. 1) ALL DUCTWORK WITHIN MECHANICAL ROOMS AND NOT LESS THAN 10 FT. ON EACH SIDE OF ALL FANS AND AC UNITS.
- 2) AIR TRANSFER DUCTS.
- ALSO, WHERE NOTED ON A DRAWING. SOUNDLINING IN DUCTWORK: FIBROUS GLASS, MINIMUM 3 LB DENSITY, 1 1/2 IN. THICKNESS, MAXIMUM 0.25 K FACTOR AT 75 DEGREES F MEAN TEMPERATURE WITH ACRYLIC COATED FINISH FACTORY APPLIED EDGE COATING AND STENCILED IN ACCORDANCE WITH NFPA 90. FLAMESPREAD SHALL BE A MAXIMUM OF 25. LINING SHALL NOT SUPPORT MICROBIAL GROWTH AND SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1071, ASTM C 423 AND ASTM G21/G22. SIMILAR TO JOHNS MANVILLE LINACOUSTIC RC HP.
- D. ALL SOUNDLINING, ADHESIVES, FACES AND ACCESSORIES TO BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED. TESTING AND BALANCING
- A. ALL AIR AND WATER BALANCING SHALL BE IN ACCORDANCE WITH AABC AND NEBB AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF FANS AND BRANCH DAMPERS FOR MAJOR ADJUSTMENTS. ADJUSTMENT OF TERMINAL DAMPERS AND DEVICES SHALL BE FOR TRIM OR MINOR ADJUSTMENT ONLY. THIS SHALL BE DONE TO PERMIT THE LEAST NOISE GENERATION IN THE TERMINAL AREAS AND UTILIZE MINIMUM FAN ENERGY.

UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL REBALANCE ANY

- EXISTING PORTIONS OF AIR DISTRIBUTION SYSTEM AND WATER DISTRIBUTION SYSTEM AFFECTED BY THE RENOVATION AND ALSO BALANCE ALL NEW WORK THE CONTRACTOR SHALL PROVIDE ALL LABOR, PRESSURE GAUGES, FLOW METERS, SHEAVES, AND BELTS REQUIRED TO BALANCE SYSTEMS.
- E. BALANCING REPORT SHALL BE PROVIDED ON AABC-TYPE FORMS. FANS, AIR HANDLING UNITS AND COILS SHALL BE BALANCED TO WITHIN +5 PERCENT OF THEIR DESIGN CAPACITIES. ALL OTHER AIR AND WATER QUANTITIES SHALL BE BALANCED
- BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED NEBB OR AABC TECHNICIAN. THE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT TO BE

TO WITHIN +10 PERCENT OF THE DESIGN QUANTITIES.

FROM MOISTURE OR HUMIDITY ARE NOT ACCEPTABLE.

- DEMONSTRATED BY THE CONTRACTOR. INSULATION - GENERAL REQUIREMENTS ALL INSULATION MATERIALS, INCLUDING JACKETS, FACING, ADHESIVE, COATINGS, AND ACCESSORIES ARE TO BE FIRE HAZARD RATED AND LISTED BY UNDERWRITERS LABORATORIES, INC. USING STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723 (ASTM E-84), (ASA A2.5-1963). FLAMESPREAD MAXIMUM IS 25 AND FUEL CONTRIBUTED AND SMOKE DEVELOPED MAXIMUM IS 50. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION
- 2) CONCEALED: INDOOR DUCTS, PIPING OR EQUIPMENT, WHICH IS NOT EXPOSED. 10. DUCTWORK INSULATION

INSULATE ALL NEW DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS

- 1) DUCTWORK INSULATION SCHEDULE
- CONCEALED SUPPLY /OUTSIDE AIR SHALL BE 1.5 IN., TYPE D-1 WITH VAPORSEAL. EXPOSED AND UNCONDITIONED AREAS (INCLUDING MECHANICAL
- MINIMUM R-VALUE OF 6.3. B. NON-INSULATED DUCTWORK WHERE SOUNDLINING IS OF MINIMUM THICKNESS AND R-VALUE SPECIFIED FOR

2) AIR CONDITIONING RETURN AIR DUCTWORK EXPOSED IN AIR-CONDITIONED SPACES AND INSTALLED IN HUNG CEILINGS WHERE SPACE IMMEDIATELY ABOVE AND BELOW ARE BOTH AIR CONDITIONED.

INSULATION SHALL BE PROVIDED WITH A FACTORY-APPLIED ALL-PURPOSE OR ALL

SERVICE FACING. THE INSULATION SHALL BE EQUAL TO JOHNS MANVILLE TYPE 814

- TYPE D-1: MINIMUM 1.5-LB DENSITY FIBERGLASS BLANKET WITH FACTORY-APPLIED FOIL SKRIM-KRAFT FACING SIMILAR TO JOHNS MANVILLE MICROLITE FSK. TYPE D-2: 3 LB. FIBERGLASS BOARD WITH A MINIMUM DENSITY OF 3 LB. THE
- TYPE D-3: MINIMUM 6 LB FIBERGLASS BOARD WITH FACTORY APPLIED ALL-PURPOSE OR ALL SERVICE FACING. SIMILAR TO JOHNS MANVILLE 817

D. INSTALLATION

- FIBERGLASS BLANKET: 2 IN. LAP STRIPS AT ALL SEAMS. SECURE BOTTOM OF ALI DUCTS OVER 24 IN. WIDE WITH MIN. 2 ROWS OF WELD PINS 12 IN. ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE. FIBERGLASS BOARD: SEAL JOINTS AND BREAKS IN FACING WITH 3 IN. WIDE TAPE
- TO MATCH FACING AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5 IN. WIDE TAPE AT CORNERS; WELD PINS ON TOP, SIDES AND BOTTOM. 11. PIPING INSULATION
- INSULATE ALL NEW PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.
 - 1) PIPING INSULATION SCHEDULE
 - P-1 WITH VAPORSEAL. b. LOW TEMP FITTINGS & VALVES 40 TO 100 DEGREES F, UP TO 4-IN., SHALL BE 1-IN. THICK, TYPE P-4 WITH VAPORSEAL AND F-1 FINISH.
- A. LOW TEMPERATURE PIPING SYSTEMS 40 TO 100 F INCLUDING:
- TYPE P-1: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.23 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE WITH FACTORY-APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL SERVICE JACKET. SIMILAR TO
- 3) TYPE P-6: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE. SIMILAR TO
- 1) TYPE F-1: FITTING COVER, MOLDED WHITE PVC JACKET, UL CLASS 1, MAXIMUM
- PERMEANCE 0.05 SIMILAR TO MANVILLE ZESTRON. LONGITUDINAL JOINTS WITH LOCK SEAMS.

1) FOR ALL PIPING. FITTINGS AND VALVES LOCATED OUTDOORS INCREASE SCHEDULED INSULATION THICKNESS BY A MINIMUM OF 1 IN. AND PROVIDE F-4 FINISH. PROVIDE VAPORSEAL ON ALL OUTDOOR PIPES, VALVES AND FITTINGS SUBJECT TO

- AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND PIPING INSULATION SHALL HAVE MITERED FITTINGS.
- SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING
- 13. VIBRATION ISOLATION, WIND AND SEISMIC RESTRAINTS

B. CEILING-HUNG FANS AND EQUIPMENT

CONDENSATION.

- PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK.
- INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. 3) PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS

REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4 IN.

- 4) ACCEPTABLE MANUFACTURERS MASON INDUSTRIES, INC.
- VIBRATION ELIMINATOR CC KORFUND DYNAMICS CORP.

FACTORY-PRELOADED TO 75 PERCENT OF RATED LOAD.

- PROVIDE SPRING HANGER ROD ISOLATORS. STEEL COMPRESSION SPRING AND NEOPRENE SOUND PAD WITHIN A STEEL RETAINER BOX. SIMILAR TO MASON TYPE 2) 1 IN. MINIMUM STATIC DEFLECTION. 1/2 IN. MINIMUM RESERVE DEFLECTION.
- PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE EQUIPMENT OR STRUCTURE CANNOT SUPPORT POINT LOADS. C. SEISMIC RESTRAINTS PROVIDE SEISMIC RESTRAINTS FOR ALL MECHANICAL EQUIPMENT AS REQUIRED BY CODE. SEISMIC RESTRAINTS SHALL BE CAPABLE OF SAFELY ACCEPTING EXTERNAL FORCES AS REQUIRED BY CODE WITHOUT FAILURE, AND SHALL MAINTAIN

EQUIPMENT, PIPING, CONDUIT, DUCT AND PRESSURE REDUCING BOXES IN A

CAPTIVE POSITION. SEISMIC RESTRAINTS SHALL NOT SHORT CIRCUIT ISOLATION

- SYSTEMS OR TRANSMIT OBJECTIONABLE VIBRATION OR NOISE, AND SHALL BE PROVIDED ON ALL EQUIPMENT SCHEDULES ON DRAWINGS. D. WIND RESTRAINTS 1) ALL ROOF AND GROUND MOUNTED EQUIPMENT SHALL BE FASTENED TO
- STRUCTURE OR BASE PER MANUFACTURERS MOUNTING RECOMMENDATIONS. PROVIDE INSTALLATION DETAILS SIGNED BY LICENSED PROFESSIONAL STRUCTURAL ENGINEER TO MEET 100 MPH WIND LOADING.
- 14. PIPING GENERAL REQUIREMENTS COMPLETE WITH PIPE, FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS,
 - STRAINERS, HANGERS, SUPPORTS, GUIDE, SLEEVES, AND ACCESSORIES. ALL ITEMS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS.
 - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME). AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM). AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
- 4) MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTING INDUSTRY (MSS) C. ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 150 PSI OR 150 PERCENT OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED
- FOR TEMPERATURE CHANGE. REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST. D. PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.
- 15. CONDENSATE DRAIN PIPING A. PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L

HANDY AND HARMAN EASY-FLO.

OF FULL-THICKNESS INSULATION.

- 1) 1 IN. IN 4 FT. PREFERRED. 2) 1 IN. IN 8 FT. MINIMUM.
- SOLDER ENDS, REGRIND BRONZE DISC TO BE USED WITH COPPER TUBING. JENKINS FIG. 16. REFRIGERANT PIPING
 - PIPE: COPPER ACR IN ACCORDANCE WITH ASTM B280. FITTINGS: WROUGHT COPPER WITH SILVER BRAZING ALLOY SOLDER SIMILAR TO

SWING CHECK VALVES: AT CONDENSATE PUMP DISCHARGE. 300 LB WOG, BRONZE BODY

INSTALL REFRIGERANT PIPING ACCORDING TO ASHRAE 15. INSTALL PIPING AS SHORT AND DIRECT AS POSSIBLE. WITH A MINIMUM NUMBER OF JOINTS, ELBOWS, AND FITTINGS.

INSTALL PIPING WITH ADEQUATE CLEARANCE BETWEEN PIPE AND ADJACENT

WALLS AND HANGERS OR BETWEEN PIPES FOR INSULATION INSTALLATION. USE

SLEEVES THROUGH FLOORS, WALLS, OR CEILINGS, SIZED TO PERMIT INSTALLATION

- DOWNWARD TO COMPRESSOR LIQUID LINES MAY BE INSTALLED LEVEL.
- 7) INSTALL UNIONS TO ALLOW REMOVAL OF SOLENOID VALVES, PRESSURE-REGULATING VALVES, AND EXPANSION VALVES AND AT CONNECTIONS TO COMPRESSORS AND EVAPORATORS.
- 8) INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
- e. NPS 1-1/2: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH. 9) CHARGE SYSTEM USING THE FOLLOWING PROCEDURES:
- INSTALL CORE IN FILTER-DRYER AFTER LEAK TEST BUT BEFORE EVACUATION. EVACUATE ENTIRE REFRIGERANT SYSTEM WITH A VACUUM PUMP TO A
- VACUUM OF 500 MICROMETERS. IF VACUUM HOLDS FOR 12 HOURS, SYSTEM IS READY FOR CHARGING.
- BREAK VACUUM WITH REFRIGERANT GAS, ALLOWING PRESSURE TO BUILD CHARGE SYSTEM WITH A NEW FILTER-DRYER CORE IN CHARGING LINE.
- PROVIDE FULL-OPERATING CHARGE. 17. CONDENSING GAS-FIRED FURNACE AND WATER HEATER VENT MATERIALS

6) SLOPE REFRIGERANT PIPING AS FOLLOWS:

- 1) CPVC PLASTIC, SCHEDULE 40 PIPE: ASTM F 441/F 441M. CPVC PLASTIC, SCHEDULE 40 FITTINGS: ASTM F 438, SOCKET TYPE. CPVC SOLVENT CEMENT: ASTM F 493 VENT AND OUTSIDE-AIR CONNECTION, GAS-FIRED EQUIPMENT: CONNECT
- OUTDOORS. TERMINATE VENT OUTDOORS WITH A CAP OR CONCENTRIC VENT AND IN AN ARRANGEMENT THAT WILL PROTECT AGAINST ENTRY OF BIRDS, INSECTS, AND DIRT VENT TERMINATION SCHEDULE

PLASTIC PIPING VENT MATERIAL TO UNITS CONNECTIONS AND EXTEND

- (1) ROOF MOUNT: 3-IN CONCENTRIC VENT SIMILAR TO DIVERSITECH CVENT-3WITH CAP. (2) WALL MOUNT: 3-IN HORIZONTAL TERMINATION KIT SIMILAR TO DIVERSITECH HVENT-3.
- A. MOTORS (UNDER HVAC WORK): IN ACCORDANCE WITH NEMA, IEEE AND ANSI C 50
- 1) STANDARD EFFICIENCY UNLESS OTHERWISE NOTED. 2) 1.15 SERVICE FACTOR.
- 3) SQUIRREL CAGE INDUCTION; OPEN DRIP-PROOF TYPE, 1750 RPM, NEMA TYPE B INSULATION CLASS AND CONTINUOUS DUTY, EXCEPT AS NOTED. 19. MOTOR CONTROLLERS
- PROVIDED BY HVAC CONTRACTOR AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.
- B. NEMA ENCLOSURE, WEATHERPROOF WHERE MOUNTED OUTDOORS. WITH OVERLOAD PROTECTION. COORDINATE ALL MOTOR CONTROLLER TYPES AND SIZES
- WITH MOTOR TYPES AND SIZES. D. 1/3 HP AND SMALLER: PROVIDE MANUAL STARTER EXCEPT USE MAGNETIC TYPE WHERE AUTOMATICALLY CONTROLLED.
- MANUAL TYPE: 2-POLE TOGGLE SWITCH WITH OVERLOAD PROTECTION AND PILOT
- COMBINATION UNFUSED DISCONNECT SWITCH AND MAGNETIC STARTER EXCEPT

2) OVERLOAD PROTECTION IN EACH PHASE LEG WITH RESET IN ENCLOSURE.

3) HOA SELECTOR SWITCH FOR AUTOMATICALLY OPERATED MOTORS. SAFETY CONTROLS COMMON TO BOTH CONTROLS.

E. 1/2 HP AND LARGER: PROVIDE MAGNETIC STARTER.

4) RED, GREEN AND AMBER PILOT LIGHTS.

- 5) SWITCHES: HORSE-POWER-RATED, EXTERNAL PADLOCKING TYPE. 6) HOLDING COILS: 10 WATT, 120 VOLT.
- 7) CONTACTS: MAIN LINE AND MINIMUM (2) NORMALLY OPEN, (2) NORMALLY CLOSED 10 AMP AUXILIARIES, IN ADDITION TO CONTACTS REQUIRED FOR CONTROLS SPECIFIED.

CONTROL VOLTAGE TO 120 VOLTS; OF THE REQUIRED CAPACITY, WITH FUSE AND

8) CONTROL TRANSFORMER: FOR MOTORS OVER 120 VOLTS, TO STEP DOWN

- GROUND CONNECTION ON VOLTAGE SIDE. 9) FUSES: SIMILAR TO BUSSMAN.
- 10-WATT COIL AND TWO 10 AMP CONTACTS. 11) TERMINALS: SUITABLE FOR CONDUCTORS NOTED AND AS APPROVED
- F. ACCEPTABLE MANUFACTURERS CUTLER-HAMMER.
- 20. EQUIPMENT A. FANS
 - PROVIDE CENTRIFUGAL TYPE, NON-OVERLOADING DESIGN EXCEPT AS NOTED WITH MINIMUM CAPACITIES AS NOTED AND WITH CERTIFIED RATINGS BY AMCA. WHEEL SHALL BE FACTORY BALANCED STATICALLY AND DYNAMICALLY. BRAKE HORSEPOWER RATINGS SHALL NOT BE MORE THAN 5 PERCENT ABOVE WHAT IS NOTED ON DRAWINGS. DRIVES SHALL BE MATCHED, MULTIPLE V-BELT DRIVE UNLESS OTHERWISE NOTED WITH

MINIMUM CAPACITY OF 1.4 TIMES RATED MOTOR HP. PULLEYS SHALL BE

MOTOR PULLEY SHALL BE VARIABLE PITCH DIAMETER EXCEPT FANS WITH

- VARIABLE INLET VANES. SUPPLY AND INSTALL ONE FIXED PITCH PULLEY CHARGE AS REQUIRED PER FAN TO BALANCE SYSTEMS. COMPANION COMPLIANCE WITH OSHA REGULATIONS AND WITH TACHOMETER
- PROVIDE REMOVABLE FLANGED SCREENS AT INLETS OR OUTLETS WHERE NO CONNECTING DUCTWORK IS INDICATED.
- LOCATIONS. MINIMUM L-10 LIFE RATING; 50,000 HOURS PER AFBMA STANDARD B-10 OR 250,000 HOURS AVERAGE (B-50) LIFE AT MAXIMUM 2) CABINET FANS SHALL HAVE ACOUSTICALLY INSULATED GALVANIZED STEEL FAN HOUSING, DIRECT DRIVEN CENTRIFUGAL FAN (S), INTERNAL VIBRATION ISOLATION,
- REQUIRED ON PLANS. FANS SHALL BE SIMILAR TO GREENHECK SP. B. ELECTRICAL HEATERS
- GRILLES, HEATING FINS AND THROW-AWAY TYPE FILTERS. PROVIDE UNITS WITH ELECTRIC THERMOSTAT WITH CAPILLARY TUBES INTEGRALLY MOUNTED IN CABINET WITH OVERHEAT CUT OUT. BULB AND CAPILLARY TYPE THERMOSTAT SHALL SENSE TEMPERATURE ALONG ENTIRE LENGTH OF HEATING
- DUCTLESS & DUCTED AIR-COOLED SPLIT SYSTEM AIR CONDITIONING/HEAT PUMP UNITS PROVIDE DUCTLESS AIR-COOLED SPLIT SYSTEM AIR CONDITIONING/HEAT PUMP

BASEBOARD HEATERS SHALL BE WALL MOUNTED DESIGN. EPOXY/POWDER COATED

STEEL BODY AND PANEL WITH STAINLESS STEEL ELEMENTS AND ALUMINUM FINS.

- 2) INDOOR FAN COIL SHALL BE WALL MOUNTED. 3) DUCTED INDOOR FANCOIL SHALL BE CONCEALED LOW PROFILE TYPE WITH FILTER
- 5) SYSTEM SHALL BE CAPABLE OF OPERATION DOWN TO MINUS 0 DEGREES F (LOW AMBIENT) AND SHALL BE PROVIDED WITH ALL NECESSARY CONTROLS, OPTIONS AND ACCESSORIES INCLUDING WINTER START CONTROL AND CRANKCASE HEATERS.

- INSTALL HORIZONTAL HOT-GAS DISCHARGE PIPING WITH A UNIFORM SLOPE DOWNWARD AWAY FROM COMPRESSOR.
- INSTALL HORIZONTAL SUCTION LINES WITH A UNIFORM SLOPE
- INSTALL TRAPS AND DOUBLE RISERS TO ENTRAIN OIL IN VERTICAL RUNS.

- NPS 1/2: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH. NPS 5/8: MAXIMUM SPAN, 60 INCHES; MINIMUM ROD SIZE, 1/4 INCH.
- NPS 1: MAXIMUM SPAN, 72 INCHES; MINIMUM ROD SIZE, 1/4 INCH. NPS 1-1/4: MAXIMUM SPAN, 96 INCHES; MINIMUM ROD SIZE, 3/8 INCH.
 - STARTING SHALL BE THROUGH AUTOMATIC POSITION ONLY. "HAND" POSITION SHALL BE FOR MAINTENANCE OPERATION ONLY. 2) SAFETY DEVICES FOR ALL SYSTEMS, EXCEPT AS OTHERWISE NOTED BELOW.
 - ONE FREEZE PROTECTION THERMOSTAT PER COIL SECTION, WIRED TO STOP

PRODUCTS OF COMBUSTION BE SENSED.

A. FURNISH AND INSTALL A COMPLETE ELECTRIC OR ELECTRONIC CONTROL SYSTEM TO

CONTROL WORK SHALL BE INSTALLED BY THE HVAC CONTRACTOR.

PROVIDE TEMPERATURE CONTROL AS SPECIFIED UNDER DESCRIPTION OF OPERATION.

TO MAKE THIS SYSTEM COMPLETE. ALL WIRING SHALL BE 24 VOLT. COORDINATE WITH

MANUFACTURER FOR INTERCONNECTION WITH CONTROLS INCLUDED IN EQUIPMENT. ALL

EXHAUST FANS. SUCH AS GENERAL OR TOILET (OPERATING INDEPENDENTLY): ALL

POSITIONS IN SERIES WITH MOTOR CONTROLLER HOLDING COIL CIRCUIT. REMOTE

SAFETY DEVICES SHALL BE INTERLOCKED WITH "HAND" AND "AUTOMATIC"

B. WORK SHALL INCLUDE ALL WIRING, CONTROL EQUIPMENT, AND ACCESSORIES NECESSARY

SUPPLY FAN. THERMOSTAT SHALL BE AUTOMATIC RESET TYPE. FOR SYSTEMS OVER 2,000 CFM, A DUCT MOUNTED SMOKE DETECTOR OF THE IONIZATION TYPE LOCATED IN THE RETURN DUCT SHALL STOP THE SUPPLY FAN AND ASSOCIATED INTERLOCKED EQUIPMENT SHOULD

E. **SEQUENCE**

C. ACCEPTABLE MANUFACTURERS

1) JOHNSON CONTROLS.

2) HONEYWELL, INC.

3) OR APPROVED EQUAL

D. OPERATION OF TYPICAL CONTROL SAFETY DEVICES.

- 1) CONSTANT VOLUME SYSTEM
 - WAREHOUSE VENTILATION FAN TO OPERATE WITH MOTOR STARTER AND THERMOSTAT. INTERLOCK OPERATION OPEN THE MOTORIZED DAMPER WHEN FAN IS RUNING. PROVIDE ALL TRANSFORMERS AND RELAYS AS REQUIRED. COORDINATE WITH ELECTRICAL CONTRACTOR TO PROVIDE COMPLETE WORKING SYSTEM.

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> > MCF PROJECT #21177

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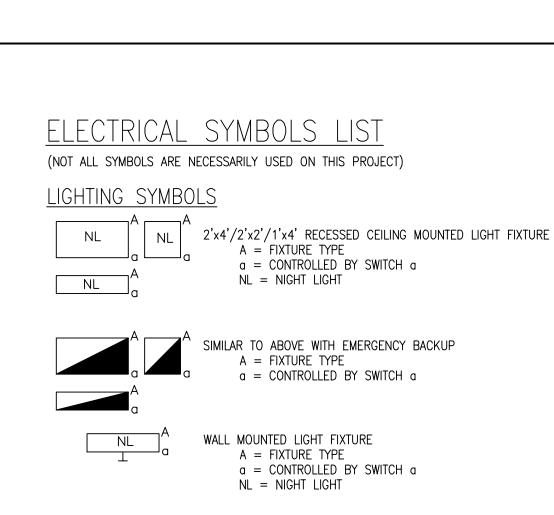
MECHANICAL SPECIFICATIONS

- 1) EXPOSED: INDOOR DUCTS, PIPING OR EQUIPMENT LOCATED IN MECHANICAL B. FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER. EQUIPMENT ROOMS AND IN AREAS, WHICH WILL BE VISIBLE WITHOUT REMOVING C. PITCH, EXCEPT AS NOTED. CEILINGS OR OPENING ACCESS PANELS.
 - EQUIPMENT ROOMS) AND OUTSIDE THE BUILDING ENVELOPE SUPPLY/RETURN/OUTSIDE AIR SHALL BE 2 IN., TYPE D-1 WITH VAPORSEAL.

- LOW TEMP 40 TO 100 DEGREES F, UP TO 4 IN., SHALL BE 1-IN. THICK, TYPE
- c. ALL REFRIGERANT LIQUID & SUCTION LINES SHALL BE ½-IN. THICK, TYPE P-6 WITH VAPORSEAL. 12. PIPING, VALVES AND FITTINGS TO BE INSULATED
- CONDENSATE DRAIN PIPING B. MATERIAL
- JOHNS MANVILLE MICRO-LOK HP. 2) TYPE P-4: MINIMUM 1 LB DENSITY FIBERGLASS FITTING INSERTS, MAXIMUM 0.28 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE SIMILAR TO MANVILLE HI-LO TEMP INSULATION INSERTS
- ARMSTRONG ARMAFLEX II.
- 2) TYPE F-4: ALUMINUM JACKETING WITH MINIMUM 0.016 IN. WALL THICKNESS AND D. OUTDOOR PIPING
- E. INSTALLATION BEFORE APPLYING INSULATION, ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED. 2) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAP STRIPS
 - VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH
 - SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.
 - 10) RELAYS TO SUPPLEMENT AUXILIARY CONTACTS IN CONTROLLER. MINIMUM
 - 2) SQUARE D. ALLEN BRADLEY
 - 1) GENERAL (APPLIES TO ALL FAN TYPES EXCEPT AS NOTED).
 - SHEAVES SHALL MAINTAIN BELTS PARALLEL. BELT GUARDS SHALL BE IN
 - BEARINGS BALL ROLLER OR TAPER. PROVIDE PRESSURE TYPE LUBRICATING FITTINGS WITH PRESSURE RELIEF FITTINGS EXTENDED TO ACCESSIBLE
 - INTEGRAL LOUVERED FACE GRILLE WITH LIGHT, AND OUTLET DUCT CONNECTION WITH SELF-ACTING BACKDRAFT DAMPER. PROVIDE WALL VENTS OR ROOF CAPS AS
 - ELEMENT. PROVIDE A MANUAL 2-SPEED SWITCH, FAN DELAY SWITCH AND HIGH LIMIT THERMAL CUTOUT AUTOMATIC RESET TYPE, WIRED TO EACH HEATING
 - REFRIGERANT PIPING AND REMOTE WALL MOUNTED MICROPROCESSOR BASED WIRED THERMOSTAT.
 - 4) INDOOR FAN/COIL UNIT SHALL INCLUDE AN INTEGRAL INTERNAL CONDENSATE
 - COMPRESSORS AND SHALL HAVE A 5-YEAR MANUFACTURER'S WARRANTY. 21. AUTOMATIC CONTROLS - GENERAL REQUIREMENTS

- OPENING FOR FAN SPEED MEASUREMENTS. MANUFACTURER SHALL PROVIDE REPLACEMENT FIXED PITCHED SHEAVES WHERE NEEDED TO
- CABINET HEATERS SHALL BE RECESSED, BLOW THROUGH TYPE, WITH DIRECT DRIVEN DOUBLE INLET FORWARD CURVED CENTRIFUGAL FANS, TWO SPEED PERMANENT SPLIT CAPACITOR MOTOR WITH OVERLOAD PROTECTION, 16 GAUGE FURNITURE QUALITY STEEL INTERNAL INSULATED, INLET AND OUTLET DISCHARGE
- UNITS CONSISTING OF WALL OR CEILING CASSETTE FAN/EVAPORATOR COIL UNITS, REMOTE OUTDOOR AIR-COOLED CONDENSING UNIT, INTERCONNECTED
- BANK AND 2" FILTER.
- 6) UNIT COMPRESSORS SHALL BE HERMETIC SCROLL TYPE INVERTER DRIVEN

SINGLE TOILET AND JANITOR CLOSET FANS SHALL ENERGIZE VIA A WALL SWITCH. BUILT-IN FAN CONTROL RUN DETECTOION FROM MOTION SENSOR. COORDINATE WITH ELECTRICAL CONTRACTOR TO PROVIDE COMPLETE WORKING SYSTEM.



