GENERAL NOTES

- . THE DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL PIPING AND EQUIPMENT AND INDICATE REQUIRED SIZE AND POINTS OF TERMINATION OF THE PIPING AND SUGGEST PROPER ROUTES OF PIPING. HOWEVER, IT IS NOT THE INTENTION OF THE DRAWINGS TO SHOW ALL NECESSARY OFFSETS OBSTRUCTIONS OR STRUCTURAL CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO INSTALL HIS WORK IN SUCH A MANNER THAT IT WILL CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR WITHOUT FURTHER CONSTRUCTION OR COST.
- 2. THE CONTRACTOR SHALL VISIT THE PREMISES OF HIS PROPOSED WORK AND SHALL CAREFULLY EXAMINE THE EXISTING CONDITIONS AND LIMITATIONS THEREOF, VERIFICATION SHALL BE MADE AS TO THE ACTUAL LOCATIONS WHERE NEW PIPE RUNS WILL TIE INTO EXISTING WORK AND CLEARANCES WITH STRUCTURAL MEMBERS. THE CONTRACTOR SHALL INCLUDE ALL COSTS OF ANY KIND WHATSOEVER WHICH ARE INCURRED THROUGH LIMITATIONS OF THE EXISTING CONDITIONS.

PLUMBING INSTALLATION CRITERIA

- PROVIDE ROUGH-IN AND FINAL CONNECTIONS FOR ALL PLUMBING FIXTURES INCLUDING WASTE, VENTS, HOT AND COLD WATER, AND PROVIDE ALL PLUMBING WORK NECESSARY TO MAKE ENTIRELY OPERABLE AND ACCEPTABLE TO LOCAL HEALTH AND BUILDING OFFICIALS.
- 2. PLUMBING CONTRACTOR SHALL LOCATE ALL PIPING AND PLUMBING ROUGH—IN FOR PLUMBING FIXTURES IN ACCORDANCE WITH EXISTING CONDITIONS.
- 3. ALL VISIBLY EXPOSED PIPE TO EQUIPMENT SHALL BE CHROME PLATED BRASS.
- 4. PROVIDE SHUT-OFF VALVES FOR EACH PLUMBING FIXTURE.
- 5. PROVIDE TRAPS ON ALL WASTE PIPING FROM PLUMBING FIXTURES.
- 6. COORDINATE POSITION OF SLEEVES AND OPENINGS THROUGH FLOOR WITH THE EXISTING STRUCTURE AND STRUCTURAL ENGINEER.
- PROVIDE VACUUM BREAKERS AND CHECK VALVES FOR THE PLUMBING FIXTURES WHERE AND WHEN REQUIRED BY CODE.
- 8. ALL PIPING AND EQUIPMENT SHALL BE SUBSTANTIALLY SUPPORTED FROM THE BUILDING STRUCTURE. HANGER AND SUPPORTS SHALL BE SPECIFICALLY APPROVED FOR USE IN PLUMBING SYSTEMS.
- 9. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OF HANGER RODS IN REQUIRED LOCATIONS. PROVIDE ADDITIONAL STEEL FRAMING AS REQUIRED AND APPROVED.
- 10. NO PLUMBING PIPING SHALL BE HUNG FROM THE PIPING OF OTHER TRADES OR DUCTWORK. HANGERS SHALL BE OF HEAVY CONSTRUCTION, SUITABLE FOR THE SIZE OF PIPE TO BE SUPPORTED.
- 11. ALL PIPES GOING THROUGH THE FOUNDATION WALLS BELOW GRADE SHALL BE CORE DRILLED AND SEALED ON BOTH SIDES OF FOUNDATION WALL.

PLUMBING SPECIFICATIONS

1.0 SANITARY WASTE AND VENT PIPING

- ALL CAST IRON SOIL PIPE SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPIE INSTITUTE (CISPI) OR ASTM A 74 AND BE LISTED BY THE NSF INTERNATIONAL. PIPING OF FOREIGN ORIGIN IS SUBJECT TO LABORATORY TESTING AT THE CONTRACTOR'S SOLE EXPENSE. MANUFACTURER SHALL BE CHARLOTTE PIPE OR EQUAL.
- 1.1 UNDERGROUND BUILDING DRAINAGE AND VENT PIPING:
- 1.1.1 SERVICE WEIGHT CAST IRON PIPE WITH HUB AND SPIGOT JOINTS MANUFACTURED TO STANDARDS ASTM A 74, CISPI 301 OR ASTM B 888.
- 1.2 ABOVEGROUND BUILDING DRAINAGE AND VENT PIPING:
- 1.2.1 SERVICE WEIGHT, HUBLESS CAST IRON PIPE MANUFACTURED TO STANDARDS ASTM A 74, CISPI 301 OR ASTM B 888 OR COPPER TYPE L OR DWC MANUFACTURED TO STANDARDS ASTM B75, ASTM B88, ASTM B 251 OR ASTM B 306.
- 1.2.2 MECHANICAL JOINT COUPLING FOR HUBLESS PIPE AND FITTINGS SHALL COMPLY WITH CISPI 310 OR ASTM C 1277. THE ELASTOMERIC SEALING SLEEVE SHALL CONFORM TO ASTM C 564 AND SHALL BE PROVIDED WITH A CENTER STOP. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- 1.2.3 CLEANOUT SPACING AND WHERE REQUIRED SHALL BE IN ACCORDANCE WITH THE GOVERNING PLUMBING CODE.
- 1.3 VENT PENETRATIONS THROUGH ROOFS:
 - 1.3.1 VENT PIPE PENETRATION THROUGH ROOFS SHALL BE MADE WATERTIGHT AND APPROVED BY THE ARCHITECT. MINIMUM SIZE OF PIPE SHALL BE 3" AND SHALL TERMINATE AT LEAST 6" ABOVE THE ROOF AND LOCATED INACCORDANCE WITH THE GOVERNING PLUMBING CODE.

1.4 TESTING: 1.4.1

SANITARY DRAINAGE SYSTEM ROUGHINGS SHALL BE PRESSURE TESTED AT NOT LESS THAN 5 PSIG FOR FIFTEEN (15) MINUTES. PROVIDE TEST TEES. TEST PLUGS AND COMPRESSOR AS REQUIRED. FINAL DRAINAGE SYSTEM SHALL BE SMOKE TESTED. WHERE APPROVED BY LOCAL AUTHORITY HAVING JURISDICTION, PEPPERMINT MAY BE USED IN-LIEU OF SMOKE TESTS.

2.0 STORM DRAINAGE PIPING (NOT IN USE)

3.0 DOMESTIC WATER PIPING, VALVES AND SPECIALTIES

PIPING OF FOREIGN ORIGIN IS SUBJECT TO LABORATORY TESTING AT THE CONTRACTOR'S SOLE EXPENSE.

3.1 UNDERGROUND SERVICE PIPING:

3.1.1 PIPE SIZES UNDER 3" SHALL BE COPPER OR COPPER ALLOY TUBING TYPE K MANUFACTURED TO STANDARDS ASTM B42, B302, OR B75, B88, B251, B447. JOINTS SHALL BE BRAZED TYPE. ALL JOINTS SHALL BE CLEANED. AN APPROVED FLUX SHALL BE APPLIED WHERE REQUIRED. THE JOINT SHALL BE BRAZED WITH A FILLER METAL CONFORMING TO AWS A5.8.

3.2 ABOVEGROUND DISTRIBUTION PIPING:

3.2.1 COPPER OR COPPER ALLOY TUBING TYPE L MANUFACTURED TO STANDARDS ASTM B42, B302, OR B75, B88, B251, B447. JOINTS SHALL BE SOLDERED IN ACCORDANCE WITH WITH THE METHODS OF ASTM B828, ALL CUT TUBE ENDS SHALL BE REAMED TO THE FULL INSIDE DIAMETER OF THE TUBE END. ALL JOINT SURFACES SHALL BE CLEANED. A FLUX CONFORMING TO ASTM D813 SHALL BE APPLIED. THE JOINT SHALL BE SOLDERED WITH A SOLDER CONFORMING TO ASTM B32. SOLDER AND FLUXES SHALL BE LEAD FREE HAVING A CHEMICAL COMPOSITION EQUAL TO OR LESS THAN 0.2 PERCENT LEAD.

3.3 VALVES:

- 3.3.1 DOMESTIC WATER SYSTEM VALVES SHALL MEET THE REQUIREMENTS OF NSF-61
- 3.3.2 ISOLATION AND REGULATION SERVICE: SIZES 3" AND SMALLER SHALL BE BALL TYPE MILWAUKEE BA-100 OR NIBCO 580/5 SERIES. SIZES OVER 3" SHALL BE BUTTERFLY LUG TYPE MILWAUKEE ML OR NIBCO LD 2000 SERIES.
- 3.3.3 FLOW CHECK HORIZONTAL SERVICE: SIZES 3" AND SMALLER SHALL BE SWING CHECK TYPE MILWAUKEE 510 OR NIBCO 433 SERIES. 3.3.4 FLOW CHECK VERTICAL SERVICE:
- SIZES 2" AND SMALLER SHALL BE SPRING CHECK TYPE MILWAUKEE 548 OR NIBCO 480 SERIES. 3.3.5 FIXTURE SHUT-OFF SERVICE: PROVIDE CHROME PLATED, BRASS ANGLED STOP VALVES FOR ALL WATER CLOSETS, LAVS,

SINKS AND SIMILAR FIXTURES.

LEGEND

COLD WATER

CW

HOT WATER (110°F) SANITARY (BELOW FLOOR) DN OR DROP UP OR RISE ⊱— I CO **CLEANOUT** CODP © CLEANOUT DECK PLATE POINT OF NEW CONNECTION WALL CLEANOUT

ABBREVIATIONS

WASTE

3.4 SPECIALTIES:

3.5 DISINFECTION:

3.6 HYDROSTATIC TEST:

4.1 FIXTURES:

4.2 PIPING:

5.0 INSULATION:

5.1 PIPING:

4.0 HANGERS AND SUPPORTS:

WATER CLOSET

WALL PLATE CLEANOUT

MULTI-PURPOSE SINK

PER MANUFACTUERS INSTRUCTIONS.

TYPE PIPING

COPPER TUBE

TYPE PIPING

STEEL THREADED

STEEL THREADED

COPPER TUBE

COPPER TUBE

CAST IRON

CAST IRON

STEEL THREADED

REQUIREMENTS OF NEW YORK STATE PLUMBING CODE.

3.4.1 ALL HOSE BIBBS AND HYDRANTS SHALL BE PROVIDED WITH VACUUM BREAKERS

3.5.1 NEW DOMESTIC WATER SYSTEMS SHALL BE DISINFECTED IN ACCORDANCE WITH THE

3.4.2 ANTI WATER HAMMER SHOCK ABSORBERS SHALL BE JAY R. SMITH "HYDROTROL" SIZED

3.6.1 DOMESTIC WATER SYSTEMS SHALL BE HYRDOSTATICALLY TESTED TO 150 PSIG FOR NOT

4.1.1 ALL FIXTURES SHALL BE SUPPORTED INDEPENDENTLY OF THE PIPING SYSTEM.

4.2.1 MAXIMUM SPACING OF SUPPORTS FOR VERTICAL PIPING SHALL NOT EXCEED:

4.2.2 PROVIDE RISER CLAMPS, WALL BRACKET HANGER, AND SIMILAR ITEMS AS REQUIRED.

4.2.3 MAXIMUM SPACING OF SUPPORTS FOR HORIZONTAL PIPING SHALL NOT EXCEED:

<u>SPACING</u>

LESS THAN ONE (1) HOUR IN ACCORDANCE WITH STATE AND LOCAL PLUMBING CODE.