WALL MOUNTED LIGHT FIXTURE A = FIXTURE TYPEa = CONTROLLED BY SWITCH a NL = NIGHT LIGHT

STRIP LIGHT FIXTURE - TYPE AS NOTED

A = FIXTURE TYPEa = CONTROLLED BY SWITCH a SIMILAR TO ABOVE WITH EMERGENCY BACKUP A = FIXTURE TYPFa = CONTROLLED BY SWITCH a UNDERCABINET LIGHT FIXTURE A = FIXTURE TYPE

> CEILING MOUNTED/RECESSED FIXTURE A = FIXTURE TYPEa = CONTROLLED BY SWITCH aSIMILAR TO ABOVE WITH EMERGENCY BACKUP A = FIXTURE TYPEa = CONTROLLED BY SWITCH a

WALL MOUNTED LIGHT FIXTURE A = FIXTURE TYPEa = CONTROLLED BY SWITCH a SIMILAR TO ABOVE WITH EMERGENCY BACKUP A = FIXTURE TYPEa = CONTROLLED BY SWITCH a ACCENT LIGHT OR WALL WASHER A = FIXTURE TYPE

> a = CONTROLLED BY SWITCH aSIMILAR TO ABOVE WITH EMERGENCY BACKUP A = FIXTURE TYPEa = CONTROLLED BY SWITCH a

> > LIGHT TRACK-TYPE 'A' WITH TRACK

MOUNTED FIXTURE TYPE 'B' CEILING MOUNTED EXIT LIGHT - DIRECTIONAL ARROWS WHERE INDICATED - SHADED AREAS INDICATE ILLUMINATED FACE/FACES W = WALL MOUNTED

E = END MOUNTED

C = CEILING MOUNTED

EMERGENCY BATTERY LIGHT UNIT A = FIXTURE TYPE

> REMOTE LIGHT HEADS FOR EMERGENCY BATTERY LIGHT UNIT TYPE AS NOTED

POWER SYMBOLS

SINGLE POLE SWITCH 2 = DOUBLE POLE3 = THREE-WAY4 = FOUR-WAYa = CONTROLS SWITCH LEG 'a' D = DIMMERDR = DOORK = KEY OPERATEDMO = MOMENTARY CONTACT T = TIMER SWITCHP = PILOT LIGHTLV = LOW VOLTAGEDISCONNECT SWITCH - TOGGLE TYPE WITH THERMAL OVERLOAD -DISCONNECT SWITCH - TOGGLE TYPE MOTOR RATED, 20A, 1P, UON VACANCY SENSOR, WALL MOUNTED VACANCY SENSOR, CEILING MOUNTED OCCUPANCY SENSOR, CEILING MOUNTED

OCCUPANCY SENSOR, WALL MOUNTED

PHOTOCELL SENSOR, WALL MOUNTED 20A, 125V DUPLEX RECEPTACLE - FLUSH WALL MOUNTED CONTROLLED FROM WALL SWITCH "a"

20A, 125V DUPLEX RECEPTACLE — FLUSH WALL MOUNTED, TAMPER

20A, 125V DUPLEX RECEPTACLE WITH DUAL USB CHARGING OUTLETS FLUSH WALL MOUNTED

20A, 125V DUPLEX RECEPTACLE - FLUSH WALL MOUNTED,

20A, 125V QUADRUPLEX RECEPTACLE — FLUSH WALL MOUNTED

20A, 125V ISOLATED GROUND, DUPLEX RECEPTACLE, FLUSH WALL

20A, 125V DUPLEX RECEPTACLE, FLUSH WALL MOUNTED, GFI TYPE 20A, 125V EMERGENCY DUPLEX RECEPTACLE, FLUSH WALL MOUNTED

SINGLE RECEPTACLE, FLUSH WALL MOUNTED

20A, 125V DUPLEX RECEPTACLE, FLUSH FLOOR MOUNTED 20A, 125V QUADRUPLEX RECEPTACLE, FLUSH FLOOR MOUNTED

PEDESTAL MOUNTED 20A, 125V DUPLEX RECEPTACLE

PEDESTAL MOUNTED 20A, 125V QUADRUPLEX RECEPTACLE

PENDANT MOUNTED 20A, 125V DUPLEX RECEPTACLE

PENDANT MOUNTED 20A, 125V QUADRUPLEX RECEPTACLE

UTILITY METER, UON

SPECIAL PURPOSE RECEPTACLE, FLUSH FLOOR MOUNTED, A = TYPE SPECIAL PURPOSE RECEPTACLE, FLUSH WALL MOUNTED, A = TYPE

WALL MOUNTED CLOCK D = DOUBLE FACE

MOTOR CONTROLLER COMBINATION MOTOR CONTROLLER AND DISCONNECT SWITCH AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED

UNFUSED DISCONNECT SWITCH SWITCH AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED FUSED DISCONNECT SWITCH SWITCH AMPS/FUSE AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED ENCLOSED CIRCUIT BREAKER TRIP AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED

POWER POLE SURFACE MOUNTED PANELBOARD FLUSH MOUNTED PANELBOARD

CEILING MOUNTED JUNCTION BOX

FLUSH WALL MOUNTED JUNCTION BOX FLUSH FLOOR MOUNTED JUNCTION BOX

PUSH BUTTON K = KEY OPERATEDH = HOLD UPP = PANICEPO = EM. POWER OFF EXISTING CONDUIT/EQUIPMENT TO BE REMOVED

POINT OF CONNECTION POINT OF DISCONNECTION

————— UNDERGROUND CONDUIT/WIRING

FIRE ALARM SYMBOLS

CEILING MOUNTED SPACE SMOKE DETECTOR F = MOUNTED UNDER RAISED FLOOR DUCT SMOKE DETECTOR CEILING MOUNTED CARBON MONOXIDE DETECTOR SINGLE/MULTI STATION SMOKE ALARM SINGLE/MULTI STATION CARBON MONOXIDE ALARM SINGLE/MULTI STATION SMOKE/CARBON MONOXIDE ALARM

THERMAL DETECTOR RATE-OF-RISE F = FIXED TEMPERATURESPRINKLER WATERFLOW SWITCH SPRINKLER PRESSURE SWITCH SPRINKLER TAMPER SWITCH

FIRE ALARM PULL STATION FIRE ALARM TELEPHONE JACK

COMBINATION FIRE ALARM SPEAKER AND STROBE LIGHT UNIT -FLUSH WALL MOUNTED

FIRE ALARM SPEAKER - FLUSH WALL MOUNTED C = CEILING MOUNTEDCOMBINATION FIRE ALARM HORN AND STROBE LIGHT UNIT, FLUSH

FIRE ALARM HORN — FLUSH WALL MOUNTED C = CEILING MOUNTED

LOW FREQUENCY SOUNDER (520 HZ) - FLUSH WALL MOUNTED

COMBINATION FIRE ALARM BELL AND STROBE LIGHT UNIT, FLUSH

FIRE ALARM BELL, FLUSH WALL MOUNTED

FIRE ALARM MONITOR MODULE

FIRE ALARM CONTROL MODULE DOOR HOLDERS

ELECTROMAGNETIC DOOR RELEASE

ELEVATOR RECALL TIE-IN POINT FLUSH WALL MOUNTED STROBE LIGHT UNIT

REMOTE INDICATOR LIGHT

CEILING MOUNTED STROBE LIGHT UNIT

VOICE/DATA/P.A. SYMBOLS

WALL MOUNTED PUBLIC ADDRESS SPEAKER D = DUAL HORN

CEILING MOUNTED PUBLIC ADDRESS SPEAKER

D = DUAL HORN VOICE & DATA OUTLET LOCATION WITH 1" CONDUIT TERMINATED IN A $\mathbb{T}_{\#}/\#$ 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING

#/# = # OF VOICE JACKS/# OF DATA JACKS VOICE OUTLET LOCATION WITH 1" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING P = PUBLICF = FAXW = WALL MOUNTED

= # OF JACKS DATA OUTLET LOCATION WITH 1" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING # = # OF JACKS

TELEVISION OUTLET LOCATION WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING CLOSED CAPTION TV CAMERA OUTLET LOCATION WITH 3/4" CONDUIT

TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CLG CARD ACCESS STATION OUTLET LOCATION WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CLG

ABBREVIATIONS

ALM

AMM

BLDG

CCTV

COM

CONN

CONT

DISC

ELEV

ENCL

EXIST,EX

FDR

FLEX

FLUOR

(NOT ALL ABBREVIATIONS ARE NECESSARILY USED ON THIS PROJECT)

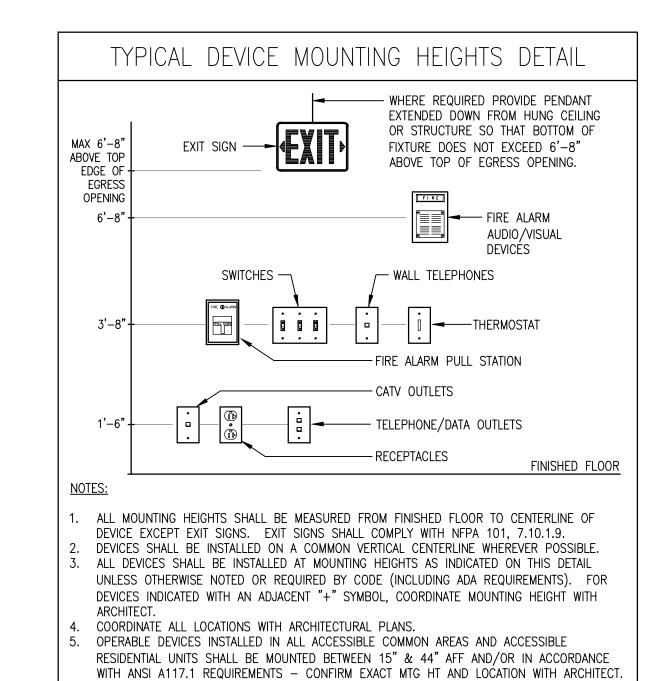
SINGLE POLE JUNCTION BOX TWO POLE KCMIL THOUSAND CIRCULAR MILS THREE POLE ΚV KILOVOLT AMPERE KILOVOLT AMPERE ABOVE COUNTER KW KII OWATT AIR CIRCUIT BREAKER KILOWATT HOUR ABOVE FINISHED FLOOR LIQUIDTIGHT FLEXIBLE ABOVE FINISHED GRADE METALLIC CONDUIT AUTHORITY HAVING JURISDICTION LIQUIDTIGHT FLEXIBLE AMPERE INTERRUPTING CAPACITY NON-METALLIC CONDUIT ALUMINUM LINE ISOLATION MONITOR AMMETER MEDICAL GAS ALARM PANEL ABOVE RAISED FLOOR MAXIMUM AUTOMATIC TRANSFER SWITCH METAL CLAD, MECH. CONTRACTOR **AUTOMATIC** MIN. CIRCUIT AMPERES AUDIO VISUAL MAIN CIRCUIT BREAKER AMERICAN WIRE GAUGE MOTOR CONTROL CENTER BELOW FINISHED CEILING MAIN DISTRIBUTION PANEL BREAK GLASS SWITCH MECHANICAL BASIC IMPULSE LEVEL MECHANICAL ROOM RUII DING MANUFACTURER CABINET MAIN FUSED SWITCH CATALOG MANHOLE, METAL HALIDE CONDUIT MICROPHONE CIRCUIT BREAKER MINIMUM CLOSED CIRCUIT TELEVISION MAIN LUG ONLY CIRCUIT MAX. OVERCURRENT PROTECTION CENTER LINE MOPD MAX. OVERCURRENT PROTECTION CEILING MOUNTED CONTROL MOUNTING CONDUIT ONLY MANUAL TRANSFER SWITCH COMMUNICATION NEUTRAL CONNECTED CONTINUATION NORMALLY CLOSED CURRENT TRANSFORMER NOT IN CONTRACT COPPER NORMALLY OPEN CABINET UNIT HEATER NOT TO SCALE DECIBEL ON CENTER DUAL ELEMENT FUSE(S) OIL CIRCUIT BREAKER DEGREE OUTSIDE DIAMETER DEGREE CELSIUS OVERHEAD DEGREE FAHRENHEI DIAMETER PUBLIC ADDRESS DISCONNECT PULL BOX DIVISION PUSH BUTTON SWITCH DOWN PLUMBING CONTRACTOR DISTRIBUTION PANEL BOARD PIPE HEATING CABLE DISCONNECT SWITCH DRAWING EXISTING TO REMAIN POTENTIAL TRANSFORMER ELECTRICAL CONTRACTOR REMOTE CONTROL SWITCH ELEVATION RELOCATED EXISTING **ELECTRICAL** ELEVATOR RECEPTACLE REFRIGERATOR **EMERGENCY** ELECTRICAL METALLIC TUBING REQUIRED **ENCLOSURE** RIGID GALVANIZED STEEL CONDUIT EQUIPMENT EXISTING SHALL BE REMOVED EXISTING SHALL BE REMOVED AND RETURN TO OWNER EXISTING SHALL BE REMOVED & RELOCATED SPRINKLER ALARM PANEL ELECTRIC REHEAT COIL **SCHEDULE** ELECTRIC WATER COOLER SERVICE ENTRANCE FXISTING SECONDARY **EXTERIOR** SECTION SOLID NEUTRAL FIRE ALARM ANNUNCIATOR PANEL **SPECIFICATION** FIRE ALARM CONTROL PANEL SPEAKER FURNISHED BY OTHERS SPKR SPRINKLER FAN COIL UNIT SURGE PROTECTION DEVICE FEEDER FUSED DISCONNECT SWITCH SWITCHBOARD FLOOR SUBSTATION FULL LOAD AMPERES SWITCHGEAR FI FXIRI F TO BE DETERMINED FLUORESCENT FIRE PROTECTION TFI FPHONE TEMPERATURE FREEZER FEET OR FOOT THERMOSTAT TAMPER PROOF GROUND TAMPER SWITCH GENERAL CONTRACTOR TELEVISION GENERATOR TYPICAL GROUND FAULT INTERRUPTER HIGH INTENSITY DISCHARGE UNIT HEATER UNDERGROUND UNLESS OTHERWISE NOTED HIGH PRESSURE CONTACT SWITCH VOLT OR VOLTAGE HFIGHT VOLT AMPERE HIGH VOLTAGE VARIABLE FREQUENCY DRIVE HERTZ VOLTMETER INSIDE DIAMETER **VAPORPROOF** ISOLATED GROUND INCANDESCENT **WEATHERPROOF** WATERTIGHT INSTRUMENT ISOLATED POWER CENTER XFMR TRANSFORMER

GENERAL FIRESTOPPING NOTE

ISOLATED POWER CENTER-X-RAY

EXPLOSION PROOF

CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR EXCEEDING WALL/CEILING/FLOOR FIRE ASSEMBLY RATINGS FOR ALL PENETRATIONS. CONTRACTOR SHALL VERIFY LOCATION AND RATING OF ALL FIRE ASSEMBLIES AND PROVIDE INTUMESCENT COLLARS AT ALL PENETRATIONS AND/OR FIRE RATED CAULKING AS REQUIRED.



GENERAL ELECTRICAL NOTES:

- 1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS AND FIELD DIMENSIONS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM AND SPACE REQUIREMENTS.
- 2. PERFORM ALL WORK IN STRICT ACCORDANCE WITH NATIONAL ELECTRICAL CODE (N.E.C.-2017) AS ADOPTED BY THE STATE OF NEW JERSEY, OSHA REQUIREMENTS, ALL FEDERAL, STATE, AND LOCAL CODES AND ALL OWNER REQUIREMENTS.
- 3. INCLUDE ALL TEMPORARY POWER AND LIGHTING, PERMIT, LICENSE, AND INSPECTION COSTS IN BID.
- 4. CONTRACTOR SHALL ISSUE IN WRITING TO ARCHITECT/ENGINEER ANY SCOPE OF WORK DISCREPANCIES AND/OR QUESTIONS PRIOR TO SUBMISSION OF BID.
- 5. CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND SPECIFICATIONS AND VISIT THE SITE TO BECOME ACQUAINTED WITH THE CONSTRUCTION, SITE AND THE EXTENT OF THE WORK PRIOR TO SUBMISSION OF BID.
- 6. COORDINATE ALL REQUIRED SHUTDOWNS WITH THE OWNER (AND UTILITY COMPANY WHERE APPLICABLE) A MINIMUM OF FOURTEEN (14) DAYS IN ADVANCE. INCLUDE OVERTIME COSTS IN BID TO PERFORM ALL SHUTDOWNS (INCLUDING SHUTDOWNS FOR AREAS WHICH MAY BE UNOCCUPIED DURING CONSTRUCTION) AFTER NORMAL WORKING HOURS AS COORDINATED WITH THE OWNER. NO EXTRA CLAIMS OR COMPENSATION SHALL BE GRANTED FOR OVERTIME COSTS ASSOCIATED WITH PERFORMING SHUTDOWNS.
- 7. SECURE ALL SUPPORTS TO BUILDING STRUCTURE BY STEEL FOR VERTICAL SUPPORT AND BY MEANS OF TOGGLE BOLTS ON HOLLOW MASONRY UNITS, EXPANSION SHIELDS IN CONCRETE OR BRICK. MACHINE SCREWS ON METAL SURFACE, AND WOOD SCREWS ON WOOD CONSTRUCTION. NAILS, RAWL OR WOOD PLUGS NOT PERMITTED. SUPPORT HORIZONTAL RUNS OR METALLIC CONDUITS NOT MORE THAN 10 FT. APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.

8. PASS RACEWAYS OVER WATER, STEAM, OR OTHER PIPING WHEN

- PULL BOXES ARE NOT REQUIRED. NO RACEWAY WITHIN 3 IN. OF STEAM OR HOT WATERS PIPES, OR APPLIANCES, EXCEPT CROSSINGS WHERE RACEWAY SHALL BE AT LEAST 1 IN. FROM PIPE COVER.
- 9. FURNISH FISH WIRE IN EACH RACEWAY RUN OVER 10 FT IN WHICH WIRING IS NOT INSTALLED.
- 10. CUT STEEL CONDUIT ENDS SQUARE, REAM SMOOTH, PAINT MALE THREADS OF FIELD THREADED CONDUIT WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH CONDUIT COUPLINGS.
- 11. HORIZONTAL OR CROSS RUNS IN PARTITIONS AND WALLS NOT PERMITTED.

- 12. ROUTE ALL CONDUITS AND CABLES PARALLEL OR PERPENDICULAR TO BUILDING LINES WHERE POSSIBLE.
- 13. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR
- 14. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF NORMAL AND EMERGENCY CIRCUITS. COMMON BOXES: PROVIDE BARRIERS BETWEEN EMERGENCY AND NORMAL WIRING.
- 15. LEAVE WIRE SUFFICIENTLY LONG TO PERMIT MAKING FINAL CONNECTIONS
- 16. WIRE COLOR CODING: PER CODE. WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION FOR OVERLAP COLOR TAPING OF CONDUCTORS (MINIMUM LENGTH 6") IN ACCESSIBLE LOCATIONS. COLOR CODING, ONCE SELECTED, MUST BE USED CONSISTENTLY FOR THE ENTIRE PROJECT
- 17. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32°F (0°C). PROVIDE CABLE SUPPORTS FOR WIRE IN RISER CONDUITS AS REQUIRED BY CODE.
- 18. SET BOXES SQUARE AND TRUE WITH BUILDING FINISH. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRONS.
- 19. VERIFY EXACT LOCATIONS AND MOUNTING HEIGHT OF ALL LIGHT FIXTURES, SWITCHES, RECEPTACLES, OUTLETS, FIRE ALARM DEVICES, VOICE/DATA DEVICES AND OTHER EQUIPMENT WITH ARCHITECTURAL DRAWINGS AND IN THE FIELD PRIOR TO ROUGH-IN. IN CENTERING OUTLETS AND LOCATION BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE, AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO
- 20. A "+" SYMBOL NEXT TO A DEVICE INDICATES A NON-STANDARD DEVICE MOUNTING HEIGHT - CONTRACTOR SHALL COORDINATE EXACT MOUNTING HEIGHT PRIOR TO ROUGH-IN.
- 21. LOCATIONS INDICATED FOR LOCAL WALL SWITCHES ARE SUBJECT TO MODIFICATIONS AT OR NEAR DOORS. COORDINATE WITH ARCHITECT AND INSTALL SWITCH ON SIDE OPPOSITE HINGE. VERIFY FINAL HINGE LOCATIONS IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.

22. PROVIDE PULL BOXES AS INDICATED AND WHEREVER

LOCATIONS WITH OTHER TRADES.

NECESSARY TO FACILITATE PULLING OF WIRE AND COORDINATE

- 23. FOR EMPTY RACEWAY RUNS, PROVIDE PULL BOXES EVERY 100FT AND AS INDICATED. COORDINATE LOCATIONS WITH OTHER TRADES.
- 24. JUNCTION AND PULL BOXES: LOCATE GENERALLY NOT EXPOSED IN FINISHED SPACES. WHERE NECESSARY, REROUTE CONDUITS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. COVERS OF JUNCTION AND PULL BOXES SHALL BE ACCESSIBLE
- 25. SUPPORT JUNCTION AND PULL BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON CONDUITS.
- 26. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- 27. FIRESTOPPING SHALL BE INSTALLED WHENEVER WIRING OR
- RACEWAYS CROSS FIRE RATED CONSTRUCTION. 28. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCES THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION, SHOP AND RECORD DRAWINGS AND APPROVALS.
- 29. DEMONSTRATE PERFORMANCE AND CAPACITY OF ALL SYSTEMS AND EQUIPMENT.
- 30. AT COMPLETION OF PROJECT, PROVIDE NEW UPDATED TYPE WRITTEN PANELBOARD DIRECTORIES FOR ALL NEW PANELBOARDS AND ANY EXISTING PANELBOARDS THAT HAVE BEEN MODIFIED.
- 31. PROVIDE REPRODUCIBLE "AS BUILT" DRAWINGS INDICATING AS-INSTALLED CONDITIONS AFTER COMPLETION OF THE
- 32. THE CONTRACTOR SHALL GUARANTEE AND SERVICE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE FINAL ACCEPTANCE OF THE INSTALLATION.
- 33. THE CONTRACTOR SHALL, DURING THE PERIOD OF THE GUARANTEE, REPLACE OR REPAIR AT HIS OWN EXPENSE ANY PIECE OF EQUIPMENT AND/OR MATERIAL WHICH IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE DONE AS SOON AS NOTIFIED BY THE ENGINEER OR AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ALSO REPAIR ALL DAMAGE TO SURROUNDING WORK CAUSED BY THE FAILURE, REPAIR OR REPLACEMENT OF DEFECTIVE EQUIPMENT.
- 34. THE CONTRACTOR SHALL COORDINATE LOCATION(S) OF ALL PLENUM RATED SPACE(S) WITH THE MC. FC SHALL PROVIDE METAL CONDUIT OR MC CABLE WITHIN PLENUM RATED SPACE(S).

NI-CAD BATTERY, AND REMOTE CAPACITY.

			LIGH	HT FIX	TURE	SCHE	DULE		
	DECORIDEION	MANUFACTURER/		LAMP DA	TA	FIXT	FIXT	MOUNTING	DEMINIC
Έ	DESCRIPTION	CATALOG #	QTY	TYPE	WATTS	WATTS		MOUNTING	REMARKS
	HIGH BAY 18,000 LUMENS LED	LUX DYNAMICS #L-2*-SA-850-2-U10 H05 4P10	INCL	LED	116	116	120- 277	SUSPENDED	PROVIDE WITH 18,000 LUMENS OUTPUT, 0-10V 10% DIMMING, AND 4-POINT CABLE MOUNTING OPTION. MOUNT FIXTURES SUCH THAT THE BOTTOM OF THE FIXTURE IS 17' AFF.
	HIGH BAY 12,000 LUMENS LED	LUX DYNAMICS #L-1-SA-850-2-U10 H05 4P10	INCL	LED	78	78	120- 277	SUSPENDED	PROVIDE WITH 12,000 LUMENS OUTPUT, 0-10V 10% DIMMING, AND 4-POINT CABLE MOUNTING OPTION. MOUNT FIXTURES SUCH THAT THE BOTTOM OF THE FIXTURE IS 17' AFF.
	2'X4' 4800 LUMEN LED TROFFER	MARK ARCHITECTURAL #WHSPR 2X4 80CRI 35K 4800LM MIN10 MVOLT SWC ZT	INCL	LED	41.2	41.2	120- 277	LAY-IN	PROVIDE WITH 4800 LUMEN OUTPUT, 80CRI, 3500K COLOR TEMPERATURE, AND 0-10V 1% DIMMING.
	2'X4' 3000 LUMEN LED TROFFER	MARK ARCHITECTURAL #WHSPR 2X4 80CRI 35K 3000LM MIN10 MVOLT SWC ZT	INCL	LED	25.4	25.4	120- 277	LAY-IN	PROVIDE WITH 3000 LUMEN OUTPUT, 80CRI, 3500K COLOR TEMPERATURE, AND 0-10V 1% DIMMING.
	2'X4' 6000 LUMEN LED TROFFER	MARK ARCHITECTURAL #WHSPR 2X4 80CRI 35K 6000LM MIN10 MVOLT SWC ZT	INCL	LED	52.9	52.9	120- 277	LAY-IN	PROVIDE WITH 6000 LUMEN OUTPUT, 80CRI, 3500K COLOR TEMPERATURE, AND 0-10V 1% DIMMING.
	EXTERIOR LED WALLPACK	LITHONIA #WSQ LED P1 40K SR2 277 PE **	INCL	LED	20	20	277	WALL	PROVIDE 4000K COLOR TEMPERATURE, TYPE SR2 DISTRIBUTION, 277V OPTION, AND INTEGRATED PHOTOELECTRIC CELL FOR AUTOMATIC DAWN TO DUSK OPERATION. **FINISH BY ARCHITECT
	220 LUMENS EMERGENCY BATTERY WALL PACK	LITHONIA #ELM2L	INCL	LED	1.2	2.4	120- 277	WALL	PROVIDE WITH WHITE THERMOPLASTIC HOUSING, NICAD BATTERY, AND DUAL ADJUSTABLE LED HEADS.
	DUAL LED EXTERIOR REMOTE	EXITRONIX #MLED2-*-WP	INCL	LED	1.5	3	DCV	WALL	PROVIDE WITH DUAL LED HEADS AND WEATHERPROOF OPTION. *HOUSING COLOR BY ARCHITECT.
	LED EXIT SIGN	EXITRONIX #QXT-R-WB-WH	INCL	LED	_	_	120/ 277	SEE DWG	E=END, C=CLG, W=WALL PROVIDE W/RED LED LAMP, WHITE THERMOPLASTIC HOUSING, NI-CAD BATTERY, CHEVRONS INDICATED ON PLANS, AND NUMBER OF FACES INDICATED ON PLANS.
	LED EXIT SIGN WITH DUAL LED HEADS AND REMOTE CAPACITY	EXITRONIX #VLED-U-WH-EL90-R	INCL	LED	_	_	120/ 277	SEE DWG	E=END, C=CLG, W=WALL PROVIDE W/RED LED LAMP, WHITE THERMOPLASTIC HOUSING, CHEVRONS INDICATED ON PLANS, NUMBER OF FACES INDICATED ON PLANS, QTY OF HEADS INDICATED ON PLANS,

Revisions lo. Date Description 11/17/21 | ISSUED FOR BID

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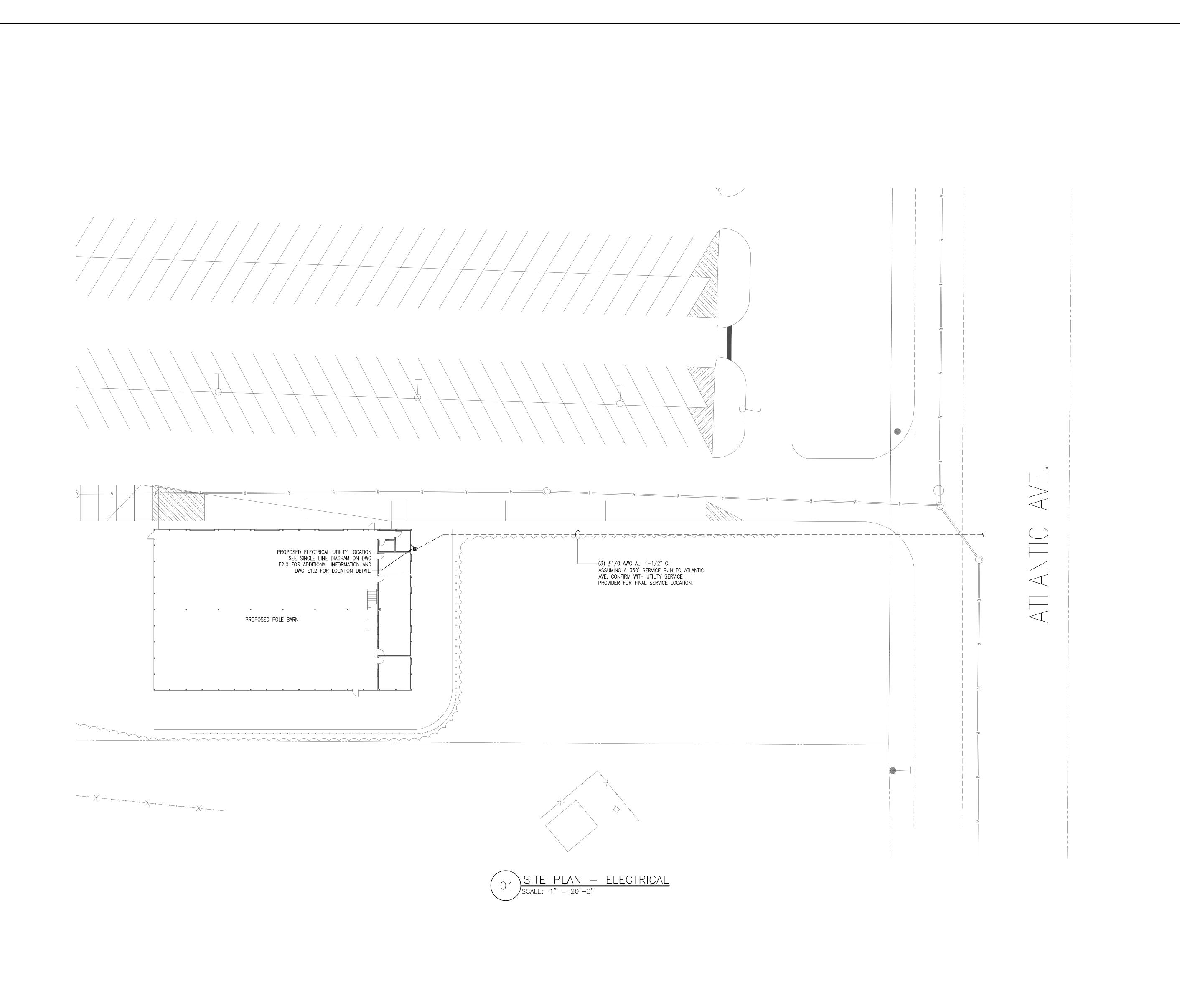
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5080 ATLANTIC AVE.