AT BASE AND EVERY OTHER STORY

AT BASE OF EACH STORY

AT BASE AND 10' INTERVALS

5' (10' FOR 10' LENGTHS)

6' FOR 1-1/4"Ø OR LESS

USING MANVILLE "HI-LO TEMP" FIBERGLASS INSERTS WITH MANVILLE "ZESTON 2000" PVC

CERTIFIED IN ACCORDANCE WITH ASTM E84 FOR FLAME SPREAD RATING OF 25 OR LESS

5.1.2 VALVES, FLANGES, ELBOWS, TEES, HUBS, AND OTHER FITTINGS SHALL BE INSULATED

5.1.3 ALL INSULATION SYSTEMS, INCLUDING INSULATION, ADHESIVES AND JACKETS SHALL BE

5.1.4 ALL INSULATION BUTT JOINTS SHALL BE SEALED USING BUTT STRIPS IN ACCORDANCE

DOMESTIC HOT WATER PIPING: 1/2" THK SIZES < 1" AND 1" THK SIZES > 1"

DOMESTIC COLD WATER PIPING: 1/2" THK SIZES < 1" AND 1" THK SIZES > 1"

7.1.1 TRENCHES SHALL BE EXCAVATED TO PROPER DEPTH AS REQUIRED TO ACCOIMODATE

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PIPING INVERTS OR BURIAL DEPTHS AS SHOWN ON THE PLANS OR PITCH AS REQUIRED

BY THE STATE AND LOCAL CODES. PLUMBING CONTRACTOR TO COORDINATE WORK WITH

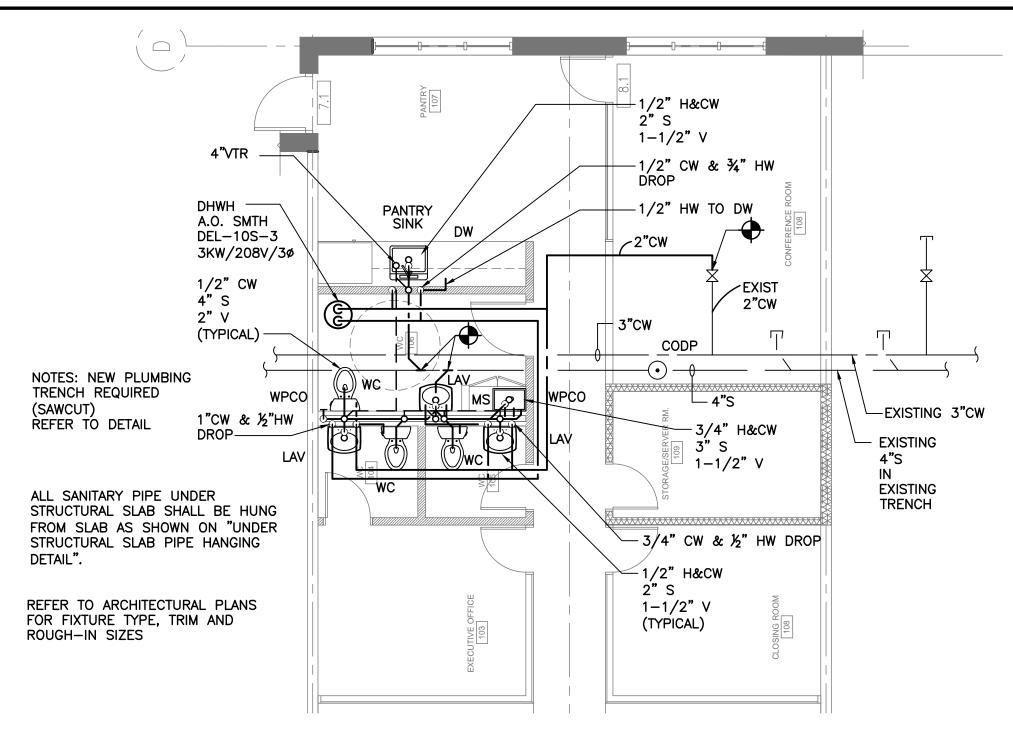
FITTING COVERS SECURED WITH MANVILLE "PERMA-WELS" ADHESIVE.

10' FOR 3/4" NPS OR LESS

12' FOR 1" NPS OR GREATER

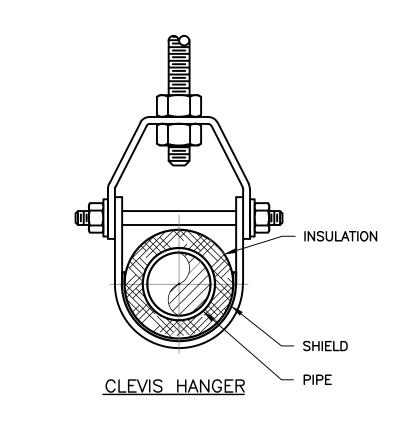
10' FOR 1-1/2" OR GREATER

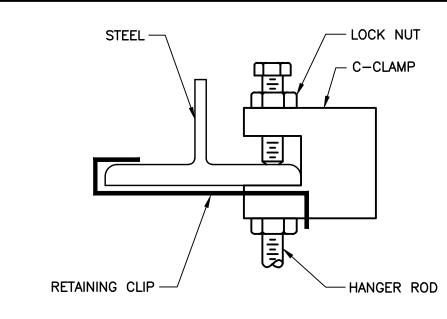
DISH WASHER DOMESTIC HOT WATER HEATER **EXISTING** F.F. FINISH FLOOR LAVATORY SANITARY TYPICAL VENT THROUGH ROOF VENT



TOILET ROOM PLANS

SCALE: 3/16"=1'-0"

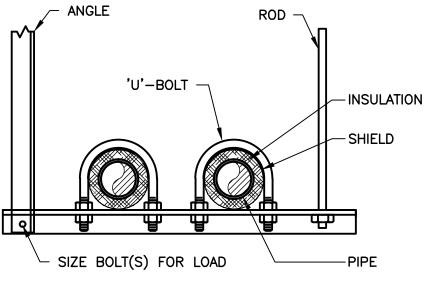




C-CLAMP WITH RETAINING CLIP

PIPE SUPPORT DETAIL (UPPER ATTACHMENT DEVICES)

SCALE: NONE



PIPE SHIELD SCHEDULE SHIELD SHIELD DIAMETER LENGTH THICKNESS 1/2" TO 1 1/2" 12" 18 USG 2" TO 4" 12" 18 USG

TRAPEZE HANGER

SIZE HANGER TO ADEQUATELY SUPPORT LOAD.