MAYS LANDING, NJ 08330 ELECTRICAL COVER SHEET



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NJ LIC. NO. 24GE04051000

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NJ AUTH. NO. 24GA28120100

MCE PROJECT #21177

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Project

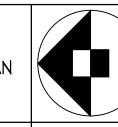
NEW MAINTENANCE BUILDING FOR ATLANTIC COUNTY

ATLANTIC COUNTY
INSTITUTE OF TECHNOLOGY

5080 ATLANTIC AVE.
MAYS LANDING, NJ 08330

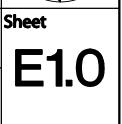
Prawing

ELECTRICAL SITE PLAN



Scale
AS NOTED

Drawn



DRAWING NOTES

- 1. CONNECT ALL EXIT SIGNS, INVERTERS, EMERGENCY WALL PACKS, AND EMERGENCY BATTERY BACK-UPS TO LOCAL CONSTANT HOT FEED AHEAD OF ANY SWITCHING UON.
- 2. ALL LIGHT FIXTURES INDICATED AS EMERGENCY ARE NORMAL/EMERGENCY OPERATION VIA NORMAL POWER W/BATTERY OR INVERTER BACK UP.
- 3. REFER TO DWG EO.O FOR THE LIGHT FIXTURE SCHEDULE. 4. REFER TO DWG E2.0 FOR THE LIGHTING CONTROL DEVICE SCHEDULE.
- 5. CONFIRM ALL DEVICE AND EQUIPMENT LOCATIONS WITH THE ARCHITECT AND OWNER PRIOR TO ANY PURCHASE OR ROUGH-IN. 6. CONTRACTOR SHALL CLOSELY COORDINATE AND ADJUST ALL

HVAC EQUIPMENT LOCATIONS WITH THE MECHANICAL

CONTRACTOR PRIOR TO ROUGH-IN SUCH THAT LIGHTING

- LAYOUT REMAINS AS INDICATED. 7. CONFIRM ALL POWER OVERCURRENT PROTECTION, WIRING AND DEVICE/DISCONNECT REQUIREMENTS FOR ALL EQUIPMENT PRIOR TO ROUGH-IN AND REPORT ANY DISCREPANCY WITH THE DESIGN TO THE ARCHITECT AND OWNER FOR RESOLUTION.
- 8. PRE-MANUFACTURED METAL-CLAD CABLE (MC) SHALL BE UTILIZED FOR ALL NORMAL BRANCH CIRCUITS IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILINGS AND WHERE PERMITTED BY ARTICLE #330 OF THE NATIONAL ELECTRICAL CODE ONLY. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH INTEGRAL GREEN INSULATED CONTINUOUS GROUND CONDUCTOR AND BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH OUTER METAL JACKET.
- 9. COORDINATE ROUTING OF ALL CONDUIT, CABLING, ETC. THROUGH CASEWORK W/CASEWORK INSTALLER PRIOR TO ANY PURCHASE OR ROÚGH-IN.
- 10. EC SHALL FIRE CAULK ALL EXISTING AND NEW CONDUIT PENETRATIONS IN FIRE WALLS WITHIN CONTRACT AREA TO MAINTAIN FIRE WALL RATING.
- 11. LIGHTING CONTROLS SHALL BE TESTED BY THE EC IN ACCORDANCE WITH ASHRAE 90.1 SECTION 9.4.3

<u>KEY NOTES</u>

12. ALL CONDUITS TRAVELING FROM OUTDOORS TO INDOORS

AND FROM A WARM ENVIRONMENT TO COLD SHALL BE

SEAL SHALL BE A CONDUIT BODY OR JUNCTION BOX

LOCATED ON THE HIGH TEMPERATURE SIDE OF THE

13. OCCUPANCY SENSORS LOCATED IN THE LARGE STORAGE

ENTERING THE COLDER SPACE.

VAPOR SEALED TO PREVENT CONDENSATION BUILDUP.THE

TRANSITION SEALED WITH ELECTRICAL DUCT SEAL OR A

NON-LATEX, CLOSED-CELL, EXPANDING FOAM SEALANT

LISTED FOR THE PURPOSE, INSTALLED IN THE CONDUIT

AREA AND MEZZANINE AREA SHALL BE PENDANT MOUNTED

SUCH THAT THE SENSOR IS AT THE SAME HEIGHT ABOVE

FINISHED FLOOR AS THE LIGHT FIXTURES IN THESE AREAS.

- 1) DIMMING EMERGENCY LIGHTING CONTROL UNIT (FOR EMERGENCY LIGHTS ONLY) SHALL WORK IN TANDEM WITH NORMAL DIMMING ROOM CONTROLLER (FOR NORMAL LIGHTS ONLY) UTILIZING THE SAME SENSORS. ALL STORAGE AND MEZZANINE LIGHT FIXTURES SHALL BE ON THE SAME SWITCH LEG. FEED (2)#12 + (1)#12G VIA 3/4°C FROM THE NORMAL ROOM CONTROLLERS LINE-SIDE TO THE NORMAL(SENSE) LINES TO THE EMERGENCY LIGHTING CONTROL UNIT.
- (2) PROGRAM OCCUPANCY SENSORS TO AUTOMATIC 50% DIMMING WHEN OCCUPANCY IS DETECTED WITH MANUAL CONTROL TO PROVIDE 100%.
- (3) MOUNT EXIT SIGN ON THE BOTTOM CHORD OF THE TRUSS. (4) PROVIDE EMERGENCY 2,000VA LIGHTING INVERTER BY IOTA MFR#IISM-2000-277IN-2770UT. FEED DESIGNATED LIGHT FIXTÜRES THROUGH EMERGENCY LIGHTING CONTROLS FROM

Rev	<i>is</i> ions	
No.	Date	Description
	11/17/21	ISSUED FOR BID

MOORE CONSULTING ENGINEERS, LLC 457 Oakshade Road Shamong, NJ 08088 Tel: (609) 268-0500 Fax: (609) 268-5050 JEFFREY A. MOORE, PE PROFESSIONAL ENGINEER NJ LIC. NO. 24GE04051000

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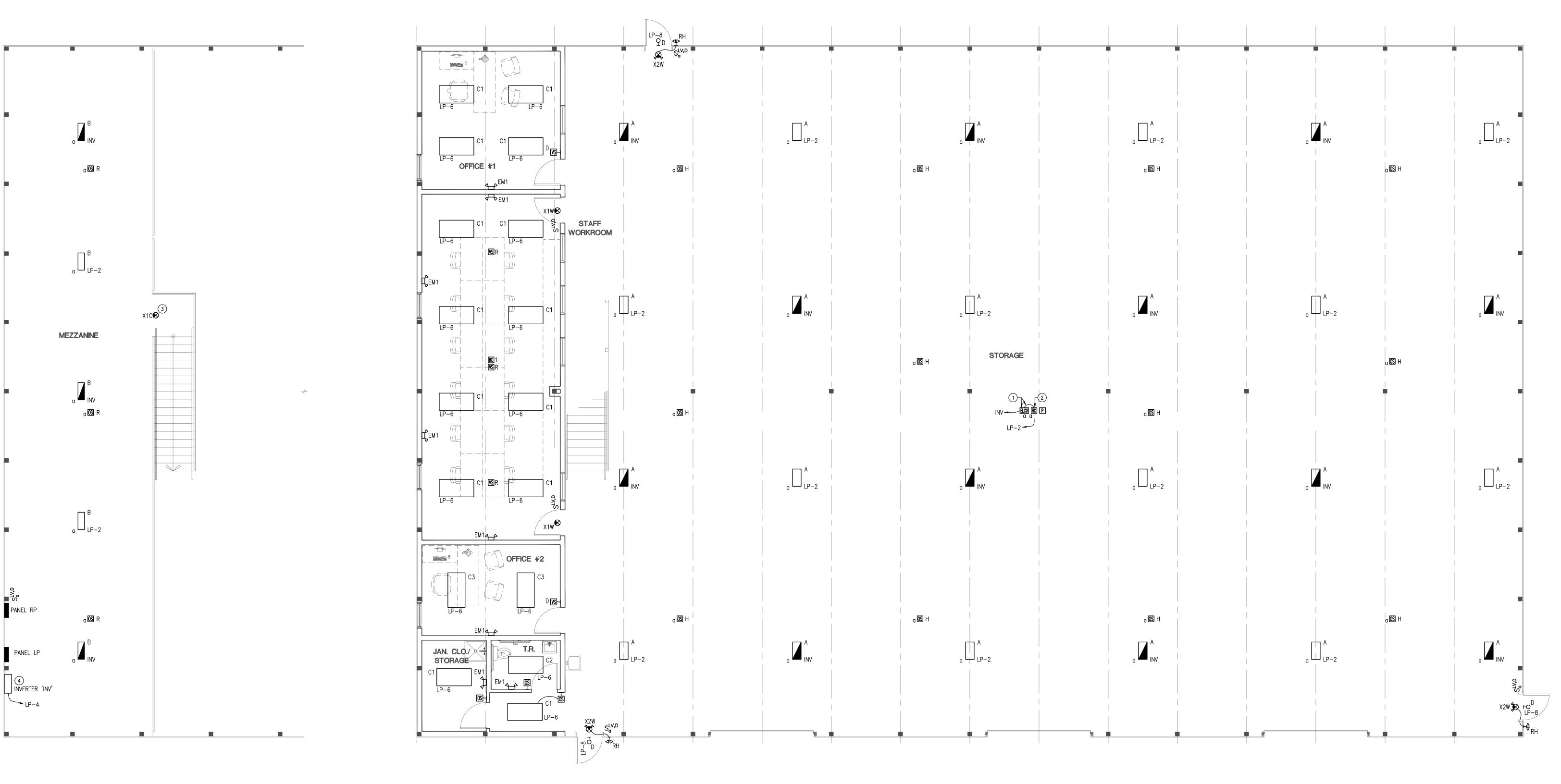
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NEW MAINTENANCE BUILDING FOR

ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY 5080 ATLANTIC AVE. MAYS LANDING, NJ 08330

ELECTRICAL LIGHTING FLOOR PLANS



DRAWING NOTES

- 1. A 24" MINIMUM SEPARATION SHALL BE MAINTAINED BETWEEN SINGLE AND TWO-GANG OUTLET AND SWITCH BOXES INSTALLED ON OPPOSITE SIDES OF ANY 2-HOUR (MAXIMUM) FIRE-RATED WALL/PARTITION. PROVIDE FIREPROOFING PUTTY PACKS OR OTHER FIREPROOFING LISTED FOR THIS PURPOSE WHERE REQUIRED BY SECTION 713.3.2 OF THE INTERNATIONAL BUILDING CODE. DO NOT INSTALL PANELBOARD BACK BOXES IN FIRE RATED WALLS. ALL EQUIPMENT AND DEVICES ARE NEW UNLESS OTHERWISE
- 2. CONFIRM ALL DEVICE AND EQUIPMENT LOCATIONS WITH THE ARCHITECT AND OWNER PRIOR TO ANY PURCHASE OR ROUGH-IN.
- 3. CONFIRM ALL POWER OVERCURRENT PROTECTION, WIRING AND DEVICE/DISCONNECT REQUIREMENTS FOR ALL EQUIPMENT PRIOR TO ROUGH-IN AND REPORT ANY DISCREPANCY WITH THE DESIGN TO THE ARCHITECT AND OWNER FOR RESOLUTION.
- 4. PROVIDE ALL DISCONNECT SWITCHES AS HEAVY-DUTY TYPE RATED WITH VOLTAGE AS REQUIRED AND AMPS, FUSING AND POLES AS INDICATED. DISCONNECT SWITCHES FOR INTERIOR EQUIPMENT SHALL BE NEMA 1 RATED UON. DISCONNECT SWITCHES FOR EXTERIOR EQUIPMENT SHALL BE WEATHERPROOF LOCKABLE HEAVY DUTY TYPE, NEMA 3R
- 5. COORDINATE ALL MECHANICAL AND PLUMBING EQUIPMENT LOCATIONS AND CONNECTIONS PRIOR TO ANY PURCHASE OR ROUGH-IN.
- 6. CONTRACTOR SHALL CLOSELY COORDINATE AND ADJUST ALL HVAC EQUIPMENT LOCATIONS WITH THE MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN SUCH THAT LIGHTING LAYOUT REMAINS AS INDICATED.
- 7. PRE-MANUFACTURED METAL-CLAD CABLE (MC) SHALL BE UTILIZED FOR ALL NORMAL BRANCH CIRCUITS IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILINGS AND WHERE PERMITTED BY ARTICLE #330 OF THE NATIONAL ELECTRICAL CODE ONLY. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH INTEGRAL GREEN INSULATED CONTINUOUS GROUND CONDUCTOR AND BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH OUTER METAL JACKET.
- 8. COORDINATE ROUTING OF ALL CONDUIT, CABLING, ETC. THROUGH CASEWORK W/CASEWORK INSTALLER PRIOR TO ANY PURCHASE OR ROUGH-IN.

KEY NOTES

9. EC SHALL FIRE CAULK ALL EXISTING AND NEW CONDUIT

10. COORDINATE FINAL LOCATIONS OF ALL TELECOM OUTLETS

OWNERS FURNITURE PACKAGE PROVIDER PRIOR TO

11. PROVIDE LOCKABLE IN-USE WEATHERPROOF (WP) EXTRA DUTY COVER FOR ALL EXTERIOR RECEPTACLES.

12. ALL CONDUITS TRAVELING FROM OUTDOORS TO INDOORS

AND FROM A WARM ENVIRONMENT TO COLD SHALL BE

TRANSITION SEALED WITH ELECTRICAL DUCT SEAL OR A

LISTED FOR THE PURPOSE, INSTALLED IN THE CONDUIT

SEAL SHALL BE A CONDUIT BODY OR JUNCTION BOX

NON-LATEX, CLOSED CELL, EXPANDING FOAM SEALANT

LOCATED ON THE HIGH TEMPERATURE SIDE OF THE

AND RECEPTACLES FOR DESKS WITH ARCH, OWNER AND

MAINTAIN FIRE WALL RATING.

PURCHASE OR ROUGH-IN.

ENTERING THE COLDER SPACE.

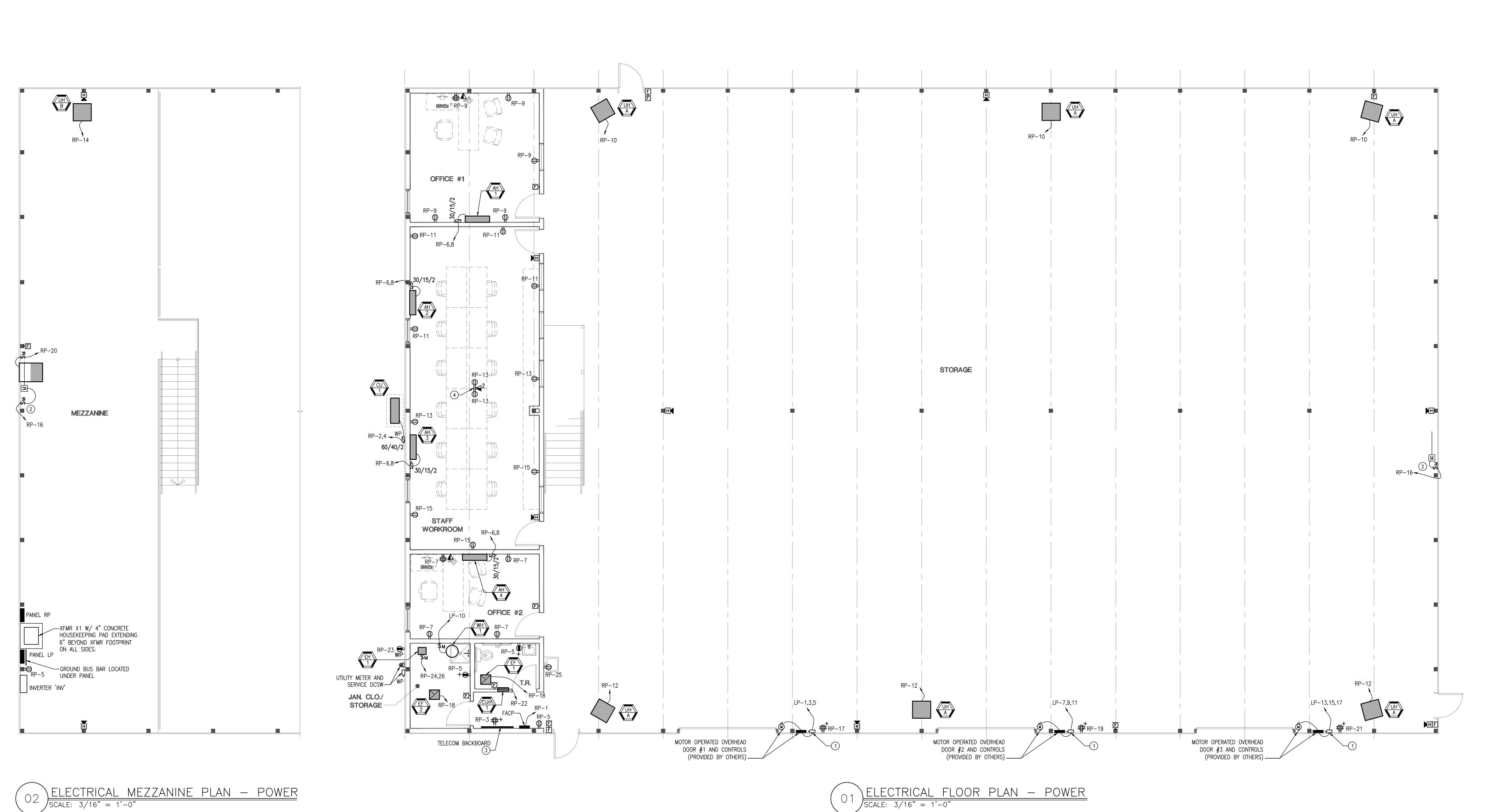
PENETRATIONS IN FIRE WALLS WITHIN CONTRACT AREA TO

- 1) EC SHALL PROVIDE DISCONNECT SWITCH AND ALL WIRING AND APPURTENANCES FOR A FULLY FUNCTIONING OVERHEAD DOOR IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COORDINATE WITH GC AND OWNER TO CONFIRM DISCONNECT SIZE, POWER REQUIREMENTS, WIRING, AND OVERCURRENT PROTECTION PRIOR TO ANY PURCHASE OR ROUGH-IN.
- 2 EC SHALL PROVIDE POWER FOR MOTORIZED DAMPERS, HVAC CONTROLS AND TRANSFORMERS COORDINATE
- (3) PLYWOOD BACKBOARD W/FIRE RETARDANT PAINT FOR TELECOM SERVICE DISTRÍBUTION. COORDINATE LOCATION VAPOR SEALED TO PREVENT CONDENSATION BUILDUP. THE AND SIZE WITH GC AND OWNER PRIOR TO ANY ROUGH-IN.
 - (4) EC SHALL PROVIDE LEGRAND TELE-POWER POLE #30TP-4WH OR EQUIVALENT WITH TWO DUPLEX RECEPTACLES AND TWO VOICE/DATA OUTLETS. COORDINATE COLOR AND TRIM WITH ARCHITECT AND OWNER PRIOR TO PURCHASE. INSTALL PER MANUFACTURER'S INSTRUCTIONS.

No. Date Description 11/17/21 | ISSUED FOR BID

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Al-07220 Al-07473

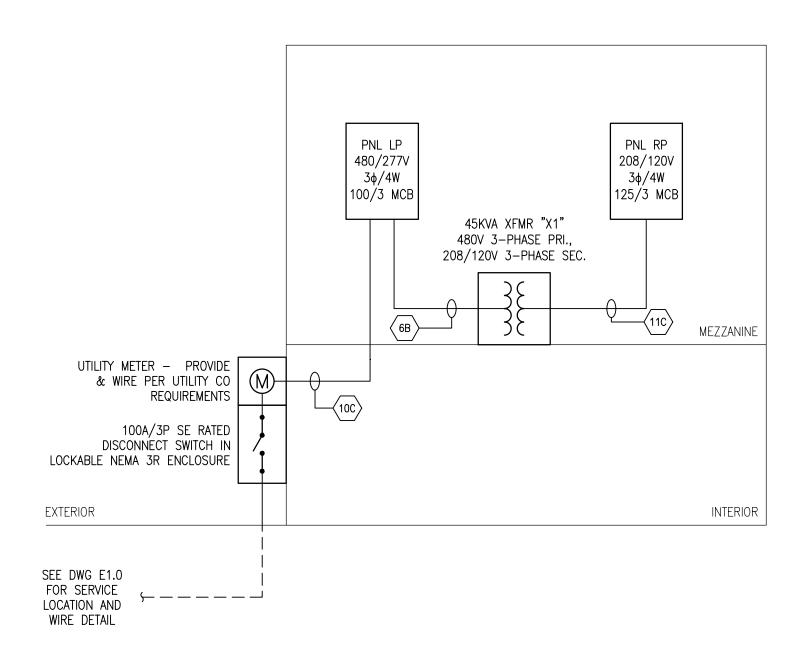
NEW MAINTENANCE BUILDING

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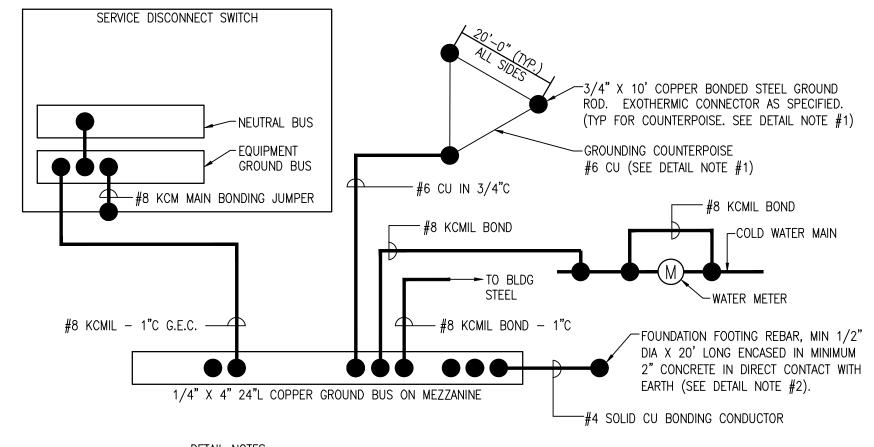
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ELECTRICAL POWER FLOOR PLANS





ELECTRICAL SINGLE LINE DIAGRAM



- **DETAIL NOTES:**
- 1. PROVIDE MULTIPLE GROUND RODS ONLY AS REQUIRED TO ACHIEVE 25 OHMS OR LESS RESISTANCE TO EARTH. TO PREVENT MUSHROOMING USE ROD DRIVE SLEEVE FOR INSTALLATION.
- 2. BOND FOUNDATION REBAR TO GROUNDING ELECTRODE SYSTEM PER NEW JERSEY DCA BULLETIN NO 02-2 USING A CLAMP LISTED FOR THE PURPOSE (BLACKBURN #JDLI OR APPROVED LISTED EQUAL). THE BONDING POINT SHALL REMAIN EXPOSED UNTIL INSTALLATION IS INSPECTED AND APPROVED BY THE BUILDING CODE OFFICIAL.



- 1	PANEL:		LP		480 /277	VOLTS,	3	PHASE	4 WI	RE	MAIN BUS AMPS		
LOC	CATION:	OUTS	SIDE OFFICE#2		M	OUNTING:	SUF	RFACE	FLUS	H	MAIN BRK 100 AMPS 3	P	
BU	JILDING:	ACIT MAIN	TENA NCE BUILD	DING		BUS	COF	PPER	ALUN	MINUM	NEUTRAL 100% AIC 22	,000	
FED	FROM:	SEE SING	SLE LINE DIAGRA	AM	GRO	UND BUS			THRU	FEED LUGS	LUGS ONLY		
FEEDE	R SIZE:	SEE SING	SLE LINE DIAGRA	AM	ISOL.	GND. BUS	\equiv		INTEC	GRAL SPD			
CKT	TRIP	DESCRIPTION	051015	MIN WIRE &	LOAD	PE	R PHASE (V	(A)	LOAD	MIN WIRE &	DECORPTION OF LOAD	TRIP	CKT
NO	AMPS	DESCRIPTION	OF LOAD	COND SIZE	(VA)	А	В	С	(VA)	CONDSIZE	DESCRIPTION OF LOAD	AMPS	NO
1	20/3	GARAGE DO	OOR#1	2C	582	2129.97			1548	2A	LTG STORAGE & MEZZANINE	20/1	2
3					582		2207.969		1626	2A	EM LTG INVERTER - STOR. & MEZZ	20/1	4
5					582			1289.97	708	2A	LTG OFFICE AREAS & EXTERIOR	20/1	6
7	20/3	GARAGE DO	OOR #2	2C	582	641.969			60	2A	LTG SITE	20/1	8
9					582		3581.969		3000	2A	WH-1	20/1	10
11					582			581.969	0		SPACE		12
13	20/3	GARAGE DO	OOR #3	2C	582	581.969			0		SPACE		14
15			3011110	20	582		581,9691		0		SPACE		16
17		*			582			581.969	0		SPACE		18
19		SPAC			0	0			0		SPACE		20
							0				1500.00		
21		SPACI			0		0	0	0		SPACE		22
23		SPAC			0	0004 47		U	0		SPACE	The same	24
25		SPAC			0	8061.47	0004 407		8061	NOTE 1	45KVA XFMR "X1" TO PNL "RP"	60/3	26
27		SPAC			0		8061.467		8061				28
29		SPACI			0		11100 1	8061.47	8061		2		30
OTAL	LTO	CONNECTED X	FACTOR =	DEMAND	TOTAL BY PHASE	11415.4	14433.4	10515.4		CD/	ARE = 50%		
OTAL	CONT.	3942.0 3000.0	- 1.25 1.25	4927.5 3750.0	·					SPF	ARE - 50%		
	NON-C	8237.7	1.25	8237.7					TOTAL	DEMAND LO	DAD = 48489 VA		
OTAL	_	5940.0	Per NEC	5940.0					IOIAL	DEIVININD EC	- 40409 VA		
OTAL	_	9470.8	1.00	9470.8					TOT	AL AMPS =	58.32 AMPS		
OTAL	-	5773.6	0.00	0.0	<u> </u>				101	IL / IIVII O			
OTAL	_	36364.1	_	32326.0									

1. SEE SINGLE LINE DIAGRAM, DETAIL #01 ON THIS DRAWING, FOR ADDITIONAL INFORMATION.

		PANEL:		RP		208 /120	VOLTS,	3	PHASE	4 W	RE	MAIN BUS AMPS		
	LO	CATION:	OUTS	SIDE OFFICE#2		MC	DUNTING:	SUF	RFACE	FLUS	Н	MAIN BRK 125 AMPS 3	P	
	В	JILDING:	ACIT MAIN	TENANCE BUILD	DING	1	BUS		PPER	=	MINUM	NEUTRAL 100% AIC	10,000	
	FED	FROM:	SEE SING	SLE LINE DIA GRA	AM	GRO	UND BUS			THRU	J-FEED LUGS	LUGS ONLY		•
	FEEDE	R SIZE	SEE SING	SLE LINE DIA GRA	M	ISOL.G	SND. BUS			INTEG	GRAL SPD			
	CKT	TRIP	DESCRIPTION	051015	MIN WIRE &	LOAD	PE	R PHASE (V	'A)	LOAD	MIN WIRE &	DESCRIPTION OF LOAD	TRIP	CKT
	NO	AMPS	DESCRIPTION (OF LOAD	COND SIZE	(VA)	Α	В	С	(VA)	CONDSIZE	DESCRIPTION OF LOAD	AMPS	NO
OTE 1	1	20/1	FACE)	2A	1500	5244			3744	4B	CU-1	40/2	2
	3	20/1	REC - TELE	ECOM	2A	1000		4744		3744				4
	5	20/1	REC - TR AN	NDJAN	2A	720			844.8	125	2A	AH-1,2,3,4	15/2	6
Ī	7	20/1	REC - OFFI	CE#2	2A	900	1024.8			125				8
Ī	9	20/1	REC - OFFI	CE #1	2A	1080		2412		1332	2A	(3) UH-A (WEST)	20/1	10
Ì	11	20/1	REC - WORK	(ROOM	2A	720			2052	1332	2A	(3) UH-A (EAST)	20/1	12
Ī	13	20/1	REC - WORK	(ROOM	2A	720	948			228	2A	(1) UH-B (MEZZANINE)	20/1	14
Ì	15	20/1	REC - WORK	(ROOM	2A	540		1040		500	2A	LOUVERS	20/1	16
	17	20/1	REC - DOC	DR#1	2A	360			386.8	27	2A	EF -1 & EF-2	20/1	18
	19	20/1	REC - DOC		2A	360	1566.4			1206	2A	EF-3	20/2	20
	21	20/1	REC - DOC		2A	360		912		552	2A	CUH-1	20/1	22
	23	20/1	REC - EXTE		2A	180			1344.8	1165	2A	EH-1	20/2	24
IOTE 2	25	20/1	ELECTRIC WATE		2A	500	1664.8			1165			EGIE	26
.012 2	27	20/1	SPARI			0		0		0		SPARE	20/1	28
	29	20/1	SPAR			0			0	0		SPARE	20/1	30
	31	20/1	SPAR			0	0			0		SPARE	20/1	32
1	33	20/1	SPAR			0		0		0		SPARE	20/1	34
+	35	20/1	SPAR			0			0	0		SPARE	20/1	36
+	37	20/1	SPARI			0	0			0		SPARE	20/1	38
-	39	20/1	SPAR		-	0		0		0		SPARE	20/1	40
	41	20/1	SPARI			0			0	0		SPARE	20/1	42
1	41		CONNECTED X	FACTOR =	DEMAND	TOTAL BY	10448.0	9108.0	4628.4	U	-	SPARE	20/1	42
	TOTAL	LTG.	0.0	1.25	0.0	PHASE					SPA	RE = 40%		
	TOTAL	CONT.	0.0	1.25	0.0	-								
		NON-C	3000.0	1.00	3000.0	_				TOTAL	DEMAND LO	AD = 25775 VA		
	TOTAL	_	5940.0	Per NEC	5940.0	-				<u></u>				
	TOTAL	_	9470.8	1.00	9470.8	•				TO	TALAMPS	71.54 AMPS		
	TOTAL	_	5773.6	0.00	0.0	-								
	TOTAL	0	24184.4		18410.8									

1. PROVIDE WITH HANDLE LOCK ACCESSORY. 2. PROVIDE WITH GFCI TYPE CIRCUIT BREAKER

,	WIRE	AND CONDUIT	SIZING	SCHEDUL	E (COPP	ER)
		WIRE SIZE (AWG	/KCMIL)	NO. OF WIF	RES & CONDUINCHES	JIT SIZE I
AMPS	TAGS	CONDUCTOR PHASE & NEUTRAL	GROUND	A 1PH, 2W+G	B 1PH/3PH, 3W+G	C 3PH, 4W+(
15	1	14	14	3/4	3/4	3/4
20	2	12	12	3/4	3/4	3/4
30	3	10	10	3/4	3/4	3/4
40	4	8	10	3/4	3/4	3/4
50	5	6	10	3/4	3/4	1
60	6	4	10	3/4	1	1 1/4
70	7	4	8	3/4	1	1 1/4
80	8	3	8	1	1	1 1/4
90	9	2	8	1	1 1/4	1 1/4
100	10	1	8	1 1/4	1 1/4	1 1/2
125	11	1	6	1 1/4	1 1/4	1 1/2
150	12	1/0	6	1 1/4	1 1/2	1 1/2
175	13	2/0	6	1 1/4	1 1/2	2
200	14	3/0	6	1 1/4	2	2
225	15	4/0	4	1 1/4	2	2 1/2
250	16	250	4	2	2	2 1/2
275	17	300	4	2	2 1/2	2 1/2
300	18	350	4	2	2 1/2	3
350	19	400	3	2	2 1/2	3
400	20	500	3	2 1/2	3	3
450	21	(2) 4/0	(2) 2		(2) 2	(2) 2 1/
500	22	(2) 250	(2) 2		(2) 2	(2) 2 1,
600	23	(2) 350	(2) 1		(2) 2 1/2	(2) 3
700	24	(2) 500	(2) 1/0		(2) 4	(2) 4
800	25	(2) 500	(2) 1/0		(2) 4	(2) 4
1000	26	(3) 400	(3) 2/0		(3) 3	(3) 4
1100	27	(3) 500	(3) 3/0		(3) 3	(3) 4
1200	28	(4) 350	(4) 3/0		(4) 3	(4) 4
1500	29	(4) 500	(4) 4/0		(4) 3	(4) 4
1600	30	(5) 400	(5) 4/0		(5) 3	(5) 4
1900	31	(5) 500	(5) 250		(5) 3	(5) 4
2000	32	(6) 400	(6) 250		(6) 3	(6) 4
2500	33	(7) 500	(7) 350		(7) 3	(7) 4
3000	34	(8) 500	(8) 400		(8) 3	(8) 4

NOTE:
THE ABOVE SCHEDULE IS BASED ON 600 VOLT CU WIRE,
TYPE THWN/XHHW AND EMT/RGS CONDUIT
EX: 2A = 2#12+1#12G, 3/4" C.

LIGH	HTING CONTROL	DEVICE SCHEDULE
SYMBOL	ACUITY CAT #	NOTES
<u>0S</u> H	WSX PDT	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT
DOSH	WSX PDT D	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON AND 0-10V DIMMING CAPABILITIES. COLOR BY ARCHITECT
DR[0S]H	WSX PDT 2P	DUAL—RELAY LINE—VOLTAGE WALL—MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT
L OSH	NWSX PDT	LOW-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT
<u>os</u>	CMR PDT [9] OR [10]	LINE VOLTAGE CLG MTD. DUAL—TECH. SENSOR. COLOR BY ARCHITECT
L OS	CM PDT [9] OR [10]	LOW VOLTAGE CLG MTD. DUAL—TECH. SENSOR. COLOR BY ARCHITECT
VS}⊣	WSX PDT SA	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON. COLOR BY ARCHITECT. ADJUST DIP SWITCH FOR MANUAL ON "VACANCY "OPERATION
D[VS]-I	WSX PDT D SA	LINE-VOLTAGE WALL-MTD DUAL TECHNOLOGY W/MANUAL CONTROL BUTTON AND 0-10V DIMMING CAPABILITIES. COLOR BY ARCHITECT. ADJUST DIP SWITCH FOR MANUAL ON "VACANCY" OPERATION
L VS	CM PDT [9] OR [10]	LOW VOLTAGE CLG MTD. DUAL—TECH. SENSOR. COLOR BY ARCHITECT
PP	PP20	UNIVERSAL POWER PACK TO FEED LOW-VOLTAGE VACANCY SENSORS. SET POWER PACK TO MANUAL ON OPERATION
RC	NPP16D	SINGLE RELAY 0-10V CEILING MOUNTED DIMMING ROOM CONTROLLER
R <u>VS</u>	NCM PDT [9] OR [10]	LOW VOLTAGE CLG MTD. DUAL—TECH. ROOM CONTROLLER SENSOR. SET FOR MANUAL—ON OPERATION COLOR BY ARCHITECT.
ROS	NCM PDT 10	LOW VOLTAGE CLG MTD. DUAL—TECH. ROOM CONTROLLER SENSOR. COLOR BY ARCHITECT.
HOS	NCM PDT 6	LOW VOLTAGE HIGH BAY MTD. DUAL—TECH. ROOM CONTROLLER SENSOR. COLOR BY ARCHITECT.
P	NPS 80	NLIGHT SYSTEM ADDITIONAL POWER SUPPLY
	SPODM	LOW VOLTAGE SWITCH FOR CONTROL OF POWER PACK PP20
S ^{LV}	NPODM	LOW VOLTAGE SWITCH FOR CONTROL OF ROOM CONTROLLER. PROVIDE # OF BUTTONS AS REQUIRED
S ^{LV,D}	NPODM DX	DIMMING LOW VOLTAGE SWITCH FOR CONTROL OF ROOM CONTROLLER
ELCU	NPP16 D ER	EMERGENCY LIGHTING CONTROL UNIT WITH DIMMING
R PS	NCM ADCX	SINGLE ZONE DIMMING CLOSED LOOP ROOM CONTROLLER. PHOTOSENSOR FOR CONTROL OF ROOM CONTROLLER.
TEC: WIDE	ALL LICHTING CONTROL DEV	VICES & DOWED DACKS DED

NOTES: WIRE ALL LIGHTING CONTROL DEVICES & POWER PACKS PER MANUFACTURER'S INSTRUCTIONS. MAKE ALL SETTING ADJUSTMENTS TO OCCUPANCY/VACANCY SENSORS NECESSARY FOR PROPER OPERATION PER MANUFACTURER'S INSTRUCTIONS AND OWNER'S PREFERENCES.

No. Date 11/17/21	risions	
No.	Date	Description
	11/17/21	ISSUED FOR BID

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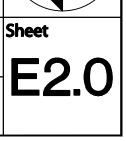
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Al-07220 Al-07473 Al-13038 Al-13618

NEW MAINTENANCE BUILDING ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY 5080 ATLANTIC AVE. MAYS LANDING, NJ 08330

ELECTRICAL SINGLE

LINE DIAGRAM AND SCHEDULES



GENERAL

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER. PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AND TENANT AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION. MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT APPROVAL.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
- G. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
- H. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING. EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR. J. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL
- WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW AND EXISTING RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS. K. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN
- THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.
- ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE. ARCHITECT OF AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- M. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED. IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- N. ALL WORK SHALL BE PERFORMED AND INSTALLED IN A NEAT AND WORKMANLIKE MANNER IN ACCORDANCE WITH THE GUIDELINES OF NECA STANDARD 1-2015 "GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".
- O. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- P. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- Q. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR; EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC) AND CONDITIONS.
- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER. T. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND

SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF

INSPECTION AND APPROVAL. SCOPE OF WORK

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES, UTILITY REQUIREMENTS AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.
- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR. THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION AND UTILITY COMPANIES. OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING. ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

SHOP DRAWINGS

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT. CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT. INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
- B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
 - 1) PROJECT NAME AND LOCATION NAME OF ARCHITECT AND ENGINEER

 - 3) ITEM IDENTIFICATION
- 4) APPROVAL STAMP OF PRIME CONTRACTOR
- C. SUBMISSIONS

- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
- 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT THREE PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD TWO PRINTS TO THE ENGINEER.
- D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
- 1) DISCONNECT SWITCHES
- 2) FUSES
- 3) CIRCUIT BREAKERS 4) PANELBOARDS (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG
- CUTS) 5) TRANSFORMERS
- 6) SURGE PROTECTION DEVICES
- 7) RACEWAYS 8) WIRE AND CABLE
- 9) CONDUIT AND FITTINGS 10) WALL SWITCHES
- 11) INSERTION RECEPTACLES
- 12) TIME SWITCHES
- 13) LIGHTING CONTROLS
- 14) SURFACE METAL RACEWAY 15) LIGHTING FIXTURES
- 16) ADDRESSABLE FIRE ALARM SYSTEM (PER 2018 IFC 907.1.2) E. COORDINATION
- 1) THE CONTRACTOR SHALL ASSURE FULL COOPERATION OF ALL TRADES AND SHALL FURNISH IN WRITING ALL INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH LEAST POSSIBLE INTERFERENCE OR DELAY.
- 2) PREPARE COORDINATED COMPOSITE DRAWINGS AT A SUITABLE SCALE NOT LESS THAN 1/4-INCH EQUALS ONE FOOT, ZERO INCHES. CLEARLY SHOWING HOW THE WORK OF THIS DIVISION IS TO BE INSTALLED IN RELATION TO THE WORK OF ALL TRADES. ANY WORK INSTALLED IN CONFLICT WITH THE WORK OF OTHER TRADES SHALL
- BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER. 3) THE CONTRACTOR MAY, SUBJECT TO THE ACCEPTANCE OF THE ARCHITECT AND WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF ALL TRADES OR FOR THE PROPER EXECUTION OF
- 4) ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. COORDINATE WITH THE ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATION OF DUCTWORK, PIPING AND **FOUIPMENT**
- 5) THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYOUT WORK AND SHALL COORDINATE ALL TRADES TO VERIEY SPACES IN WHICH WORK SHALL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM OR SPACE CONDITIONS. WHERE SPACE CONDITIONS APPEAR INADEQUATE, THE ARCHITECT SHALL BE NOTIFIED BEFORE INSTALLATION. DO NOT PROCEED WITH THE INSTALLATION UNTIL RECEIVING CLARIFYING INSTRUCTIONS
- 4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL
 - FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
 - THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- REPRODUCIBLE "AS-BUILT" DRAWINGS PREPARED IN COMPUTER AIDED DRAFTED (AUTO CAD) FORMAT SHALL BE PROVIDED TO THE OWNER INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. A COMPLETE "AS-BUILT" DRAWING FILE SHALL BE PROVIDED TO THE OWNER AFTER COMPLETION OF THE INSTALLATION.

5. GENERAL PROVISIONS FOR ELECTRICAL WORK

- A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- B. DEFINITIONS 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK
- REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED. 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES
- "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES. 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS,
- ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION. 5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES. 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS
- DEFINED ABOVE 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT AS DETERMINED BY THE
- ENGINEER AND ARCHITECT. C. GENERAL 1) THE DRAWING SHOWS THE APPROXIMATE LOCATIONS OF ALL
 - APPARATUS. THE EXACT LOCATIONS OF WHICH ARE SUBJECT TO THE APPROVAL OF THE OWNER, WHO RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES IN THE LOCATION INDICATED WITHOUT EXTRA COST. WHILE THE GENERAL RUN OF CONDUIT AND CABLES ARE INDICATED ON THE DRAWING, IT IS NOT INTENDED THAT THE EXACT ROUTING OR LOCATIONS OF CONDUIT AND CABLES BE DETERMINED THEREFROM.
- REQUIRED BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, MAINTAIN HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. 3) THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH ALL

2) THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL

- TRADES.
- 4) WIRE ALL FIXTURES, DEVICES, ETC., TO RESPECTIVE PANEL AND CONTROLS AS SHOWN ON PLANS IN SYMBOL FORM. 5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN—UP AND
- REMOVAL FROM THE SITE OF RESULTING DEBRIS UPON COMPLETION OF WORK UNDER THIS SECTION. 6) PROVIDE SEPARATE SYSTEMS AND ENCLOSURES FOR 120/208 AND 277/480 VOLT POWER AND CONTROL WIRING AND FOR EMERGENCY

AND NORMAL POWER. COMMON PULL BOXES AND JB'S ARE NOT

- ACCEPTABLE. 7) LOCATIONS INDICATED FOR LOCAL WALL SWITCHES/CONTROLS ARE SUBJECT TO RELOCATIONS. AT OR NEAR DOORS INSTALL SWITCH INSIDE OPPOSITE HINGE, VERIFY FINAL DOOR HINGE LOCATION IN FIELD PRIOR TO SWITCH OUTLET INSTALLATION.
- 8) HEIGHTS OF OUTLET FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS SHALL CONFORM TO "ADA" CODE REQUIREMENTS UNLESS OTHERWISE NOTED.
- 9) ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND. PROVIDE BARRIERS BETWEEN NORMAL ONLY AND NORMAL/EMERGENCY SWITCHES INSTALLED WITHIN A COMMON OUTLET BOX.

- 10) PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED
- D. TEMPORARY LIGHT AND POWER
 - PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. OWNER WILL PAY FOR COST OF ENERGY. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
- QUALITY ASSURANCE
- QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY RECOGNIZED TESTING LABORATORY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
- ON COMPLETION OF THE WORK, THE ENTIRE WIRING SYSTEM SHALL BE ENTIRELY FREE FROM GROUNDS, SHORT CIRCUITS, OPENS, OVERLOADS AND IMPROPER VOLTAGES AND THOROUGH TEST SHALI BE MADE. FURNISH ALL LABOR AND MATERIALS AND INSTRUMENTS.
- GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE.
- 4) VOLTAGE CHARACTERISTICS
- a. SERVICE: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
- b. DISTRIBUTION: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL. 5) HEIGHTS OF OUTLETS
- a. SEE TYPICAL DEVICE MOUNTING HEIGHT DETAIL ON DRAWINGS. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH
- MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED. c. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND CONFIRMING ALL MOUNTING HEIGHTS WITH ARCHITECT AND
- ARCHITECTURAL DRAWINGS. F. PRODUCT DELIVERY, STORAGE AND HANDLING
 - MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
- ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
- NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER. ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES
- SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT. 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
 - (1) SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
 - (2) MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
 - (3) CLIP FORM NAILS FLUSH WITH INSERTS.
 - (4) MAXIMUM LOADING 75 PERCENT OF RATING. b. STRUT: GALVANIZED U-CHANNEL (SIMILAR TO UNISTRUT OR KINDORF)
 - (1) COLD FORMED FROM LOW-CARBON STEEL WITH
 - HOT-DIPPED GALVANIZED FINISH (ASTM 653 33) (2) MAXIMUM LOADING 75 PERCENT OF RATING
 - (3) ASSOCIATED FITTINGS (SPRING NUTS, PIPE STRAPS, ETC.) SHALL BE BY SAME MANUFACTURER AS STRUT. (4) FILE ALL CUT ENDS SMOOTH AND APPLY COLD GALVANIZING COMPOUND SPRAY (ZRC COLD GALVANIZING
- COMPOUND SPRAY OR EQUAL) SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS. STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR
- d. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS
- WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW
- H. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. RED LEAD OR ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC CHROMATE PRIME COAT SHALL BE UTILIZED FOR STEEL
- OR IRONWORK. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- J. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES/CONTROLS, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT, PRIOR TO ROUGH IN.

K. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR

- CUTTING AND PATCHING A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF THE EXISTING AND NEW CONSTRUCTION WORK, WHICH MAY BE REQUIRED FOR THE PROPER INSTALLATION OF THE ELECTRICAL WORK. ALL
- PATCHING SHALL BE OF THE SAME MATERIALS, WORKMANSHIP, AND FINISH, AND SHALL ACCURATELY MATCH ALL SURROUNDING WORK. B. CORE BORING OF CONCRETE FLOORS AND/OR WALLS IF REQUIRED. IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- A. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EQUIPMENT WITH ARCHITECTURAL DRAWINGS. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS, AND MECHANICAL EQUIPMENT, VARIATIONS IN FIRE PROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS, AND THE LIKE, AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSES TO THE OWNER

8. EQUIPMENT FURNISHED BY OTHERS

LOW-VOLTAGE DISTRIBUTION EQUIPMENT

TO INSTALLATION.

- A. THE CONTRACTOR SHALL FURNISH AND INSTALL WIRING FOR EQUIPMENT FURNISHED BY OTHERS, AS SHOWN ON DRAWINGS. COORDINATE WITH ALL OTHER TRADES OR DETAILS FOR INSTALLATION. THE TERM "WIRING" AS USED HERE-IN, INCLUDES, BUT IS NOT LIMITED TO, FURNISHING AND INSTALLING CONDUIT, WIRE, JUNCTION BOXES, DISCONNECTS AND MAKING CONNECTIONS. CONTRACTOR SHALL CHECK ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT TO BE INSTALLED BY OTHERS. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER WIRING AND NECESSARY ELECTRICAL ADJUSTMENTS TO EQUIPMENT TO CONFORM TO SPECIFIED REQUIREMENTS OF THE EQUIPMENT.
- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.

- C. DISCONNECT SWITCHES SHALL BE FUSED OR NON-FUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, FXCFPT AS NOTED. AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NON-FUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 30 AMP AT 600 VOLTS IN AN ALUMINUM NEMA 1 ENCLOSURE UON. TWO-POLE SWITCHES SHALL BE SIMILAR TO HUBBELL #HBL1372D. THREE-POLE SWITCHES SHALL BE SIMILAR TO HUBBELL #HBL1379D.
 - KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE-QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO SQUARE D CLASS 3110. APPROVED EQUALS BY SQUARE D AND ALLEN-BRADLEY. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.
- D. FUSES: DUAL ELEMENT FUSES FOR MOTOR LOADS SHALL BE TIME DELAY HAVING A MAXIMUM RATING OF 600 AMP AT REQUIRED VOLTAGE. 200,000 AMP IC FUSES SHALL BE SIMILAR TO LIMITRON FUSETRON FRN OR FRS (UL CLASS R). CURRENT LIMITING FUSES SHALL BE UTILIZED FOR OTHER LOADS. 200,000 AMP IC SHALL BE SIMILAR TO LIMITRON KTN, KTS, OR KTU (UL CLASS R UP TO 600 AMP; CLASS L OVER 600 AMP). ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER. PROVIDE 1 SPARE MATCHING FUSE FOR EACH SET OF 3.
- CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
 - 1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE.
 - 2) 240 VOLTS, 100-AMP FRAME: 18,000 AMPS, 2 AND 3 POLES. 3) 240 VOLTS, 200-AMP FRAME: 50,000 AMPS, 2 AND 3 POLES WITH
 - INTERCHANGEABLE TRIP. 4) 277 VOLTS, 100-AMP FRAME: 14,000 AMPS, 1 POLE.

PRESENTLY IN USE.

- 5) 480 VOLTS, 100-AMP FRAME: 20,000 AMPS, 2 AND 3 POLES. CIRCUIT BREAKERS INSTALLED IN EXISTING PANEL BOARDS, SHALL BE OF THE SAME MANUFACTURER, TYPE AND A.I.C. RATING AS
- DISTRIBUTION PANELS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT-BREAKER TYPE UNLESS OTHERWISE NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98 PERCENT CONDUCTIVITY, SILVER OR TIN-PLATED JOINTS. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME—PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN. HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN. HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEGREES OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. PROVIDE DOOR—IN—DOOR CONSTRUCTION. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5-3/4 IN. SIDES, TOP AND BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND
- THEIR LOCATIONS SHALL BE PROVIDED. TRANSFORMERS SHALL BE NEMA TP1 COMPLIANT, OPEN-VENTILATED, DRY TYPE, CLASS H (220 DEGREES C) INSULATION, 115 DEGREES C TEMPERATURE RISE AND WINDINGS SHALL BE COPPER. PRIMARY AND SECONDARY VOLTAGES SHALL BE NOTED. PRIMARY TAPS (6 - 2-1/2)PERCENT TAPS. 2 ABOVE AND 4 BELOW RATED VOLTAGE) SHALL BE PROVIDED. ADJUST FOR REQUIRED VOLTAGE. PROVIDE K RATING AND
- SHIELDING AS SHOWN ON DRAWINGS. H BALANCE THE LOAD OVER PHASES WHEN NEW CIRCUITS ARE ADDED TO NEW OR EXISTING PANELS. PROVIDE MULTI-CABLE LUGS WHERE REQUIRED DOUBLE LUGGING SHALL NOT BE PERMITTED. MOUNTING HEIGHT SHALL B A MAXIMUM OF 6 FT.-6 IN. FROM FLOOR TO TOP SWITCH UNIT. UPDATE DIRECTORIES ON EXISTING PANELBOARDS WHERE CIRCUITING IS CHANGED. I. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD. MAINTAIN REQUIRED DEDICATED WORKING SPACE AROUND AND IN FRONT OF
- 10. SPD A. THE INDIVIDUAL SURGE PROTECTION DEVICE (SPD) UNITS SHALL BE UL LISTED UNDER UL1449 STANDARD FOR TRANSIENT VOLTAGE SURGE SUPPRESSIONS AND THE SURGE RATINGS AND SHORT CIRCUIT CAPACITY RATING SHALL BE PERMANENTLY AFFIXED TO THE COVER OF SPD. THE UNIT SHALL ALSO BE COMPLEMENTARY LISTED TO UL 1283 STANDARD FOR EMI/RFI FACILITY FILTERS.

SERVICE EQUIPMENT.