EXISTING STEEL BEAM-

STEEL BEAM CLAMP

WITH LOCK NUT

PART NO: 351L

CHECK VALVE -

EXPANSION TANK

MODEL V-6E BY

PIPE SUPPORT DETAIL

(LOWER ATTACHMENT DEVICES) SCALE: NONE

-STEEL STRAP

EXISTING DECK-

-ANCHOR STUDS

— CW ——

— нw ——

PHILIPS, RED HEAD

OR EQUAL (TYPICAL)

-ASME TEMPERATURE AND

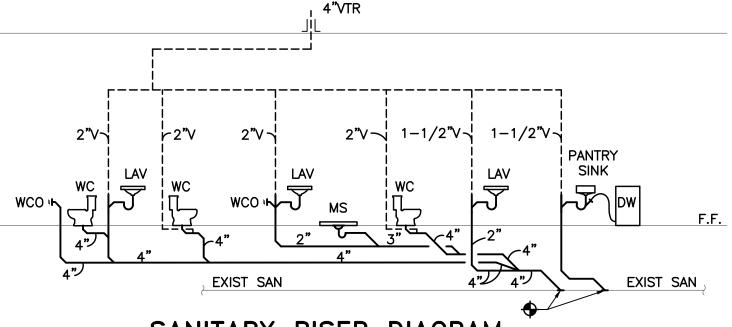
PRESSURE RELIEF VALVE

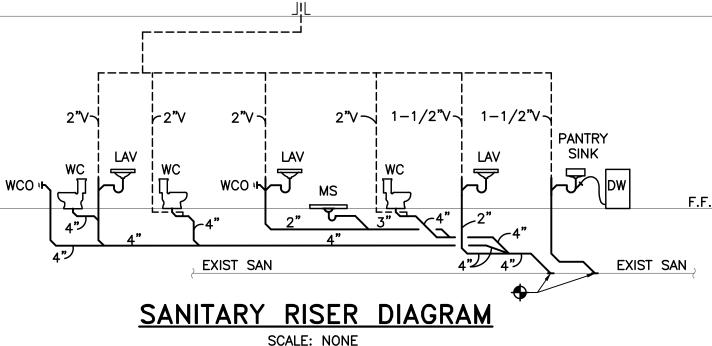
-3/8" THREADED ROD

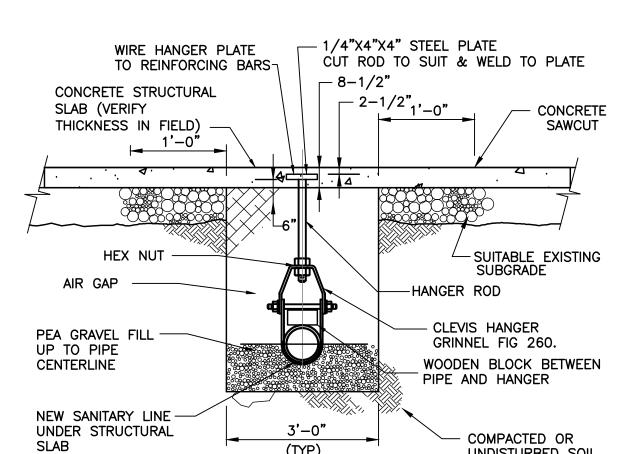
-3/4" THICK PLYWOOD

STRUT CHANNEL

B-LINE B22 SH







(TYP) UNDISTURBED SOIL

1. REFER TO PLUMBING PLAN FOR NEW TRENCH LOCATIONS

2. 4" TO 8" PIPE= 5/80 HANGER ROD 3. MAXIMUM HANGERS SHALL BE 6'-0" O.C-.HANGERS SHALL BE LOCATED AT EA.PIPE JOINT.

4. HANGER RODS, CLEVIS HANGERS BOLTS AND NUTS TO BE GALVANIZED.

5. COAT ALL HANGER PARTS WITH HEAVY APPLICATION OF COAL TAR COATING.

UNDER STRUCTURAL SLAB PIPE HANGING DETAIL

	A.O. SMITH (SUPPORT IN HORIZONTAL AND VERTICAL POSITION)	ASME
	UNION (TYP)	PRESS
	ELECTRIC WATER HEATER	3/8" (TYP)
E	DRIP PAN WITH DRAIN	A ▼ -3/4"
;	SECURE DRAIN LINE TO WALL AND ROUTE TO NEAREST SERVICE SINK	STRUT B-LIN
N	ELECTRIC WATER HE PIPING DETAIL SCALE: NONE	<u>EATER</u>

SCALE: NONE

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7.1 TRENCHES

303 Tarrytown Road, 1st Floor, White Plains, NY 10603 Corporate Seal Initiated 1996 State of New York

EXISTING SANITARY WASTE LINE ON THE PREMISE.

AND SMOKE DEVELOPED RATING OF 50 OR LESS.

WITH MANUFACTURERS RECOMMENDATION.