- B. SYSTEM DESCRIPTION 1) THE SPD/FILTER SHALL BE CONSTRUCTED USING MULTIPLE SURGE CURRENT DIVERSION ARRAYS OF METAL OXIDE VARISTORS (MOV), MATCHED TO 1 PERCENT VARIANCE. THE ARRAY SHALL CONSIST OF MULTIPLE GAP-LESS METAL OXIDE VARISTORS, WITH EACH MOV INDIVIDUALLY FUSED. THE ARRAYS SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER, WHICH ENSURES MOV SURGE CURRENT SHARING. NO GAS TUBES, SILICON AVALANCHE DIODES OR SELENIUM PLATES/RECTIFIERS SHALL BE USED. THE STATUS OF EACH ARRAY SHALL BE CONTINUOUSLY MONITORED AND A GREEN LED SHALL BE
- AND INTERNALLY FUSED, FOR COMPLIANCE TO NEC ARTICLE 110.9, 110.10 AND 280.22. C. BASIS OF DESIGN (MINIMUM DISCHARGE RATING SHALL BE 20 KA — L-L, 20 KA - L-G, 20 KA - L-N):

ILLUMINATED IF THE ARRAY IS IN FULL WORKING ORDER. ALL

PROTECTION MODES, INCLUDING N-G, SHALL BE CLOSELY MONITORED

- EMERSON CATALOG NOS. a. SERVICE ENTRANCE SERIES 570 b. DISTRIBUTION PANEL SERIES 560
- c. BRANCH PANEL SERIES 510 WARRANTY 1) THE MANUFACTURER SHALL PROVIDE A LIMITED FIVE (5) YEAR WARRANTY FROM THE DATE OF SHIPPING AGAINST FAILURE WHEN INSTALLED IN COMPLIANCE WITH MANUFACTURER'S WRITTEN INSTRUCTION, UL LISTING REQUIREMENTS, AND ANY APPLICABLE NATIONAL OR LOCAL ELECTRICAL CODES. MANUFACTURER SHALL
- SERVICE SUPPORT. MANUFACTURER
- EMERSON 500 SERIES OR APPROVED EQUAL BY THOMAS AND BETTS CURRENT TECHNOLOGY OR EATON — INNOVATIVE TECHNOLOGY.
- F. ACCESSORIES
- 1) UNIT STATUS INDICATORS a. THE UNIT SHALL HAVE AN INTEGRAL STATUS CIRCUIT THAT MONITORS THE OPERATIONAL STATUS OF ALL MODES OF PROTECTION. INCLUDING LINE TO NEUTRAL, LINE TO GROUND AND NEUTRAL TO GROUND. NO MANUAL TESTING IS REQUIRED TO CONFIRM THE INTEGRITY OF THE SUPPRESSION AND FILTER SYSTEMS. IF THE SYSTEM DOES FAIL. THE GREEN LED LIGHT

WILL GO OUT AND THE RED LED LIGHT WILL BE LIT.

MAKE AVAILABLE FOR CONSULTATION, (LOCAL, NATIONAL) ENGINEERING

- a. AN EQUIPMENT-GROUNDING CONDUCTOR, COMMONLY DESCRIBED AS A "GREEN WIRE" SHALL BE PROVIDED FOR ALL BRANCH CIRCUITS PROTECTED BY OVERCURRENT DEVICES. "GREEN GROUND" WIRE SHALL ALSO BE PROVIDED FOR FLEXIBLE CONDUIT AND MOTOR CIRCUITS.
- b. LIGHTING CIRCUITS INCLUDING WHERE REQUIRED AT SWITCH LOCATIONS FOR PROPER LIGHTING CONTROLS OPERATION.
- A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN. B. MATERIALS
- RACEWAYS
- a. RIGID STEEL CONDUIT: FULL—WEIGHT PIPE, GALVANIZED,

b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE.

- GALVANIZED, THREADLESS. c. RIGID NON-METALLIC CONDUIT (PVC): POLYVINYL CHLORIDE, SCHEDULE 40 OR 80, UL STANDARD ANSI/UL 651 d. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP,
- GALVANIZED. e. LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT: GALVANIZED LOW CARBON STEEL CORE WITH UL BONDED STRIP, WITH A FLAME RETARDANT, SUNLIGHT RESISTANT PVC JACKET. UL LISTED AS
- f. WIREWAYS: DIMENSIONS AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

- 2) FITTINGS AND ACCESSORIES a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC-PLATED STEEL ONLY - ZINC DIE CAST NOT
- b. ELECTROMETALLIC TUBING: COMPRESSION TYPE 2 IN. AND UNDER. SET SCREW TYPE 2-1/2 IN. AND LARGER. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER. ZINC-PLATED STEEL ONLY - ZINC DIE CAST NOT PERMITTED. EXTERIOR EMT FITTINGS SHALL BE RAIN-TIGHT TYPE.
- c. PVC: SLIP-ON TYPE, UL CATEGORY DWTT, INSTALLED WITH MANUFACTURER RECOMMENDED SOLVENT.
- d. FLEXIBLE METALLIC CONDUIT: SQUEEZE TYPE COMPRESSION FITTING WITH INSULATED THROAT. ZINC-PLATED STEEL ONLY -ZINC DIE CAST NOT PERMITTED.
- e. LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT: THREADED GASKETED MALLEABLE IRON, STEEL OR ALUMINUM WITH INSULATED THROAT, UL LISTED FOR WET LOCATIONS. f. BUSHINGS: METALLIC INSULATED TYPE.
- a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY
- CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE
 - (1) WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN.
- SEPARATION. (2) ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES
- EXCEEDING 150 VOLTS TO GROUND. (3) OUTLET BOXES FOR LIGHTING FIXTURES: SUITABLE GALVANIZED THREADED FIXTURE STUDS WHERE REQUIRED, INSTALLED IN OR ON VERTICAL SURFACES FOR SUPPORT OF A LUMINAIRE OVER 6 POUNDS MARKED INDICATING BOX IS SUITABLE FOR INSTALLATION OF A LUMINAIRE, INSTALLED IN CEILING INTENDED FOR SUPPORT OF LIGHTING LUMINAIRE OVER 50 POUNDS BE MARKED ON THE INTERIOR WITH THE WEIGHT OF THE LUMINAIRE IT CAN SUPPORT AND INSTALLED CONCEALED IN CEILING OR WALLS PROVIDED WITH PROPER EXTENSION RINGS AND/OR PLASTER COVERS LISTED FOR THE APPLICATION.
- b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN RENOVATED BOXES BETWEEN 120/208 VOLT AND 277/480 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING.
- c. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON OR GALVANIZED STEEL CHANNEL SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX
- VOLUME WHERE REQUIRED. C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED. EXCEPT AS NOTED.
 - PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAPHANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS, TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR.
 - PACK FITTING TO RESTORE FIRE RATING OF FLOOR. 2) SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT. ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT. ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAW PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH
- THROUGH BOLTS AND FISHPLATES. 3) EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN
- HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY. MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT
- FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS. EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE. 6) RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED
- ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. 7) EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL BE PERMITTED FOR FEEDERS WHERE HIDDEN OR NOT EXPOSED TO POTENTIAL DAMAGE. WHERE DAMAGE

CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT

- IS A POSSIBILITY (I.E. WAREHOUSE WALL) USE RIGID ONLY. 8) IN WET LOCATIONS, PROVIDE GALVANIZED RIGID CONDUIT WITH THREADED COUPLING, PVC CONDUITS AND FITTINGS (SCHEDULE 80 WHERE EXPOSED TO DAMAGE) OR LIQUIDTIGHT FLEXIBLE METALLIC
- 9) ALL EMERGENCY BRANCH CIRCUIT WIRE SHALL BE RUN IN CONDUIT. 10) FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT. AND MAXIMUM 6 FT. LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT
- CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS. 11) CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS

OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE

PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR.

MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND

- COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING. 12) ALL COUPLINGS ON EMT RACEWAYS SHALL BE COMPRESSION TYPE UP TO AND INCLUDING 2 IN. CONDUIT. SET SCREW TYPE FITTINGS SHALL BE USED ON 2-1/2 IN. EMT CONDUIT AND LARGER EXCEPT FOR EXTERIOR INSTALLATIONS WHERE ALL EMT FITTINGS SHALL BE
- 13) EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

14) RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL

RAINTIGHT TYPE.

MAINTAIN FIRE RATING OF CONSTRUCTION. 15) PROVIDE INTERNAL VAPOR SEALING OF ALL CONDUITS PASSING FROM EXTERIOR TO CONDITIONED INTERIOR SPACES.

CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1

CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

16) PROVIDE RACEWAYS CONTINUITY TESTS OF RESISTANCE OF FEEDER

OPENING WITH FIRE SEALANT APPROPRIATE TO CONSTRUCTION TO

- 13. WIRE AND CABLE A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE
 - SHALL BE AWG EXCEPT AS NOTED. B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID OR STRANDED (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER), GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT. CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 277 VOLTS AND OVER 200
 - FT. CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. 1) CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT. CIRCUIT LENGTH
 - PROVIDE NO. 12 MINIMUM. 2) OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
 - INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEGREES C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).
- PRE-MANUFACTURED STEEL ARMOR, SPECIFICATION GRADE METAL CLAD CABLE (MC-TUFF) MAY BE UTILIZED FOR ALL NORMAL BRANCH CIRCUITS IN DRY HOLLOW STUD WALL LOCATIONS, ABOVE ACCESSIBLE CEILING AND WHERE PERMITTED BY ARTICLE #320 & #517 OF THE NATIONAL ELECTRICAL CODE (APPLICABLE EDITION) ONLY. MINIMUM CONDUCTOR SIZE SHALL BE NO. 12 AWG COPPER WITH INTEGRAL GREEN INSULATED CONTINUOUS GROUND CONDUCTOR AND BARE BONDING CONDUCTOR IN DIRECT CONTACT WITH THE OUTER METAL JACKET.
- THE INSULATION OF ALL CONDUCTORS SHALL BE 90 DEGREES C RATED THERMOPLASTIC WITH COLOR CODING AS FOLLOWS:
 - 1) 120/208 VOLT SYSTEM
 - a. BLACK FOR A PHASE b. RED FOR B PHASE
 - c. BLUE FOR C PHASE
 - 2) 277/480 VOLT SYSTEM a. BROWN FOR A PHASE

b. ORANGE FOR B PHASE

c. YELLOW FOR C PHASE

- NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING
- WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS. F. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS.

FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF

ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE

- TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE
- COPPER LUG CONNECTIONS TO BUS BARS: USE ANTI-SEIZE COMPOUND ON TANG. H. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLIFT CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEGREES F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 277/480 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT
- WIRING AND RELATED 120 VOLT CONTROL WIRING. I. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT

OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH

- K. PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.
- A. PROVIDE ALL POWER WIRING TO ALL MOTORS AND EQUIPMENT FURNISHED UNDER ALL CONTRACTS ON THE PROJECT. INCLUDE EXTENSIONS FROM CONTROLLERS TO MOTORS AND MOTOR CONNECTIONS. MOUNT AND WIRE ALL CONTACTORS AND POWER DEVICES FURNISHED UNDER ALL CONTRACTS. 15. CONTROL WIRING PROVIDE ALL CONTROL WIRING FOR MOTORS AND EQUIPMENT FURNISHED
 - MOUNTING AND WIRING OF ALL CONTROL DEVICES FURNISHED WITH CONTROL WIRING LESS THAN 120 VOLTS FOR MOTORS, ALARMS FOR

UNDER ALL CONTRACTS AND AS SPECIFICALLY SHOWN ON THE DRAWINGS,

EQUIPMENT FURNISHED UNDER MECHANICAL/PLUMBING WILL BE PROVIDED

EXCEPT AS NOTED FOR MECHANICAL/PLUMBING EQUIPMENT. INCLUDE

UNDER DIVISION 15 CONTRACT. DEVICES

CIRCUITS OVER 25 HP.

- A. LOCAL SWITCHES 1) CONVENTIONAL QUITE TOGGLE TYPE, RATED AT 20 AMP, 120/277 VOLT AC SIMILAR TO LEVITON #1221-2, 1223-2, 1224-2 OR EQUAL BY HUBBELL OR PASS & SEYMOUR. THE OWNER OR ARCHITECT
- SHALL SELECT TOGGLE COLOR. 2) PILOT LIGHT TOGGLE TYPE WITH NEON LAMP, RATED AT 20 AMP, 120/277 VOLT AC SIMILAR TO LEVITON #1221-PLC OR EQUAL BY
- B. MANUAL MOTOR STARTERS 1) FLUSH OR SURFACE MOUNTED TYPE WITH INTEGRAL THERMAL OVERLOAD PROTECTION AND PILOT LIGHT. SIMILAR TO SQUARE D

HUBBELL OR PASS & SEYMOUR..

CLASS 2510 AND 2512 TYPE F.

MOTOR-RATED SWITCHES 1) FLUSH OR SURFACE MOUNTED TYPE WITH PILOT LIGHT. SIMILAR TO SQUARE D CLASS 2510, 2511 AND 2512 TYPE F. D. INSERTION RECEPTACLES

EXCEPT AS NOTED. DEVICE SHALL MEET OR EXCEED:

1) CONVENTIONAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLT, 2 POLE, 3 WIRE, 20 AMP WITH U GROUND SLOT GROUNDED,

b. UL HOSPITAL GRADE

3) SPECIAL RECEPTACLES

5) RECEPTACLE ORIENTATION

BRANCH CIRCUIT DEVICE.

ARTICLE 410.

- a. UL 488
- c. UL FEDERAL SPECIFICATION WC-596 LISTING. d. NEMA WD-1 AND WD-6 e. DEVICE SHALL BE SIMILAR TO HUBBELL HBL5362 OR EQUAL

BY LEVITON, PASS & SEYMOUR OR GE. OWNER OR

ARCHITECT SHALL SELECT FACE COLOR. DEVICES USED ON

EMERGENCY BRANCH CIRCUITS SHALL BE RED FACE ONLY.

- 2) GROUND FAULT INTERRUPTER WITH SELF-PROTECTION AND LED INDICATOR LIGHT. SIMILAR TO HUBBELL GFR5362 OR EQUAL BY LEVITON, PASS & SEYMOUR OR GE.
- a. THE TRADE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE SPECIAL RECEPTACLES REQUIRED TO MATCH PROVIDED. EXISTING AND NEW EQUIPMENT PLUGS.

4) LIGHTING CONTROLS (SEE SCHEDULES/NOTES ON DRAWINGS)

a. CONTRACTOR SHALL COORDINATE ORIENTATION OF DEVICE WITH ARCHITECT. E. DEVICE PLATES

1) BRUSHED 302 STAINLESS STEEL WITH ENGRAVED CIRCUIT

IDENTIFICATION PLATE WHEN USED TOGETHER WITH EMERGENCY

PUSH-IN WIRING (AKA "QUICKWIRE") THROUGH THE BACK OF THE

- 2) REINFORCED THERMOPLASTIC BY SAME MANUFACTURER OF DEVICES. F. DEVICE WIRING 1) ALL DEVICES SHALL BE SIDE-WIRED VIA SCREW TERMINALS -
- DEVICE IS NOT AN ACCEPTABLE WIRING METHOD. 17. LIGHTING FIXTURES MANUFACTURE AND INSTALL LIGHTING FIXTURES IN ACCORDANCE WITH NEC

Revisions lo. Date Description 11/17/21 | ISSUED FOR BID

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NJ LIC. NO. 24GE04051000 NJ AUTH. NO. 24GA28120100 MCF PROJECT #21177

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| Drawing

Drawn

NEW MAINTENANCE BUILDING ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY 5080 ATLANTIC AVE. MAYS LANDING, NJ 08330

ELECTRICAL SPECIFICATIONS AS NOTED

19033 Date

- MOUNTED ON THE BUILDING. C. FURNISH ALL PLASTER FRAMES OR DRY WALL AND DELIVER TO PROJECT SITE FOR INSTALLATION UNDER FINISHES, DIVISION 9. D. USE FIXTURES CONFORMING TO UL STANDARDS, AND BEARING UL LABEL AND UNION LABEL. E. GENERAL CONSTRUCTION 1) PLASTICS: 100 PERCENT VIRGIN ACRYLIC, REFER TO FIXTURE LIST FOR FURTHER DESCRIPTION. a. METAL (1) MATERIAL: STEEL, ALUMINUM OR OTHER TYPES (2) B & S GAUGE: NO. 22 MINIMUM FOR HOUSINGS, WITH b. FINISHES (1) CORROSION PROTECTION: PLATING, BONDERIZING, (2) COLORS: FACTORY STANDARD UNLESS OTHERWISE (3) FINAL COATING: BAKED PAINT OR ENAMEL ON STEEL c. EXTERIOR FIXTURES: ENCLOSED AND GASKETED, UNLESS OTHERWISE NOTED. d. LED FIXTURES: (1) MODULAR TO ALLOW FOR SEPARATE REPLACEMENT OF (2) USER SERVICEABLE LED LAMPS AND DRIVERS (3) DIMMABLE LED FIXTURES WITH EITHER A 01-10 VOLT, e. LATCHES: QUICK-OPERATING TYPE WITHOUT NEED FOR TOOLS, UNLESS OTHERWISE NOTED; STAINLESS STEEL OR CADMIUM PLATED STEEL. f. EXPOSED HARDWARE: NOT ACCEPTABLE ON VISIBLE SURFACES OF FIXTURES IN FINISHED AREAS UNLESS OTHERWISE NOTED. F. PROVIDE APPROPRIATE MOUNTING ACCESSORIES FOR EACH FIXTURE. COMPATIBLE WITH THE VARIOUS STRUCTURAL CONDITIONS THAT WILL BE ENCOUNTERED. PROVIDE FASTENING CLIPS (EARTHQUAKE CLIPS) FOR LIGHTING FIXTURES THAT ARE SUPPORTED FROM FRAMING MEMBERS OF SUSPENDED CEILINGS. G. ASSEMBLE. WIRE AND INSTALL ALL LIGHTING FIXTURES AT THEIR RESPECTIVE OUTLETS AS INDICATED AND ASSUME RESPONSIBILITY FOR THEIR CONDITION UNTIL ACCEPTANCE BY OWNER. INSTALL PROPER LAMPS IN EACH FIXTURE. H. FIXTURE CONNECTIONS TO BRANCH CIRCUITS SHALL BE MADE USING STRANDED WIRE WITH INSULATION TEMPERATURE RATING EQUAL TO OR HIGHER THAN THAT OR WIRE SUPPLIED WITH THE FIXTURE, OR SPECIFIED BY FIXTURE MANUFACTURER. FIXTURES ARE TO BE CONNECTED TO BRANCH CIRCUITS VIA JUNCTION BOX USING FLEXIBLE CONDUIT OF LENGTHS BETWEEN 4 FT. MINIMUM AND 6 FT. MAXIMUM. I. THE USE OF FLEXIBLE CONDUIT, TO FIXTURES IN ANY LENGTH OVER 6 FT. S PERMITTED ONLY WHEN A SEPARATE GROUND WIRE IS INSTALLED ALONG WITH THE CONDUCTORS INSIDE THE FLEXIBLE CONDUIT. IN THIS APPLICATION THE GROUND WIRE MUST BOND THE LIGHTING FIXTURE HOUSINGS TO EACH OTHER AND/OR TO THE JUNCTION BOX. ALL FLEXIBLE CONDUIT SHALL BE SUPPORTED AS REQUIRED BY NEC AND SHALL BE INSTALLED IN A WORKMANLIKE MANNER. J. NOTE THAT SPECIFICATIONS FOR RECESSED FIXTURES GENERALLY DO NOT INCLUDE MOUNTING ACCESSORIES, AND THAT EACH FIXTURE TYPE MAY BE USED IN SEVERAL DIFFERENT CEILINGS, SUCH AS LAY-IN EXPOSED GRID. CONCEALED SPLINE TILE, OR DRYWALL. VERIFY MOUNTING DETAILS FOR EACH SPACE BEFORE ORDERING FIXTURES SO THAT PROPER QUANTITIES FOR EACH CONDITION WILL BE DELIVERED IN TIME TO AVOID CONSTRUCTION K. SECURELY FASTEN LIGHTING FIXTURES TO FRAMING MEMBERS OF SUSPENDED CEILINGS WITH FASTENING CLIPS, AS SPECIFIED. CLIP EACH FIXTURE TO ALL ADJOINING FRAMING MEMBERS TO PREVENT MOVEMENT OF THE MEMBERS AWAY FROM THE FIXTURES. L. SUPPORT EXIT SIGNS IN TILE CEILINGS WITH RAILS THAT SPAN BETWEEN RUNNERS OF CEILING SUSPENSION SYSTEM. USE FLANGED FIXTURES FOR FINISHED APPEARANCE. M. SUPPORT LED FIXTURES IN DRYWALL CEILINGS FROM PLASTER FRAMES, WITH ADJUSTABLE LUGS ON SIDE OF FIXTURE OR YOKE MOUNTING AS RECOMMENDED BY FIXTURE MANUFACTURER. USE FLANGED FIXTURES FOR FINISHED APPEARANCE, UNLESS OTHERWISE NOTED. N. LOCATE FIXTURE IN CENTER OF PANEL WHERE USED IN MODULAR TILE CEILINGS, UNLESS OTHERWISE NOTED. REFER TO REFLECTED CEILING PLAN. 18. EMPTY RACEWAY SYSTEMS A. A COMPLETE EMPTY RACEWAY SYSTEM CONSISTING OF BLANK 4-11/16 IN. SQ. X 2-1/8 INCHES DEEP OUTLET BOXES WITH SINGLE OR DOUBLE GANG DRYWALL FINISH COLLAR AS NOTED. METALLIC RACEWAY WITH PULL STRING SHALL BE PROVIDED AND INSTALLED WHERE SHOWN FOR THE FOLLOWING SYSTEMS. 1) TELEPHONE/DATA (SINGLE GANG) 2) CABLE TELEVISION (SINGLE GANG) B. RACEWAY SIZE SHALL BE A MINIMUM OF 3/4 IN. OR AS DOCUMENTED IN PLANS AND DETAILS. C. ALL METALLIC RACEWAY SYSTEMS SHALL BE STUBBED UP AND TERMINATE IN ACCESSIBLE CEILING. END BUSHINGS AND PULL WIRES SHALL BE PROVIDED. BONDING OF ALL RACEWAY SYSTEMS TO PROVIDE A COMMON GROUND PATH SHALL BE PROVIDED. D. ACTUAL DEVICES, CONNECTORS, WIRING COMPLETE WITH TERMINATIONS AND BOX COVERS SHALL BE PROVIDED BY THE OWNER. FIRE STOPPING A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION. B. PROVIDE ALL REQUIRED FIRE STOPPING. WORK INCLUDES FIRE-STOPPING PENETRATIONS OF FIRE-RESISTANCE RATED FLOORS, WALLS AND PARTITIONS IN NEW CONSTRUCTION, AS WELL AS PRE-EXISTING PENETRATIONS IN RENOVATION AREAS OF EXISTING CONSTRUCTION. PRODUCT DATA: SUBMIT MANUFACTURER'S PRODUCT DATA FOR EACH FIRE-STOPPING PRODUCE REQUIRED, INCLUDING INSTRUCTIONS FOR SUBSTRATE PREPARATION AND FIRE-STOPPING INSTALLATION. D. FIRE RESISTANT JOINT SEALERS: PROVIDE MANUFACTURER'S STANDARD FIRE-STOPPING SEALANT WITH ACCESSORY MATERIALS, HAVING FIRE RESISTANCE RATINGS INDICATED AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES PER ASTM E814 BY UNDERWRITERS LABORATORY, INC. OR OTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. MATERIALS — PROVIDE THE FOLLOWING: 1) ONE-PART FIRE-STOPPING SEALANT: ONE PART LATEX BASED INTUMESCENT SEALANT FORMULATED FOR USE IN A THROUGH-PENETRATION FIRE-STOP SYSTEM FOR SEALING OPENINGS AROUND CABLES, CONDUIT, PIPES AND SIMILAR PENETRATIONS THROUGH WALLS AND FLOORS. ACCEPTABLE PRODUCTS/MANUFACTURERS INCLUDE THE FOLLOWING: a. SPEC SEAL LC150 SERIES b. HILTI FS ONE c. 3M 20. TESTS A. BEFORE MAKING TESTS, COMPLETE ALL CONNECTIONS AT PANELS, FIXTURES AND OTHER EQUIPMENT. INSTALL FUSES AND HAVE ALL WIRING CONTINUOUS FROM SERVICE EQUIPMENT TO UTILIZATION OUTLETS. CORRECT ALL UNDESIRABLE GROUND, OPEN AND SHORT CIRCUIT CONDITIONS. B. PROVIDE SOURCE OF TEMPORARY POWER FOR MAKING TESTS IF NORMAL BUILDING POWER IS NOT AVAILABLE AT THE TIME. C. TAKE AND RECORD THE FOLLOWING READINGS ON SYSTEMS 600 VOLTS AND BELOW: 1) MEGGER TESTS OF ALL FEEDER CIRCUIT CONDUCTORS, GROUND CONDUCTORS, AND CONDUIT GROUND. 2) AMMETER READINGS ON ALL PHASES AND NEUTRAL OF EACH FEEDER TO INDICATE BALANCE.
 - B. PROVIDE ALL LIGHTING FIXTURES INDICATED, COMPLETE WITH LAMPS. 3) AMMETER READINGS ON ALL PHASES OF EACH POLYPHASE MOTOR. INCLUDE ALL INTERIOR LIGHTING FIXTURES, AND ALL EXTERIOR FIXTURES INCLUDE NAMEPLATE FULL LOAD CURRENT OF EACH MOTOR ON DATA

MENTIONED.

APPROVED MEANS.

LED LAMPS AND DRIVERS.

REPLACEABLE FROM THE ROOM SIDE.

APPROPRIATE CROSS-SECTIONAL CONFIGURATION FOR

FIXTURE HOUSING; THINNER SHEET METAL ACCEPTABLE

FOR BALLAST ENCLOSURES AND INCIDENTAL PURPOSES.

PRIMING, ELECTROSTATIC PAINTING, OR OTHER

AND ALUMINUM: BAKED CLEAR LACQUER OR OTHER DURABLE TRANSPARENT FILM ON POLISHED METAL

3-WIRE DIMMING DRIVER OR A TWO-STEP (50%-100%)

LINE VOLTAGE, TWO SWITCH CONTROLLED DIMMING

4) CERTIFY THAT ALL OVERLOAD DEVICES HAVE BEEN SET IN ACCORDANCE WITH DATA SHOWN ON THE DRAWINGS AND/OR MANUFACTURER'S RECOMMENDED SETTING.

FOR FINAL REVIEW.