STORM DRAINAGE PIPING: 1" THK ALL SIZES

5.1.5 INSULATION THICKNESS SHALL BE:

7.0 UNDERGROUND PIPING INSTALLATION:

CAMERON ENGINEERING & ASSOCIATES, LLP .00 Sunnyside Boulevard, Suite 100, Woodbury, NY 11797 T: (516) 827-4900 45 West 36th Street, 3rd Floor, New York, NY 10018 T: (212) 324-4000

T: (914) 721-8300

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EMPOWER SOLAR

BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

"PLUMBING GENERAL NOTES AND PART PLANS

DRAWN BY

CE2355A CE2355A DATE: JAN 2014

DRAWING

PLUMBING

DESIGNED BY: SCALE:
AS SHOWN CHECKED BY:

FIRE PROTECTION SPECIFICATIONS

A. GENERAL:

- 1. THE INTENT OF THESE DRAWINGS IS TO PROVIDE A COMPLETE AND OPERATIVE WET PIPE SPRINKLER SYSTEM IN ACCORDANCE WITH THE LATEST STATE BUILDING CODE, NFPA-13 AND THE PLANS AND SPECIFICATIONS, THIS CONTRACTOR SHALL MEET THE INTENT OF THE PLANS AND SPECIFICATIONS AND ANY ACCOMPANYING DOCUMENTS. THIS CONTRACTOR SHALL PROVIDE ANY ADDITIONAL MATERIAL AND LABOR NOT SPECIFICALLY LISTED OR DIRECTED WHICH MAY BE REQUIRED TO MEET THE INTENT OF THE PLANS AND SPECIFICATIONS FOR A COMPLETE AND OPERABLE SYSTEM.
- 2. HYDRAULIC CALCULATIONS AND SPRINKLER SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW BY THE ENGINEER OF RECORD.
- 3. THE OCCUPANCY CLASSIFICATION FOR STORAGE AREA WORK IS ORDINARY HAZARD (GROUP 2) AND LIGHT HAZARD FOR OFFICE AREA.
- 4. IT IS THIS CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE ALL CUTTING. PATCHING, BOXING, PRIME AND FINISH WORK REQUIRED TO COMPLETE THE INSTALLATION. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
- 5. DO NOT PIERCE ANY STRUCTURAL MEMBER.
- 6. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL PIPING WITH THE BUILDING STRUCTURE, AS WELL AS WITH OTHER TRADES DURING CONSTRUCTION. SEE PLANS FOR ADDITIONAL REQUIREMENTS. CONTRACTOR SHALL OBTAIN APPROVAL AND COORDINATE THE WITH THE LOCAL AUTHORITY HAVING JURISDICTION.
- 7. ALL SPRINKLER PIPING SHALL BE BLACK STEEL. PIPING 2" AND SMALLER SHALL BE SCHEDULE 40 WITH THREADED FITTINGS. PIPING GREATER THAN 2" SHALL BE SCHEDULE 10 WITH ROLL GROOVED FITTINGS. REFER TO SPECIFICATIONS FOR PIPING METHODS.
- 8. THE SPRINKLER SYSTEM SUB-CONTRACTOR AND THE FIRE ALARM SYSTEM SUB-CONTRACTOR SHALL COORDINATE WITH THE FIRE DEPARTMENT AND OBTAIN ALL APPROVALS AND PAY ALL FEES.
- 9. TAMPER SWITCHES AND FLOW SWITCHES TO BE FURNISHED AND INSTALLED BY THIS CONTRACTOR. CONNECTIONS TO BUILDING FIRE ALARM SYSTEM BY FIRE ALARM CONTRACTOR.
- 10. CONTRACTOR SHALL SEAL ALL PIPE WALL PENETRATIONS AND PIPE CEILING PENETRATIONS WITH INTUMESCENT TYPE FIRE SEALANT CAULK. PROVIDE ESCUTCHEONS AT ALL PENETRATIONS IN FINISHED AREAS.
- 11. IN GENERAL, SPRINKLERS SHALL BE ARRANGED FOR A MAXIMUM COVERAGE WHILE AVOIDING LIGHTS, DIFFUSERS, ETC. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE HIS PIPING AND SPRINKLERS FOR PROPER COVERAGE IN EACH AREA.
- 12. ALL MATERIALS AND EQUIPMENT USED ON THIS PROJECT MUST BE APPROVED FOR USE BY THE AUTHORITY HAVING JURISDICTION. EQUIPMENT USE PERMITS SHALL BE OBTAINED AND POSTED BY THIS CONTRACTOR AS REQUIRED TO PROVIDE AN APPROVED OPERATING SPRINKLER SYSTEM.

B. SCOPE OF WORK:

- 1. THE FOLLOWING IS A GENERAL LISTING, NOT NECESSARILY COMPLETE, OF THE WORK TO BE PROVIDED AND INSTALLED BY THE SPRINKLER CONTRACTOR.
- a. DESIGN, INSTALL AND OBTAIN APPROVALS FOR A FULLY OPERATIONAL SPRINKLER SYSTEM IN ACCORDANCE WITH STATE AND LOCAL FIRE PREVENTION CODES AND AUTHORITIES HAVING JURISDICTION FOR SUCH CODES.
- b. HYDRAULIC CALCULATIONS PER NFPA 13.
- c. WATER FLOW AND PRESSURE TESTING OF AVAILABLE WATER SUPPLY SYSTEM. d. INSPECTION AND TESTING OF ALL PIPING AND DEVICES, OBTAINING APPROVALS AND PAY ALL FEES AS REQUIRED FOR THE SYSTEM INSTALLATION AND
- APPROVALS. e. COORDINATION ALL WORK WITH SUB-CONTRACTORS.
- f. COMPLIANCE WITH DRAWINGS AND SPECIFICATIONS
- g. PERMITS AND BUILDING DEPARTMENT FILING
- h. SHOP DRAWINGS i. GUARANTEE

C. SHOP DRAWINGS AND DATA:

- 1. THE CONTRACTOR SHALL SUBMIT FOR APPROVAL FULLY COORDINATED SHOP DRAWINGS, CAPACITY DATA, HYDRAULIC CALCULATION AND CATALOG CUTS OF THE FOLLOWING:
- a. PIPE, FITTINGS AND ACCESSORIES
- b. SPRINKLER HEADS c. HANGERS AND SUPPORTS
- d. SPRINKLER AND PIPING LAYOUT
- e. HYDRAULIC CALCULATIONS D. BUILDING DEPARTMENT FILING, PERMITS, AND CERTIFICATES
- 1. THE SPRINKLER CONTRACTOR SHALL FILE ALL REQUIRED DRAWINGS AND SPECIFICATIONS WITH THE AUTHORITIES HAVING JURISDICTION AND BE
- RESPONSIBLE FOR OBTAINING FINAL APPROVAL.

E. PIPES AND PIPE FITTINGS

- 1 STEEL PIPE: ASTM A53, ASTM 795, SCHEDULE 40 BLACK. JOINTS: SCREWED, FLANGED OR GROOVED. SCHEDULE 10 PIPE MAY BE USED FOR PIPE 2" AND GREATER WITH ROLLED GROOVED FITTINGS ONLY.
- 2. CAST IRON FITTINGS: CLASS 125, ANSI/ASME B16.1 FLANGES AND FITTINGS: ANSI/ASME B16.4 SCREWED FITTINGS.
- 3. MALLEABLE IRON FITTINGS: CLASS 150, ANSI/ASME B16.3 SCREWED.
- 4. MECHANICAL GROOVED COUPLINGS: 500 PSI, UL AND FM LISTED MALLEABLE IRON HOUSING CLAMPS TO ENGAGE AND LOCK, "C" SHAPED COMPOSITION SEALING GASKET, STEEL BOLTS, NUTS AND WASHERS; GALVANIZES FOR GALVANIZED PIPE, VICTAULIC CO. FIRE "FIRE LOCK" SYSTEM.
- 5. ALL PIPE, INCLUDING SPECIALLY LISTED, SHALL BE MARKED CONTINUOUSLY ALONG ITS LENGTH BY THE MANUFACTURER IN SUCH A WAY AS TO PROPERLY IDENTIFY THE TYPE OF PIPE.
- F AUTOMATIC SPRINKLERS
- 1. PROVIDE AUTOMATIC SPRINKLERS AS SPECIFIED ON DRAWING
- 2. SEE ARCHITECT DRAWINGS FOR ADDITIONAL REQUIREMENTS.

G. VALVES

- 1. ALL VALVES CONTROLLING THE FLOW OF WATER TO SPRINKLERS MUST BE LISTED AND MUST INCORPORATE A METHOD OF READILY DETERMINING THAT THE VALVE IS OPEN.
- 2. ALL CONTROL, DRAIN AND TEST CONNECTION VALVES SHALL BE PROVIDED WITH PERMANENTLY MARKED WEATHERPROOF METAL OR RIGID PLASTIC IDENTIFICATION SIGNS. THE CONTROL VALVE SHALL IDENTIFY THE PORTION OF

H. CUTTING AND PATCHING

- 1. DO ALL CUTTING NECESSARY FOR THE INSTALLATION OF SPRINKLER WORK. ACCURATELY LAYOUT WORK FOR WHICH CUTTING IS REQUIRED, SO AS TO AVOID UNNECESSARY LARGE OPENINGS. CUTTING OF BEAMS, JOISTS, FLOORS OR WALLS OF THE BUILDING WILL NOT BE PERMITTED ACCEPT AFTER RECEIVING APPROVAL OF THE OWNERS REPRESENTATIVE.
- 2. ROUGH PATCHING WILL BE DONE BY THIS CONTRACTOR IN A MANNER TO ACCOMMODATE FINISHED PATCHING WORK.

J. FIRE STOPPING

- 1. THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF NEW FIRE PROTECTION PIPING THRU EXISTING FIRE/SMOKE BARRIERS ABOVE THE HUNG CEILING. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS. FIRE/SMOKE STOPPING SHALL BE 3M FIRE BARRIER CP 25 N/S CAULK.
- K. HANGERS AND SUPPORTS
- 1. ALL SPRINKLER PIPING SHALL BE SUBSTANTIALLY SUPPORTED AND SHALL COMPLY WITH THE STANDARDS OF THE NATIONAL FIRE PROTECTION ASSOCIATION 13 STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS AND AS REQUIRED BY THE LOCAL AND STATE CODES.
- 2. HANGERS AND THEIR COMPONENTS SHALL BE FERROUS. HANGERS SHALL BE ADJUSTABLE, OR CLEVIS TYPE.
- 3. SPRINKLER PIPING OR HANGERS SHALL NOT BE USED TO SUPPORT NON-SYSTEM COMPONENTS.
- 4. SPRINKLER PIPING SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE WHICH MUST SUPPORT THE ADDED LOAD OF THE WATER-FILLED PIPE PLUS A MINIMUM OF 250 LBS. APPLIED AT THE POINT OF HANGING.
- 5. SPRINKLER PIPING SHALL BE SUPPORTED INDEPENDENTLY OF THE CEILING SHEATHING.
- 6. WHEN SPRINKLER PIPING IS INSTALLED BELOW DUCTWORK, PIPING SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE, NOT FROM THE DUCTWORK.
- 7. MAXIMUM DISTANCE BETWEEN HANGERS SHALL NOT EXCEED 12' FOR 1 AND 1-1/4" SIZES NOR 15' FOR SIZES 1-1/2" AND LARGER.
- 8. MAXIMUM DISTANCE BETWEEN HANGERS FOR LIGHT WEIGHT STEEL PIPE SHALL NOT EXCEED 12' FOR 3" SIZE AND SMALLER.
- 9. THE MAXIMUM UNSUPPORTED LENGTH AT THE END OF A BRANCH LINE SHALL BE 36" FOR UPRIGHT HEADS AND 12" FOR PENDENT HEADS.
- 10. HANGERS AT THE END OF BRANCH LINES SERVING PENDENT HEADS SHALL RESTRICT UPWARD MOVEMENT OF PIPING.

L. ESCUTCHEONS

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

M. GUARANTEE

- CONTRACTOR SHALL GUARANTEE FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER, ALL MATERIALS, APPARATUS AND WORKMANSHIP WHETHER FURNISHED BY HIMSELF OR BY HIS SUBCONTRACTORS AND HE SHALL REPLACE OR REPAIR IN A MANNER APPROVED BY THE OWNER'S REPRESENTATIVE, WITHOUT COST TO THE OWNER, ANY PART OR PART OF THE WORK WHICH MAY PROVE DEFECTIVE OR UNSATISFACTORY WITHIN THE PERIOD OF THE GUARANTEE.
- 2. ARRANGE FOR INSPECTION AND TESTS OF ANY AND ALL PARTS OF THE WORK AS REQUIRED BY AUTHORITIES HAVING JURISDICTION AND PAY ALL CHARGES FOR SAME.