- SEND FINAL CERTIFIED TEST REPORTS AND CERTIFICATIONS TO THE ARCHITECT FOR APPROVAL AND TRANSMITTAL TO THE OWNER.
- PROVIDE FUNCTIONAL TESTING FOR OCCUPANT SENSORS AND AUTOMATIC TIME SWITCH IN ACCORDANCE WITH ARTICLE 9.4.3 OF THE 2013 EDITION OF ASHRAE STANDARD 90.1.
- 21. DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS A. SUBMIT WRITTEN CERTIFICATION THAT ELECTRICAL SYSTEMS ARE COMPLETE AND OPERATIONAL. SUBMIT CERTIFICATION WITH CONTRACTOR'S REQUEST
 - 1) AT THE TIME OF FINAL REVIEW OF ELECTRICAL WORK, DEMONSTRATE THE OPERATION OF ELECTRICAL SYSTEMS. FURNISH LABOR, APPARATUS AND EQUIPMENT FOR SYSTEMS' DEMONSTRATION. THE VARIOUS TEST SHALL BE WITNESSED BY AND THE OWNER OR HIS
- B. THE CONTRACTOR SHALL FURNISH ALL TEST EQUIPMENT, MATERIALS, LABOR, AND TEMPORARY POWER HOOK-UPS TO PERFORM START-UP AND ALL TESTS AS REQUIRED TO OBTAIN FINAL FIELD ACCEPTANCE FROM OWNER. ALL TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE OWNER OR HIS REPRESENTATIVE. ALL TEST PROCEDURES SHALL CONFORM TO THIS SPECIFICATION AND APPLICABLE STANDARDS THE ANSI, IEEE, NEMA, OSHA, NEPA, ETC.
- C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TESTS AND TEST RECORD. TESTING SHALL BE PERFORMED BY AND UNDER THE IMMEDIATE SUPERVISION OF THE CONTRACTOR. TEST RECORD SHALL BE KEPT FOR EACH PIECE OF EQUIPMENT. COPIES SHALL BE FURNISHED TO THE ENGINEER FOR REVIEW AND/OR APPROVAL.
- D. A VISUAL INSPECTION OF ALL ELECTRICAL EQUIPMENT, TO CHECK FOR THE FOREIGN MATERIAL, TIGHTNESS OR WIRING AND CONNECTION, PROPER GROUNDING, MATCHING NAMEPLATE CHARTS WITH SPECIFICATION, ETC., SHALL BE MADE PRIOR TO ACTUAL TESTING.
- E. A COMPLETE OPERATIONAL TEST SHALL BE MADE ON THE REVISED LIFE SAFETY FIRE ALARM SYSTEM. THE CONTRACTOR SHALL CONSULT WITH THE EQUIPMENT VENDORS AND THEN SUBMIT FOR APPROVAL A STEP-BY-STEP PROCEDURE DESCRIBING THE METHOD OF MAKING THE TESTS, THE EQUIPMENT TO BE UTILIZED AND THE FEATURE TO BE CHECKED BY THE TEST. ALL INTERLOCKS AND PROTECTIVE FEATURES SHALL BE CHECKED
- 22. ADDRESSABLE FIRE ALARM SYSTEM
- A. PROVIDE A COMPLETE INSTALLATION FOR AN ADDRESSABLE FIRE ALARM SYSTEM WITH ALL ALARM, MECHANICAL UNITS CONTROL, REMOTE STATION NOTIFICATION, AND DELAYED EGRESS SYSTEM INTERFACE AS REQUIRED.
- B. THE INSTALLATION OF THE PROJECT'S FIRE ALARM SYSTEM SHALL CONFORM TO THE APPLICABLE CODES AND REQUIREMENTS OF THE LOCAL FIRE
- ALL COMPONENTS OF THE SYSTEM SHALL BE U.L. LISTED AND LABELED FOR THEIR INTENDED USE.
- THE ACTUATION OF ANY FIRE ALARM SYSTEM INITIATION DEVICE SHALL BE ANNUNCIATED ON THE ALPHA-NUMERIC DISPLAY ON THE CONTROL PANEL, AND SHALL CAUSE OFF ALARM SIGNALS TO SOUND AND FLASH CONTINUOUSLY UNTIL SUCH TIME AS THE DEVICE IS RESTORED TO NORMAL AND THE CONTROL PANEL IS SILENCED OR RESET. THE SYSTEM SHALL BE NON-CODED, ADDRESSABLE. ALL AUXILIARY DEVICES SUCH AS ACCESS CONTROL LOCKS AND DOOR HOLDERS SHALL ALSO RESPOND WHEN AN ALARM IS INITIATED. RESET OF THESE DEVICES SHALL ALSO BE BY USE OF THE SYSTEM RESET SWITCH. PROVISION TO BYPASS THESE FUNCTIONS DURING DRILL SHALL ONLY BE THROUGH USE OF SWITCHES, WHICH GIVE TROUBLE INDICATION WHEN NOT IN NORMAL OPERATING POSITION.
- PRODUCT DATA SUBMITTALS TO INCLUDE OPERATING INSTRUCTIONS. PARTS. DEVICES, ACCESSORIES, PERFORMANCE DATA, SEQUENCE OF OPERATIONS, SCHEMATICS OF ENTIRE SYSTEM, RISER DIAGRAM, FLOOR PLANS, AND WIRING TO ALL COMPONENTS INCLUDING COLOR-CODE CHART FOR ALL CONDUCTORS FOR SYSTEM DEVICES.
- F. SHOP DRAWINGS AND SEQUENCE OF OPERATION SHALL BE APPROVED BY THE LOCAL FIRE MARSHAL AND SHALL INCLUDE ALL SUBMITTAL MATERIALS REQUIRED BY IFC 907.
- CONTRACT CLOSEOUT SUBMITTALS SHALL BE REQUIRED UNDER DIVISION 1 SPECIFICATIONS:
- H. THE CENTRAL PANEL SHALL BE NOTIFIER OR APPROVED EQUAL BY FIRE-LITE, EST, SILENT KNIGHT, GAMEWELL- FCI OR SIMPLEX. PANEL SHALL BE MODULAR CONSTRUCTION WITH THE CONTROLS BEING HOUSED IN A SURFACE-MOUNTED CABINET WHERE INDICATED ON THE FLOORPLANS. ALL INDICATOR LAMPS, METERS, AND ALPHA-NUMERIC DISPLAY SHALL BE PROPERLY LABELED AND COMPLETELY VISIBLE FROM THE PANEL FRONT WITHOUT OPENING THE CABINET DOOR. LAMPS SHALL INCLUDE SYSTEM POWER, ALARM AND TROUBLE INDICATORS SWITCHES SHALL INCLUDE THOSE FOR LAMP TEST. SIGNAL SILENCE. TROUBLE SILENCE WITH RINGBACK AND SYSTEM RESET. A TROUBLE SIGNAL SHALL SOUND WHEN SWITCHES ARE LEFT IN NON-NORMAL POSITION.
- A BATTERY CHARGER MODULE SHALL BE AN INTEGRAL PART OF THE CONTROL PANEL. STANDBY BATTERIES SHALL BE OF THE SEALED MAINTENANCE FREE TYPE. BATTERIES SHALL BE SIZED TO HAVE AMPLE CAPACITY TO OPERATE THE ENTIRE SYSTEM IN STANDBY FOR 24 HOURS AND STILL OPERATE ALL ALARM DEVICES FOR THE FIVE (5) MINUTES AT THE END OF THIS PERIOD. THE BATTERY SHALL BE HOUSED IN THE FIRE ALARM CABINET.
- ADDRESSABLE MANUAL STATIONS SHALL BE DUAL ACTION PULL LEVER TYPE REQUIRING A KEY TO BE RESET.
- SMOKE DETECTORS SHALL BE PHOTOELECTRIC TYPE WITH BUILT-IN DETECTOR MAINTENANCE SIGNAL CAPABILITY. THE DETECTOR HEAD SHALL BE PLUG-IN AND MOUNT TO A TWIST LOCK BASE. THE BASE SHALL HAVE AN INDICATOR LAMP TO SHOW WHEN THE UNIT HAS ACTIVATED.
- DUCT DETECTORS SHALL BE OF PHOTOELECTRIC TYPE WITH PLUG-IN DETECTOR HEAD. UNIT SHALL HAVE FIELD ADJUSTABLE SENSITIVITY. THE SAMPLING TUBES SHALL BE FULL LENGTH AND COVER THE ENTIRE WIDTH OF THE DUCT.
- M. CARBON MONOXIDE DETECTORS SHALL BE ELECTROCHEMICAL CELL TYPE WITH BUILT-IN DETECTOR MAINTENANCE SIGNAL CAPABILITY. THE DETECTOR HEAD SHALL BE PLUG-IN AND MOUNT TO A TWIST LOCK BASE. THE BASE SHALL HAVE AN INDICATOR LAMP TO SHOW WHEN THE UNIT HAS ACTIVATED.
- N. AUDIO-VISUAL HORN/STROBE UNITS SHALL CONSIST OF A COMBINATION HORN AND STROBE TYPE LIGHT SEMI-FLUSH MOUNTED IN A COMMON ENCLOSURE. STROBE LENS SHALL HAVE "FIRE" SILK-SCREENED. THE LAMP SHALL PULSE AND OPERATE OVER THE COMMON ALARM CIRCUIT.
- VISUAL STROBE UNITS SHALL CONSIST OF A STROBE TYPE LIGHT SEMI-FLUSH MOUNTED IN A COMMON ENCLOSURE. STROBE LENS SHALL HAVE "FIRE" SILK-SCREENED. THE LAMP SHALL PULSE AND OPERATE OVER THE COMMON ALARM CIRCUIT.
- P. SYSTEM SHALL BE PRE-ENGINEERED BY THE EQUIPMENT SUPPLIER AND MANUFACTURER'S REPRESENTATIVE. THE PRE-ENGINEERING SHALL INCLUDE THE SELECTION OF THE PROPER TYPES AND QUANTITIES OF SYSTEM COMPONENTS, THE FINAL LAYOUT OF THESE COMPONENTS AND THE FURNISHING OF ALL SHOP DRAWINGS IN ACCORDANCE WITH SECTION 907.1 OF THE INTERNATIONAL FIRE CODE FOR REVIEW BY THE A/E, COMPLETE WITH DETAILED WIRING DIAGRAMS FOR THE CONTRACTOR'S USE AND OWNER'S RECORD.
- FINAL CONNECTIONS AND MOUNTING OF FIELD DEVICES TO BE MADE UNDER SUPERVISION OF MANUFACTURER'S REPRESENTATIVE. FINAL PANEL CONNECTIONS AND SYSTEM START-UP TO BE ACCOMPLISHED BY THE MANUFACTURER'S REPRESENTATIVE, WITH INSTALLER PRESENT TO ASSIST.
- R. FIRE ALARM SYSTEM WIRING SHALL COMPLY WITH THE REQUIREMENTS OF NEC ARTICLE 760 FOR POWER-LIMITED FIRE ALARM CIRCUITS (PLFA) AND NONPOWER-LIMITED FIRE ALARM CIRCUITS (NPLFA) AND SHALL NOT BE COMBINED WITH OTHER SYSTEMS IN COMMON RACEWAY. IN ADDITION, AUXILIARY CIRCUITS SUCH AS DOOR HOLDERS AND FAN INTERLOCK CIRCUITS REQUIRING 120VAC SHALL BE INSTALLED IN SEPARATE CABLES OR RACEWAYS FROM THE FIRE DETECTION AND SIGNALING CIRCUITS. WIRING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2014 EDITION OF THE NATIONAL ELECTRIC CODE AND NFPA 72. ALL WIRING SHALL FOLLOW A LOGICAL COLOR CODE AND BE UNIFORM THROUGHOUT THE BUILDING. WIRES AT ALL TERMINATION POINTS SHALL BE LABELED WITH BRADY TAGS. THIS SHALL BE THE CONTRACTOR'S RESPONSIBILITY. WIRE TO BE THHN. MINIMUM SIZES AS FOLLOWS: #14 - INITIATION, #14 -SIGNAL, #14 AUXILIARY CONTROLS.
- THE MANUFACTURER'S REPRESENTATIVE SHALL PERFORM A QUALITY INSPECTION OF THE FINAL INSTALLATION. ALL DETECTORS AND COMPONENTS REQUIRING PERIODIC TESTING SHALL BE CHECKED TO ENSURE PROPER OPERATION. THE SENSITIVITY OF EACH DETECTOR SHALL BE CHECKED WITH A SPECIAL TEST METER PROVIDED BY THE MANUFACTURER. THE READING MUST BE WITHIN THE LIMITS SET BY THE MANUFACTURER.
- IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE AND LOCAL FIRE OFFICIAL, A COMPLETE FUNCTIONAL TEST OF THE SYSTEM SHALL BE MADE TO SHOW OPERATION OF ALL PARTS. THE OWNER SHALL BE INSTRUCTED IN A COPY OF THE CHECKOUT TEST RESULTS. A SYSTEM CERTIFICATION VERIFYING THE PROPER OPERATION OF THE SYSTEM SHALL BE REQUIRED PRIOR TO ACCEPTANCE.
- 23. SPECIAL ENGINEERING SERVICES

- A. IN THE INSTANCE OF COMPLEX OR SPECIALIZED ELECTRICAL SYSTEMS SUCH AS EMERGENCY SYSTEM FIRE ALARM OR SIMILAR MISCELLANEOUS SYSTEMS, THE INSTALLATION, FINAL CONNECTIONS AND TESTING OF SUCH SYSTEMS SHALL BE MADE UNDER THE DIRECT SUPERVISION OF COMPETENT AUTHORIZED SERVICE ENGINEERS WHO SHALL BE IN THE EMPLOY OF THE RESPECTIVE EQUIPMENT MANUFACTURER.
- ANY AND ALL EXPENSES INCURRED BY THESE EQUIPMENT MANUFACTURERS' REPRESENTATIVES RELATED TO THIS PROJECT, SHALL BE BORNE BY THE ELECTRICAL CONTRACTOR.
- 24. DESIGN MODIFICATIONS
- A. THE DRAWINGS SHOW ELECTRICAL SYSTEMS, WHICH SUPPLY, CONTROL, AND/OR MONITOR SYSTEMS SPECIFIED ELSEWHERE. THE ELECTRICAL SYSTEM SHOWN HAS BEEN BASED ON SPECIFIC MANUFACTURERS DATA OR INFORMATION CONVEYED TO THE ELECTRICAL DESIGNER. WHERE ANY AGREEMENT OR CHANGE IS MADE TO SUPPLY EQUIPMENT OF LARGER CAPACITY OR DIFFERENT ELECTRICAL CHARACTERISTICS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE ELECTRICAL SYSTEM TO EFFECT SUCH CHANGES WITHIN THE INTENT OF THESE SPECIFICATIONS AND TO INFORM THE ENGINEER, IN WRITING, OF SUCH CHANGE. FOR EXAMPLE, IF HVAC COMPRESSORS AND/OR MOTORS ARE ALLOWED TO BE CHANGED TO 230 VOLTS RATHER THAN THE ORIGINALLY SPECIFIED 208 VOLTS,

BOOSTING OR BUCKING TRANSFORMERS SHALL BE SUPPLIED, INSTALLED,

AND WIRED TO ACCOMMODATE THE CHANGE AT NO ADDITIONAL COST.

No. Date Description 11/17/21 | ISSUED FOR BID

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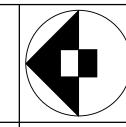
NEW MAINTENANCE BUILDING ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY

5080 ATLANTIC AVE.

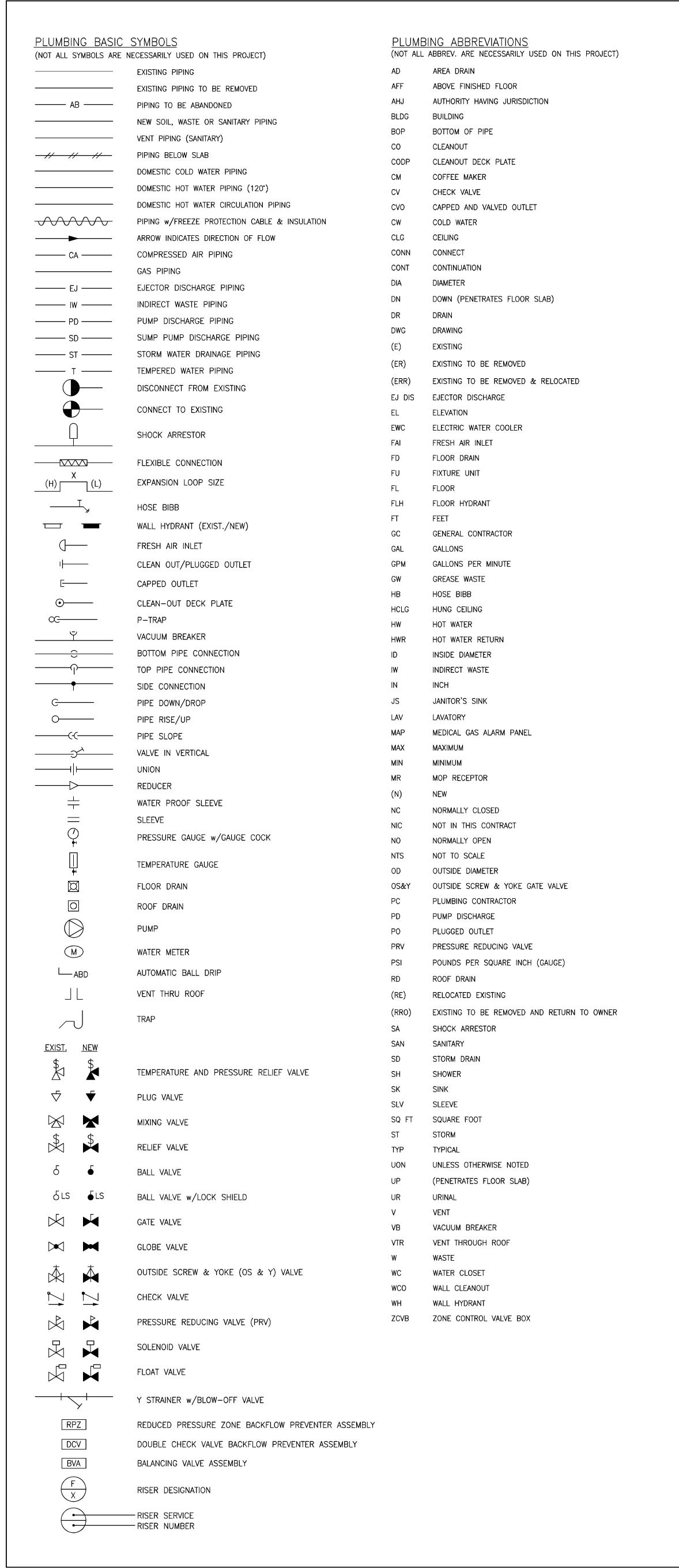
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MAYS LANDING, NJ 08330 Drawing

ELECTRICAL SPECIFICATIONS



AS NOTED Date Drawn



PLUMBING GENERAL NOTES

- CONTRACTOR SHALL PROVIDE AND PAY ALL FEES AND PERMITS. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST INTERNATIONAL MECHANICAL CODE, INTERNATIONAL FUEL GAS CODE, NATIONAL STANDARD PLUMBING CODE, NEC CODE AND ALL OTHER STATE AND LOCAL AUTHORITIES HAVING JURISDICTION.
- 2. CONTRACTOR SHALL VISIT THE JOB SITE AND OBSERVE ALL EXISTING CONDITIONS. PRIOR TO SUBMITTING A BID.
- DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO SHOW APPROXIMATE LOCATIONS. CONTRACTOR SHALL INSTALL ALL WORK WITHOUT CONFLICT WITH OTHER TRADES AND MAKE ALTERATIONS AS REQUIRED WITHOUT ADDITIONAL COST TO OWNER. CONTRACTOR SHALL INCLUDE ALL NEEDED OFFSETS, CHANGES IN DIRECTION, TRANSITIONS, COLLARS, FITTINGS, ETC. NEEDED FOR COMPLETE AND OPERATIONAL SYSTEMS.
- 4. ALL COMPONENTS OF THE DOMESTIC WATER SYSTEM SHALL CONFORM TO THE FEDERAL "REDUCTION OF LEAD IN DRINKING WATER ACT" AS DEFINED PER SDWA IN SECTION 1417(D). THE WETTED AREA EXPOSED TO DRINKING WATER SHALL BE LEAD FREE.
- COORDINATE WORK WITH OTHER TRADES SO THAT ALL COMPONENTS SHALL BE INSTALLED IN THE PROPER PLACE AT THE PROPER TIME.
- 6. SANITARY PIPING SHALL BE SLOPED ON A DOWNWARD PITCH AT A MINIMUM OF 1/4" PER FOOT FOR 2" SIZES AND LESS. PIPING 3" AND LARGER SHALL BE SLOPED AT 1/8" PER FOOT, AND IN ALL CASES CONFORMING TO JURISDICTIONAL CODE REQUIREMENTS.
- 7. PROVIDE ACCESSIBLE DRAINAGE SYSTEM CLEANOUTS, EFFECTIVELY PLACED FOR EACH TRAP, STACK, BASE, AND AT CHANGE IN DIRECTION AND SPACING AS REQUIRED BY CODE, WHETHER INDICATED ON PLANS OR NOT. PROVIDE ALL ADDITIONAL SYSTEM CLEANOUTS REQUIRED FOR THOROUGH CLEANING..
- 8. FOR SOLDERED JOINTS, CLEAN THE ENDS OF ALL COPPER TUBING BEFORE ASSEMBLY. APPLY FLUX AND TIN THE ENDS OF TUBING 2 INCHES AND LARGER.
- 9. BALL TYPE CONTROL VALVES SHALL BE INSTALLED ON EACH BRANCH FROM THE DOMESTIC WATER SUPPLY MAINS AND ON EACH ISOLATED FIXTURE BRANCH.
- 10. PUBLIC USE HAND WASHING FACILITIES: WATER DISCHARGED FROM PUBLIC-USE HAND WASHING FACILITIES SHALL BE LIMITED TO A MAXIMUM TEMPERATURE OF 110°F USING A WATER TEMPERATURE LIMITING DEVICE COMPLYING WITH ASSE 1070.
- 11. FLUSH CONTROLS FOR WATER CLOSETS MUST BE LOCATED ON THE "APPROACH" OR OPEN SIDE OF THE TANK, TO COMPLY WITH UFAS SECTION 4.16.5.
- 12. ALL PIPING ON EXTERIOR WALLS SHALL BE PROTECTED
- 13. PROVIDE DIELECTRIC FITTINGS WHEN JOINING DISSIMILAR

FROM FREEZING.

- 14. EXPOSED PIPING AND FITTINGS AT FIXTURES SHALL BE CHROME PLATED I.P.S. BRASS.
- 15. ESCUTCHEON PLATES SHALL BE PROVIDED ON ALL PIPE WHICH PASS THROUGH WALLS, PARTITIONS, FLOORS OR CEILINGS AND SHALL BE THE SPLIT RING TYPE, STEEL
- CONSTRUCTION. 16. SLEEVES SHALL BE SCHEDULE 40 STEEL AND SHALL BE TWO PIPE SIZES LARGER THAN THE SYSTEM PIPE. SLEEVES SHALL BE LOCATED WHERE PIPE PASSES THROUGH WALLS, FLOORS OR PARTITIONS. ANNULAR SPACE BETWEEN SLEEVE AND PIPE SHALL BE SEALED WATER TIGHT AND FIRE STOPPED (IF APPLICABLE) TO ACHIEVE AN HOURLY RATING EQUAL OR GREATER TO THAT OF THE ASSEMBLY BEING PENETRATED.
- 17. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND DETAILS.
- 18. ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE BEST PRACTICES OF THE TRADE AND THE LATEST CODE REQUIREMENTS. SYSTEM MATERIALS SHALL BE UNIFORM THROUGHOUT THE BUILDING.
- 19. ALL PIPING SHALL BE KEPT AS HIGH AS POSSIBLE CONSISTENT WITH THE PROPER PITCH, TO MAINTAIN MAXIMUM HEADROOM. PIPING SHALL BE ACCURATELY CUT TO MEASUREMENTS ESTABLISHED AT THE BUILDING. PIPING SHALL BE WORKED INTO PLACE WITHOUT SPRINGING, FORCING OR CUTTING OF THE BUILDING STRUCTURE, AND SHALL BE INSTALLED AS DIRECTLY AS POSSIBLE BETWEEN CONNECTING POINTS PARALLEL WITH OR AT RIGHT ANGLES TO BUILDING CONSTRUCTION, EXCEPT AS REQUIRED TO OBTAIN PITCH.
- 20. ALL EQUIPMENT AND MATERIALS SHALL, AS A MINIMUM, HAVE A WORKING PRESSURE AS DETERMINED BY CODES, ASME (OR SIMILAR OTHER BODY) AND OF NOT LESS THAN 125 PSI.
- 21. CLEAN ALL PIPE BEFORE ERECTION. REAM ALL PIPE ENDS AFTER CUTTING.
- 22. FOR SCREWED JOINTS APPLY NON-CORROSIVE, NON-HARDENING TEFLON PIPE TAPE OR SUITABLE COMPOUND TO MALE THREADS ONLY. CAULKING AND PACKING OF THREADS IS PROHIBITED.
- 23. INSTALL EXPOSED PIPE LINES PARALLEL WITH BUILDING WALLS OR STRUCTURE. DO NOT EMBED PIPING IN CINDER FILL, NOR INSTALL WHERE THERE IS A POSSIBILITY OF
- 24. PITCH PIPING TO PERMIT AIR VENTING THROUGH THE FIXTURES. ALLOW FOR EXPANSION AND COMPLETE LOW POINT DRAINAGE.
- 25. IT IS THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR THE RELATED HVAC, FIRE PROTECTION, ELECTRICAL, STRUCTURAL, ARCHITECTURAL, INTERIOR DECOR AND SITE ENGINEERING DRAWING TO BECOME FAMILIAR WITH THE FULL PROJECT SCOPE. IN ADDITION, THIS CONTRACTOR MUST COORDINATE WITH AN OWNER REPRESENTATIVE TO FULLY UNDERSTAND ALL REQUIREMENTS WHICH MAY NOT BE SPECIFIED HEREIN AND WHICH THE OWNER MAY CONSIDER PART OF THIS CONTRACT. DURING THE COURSE OF CONSTRUCTION COORDINATION AND ACTUAL CONSTRUCTION IT IS THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO WORK CLOSELY WITH ALL ACCOMPANYING CONTRACTORS AND TRADESMEN IN ORDER TO ENSURE A SMOOTH
- RUNNING AND CAREFULLY COORDINATED INSTALLATION. 26. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS INCLUDING BUT NOT LIMITED TO NATIONAL, CITY, STATE, LOCAL CODES AND ORDINANCES WHICH MAY BE IN EFFECT. ALL PLUMBING MATERIALS, INSTALLATION PROCEDURES AND SYSTEM LAYOUTS SHALL BE APPROVED BY ALL APPLICABLE CODE ENFORCEMENT AUTHORITIES WITHIN JURISDICTION, AND IT SHALL BE THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FOR THIS INSTALLATION.
- 27. THE PLUMBING CONTRACTOR SHALL VISIT THE SITE AND NOTE ALL EXISTING CONDITIONS AS WELL AS ALL CONDITIONS TO BE MET. PRIOR TO BID SUBMISSION. LACK OF A THOROUGH UNDERSTANDING OF THE PROJECT SCOPE AND CONDITIONS SHALL NOT CONSTITUTE AN EXCUSE FOR ERRORS OR OMISSIONS, NOR FOR A REQUEST FOR EXTRA COMPENSATION.
- 28. IT IS CRITICAL THAT THE PLUMBING CONTRACTOR FIELD VERIFIES ALL INVERTS PRIOR TO BID SUBMISSION, IF ANY CONFLICTS EXIST BETWEEN THE NEW PLUMBING SYSTEMS AND THE EXISTING SITE LEVEL SYSTEMS, THEY SHOULD BE BROUGHT TO THE ATTENTION OF AN OWNER'S REPRESENTATIVE AND THE ENGINEER PRIOR TO BID SUBMISSION. EXTRA COMPENSATION SHALL NOT BE ALLOWED FOR ANY EXTRA WORK WHICH RESULTS FROM AN

INABILITY TO MEET THE INVERTS OF THE EXISTING SITE LEVEL PIPING SYSTEMS.