N. INSPECTION AND TESTING

- THE SPRINKLER SYSTEM SHALL BE INSPECTED AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AND STATE BUILDING CODES.
- 2. THE SPRINKLER SYSTEM SHALL BE SUBJECTED TO A HYDROSTATIC PRESSURE TEST FOR A PERIOD OF TWO HOURS AT A PRESSURE OF AT LEAST 200 PSIG OR 50 PSI IN EXCESS OF THE MAXIMUM PRESSURE TO BE MAINTAINED WHEN THE MAXIMUM PRESSURE IN THE SYSTEM IS IN EXCESS OF 150 PSI AS PER NFPA.
- 3. BEFORE SPRINKLER SYSTEM IS CONCEALED, THE AUTHORITY HAVING JURISDICTION SHALL BE NOTIFIED THAT THE SYSTEM IS READY FOR INSPECTION AND TESTING. THE INSPECTOR SHALL WITNESS THE TEST. FINAL APPROVAL OF THE SPRINKLER SYSTEM SHALL BE OBTAINED FROM AUTHORITY HAVING JURISDICTION

O. INSTALLATION

- 1. THE SPRINKLER CONTRACTOR SHALL COORDINATE HIS WORK WITH EXISTING CONDITIONS AND WITH WORK OF ALL OTHER CONTRACTORS. THE CONTRACTOR SHALL NOTIFY IN WRITING THE OWNER OR HIS REPRESENTATIVE OF ANY CONFLICTS BETWEEN THE OTHER TRADES BEFORE INSTALLATION OF THE SPRINKLER SYSTEM.
- 2. SPRINKLER SYSTEM SHALL BE HYDRAULICALLY SIZED IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS FOR SPRINKLER SYSTEMS. STATE AND LOCAL CODES AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. FINAL SPRINKLER DRAWINGS AND HYDRAULIC CALCULATIONS SHALL BE SIGNED/SEALED BY A LICENSED PROFESSIONAL ENGINEER RECOGNIZED BY LOCAL AUTHORITY HAVING JURISDICTION..
- 3. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. ANY DIMENSIONS NOT SHOWN SHALL BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS. FOR EXACT LOCATIONS, MOUNTING HEIGHTS, ETC., REFER TO ARCHITECTURAL DRAWINGS AND DETAILS. ALL DIMENSIONS, ETC., SHALL BE VERIFIED BY FIELD CHECK.
- 4. ALL SPRINKLER PIPING TO SINGLE SPRINKLER HEADS SHALL BE 1" MINIMUM
- 5. ALL SPRINKLER HEADS IN ACOUSTIC TILE CEILING ARE TO BE CENTERED ON TILE IN BOTH DIRECTIONS.
- 6. SPRINKLER SYSTEM AND ITS COMPONENTS SHALL BE SEISMIC PROTECTED IN ACCORDANCE WITH NFPA 13 STANDARDS.
- 7. CAUTION SIGNS SHALL BE PROVIDED ON ALL VALVES CONTROLLING SPRINKLERS PER NFPA 13.