- 29. THE PLUMBING CONTRACTOR SHALL PROVIDE A COMPLETE SET OF RECORD "AS-BUILT" DRAWINGS INDICATING THE PRECISE LOCATION OF ALL SYSTEMS, EQUIPMENT CONCEALED OR EMBEDDED PIPING, PIPING CONNECTIONS AND ACCESS DOORS. THESE DRAWINGS SHALL ALSO INCLUDE ALL CHANGES AND DEVIATIONS FROM BID
- 30. RUN ALL DOMESTIC, WASTE, VENT AND GAS PIPING AS HIGH AS POSSIBLE THROUGHOUT ENTIRE BUILDING. INSTALL LONG RUNS OF PIPING WITHIN STEEL (JOIST) SPACE AND OTHER PIPING TIGHT TO BOTTOM OF STEEL. COORDINATE AND VERIFY WITH OTHER CONTRACTORS AS NOT TO INTERFERE WITH DUCTWORK, FIRE PROTECTION PIPING, LIGHTING SYSTEMS, ETC.
- 31. ALL EXPOSED HORIZONTAL AND VERTICAL PIPING SHALL BE INSTALLED IN A NEAT ARRANGEMENT IN LOCATIONS WHICH ARE THE MOST INCONSPICUOUS. VERTICAL DROP FINAL LOCATIONS SHALL BE COORDINATED AND RUN WITHIN CHASES, WALLS, SOFFITS WITH OTHER MECHANICAL / ELECTRICAL FEEDS. ALL SUCH LOCATIONS ARE TO BE REVIEWED WITH AN OWNER REPRESENTATIVE AND ARCHITECT PRIOR TO INSTALLATION.
- 32. FINAL CONNECTIONS TO ALL GAS FIRED APPLIANCES TO BE BY THE PLUMBING CONTRACTOR, REGARDLESS OF WHO PROVIDES APPLIANCE. THIS SHALL INCLUDE BUT NOT BE LIMITED TO HVAC FQUIPMENT, COOKING FQUIPMENT. EMERGENCY GENERATORS AND DOMESTIC HOT WATER HEATERS. EACH PIECE OF EQUIPMENT SHALL BE PROVIDED WITH A DIRT LEG, LUBRICATED PLUG VALVE, UNION, GAS SHUT-OFF VALVE AND A FLEXIBLE STAINLESS STEEL CONNECTION.
- 33. ALL PLUMBING FIXTURES / APPLIANCES SHALL HAVE THEIR OWN INDEPENDENT SHUT-OFF VALVES, INSTALLED IN AN EASILY ACCESSIBLE AND CONVENIENT LOCATION.
- 34. ALL DOMESTIC WATER BRANCH LINES SHALL HAVE THEIR OWN RESPECTIVE SHUT-OFF VALVES.
- 35. DOMESTIC WATER HEATER TEMPERATURE / PRESSURE RELIEF VALVES SHALL BE PIPED FULL SIZE TO THE NEAREST APPROVED STANDPIPE OR FLOOR DRAIN. THIS REQUIREMENT SHALL BE APPLICABLE TO ALL DOMESTIC WATER HEATERS.
- 36. ALL HAND SINKS SHALL HAVE IN-LINE WATER TEMPERING VALVES INSTALLED SO AS TO BE EASILY ACCESSIBLE. THESE TEMPERING VALVES SHALL BE SET TO DELIVER HOT WATER AT 105°F.
- 37. WHERE APPLICABLE, DO NOT RUN VENTS THROUGH ROOF AT PRE-FINISH METAL ROOFING SYSTEMS, INSTEAD DIVERT VENT PIPING TO RUN UP THROUGH FLAT MEMBRANE ROOF. VENTS THROUGH ROOF SHALL NOT BE VISIBLE TO THE PUBLIC AND NOT LOCATED CLOSER THEN 10'-0" OF ROOFTOP EQUIPMENT.
- 38. THE PLUMBING CONTRACTOR SHALL RUN OUT ALL BUILDING DRAINAGE AND WASTE LINES AND MAKE ALL CONNECTIONS TO SITE LEVEL SYSTEMS AS INDICATED ON BID DOCUMENTS.
- 39. THE PLUMBING CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATIONS AND CONNECTIONS OF THE HOSE BIBB. PLUMBER TO FURNISH AND INSTALL ALL PIPING AND EQUIPMENT AS PER MANUFACTURER'S INSTRUCTIONS FURNISH AND INSTALL AN ACCESSIBLE SHUT-OFF VALVE FOR THE HOSE BIBB BRANCH SUPPLY. FINAL CONNECTION & INSTALLATION BY PLUMBING CONTRACTOR.
- 40. PRIOR TO INSTALLING SYSTEMS, THE PLUMBING CONTRACTOR SHALL MEET WITH AN OWNER'S REPRESENTATIVE TO FIELD VERIFY THE EXACT LOCATION OF ALL PROPOSED EQUIPMENT WHICH MAY NOT BE CLEARLY INDICATED ON THE DRAWINGS.
- 41. THE PLUMBING CONTRACTOR SHALL COORDINATE THE ENTIRE UNDERGROUND PLUMBING PIPING SYSTEM LOCATIONS AND INVERTS WITH THE GRADE BEAMS, INCLUDING TRENCH DRAINS AS WELL AS ALL OTHER UNDERGROUND SYSTEMS.
- 42. RUN ALL INTERIOR PIPING (GAS, WATER, VENTS AND WASTE) AS TIGHT TO STEEL AS POSSIBLE.
- 43. PROVIDE TRAP PRIMERS TO ALL DRAINS ONLY WHEN
- REQUIRED BY CODE. VERIFY PRIOR TO SUBMITTING BID. 44. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF FIRE WALLS AND WALLS WHICH REQUIRE SEALING. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING ALL FLOOR AND WALL PENETRATIONS WITH FIRE RATED SEALANT BEFORE FINAL PAYMENT.
- 45. PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL ALL INDIRECT WASTE PIPING - SHALL BE COPPER WITH SOLDER

46. PLUMBING CONTRACTOR SHALL RUN ALL PIPING TO AVOID

- REINFORCING AT ALL COLUMN LINES.
- 47. FOR MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES, SEE ARCHITECTURAL DRAWINGS.
- 48. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN-LIKE MANNER IN ACCORDANCE WITH LOCAL CODES AND ALL AUTHORITIES HAVING JURISDICTION.
- 49. VALVES SHALL NOT BE INSTALLED WITH THE OPERATING HANDLE POINTING DOWNWARD. RUN PIPING GENERALLY PARALLEL TO THE AXIS OF THE BUILDING, ARRANGED T CONFORM TO THE BUILDING REQUIREMENTS AND TO SUIT THE NECESSITIES OF CLEARANCE OF DUCTS, FLUES, CONDUITS AND WORK OF OTHER TRADES AND CLOSE TO CEILING OR OTHER CONSTRUCTION AS PRACTICAL, FREE OF
- TRAPS OR BENDS. 50. PLUMBING CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS TO WATER, STORM AND SANITARY LATERALS INSTALLED BY SITE CONTRACTOR.
- TO REVIEW THESE PLANS AND SPECIFICATIONS, AS WELL AS 51. ALL PIPES, DUCT, CONDUIT AND OTHER PENETRATIONS OF RETURN AIR PLENUM, INCLUDING HANGERS AND SUPPORT SYSTEM PENETRATIONS OF TOP HORIZONTAL SHALL BE SEALED AIRTIGHT; DUCT PENETRATIONS SHALL BE NEATLY FRAMED WITH SHEETMETAL.
 - 52. PLUMBING CONTRACTOR SHALL REPLACE ANY PIPING SYSTEM AND COMPONENTS WHICH DO NOT PASS TESTING PROCEDURES SPECIFIED AND RETEST REPAIRED PORTIONS OF THE SYSTEM.
 - 53. PLUMBING CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO ALL PLUMBING EQUIPMENT. EQUIPMENT SUPPLIED BY OTHERS, INCLUDING REQUIRED FAUCETS, STOPS, VALVES, FITTINGS, TRAPS, ETC.
 - 54. PLUMBING CONTRACTOR SHALL INSTALL PIPING SO AS NOT TO ENCROACH ON REQUIRED CLEARANCES ABOVE ANY ELECTRIC PANEL. NO PIPING SHALL BE INSTALLED DIRECTLY OVER ELECTRICAL PANELS AND NO PIPING SHALL BE INSTALLED WITH THE BOTTOM AT LESS THAN 66" ABOVE THE 4'-0" SPACE DIRECTLY IN FRONT OF ANY ELECTRIC
 - 55. PLUMBING CONTRACTOR SHALL FURNISH AND INSTALL AIR CHAMBERS PER NATIONAL STANDARD PLUMBING CODE ON ALL WATER SUPPLIES TO PLUMBING FIXTURES WITH QUICK CLOSING VALVES.
 - 56. PLUMBING CONTRACTOR SHALL ARRANGE FOR AND SHALL PAY ALL COSTS INCURRED FOR THE NEW GAS SERVICE
 - 57. PIPING HANGERS SHALL BE SPACED SO AS TO PREVENT SAG AND PERMIT PROPER DRAINAGE AND SHALL NOT BE SPACED MORE THAN EIGHT FEET APART UNLESS A GREATER SPACE IS DEFINITELY INDICATED ON THE DRAWINGS. A HANGER SHALL BE PLACED WITHIN (1) FOOT OF EACH HORIZONTAL ELBOW. HANGERS SHALL BE SIZED TO FIT OVER INSULATION AND BE PROVIDED WITH AN INSULATION

58. THE INSTALLATION OF ALL INSULATION SHALL BE PERFORMED BY AN EXPERIENCED CRAFTSMAN IN A NEAT WORKMAN-LIKE MANNER AND SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED RECOMMENDATIONS FOR SERVICE INTENDED.

- 59. ALL MATERIALS OF INSULATION SHALL BE OF THE TYPE AND QUALITY AS MANUFACTURED BY ARMSTRONG, CERTAINTEED, OWENS-CORNING OR SCHULLER.
- 60. ALL MATERIAL AND EQUIPMENT SPECIFIED TO BE INSULATED SHALL BE THOROUGHLY TESTED AND APPROVED PRIOR TO APPLYING THE INSULATION.
- 61. PLUMBING CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR TO ASSURE DOMESTIC WATER AND ELECTRICAL WIRING ARE NOT INSTALLED IN SAME STUD BAY IN WALLS AND CEILINGS.
- 62. ALL PIPING IN RETURN AIR PLENUMS SHALL BE CAST IRON OR CPVC. PVC PIPING IS PROHIBITED IN RETURN AIR PLENUMS.
- 63. DRAINAGE SYSTEM TEST

A. WATER TEST: THE ENTIRE DRAINAGE AND VENTING SYSTEM SHALL HAVE ALL NECESSARY OPENINGS PLUGGED TO PERMIT THE ENTIRE SYSTEM TO BE FILLED WITH WATER TO THE LEVEL OF THE HIGHEST VENT STACK ABOVE THE ROOF. THE SYSTEM SHALL HOLD THIS WATER FOR 30 MINUTES WITHOUT LEAKAGE. WHERE A "PORTION" OF THE SYSTEM IS TO BE TESTED, THE TEST SHALL BE CONDUCTED IN THE SAME MANNER, EXCEPT THAT A VERTICAL STACK 19 FEET ABOVE THE HIGHEST HORIZONTAL LINE TO BE TESTED SHALL BE INSTALLED AND FILLED WITH WATER TO MAINTAIN SUFFICIENT PRESSURE, OR A PUMP MAY BE USED TO SUPPLY THE PRESSURE. THE PRESSURE SHALL BE MAINTAINED FOR 30 MINUTES.

B. AIR TEST: IF TEST IS DONE WITH AIR, A PRESSURE OF 5 PSIG SHALL BE APPLIED WITH A FORCE PUMP AND MAINTAINED AT LEAST 15 MINUTES WITHOUT LEAKAGE. A MERCURY-COLUMN GAGE REGISTERING 10" IN HEIGHT SHALL BE USED IN THE AIR TEST. AIR TESTS SHALL NOT BE USED EXCEPT WHERE PERMITTED BY CODES AND WHEN AMBIENT TEMPERATURES ARE LESS THAN 32 DEGREES FAHRENHEIT FOR 30 MINUTES.

64. DOMESTIC WATER PIPING SYSTEM

UPON COMPLETION OF THE ROUGH-IN AND BEFORE INSULATION OR SETTING OF FIXTURES, DOMESTIC HOT AND COLD WATER PIPING SYSTEMS SHALL BE TESTED AT A HYDROSTATIC PRESSURE OF 1-1/2 TIMES THE ACTUAL WATER PRESSURE BUT NOT LESS THAN 100 PSIG AND PROVEN TIGHT AT THIS PRESSURE FOR NOT LESS THAN 3

65. CLEANING OF PIPING SYSTEMS

HOURS.

FOLLOWING THE COMPLETION OF SYSTEM TESTS, ALL PIPING SYSTEMS SHALL BE THOROUGHLY CLEANED BY THE CONTRACTOR BY FLUSHING WITH WATER OR AS OTHERWISE SPECIFIED. ALL DIRT, SCALE, OIL, GREASE AND FOREIGN SUBSTANCES WHICH MAY HAVE ACCUMULATED IN THE SYSTEMS DURING INSTALLATION SHALL BE COMPLETELY REMOVED.

66. STERILIZATION OF POTABLE WATER SYSTEMS

A. BEFORE BEING PLACED IN SERVICE, THE COMPLETE DOMESTIC HOT AND COLD WATER PIPING WITHIN TH BUILDING SHALL BE STERILIZED IN ACCORDANCE WITH THE LATEST ISSUE OF AWWA SPECIFICATION C-651 AND PER NATIONAL STANDARD PLUMBING CODE SECTION 10.9. THE PIPING SHALL BE FILLED WITH A WATER-CHLORINE SOLUTION CONTAINING AT LEAST 50 PARTS PER MILLION OF CHLORINE AND SHALL BE VALVED OFF FOR 24 HOURS OR FILLED WITH A WATER-CHLORINE SOLUTION CONTAINING AT LEAST 200 PARTS PER MILLION OF CHLORINE AND ALLOWED TO STAND FOR AT LEAST HOURS, FOLLOWING THE ALLOWED STANDING TIME, THE SYSTEM SHALL BE FLUSHED WITH POTABLE WATER UNTIL NO CHLORINE REMAINS IN THE SYSTEM.

B. PRIOR TO STERILIZATION, SYSTEMS SHALL BE LEAK TESTED AND ALL DIRT AND FOREIGN MATTER SHALL BE REMOVED BY A THOROUGH FLUSHING WITH WATER.

67. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICES. COMPLETE INSTALLATION AND STARTUP CHECKS SHALL BE ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND STARTUP REPORTS SHALL BE PROVIDED TO ARCHITECT/ENGINEER FOLLOWING COMPLETION. STARTUP SHALL BE PROVIDED FOR ALL EQUIPMENT SUPPLIED OR INSTALLED, INCLUDING

BUT NOT LIMITED TO THE FOLLOWING: A. WATER HEATERS B. PUMPS C. COMPRESSORS

D. CONTROLS

Revisions No. Date Description 11/17/21 | ISSUED FOR BID

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MCE PROJECT #21177

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AS NOTED

Drawn

GENERAL FIRESTOPPING NOTE

CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR EXCEEDING

WALL/CFILING/FLOOR ASSEMBLY RATINGS FOR ALL PENETRATIONS. CONTRACTOR SHALL

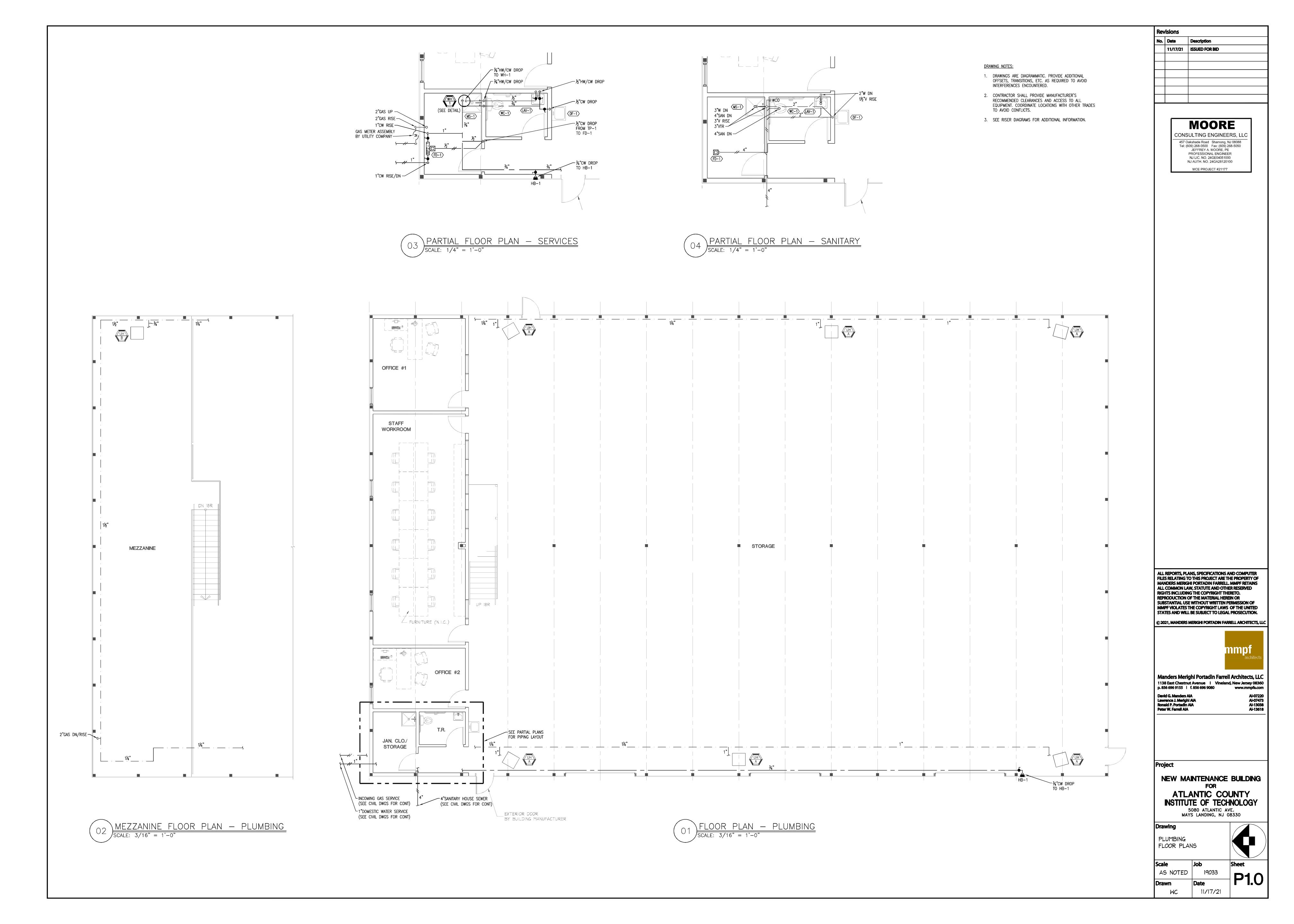
COLLARS AT ALL PENETRATIONS AND FIRE RATED CAULKING AS REQUIRED.

VERIFY LOCATION AND RATING OF ALL FIRE ASSEMBLIES AND PROVIDE INTUMESCENT

PLUMBING COVER SHEET



19033 Date



PLUM	IBING FIXTURE	SCHEDULE						
FIXTURE #	FIXTURE	MANUFACTURER AND EQUIPMENT	MODEL NUMBER	SI	ERVICE CO	ONNECTION	IS .	REMARKS
TIXTORE #	TIXTONE	WATOTACIONEN AND EQUI MENT	WODEL NOWBEN	CW	HW	SAN	VENT	NEWATING.
⟨WC−1⟩	WATER CLOSET—HANDIAPPED TANK TYPE FLOOR MOUNTED	AMERICAN STANDARD CADET RIGHT HEIGHT ELONGATED BEMIS OPEN FRONT SEAT LESS COVER	2467.016 1955SSCT	1/2"	-	4"	2"	PROVIDE SUPPLIES AND STOPS AS REQUIRED COORDINATE LEFT OR RIGHT TRIP LEVER WITH ARCHITECTURAL DRAWINGS.
(LAV-1)	LAVATORY WALL HUNG	AMERICAN STANDARD LUCERNE CHICAGO FAUCET SINGLE HOLE TRUEBRO ADA KIT	0356.421 2200-E2805ABCP 102 E-Z	1/2"	1/2"	1-1/2"	1-1/2"	PROVIDE GRID DRAIN, TRAP, SUPPLIES, VALVE STOPS & RISERS PROVIDE ADA INSULATION KIT
⟨MS−1⟩	MOP SINK	FIAT 24"x24"x10" MOLDED STONE FIAT BUMPERGUARD, HOSE & HOSE BRACKET CHICAGO FAUCET	MSB 2424 E-77-AA, 832-AA 540-LD897SGXKCCP	3/4"	3/4"	3"	1-1/2"	PROVIDE STAINLESS STEEL BUMPER GUARD, HOSE AND HOSE BRACKET, MOP HANGER AND WALL GUARD
⟨DF−1⟩	DRINKING FOUNTAIN	ELKAY ADA NON—FILTERED	EZS8L	1/2"	_	1-1/2"	1-1/2"	PROVIDE TRAP, SUPPLIES, VALVE STOPS & RISERS

1. ALL EXPOSED WATER AND/OR SANITARY PIPING UNDER SINKS OR LAVATORIES SHALL BE INSULATED WITH "LAV GUARD" INSULATION KIT.

- 2. PVC CELLULAR CORE (FOAM CORE) PIPE SYSTEMS IS NOT AN APPROVED MATERIAL AND SHALL NOT BE ACCEPTED FOR INSTALLATION UNDER ANY CIRCUMSTANCE.
- 3. ALL FIXTURE SHUT-OFFS AND STOP VALVES SHALL HAVE BRASS STEMS, PROVIDE ANGLE SUPPLY STOP WITH FLANGE (ESCUTCHEON PLATE) AND FLEXIBLE HOSE.
- 4. PROVIDE THERMOSTATIC MIXING VALVES (MV-1) BELOW EACH SINK AND/OR LAVATORY, (THAT IS NOT LOCATED WITHIN A DWELLING UNIT).
- 5. SEE ARCHITECTURAL DRAWING SETS FOR ADDITIONAL FIXTURE AND ACCESSORY REQUIREMENTS. CONTRACTOR SHALL COORDINATE AND PROVIDE FOR ALL FIXTURE AND EQUIPMENT.
- 6. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL PLUMBING FIXTURES.

WATER HEATER SCHEDULE														
TAG NO.	ITEM	MANUFACTURER	MODEL	STORAGE (GALLONS)	GAS (MBH)	V	ELECT PH	RICAL HZ	KW	THERMAL EFFICIENCY	RECOVERY (GPH)	TEMP RISE (DEG. F)	REMARKS	
WH 1	ELECTRIC WATER HEATER	BRADFORD WHITE	LE120L3-3	19		277	1	60	3	96%	15	80°	MOUNT ON PLATFORM ABOVE MOP SINK IN JANITORS CLOSET, COORDINATE LOCATION IN FIELD.	
NOTES:			-			-	-			-	-	-		

[2"(480 MBH)

✓ GAS METER ASSEMBLY

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─ GAS SERVICE

1. WATER HEATER TEMPERATURE TO BE SET AT 120°F.

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						BODY	′																	S1	FRAINE	R											REMARKS
		MANU	JFACT	URER																																	
DESIGNATION	ZURN	WADE	× JR SMITH	JOSAM	WATTS	CAST IRON	ACID RESISTANT COATING	GALVANIZED	ALL BRONZE	SECONDARY CLAMP	DECK CLAMP	SUMP RECEIVER	FLASHING COLLAR	CAST IRON	GALVANIZED	ALL BRONZE	NICKEL BRONZE	CHROME PLATED	SEDIMENT BUCKET	SECONDARY STRAINER	POLISHED FINISH	SATIN FINSIH	TRACTOR GRATE	BRONZE MESH SCREEN	FUNNEL TOP	FLAT TOP	DOME	RAISED LIP	NICKEL BRONZE RIM	LESS GRATE	HALF GRATE	BRONZE TOP	IRON GRATE	POLYETHYLENE	SOLID HINGED COVER	TRAP PRIMER	LOCATION
⟨FD-1⟩		1	2110			Х							χ						Х		Χ					Х							Х			Х	MER

- 1. ALL FLOOR DRAINS IN FINISHED AREAS SHALL BE LOCATED AS PER THE ARCHITECTURAL DRAWINGS.
- 2. ALL FLOOR DRAINS IN MECHANICAL EQUIPMENT, BOILER ROOMS, FAN ROOMS ETC., SHALL BE LOCATED IN COORDINATION WITH THE MECHANICAL CONTRACTOR.
- 3. THE CONTRACTOR SHALL VERIFY THE COMPATIBILITY OF THE DRAINS WITH THE APPROVED ROOFING AND/OR WATER PROOFING SYSTEMS PRIOR TO SUBMITTING SHOP DRAWINGS.
- 4. THE TOP OF CURVE OF ALL FLOOR DRAINS SHALL BE FLUSH WITH THE ADJACENT FINISHED FLOOR.
- 5. PROVIDE AUXILIARY INLETS ON ALL TRAPS FOR FLOOR DRAINS IN TOILET ROOMS FOR TRAP PRIMER 'TP-1'.

PIPE	SCHEDULE				
TAG	TYPE	MATERIAL/FITTINGS	SIZES	INSULATION	HANGER SPACING
CW	DOMESTIC COLD WATER	TYPE L COPPER HARD DRAWN / WROUGHT COPPER FITTINGS	1-1/4" OR SMALLER	1" FIBERGLASS	EVERY 6'
HW	DOMESTIC HOT WATER	TYPE L COPPER HARD DRAWN / WROUGHT COPPER FITTINGS	1-1/4" OR SMALLER	1.5" FIBERGLASS	EVERY 6'
GAS	LOW PRESSURE GAS	BLACK STEEL SCHEDULE 40 / MALLEABLE-IRON THREADED FITTINGS	3/4" TO 1"	N/A	EVERY 6'
GAS	LOW PRESSURE GAS	BLACK STEEL SCHEDULE 40 / MALLEABLE-IRON THREADED FITTINGS	1-1/4" OR LARGER	N/A	EVERY 8'
SAN	SANITARY BELOW GRADE	CAST IRON/HUB AND SPIGOT	ALL	N/A	-
SAN	SANITARY ABOVE GRADE	CAST IRON/HUBLESS	ALL	N/A	EVERY 4' AND AT EVERY FITTING OR JOINT
SAN	SANITARY BELOW GRADE	SCHEDULE 40 PVC/HUB AND SPIGOT	ALL	N/A	-
SAN	SANITARY ABOVE GRADE	SCHEDULE 40 PVC/HUBLESS	ALL	N/A	EVERY 4' AND AT EVERY FITTING OR JOINT
VENT	VENT ABOVE GRADE	CAST IRON/HUBLESS	ALL	N/A	EVERY 5' AND AT EVERY FITTING OR JOINT

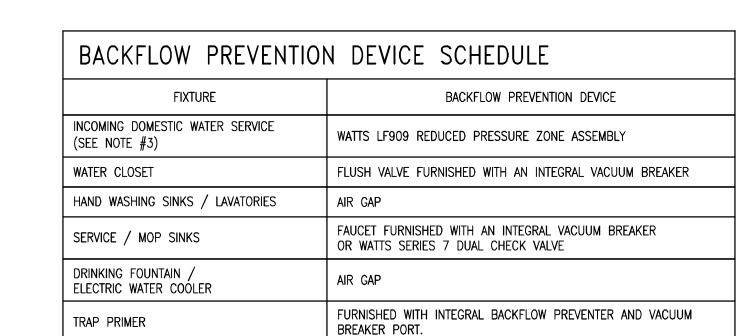
1. REFER TO SPECIFICATION FOR ADDITIONAL INFORMATION.

2. FOAM CORE PVC IS NOT AN APPROVED MATERIAL TO MCE STANDARDS

MISCE	MISCELLANEOUS PLUMBING SCHEDULE												
TAG	TYPE	MANUFACTURER	MODEL #	SIZE	ACCESSORIES								
RPZ-1	REDUCED PRESSURE ZONE ASSEMBLY	WATTS	1"	8									
MV-1	MIXING VALVE	WATTS	LFLM495	1/2", 3/4"	3,4,6,9								
TP-1	TRAP PRIMER	PRECISION PLUMBING PRODUCTS	PR-500	1/2"	12,13								
HB-1	FREEZE PROTECTED WALL HYDRANT	JAY R. SMITH	5509QT	3/4"	10,11								
NOTES/ACC	CESSORIES:												

WCO I ⊢

(1) P.D.I. AND/OR A.S.S.E. APPROVED (2) EXPANSION BELLOWS TYPE (3) IN-LINE TYPE (4) BRONZE BODY (5) SWEAT CONNECTION (6) THREADED CONNECTIONS (7) BUILT IN BY-PASS (8) PROVIDE 909AG-C AIR GAP (9) CW SHUT-OFF FOR EXCESSIVE HW DEMAND (10) WITH INTEGRAL VACUUM BREAKER (11) FROST PROOF (12) PROVIDE DU-U DISTRIBUTION UNIT AS REQUIRED (13) INSTALL PER MANUFACTURERS RECOMMENDATIONS



1. CONTRACTOR SHALL PROVIDE BACKFLOW PREVENTION DEVICES AT THE EQUIPMENT LISTED ABOVE.

FURNISHED WITH AN INTEGRAL VACUUM BREAKER

2. DEVICES LISTED ARE MANUFACTURED BY WATTS REGULATOR COMPANY. CONTRACTOR MAY SUBMIT AN EQUAL FROM ANOTHER MANUFACTURER FOR REVIEW.