HAZARD CLASSIFICATION **AREAS** DENSITY LOCATIONS CLASSIFICATION

OFFICE AREAS, CORRIDORS, RESTROOMS, 1500 0.10 GPM/SQ FT LIGHT HAZARD SQ.FT. PUBLIC SPACE AND SIMILAR SPACES

GENERAL NOTES

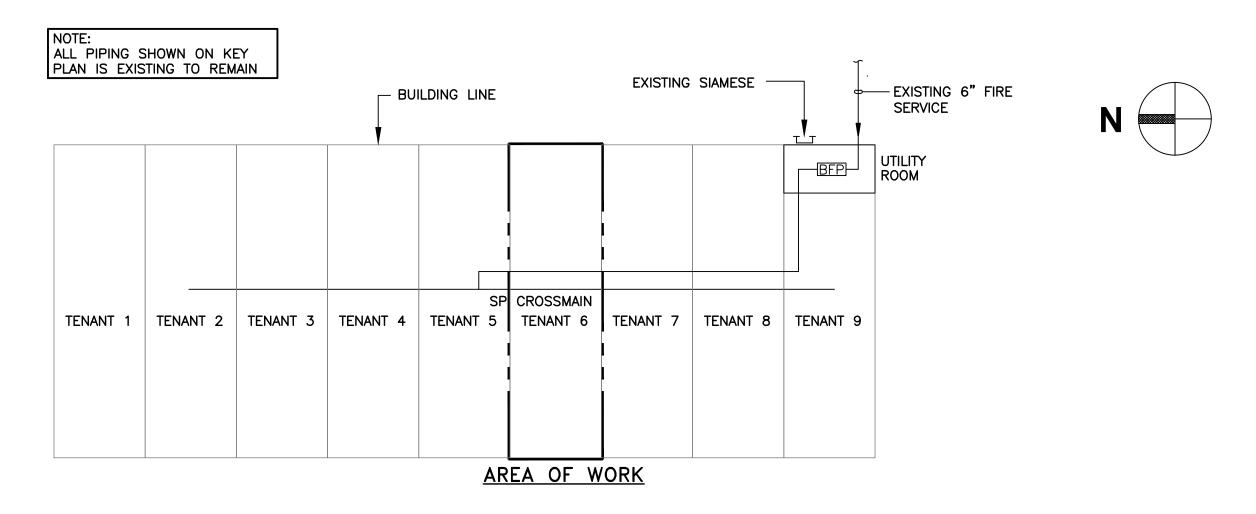
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT POSITIONING OF CEILING DIFFUSERS, RETURN REGISTERS AND LIGHT
- 2. COORDINATE PIPING RUNS AND SPRINKLER HEAD PLACEMENT WITH HVAC CONTRACTOR, AND ELECTRICAL CONTRACTOR.
- 3. THE DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL PIPING AND EQUIPMENT AND INDICATE REQUIRED SIZE AND POINTS OF TERMINATION OF THE PIPING AND SUGGEST PROPER ROUTES OF PIPING. HOWEVER, IT IS NOT THE INTENTION OF THE DRAWINGS TO SHOW ALL NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO INSTALL HIS WORK IN SUCH A MANNER THAT IT WILL CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS. PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR WITHOUT FURTHER CONSTRUCTION OR COST.
- 4 THE CONTRACTOR SHALL VISIT THE PREMISES OF HIS PROPOSED WORK AND SHALL CAREFULLY EXAMINE THE EXISTING CONDITIONS AND LIMITATIONS THEREOF. VERIFICATION SHALL BE MADE AS TO THE ACTUAL LOCATIONS WHERE NEW PIPE RUNS WILL TIE INTO EXISTING WORK AND CLEARANCES WITH STRUCTURAL MEMBERS. THE CONTRACTOR SHALL INCLUDE ALL COSTS OF ANY KIND WHATSOEVER WHICH ARE INCURRED THROUGH LIMITATIONS OF THE EXISTING CONDITIONS.
- 5. THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF NEW FIRE PROTECTION PIPING THRU EXISTING FIRE/SMOKE BARRIERS ABOVE THE HUNG CEILING. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS. FIRE/SMOKE STOPPING SHALL BE 3M FIRE BARRIER CP 25 N/S CAULK.
- 6. SPRINKLER CONTRACTOR SHALL REVIEW SHEET METAL SHOP DRAWINGS. COORDINATE THE ROUTING OF HIS PIPING AND SIGN THE COORDINATED SHEET METAL SHOP DRAWINGS.
- 7 ALL SPRINKLER PIPING TO SINGLE SPRINKLER HEADS SHALL BE 1" MINIMUM DIAMETER.
- 8. ALL SPRINKLER HEADS IN ACOUSTIC TILE CEILING ARE TO BE CENTERED ON TILE IN BOTH DIRECTIONS.
- 9. UPRIGHT SPRINKLER HEADS IN ROOMS WITH NO CEILINGS ONLY.
- 10. PIPE SIZE SHOWN ARE FOR BIDDING PURPOSES ONLY. EXACT SIZES SHALL BE BASED ON HYDRAULIC CALCULATIONS - REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

SPRINKLER SUMMARY			
SYMBOL	•		
LOCATION	ALL AREAS WITH SUSPENDED CEILINGS (UNLESS OTHERWISE NOTED)		
SPRINKLER STYLE	CONCEALED PENDENT		
COVERAGE	STANDARD		
RESPONSE	QUICK		
K-FACTOR	5.6		
TEMPERATURE	ORDINARY		
MANUFACTURER	RELIABLE		
MODEL	G5-56		
NOTE	CENTER SPRINKLER IN THE CEILING GRID UNLESS NOTED		

 REFER TO MANUFACTURER'S SPECIFICATIONS FOR INSTALLATION REQUIREMENTS

	TROTECTION STRIBULS	α	ADDICEVIATIONS
ф	O.S.&Y. VALVE	ABD	AUTOMATIC BALL DRIP
_ _	CHECK VALVE (CV)	AFF	ABOVE FINISHED FLOOR
FS	WATERFLOW SWITCH	BFP	BACKFLOW PREVENTER
TS	TAMPER SWITCH	¢	CENTER LINE
DR	SPRINKLER DRAIN PIPING	DCDV	DOUBLE CHECK DETECT VALVE
	NEW SPRINKLER PIPING	DN	DOWN
	EXISTING PIPING TO REMAIN	DR	DRAIN
1414141	EXISTING PIPING TO BE REMOVED	DWG	DRAWING
	ALARM CHECK VALVE	EL	ELEVATION
\bigcirc	DRY PIPE VALVE	FCA	FLOOR CONTROL ASSEMBLY
—	EXISTING SPRINKLER TO BE RELOCATED	FD	FLOOR DRAIN
•	CONCEALED PENDENT SPRINKLER	FHS	FIRE HOSE STATION
0	UPRIGHT SPRINKLER	FP	FIRE PROTECTION
•	SIDEWALL SPRINKLER	FS	FLOW SWITCH
ъ	FIRE DEPARTMENT SIAMESE CONNECTION	FT	FOOT, FEET
	CAPPED PIPING	INV	INVERT
	PIPE-UP UNLESS OTHERWISE NOTED	JP	JOCKEY PUMP
	PIPE DROP UNLESS OTHERWISE NOTED	NTS	NOT TO SCALE
W c HIGH	DROP OR RISE	PG	PRESSURE GAUGE
 ф	TOP CONNECTION	SBP	SPRINKLER BOOSTER PUMP
	BOTTOM CONNECTION	S.F.	SQUARE FOOT, FEET
—⋈—:	VALVED CAPPED OUTLET	SP	SPRINKLER PIPING
φ	PRESSURE GAUGE (PG)	SPRK	SPRINKLER
	SPRINKLER FLOOR CONTROL VALVE ASSEMBLY	SPEC	SPECIFICATIONS
DC DA	DOUBLE CHECK DETECTOR ASSEMBLY	STD	STANDARD
<u></u>	WATER-PROOF PIPE SLEEVE	ST PR	STREET PRESSURE
	PIPE SLEEVE	TS	TAMPER SWITCH
	POINT OF NEW CONNECTION	TYP	TYPICAL
SP		VIF	VERIFY IN FIELD
(SP #	DENOTES FIRE SPRINKLER RISER		

FIRE PROTECTION SYMBOLS & ABBREVIATIONS



FIRE PROTECTION

KEY PLAN

		THE BUILDING SERVED.		
).	DATE	REVISION DESCRIPTION	INT.	UNAUTHORIZED ALT
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