WALL HYDRANTS, HOSE BIBB

ROOF

4" SANITARY HOUSE SEWER

(SEE CIVIL DWGS FOR CONT) —

3. CONTRACTOR TO VERIFY REQUIREMENTS WITH LOCAL AUTHORITIES HAVING JURISDICTION.

MOORE CONSULTING ENGINEERS, LLC 457 Oakshade Road Shamong, NJ 08088 Tel: (609) 268-0500 Fax: (609) 268-5050 JEFFREY A. MOORE, PE PROFESSIONAL ENGINEER NJ LIC. NO. 24GE04051000 NJ AUTH. NO. 24GA28120100

No. Date Description

11/17/21 | ISSUED FOR BID

MCE PROJECT #21177

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Al-07473 Al-13038 Al-13618

NEW MAINTENANCE BUILDING ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY

5080 ATLANTIC AVE. MAYS LANDING, NJ 08330 Drawing

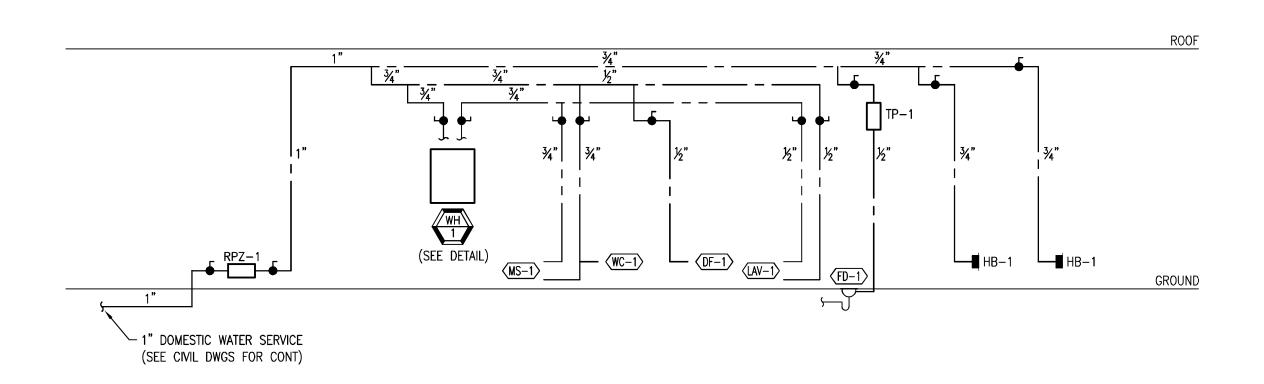
PLUMBING RISER DIAGRAMS AND SCHEDULES

Drawn

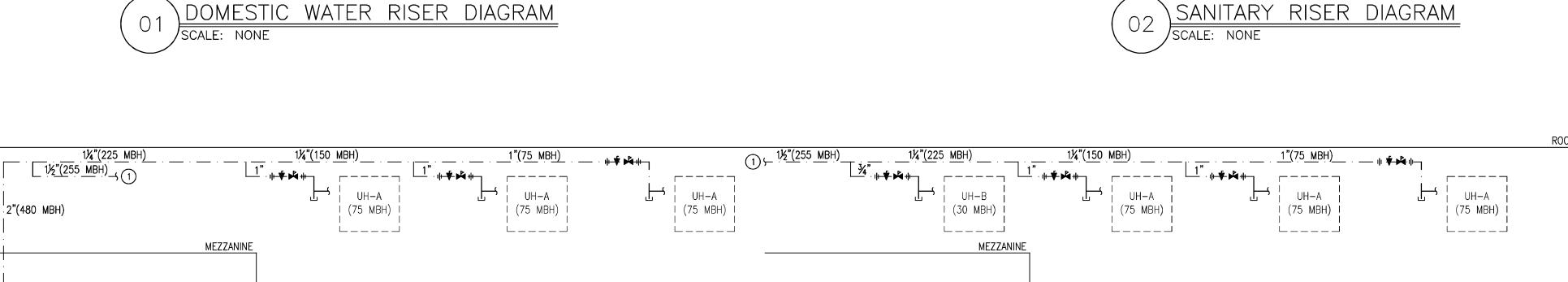
19033

AS NOTED

SERVICE PRESSURE = TBD AT METER MAX DISTANCE TO END = 250 FT UNIT (EQUIV. LGTH) TOTAL NEW NATURAL = 480 MBH GAS LOAD (2018) IFGC TABLE 402.4(2) ÙSED FOR SIZING

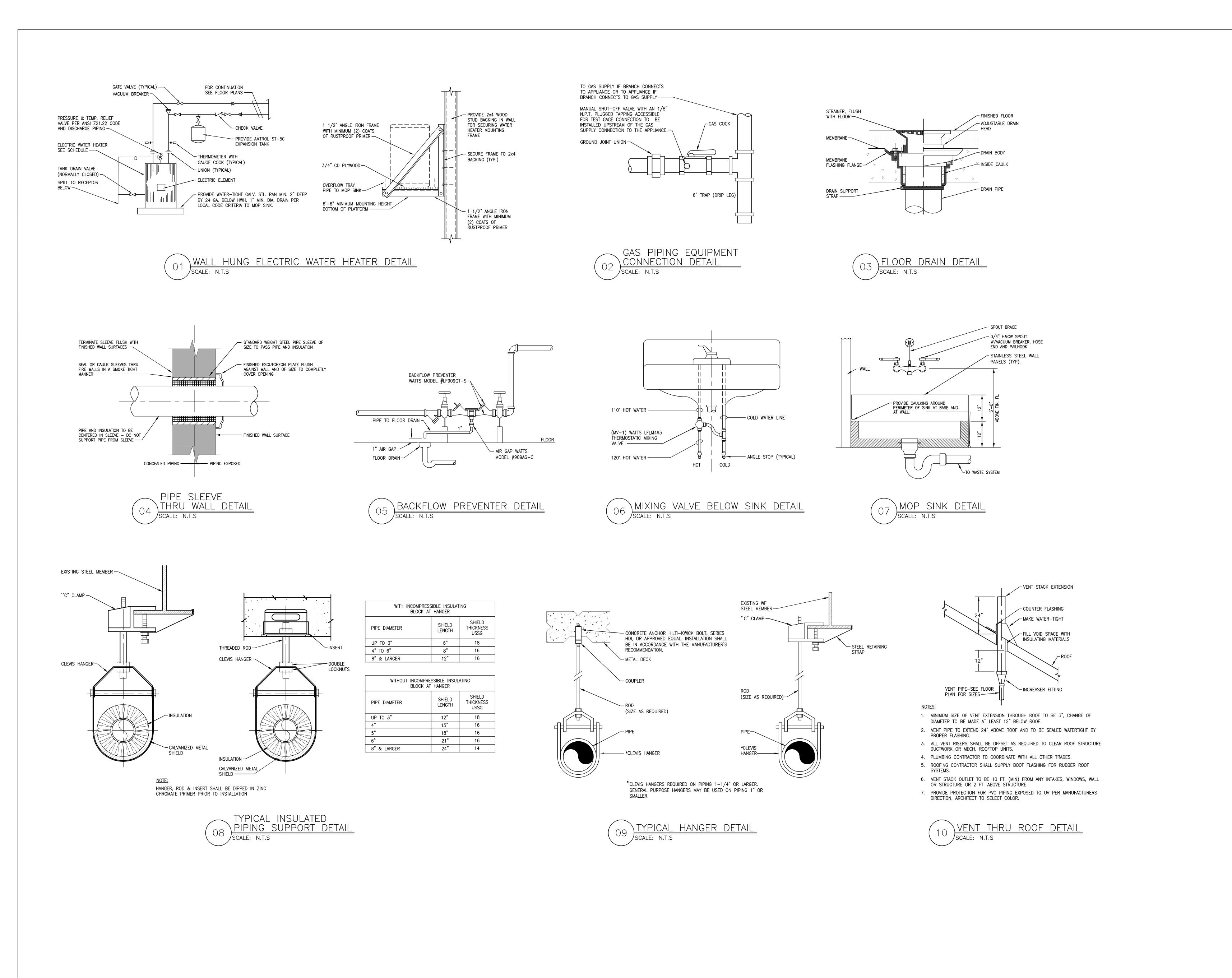


DOMESTIC WATER RISER DIAGRAM SCALE: NONE



NATURAL GAS RISER DIAGRAM SCALE: NONE

- 1. ALL NATURAL GAS SYSTEMS SHALL COMPLY WITH THE 2018 INTERNATIONAL FUEL GAS CODE.
- 2. THE PLUMBING CONTRACTOR SHALL PROVIDE VENTLESS REGULATOR AT EQUIPMENT TO MATCH MANUFACTURERS PRESSURE REQUIREMENTS.
- 3. ALL GAS PIPING INTERIOR AND EXTERIOR OF THE BUILDING, WITHIN ANY INTERIOR AREAS WITHOUT CEILINGS AND MECHANICAL ROOMS SHALL BE PROTECTED AGAINST CORROSION IN AN APPROVED MANNER (1 COAT OF RUST INHIBITING PRIMER PLUS 2 COATS OF EXTERIOR BRASS ENAMEL IN O.S.H.A. YELLOW).
- 4. CONTRACTOR SHALL CONFIRM NEW GAS LOADS, MODIFICATIONS AND REQUIREMENTS WITH LOCAL UTILITY COMPANY.



Revisions

No. Date Description

11/17/21 ISSUED FOR BID

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Project

NEW MAINTENANCE BUILDING FOR ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY 5080 ATLANTIC AVE. MAYS LANDING, NJ 08330

DrawingPLUMBIN

DETAILS

AS NOTED

P3.0

PLUMBING SPECIFICATIONS

GENERAL

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, "AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- C. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, FOUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AND TENANT AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. PIPE ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS. DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF PIPE TO AVOID OBSTRUCTIONS. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES, WHICH INVOLVE EXTRA COST, SHALL NOT BE MADE WITHOUT APPROVAL
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.
- CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION.
- H. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- THE LOCATIONS OF THE EXISTING SERVICES ARE BELIEVED TO BE AS INDICATED ON THE DRAWINGS. THE CONTRACTOR SHALL VERIFY THE ACTUAL LOCATION OF THESE SERVICES AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCING ANY
- K. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH AN APPROVED NON-SHRINKING FIRE PROOF CAULKING OR OTHER APPROVED NONCOMBUSTIBLE MATERIAL.
- PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPING AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.
- M. ALL PRESENT MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- N. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- Q. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- R. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR. EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING PIPE SIZES, CLEARANCES, ETC. AND CONDITIONS.
- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- U. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- V. PROVIDE ALL REQUIRED CUTTING, PATCHING, EXCAVATING AND

2. SCOPE OF WORK

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL STANDARD PLUMBING CODE AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- THE BASE BUILDING DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

- C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
- D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS

3. SHOP DRAWINGS

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT PROVIDE COMPLETE SET OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
- B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED
- PROJECT NAME AND LOCATION
- 2) NAME OF ARCHITECT AND ENGINEER

4) APPROVAL STAMP OF PRIME CONTRACTOR

- iTEM IDENTIFICATION
- C. SUBMISSIONS
- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
- 2) SUBMISSIONS LARGER THAT 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
- D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
- 1) PIPE AND FITTINGS
- 2) VALVES
- 3) PLUMBING FIXTURES AND TRIM
- PIPING LAYOUTS
- 5) SUPPORTS, HANGERS AND GUIDES
- 6) INSULATION
- WATER HEATERS
- 8) FLOOR DRAINS

E. COORDINATION

- 1) THE CONTRACTOR SHALL ASSURE FULL COOPERATION OF ALL TRADES AND SHALL FURNISH IN WRITING ALL INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED SATISFACTORILY AND WITH LEAST POSSIBLE INTERFERENCE OR DELAY.
- PREPARE COORDINATED COMPOSITE DRAWINGS AT A SUITABLE SCALE NOT LESS THAN 1/4-INCH EQUALS ONE FOOT, ZERO INCHES, CLEARLY SHOWING HOW THE WORK OF THIS DIVISION IS TO BE INSTALLED IN RELATION TO THE WORK OF ALL TRADES. ANY WORK INSTALLED IN CONFLICT WITH THE WORK OF OTHER TRADES SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER.
- 3) THE CONTRACTOR MAY, SUBJECT TO THE ACCEPTANCE OF THE ARCHITECT AND WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF ALL TRADES OR FOR THE PROPER EXECUTION OF THE WORK.
- 4) PLUMBING DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. COORDINATE WITH THE ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT.
- 5) THE CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYOUT WORK AND SHALL COORDINATE ALL TRADES TO VERIFY SPACES IN WHICH WORK SHALL BE INSTALLED. MAINTAIN MAXIMUM HEADROOM OR SPACE CONDITIONS. WHERE SPACE CONDITIONS APPEAR INADEQUATE, THE ARCHITECT SHALL BE NOTIFIED BEFORE INSTALLATION. DO NOT PROCEED WITH THE INSTALLATION UNTIL RECEIVING CLARIFYING INSTRUCTIONS.
- 4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- B. DEFINITIONS
- 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR
- 5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

PROPER AND COMPLETE INSTALLATION.

- 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- C. QUALITY ASSURANCE
- 1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
- 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE OF WORK.
- D. PRODUCT DELIVERY, STORAGE AND HANDLING
- 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
- 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
- E. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES. AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC CHROMATE FOR OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. RED LEAD OR ZINC CHROMATE WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC CHROMATE PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED. CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL PLUMBING FIXTURES SHALL BE VERIFIED BY ARCHITECT.
- F. "HW" PIPING: PROVIDE 1 IN. THICK FIBERGLASS SECTIONAL PIPE H. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT COVERING. PRIOR TO INSTALLATION.

6. PIPE AND FITTINGS

A. SANITARY DRAINAGE AND VENT

PATTERNS.

- 1) SERVICE WEIGHT HUB AND SPIGOT CAST IRON SOIL PIPE AND FITTINGS WITH LEAD AND OAKUM JOINTS.
- 2) HUBLESS CAST IRON SOIL PIPE AND FITTINGS WITH EXTRA WIDE HEAVY-DUTY GASKETED HUBLESS COUPLINGS FOR FOOD SERVICE APPLICATIONS.
- 3) PVC PIPE: ASTM D 2665, SOLID-WALL DRAIN, WASTE, AND a. PVC SOCKET FITTINGS, ASTM D 2665, SOCKET TYPE, MADE TO ASTM D 3311, DRAIN, WASTE, AMD VENT
- b. PROVIDE ALL LONG RADIUS FITTINGS FOR ALL SANITARY TIED INTO PROCESSING SYSTEM.
- PERMITTED IN NON-AIR PLENUM APPLICATIONS OR LOCATIONS.

B. DOMESTIC WATER

- 1) TYPE L HARD COPPER TUBING WITH CAST BRONZE OR WROUGHT COPPER FITTINGS AND 95/5 TIN ANTIMONY SOLDER
- 2) STANDARD WEIGHT RED BRASS PIPE WITH STANDARD WEIGHT CAST BRONZE THREADED FITTINGS.
- 3) CROSSLINKED POLYETHYLENE (PEX)
- a. ZURN, WATTS OR VIEGA FITTINGS: BRASSS COMPRESSION CONNECTION.
- MANIFOLD: MANABLOC DISTRIBUTION d. ALL PIPING, VALVES AND FITTINGS SHALL BE LEAD FREE.
- C. ALL EXPOSED PIPE AND FITTINGS SHALL BE CHROME—PLATED BRASS.
- D. ALL EXPOSED PIPING PASSING THROUGH WALLS, FLOORS, CEILINGS, AND PARTITIONS SHALL BE PROVIDED WITH CHROME PLATED CAST BRASS ESCUTCHEONS HELD IN PLACE WITH SET SCREWS.
- E. FUEL GAS
 - 1) STEEL PIPE: ASTM A 53; TYPE E OR S; GRADE B;
- 1) CPVC PLASTIC, SCHEDULE 40 PIPE: ASTM F 441/F 441M.
 - a. CPVC PLASTIC, SCHEDULE 40 FITTINGS: ASTM F 438, SOCKET TYPE. b. CPVC SOLVENT CEMENT: ASTM F 493. VENT AND OUTSIDE-AIR CONNECTION, GAS-FIRED

EQUIPMENT: CONNECT PLASTIC PIPING VENT MATERIAL

TERMINATE VENT OUTDOORS WITH A CAP OR CONCENTRIC VENT AND IN AN ARRANGEMENT THAT WILL PROTECT AGAINST ENTRY OF BIRDS, INSECTS, AND DIRT, d. VENT TERMINATION SCHEDULE:

SIMILAR TO DIVERSITECH HVENT-3.

TO UNITS CONNECTIONS AND EXTEND OUTDOORS.

(1) ROOF MOUNT: 3-IN CONCENTRIC VENT SIMILAR TO DIVERSITECH CVENT-3WITH CAP. (2) WALL MOUNT: 3-IN HORIZONTAL TERMINATION KIT

- 7. VALVES
- A. GATE VALVES
 - 1) BRONZE RISING STEM, CLASS 150 RISING STEM, UNION BONNET, SOLID WEDGE AND MANUFACTURED IN ACCORDANCE WITH MSS-SP80. MODEL NO. T134 AS MANUFACTURED BY
- B. BALL VALVES
 - 1) TWO-PIECE, BRONZE, END ENTRY, 600 PSI WWP; SIMILAR TO NIBCO #T585-70.
- 2) THREE-PIECE, STAINLESS STEEL, BUTT WELD, 2,000 PSI WWP; SIMILAR TO NIBCO #BM-590-S6-R-66-FS-LL.
- C. CHECK VALVES
- 1) BRONZE, THREADED CAP, TEFLON DISC; SIMILAR TO NIBCO #T433-Y.
- APPLIANCE CONNECTOR VALVES: ANSI Z21.15 AND IAS LISTED. E. GAS STOPS: BRONZE BODY WITH AGA STAMP, PLUG TYPE WITH
- BRONZE PLUG AND FLAT OR SQUARE HEAD, BALL TYPE WITH CHROME—PLATED BRASS BALL AND LEVER HANDLE. OR BUTTERFLY VALVE WITH STAINLESS-STEEL DISC AND FLUOROCARBON ELASTOMER SEAL AND LEVER HANDLE; 2-PSIG MINIMUM PRESSURE
- F. GAS VALVES, NPS 2 AND SMALLER: ASME B16.33 AND IAS-LISTED BRONZE BODY AND 125-PSIG PRESSURE RATING.
- G. PLUG VALVES, NPS 2-1/2 AND LARGER: ASME B16.38 AND MSS SP-78 CAST-IRON, LUBRICATED PLUG VALVES, WITH 125-PSIG PRESSURE RATING.
- 8. INSULATION
 - A. ALL INSULATION (INCLUDING JACKET, FACING AND ADHESIVE) SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS AS TESTED BY PROCEDURES LISTED IN ASTM E-84, NFPA 255 AND UL 273; NOT EXCEEDING A FLAME SPREAD OF 25 AND A SMOKE DEVELOPED OF
- B. PIPING SHALL HAVE A MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.23 K-FACTOR AT 75 DEGREES F MEAN TEMPERATURE WITH FACTORY -APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL SERVICE JACKET SIMILAR TO JOHNS MANVILLE MICRO-LOK HP
- C. FITTING COVER, MOLDED WHITE PVC JACKET, UL CLASS 1, MAXIMUM PERMEANCE 0.05 SIMILAR TO MANVILLE ZESTRON
- D. ON VALVES AND FITTINGS PROVIDE PRE-MOLDED FIBERGLASS FITTINGS. VAPOR SEAL INSULATION ON "CW".
- "CW" PIPING: PROVIDE 1/2 IN. THICK FIBERGLASS SECTION PIPE COVERING WITH VAPOR BARRIER JACKET.

G. PEX PIPING TO BE PRE-INSULATED OR INSTALLED WITH INSULATION

- WITH AN R-VALUE OF 3.3 OR GREATER. 1) UPONOR AQUAPEX WITH A THERMAL CONDUCTIVITY OF .25
- 9. PLUMBING FIXTURES
- A. PROVIDE ALL FIXTURES WITH STOP VALVES AND SUPPLIES AND FIXTURE TRAPS AS REQUIRED.
- B. ALL FIXTURES SHALL BE AS INDICATED ON THE ARCHITECTURAL AND PLUMBING DOCUMENTS.
- 10. PIPING SUPPORTS
- A. SUPPORT ALL PIPING FROM BUILDING CONSTRUCTION BY PROVIDING INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), AND ACCEPTABLE BRACKETS. SUBMIT ALL METHODS FOR
- B. PROVIDE TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS
- C. PROVIDE ADDITIONAL FRAMING WHERE BUILDING CONSTRUCTION IS
- INADEQUATE. SUBMIT FOR REVIEW.

FOR GROUPED LINES AND SERVICES.

- D. SUSPENDED HORIZONTAL PIPING SUPPORT ALL PIPING IN PROCESS AREAS INDEPENDENTLY FROM STRUCTURE USING FRP TYPE HANGERS, SIMILAR TO
 - SUPPORT ALL PIPING INDEPENDENTLY FROM STRUCTURE USING HEAVY IRON-HINGED TYPE HANGERS, SIMILAR TO

AUTO-GRIP, FOR TWO-INCH AND SMALLER PIPE.

CENTURY COMPOSITES CC-HANGERS.

GRINNELL CLEVIS NO. 260.

- 3) PROVIDE ELECTROPLATED SOLID-BAND HANGERS SIMILAR TO
- 4) PROVIDE WALL BRACKETS FOR WALL-SUPPORTED PIPING, AND

PROVIDE PIPE SADDLES FOR FLOOR-MOUNTED PIPING.

5) PROVIDE SUPPORTS WITH COPPER LINING FOR UNINSULATED COPPER PIPING. 6) SUSPEND PIPING FROM INSERTS, USING BEAM CLAMPS WITH

RETAINING CLAMP OR LOCKNUT, STEEL FISH PLATES,

F. MAXIMUM HANGER SPACING AS INDICATED

10 FEET.

2) PIPE 1-1/4 INCH AND LARGER SHALL BE EVERY 10 FEET.

1) PIPE 1 INCH AND SMALLER SHALL BE EVERY 8 FEET.

4) COPPER TUBING 1-1/2 INCH AND LARGER SHALL BE EVERY

3) COPPER TUBING 1-1/4 INCH AND SMALLER SHALL BE EVERY

5) CAST IRON: EVERY 5 FEET AND AT EVERY FITTING OR JOINT.

- G. VERTICAL PIPING
- PROVIDE EXTENSION PIPE CLAMPS BOLTED TO BARE PIPE ON EACH SIDE AND BEARING EQUALLY ON STRUCTURE OR WELDED TO BEAM.
- 2) PROVIDE SPACING AS INDICATED
- a. THREADED PIPING SHALL BE EVERY OTHER FLOOR LEVEL, AT A MAXIMUM OF 25 FEET ON CENTERS.
- b. CAST IRON PIPING SHALL BE EVERY FLOOR LEVEL, MAXIMUM 20 FEET ON CENTERS; HUBBLESS PIPE IS THE EXCEPTION, REQUIRING A MAXIMUM OF 10 FEET ON CENTERS.
- TUBING SHALL BE EVERY FLOOR LEVEL MAXIMUM 10 FEET ON CENTERS.

11. TESTS

- A. DOMESTIC WATER PIPING
- 1) TEST PIPING HYDROSTATICALLY AT A PRESSURE OF 125 PSI.
- 2) DURATION OF TEST SHALL BE 2 HOURS WITHOUT A LOSS IN PRESSURE.
- B. DRAINAGE AND VENT PIPING
- 1) CAP ALL OUTLETS AND FILL PIPING SYSTEM TO OVERFLOWING FROM A POINT AT LEAST 10 FEET ABOVE THE FLOOR.
- 2) THE WATER LEVEL SHALL REMAIN CONSTANT THROUGHOUT THE TEST DURATION OF 2 HOURS.
- C. ARRANGE AND COORDINATE TESTS WITH OWNER 48 HOURS IN ADVANCE. NOTIFY ENGINEER AND ARCHITECT OF TEST DATE AND

WORK IS PROVEN SATISFACTORY.

D. DEFECTS DISCLOSED BY THE TESTS SHALL BE REPAIRED OR

E. TAKE ALL PRECAUTIONS NECESSARY TO PREVENT DAMAGE TO THE BUILDING AND ITS CONTENTS AS A RESULT OF SUCH TESTS. REPAIR ANY DAMAGE CAUSED.

REPLACED. TESTS SHALL BE REPEATED AS DIRECTED UNTIL ALL

No. Date Description 11/17/21 | ISSUED FOR BID

Revisions

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PROFESSIONAL ENGINEER NJ LIC. NO. 24GE04051000 NJ AUTH. NO. 24GA28120100 MCF PROJECT #21177

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NEW MAINTENANCE BUILDING FOR ATLANTIC COUNTY INSTITUTE OF TECHNOLOGY

5080 ATLANTIC AVE.

MAYS LANDING, NJ 08330 l Drawing PLUMBING

Drawn

SPECIFICATIONS AS NOTED 19033

CANTILEVER BRACKETS OR OTHER ACCEPTED MEANS. BEAM CLAMPS SHALL BE SIMILAR TO GRINNELL FIGURES 61, 87, **David G. Manders AIA** SCHEDULE 40; BLACK. 131, OR 225. Lawrence J. Merighi AIA MALLEABLE-IRON THREADED FITTINGS: ASME B16.3, B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. **Ronald P. Portadin AIA** CLASS 150, STANDARD PATTERN, WITH THREADED ENDS Peter W. Farrell AIA PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE ACCORDING TO ASME B1.20.1. COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE 7) SUSPEND PIPING BY RODS WITH DOUBLE NUTS. b. UNIONS: ASME B16.39, CLASS 150, MALLEABLE IRON INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER. WITH BRASS-TO-IRON SEAT, GROUND JOINT, AND 8) PROVIDE ADDITIONAL STEEL FRAMING AS REQUIRED AND THREADED ENDS ACCORDING TO ASME B1.20.1. C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND ACCEPTED WHERE OVERHEAD CONSTRUCTION DOES NOT CAST-IRON FLANGES AND FLANGED FITTINGS: ASME TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER. PERMIT FASTENING HANGER RODS IN REQUIRED LOCATIONS. B16.1, CLASS 125. D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED 9) SUPPORT BRANCH FIXTURE WATER PIPING IN CHASES WITH INSTALL MECHANICAL SLEEVE SEAL AT EACH PENETRATION THROUGH INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. COPPER-PLATED METAL BRACKETS, SECURED TO STUDS, FOUNDATION WALL AND BETWEEN REFRIGERATED AND SIMILAR TO HOLDRITE NOS. 102-18, 107-18, 102-26, OR NON-REFRIGERATED SPACES. SELECT NUMBER OF INTERLOCKING "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT 101-26. AFTER COMPLETION OF THE INSTALLATION. RUBBER LINKS REQUIRED TO MAKE INSTALLATION WATER TIGHT. PROVIDE 180-DEGREE ARC GALVANIZED METAL COVERING SHIELDS 5. GENERAL PROVISIONS FOR PLUMBING WORK G. CONDENSING GAS-FIRED FURNACE AND WATER HEATER VENT ON HANGERS FOR INSULATED PIPING WITHOUT INCOMPRESSIBLE MATERIALS INSULATING BLOCK IN INSULATION AT HANGERS. A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE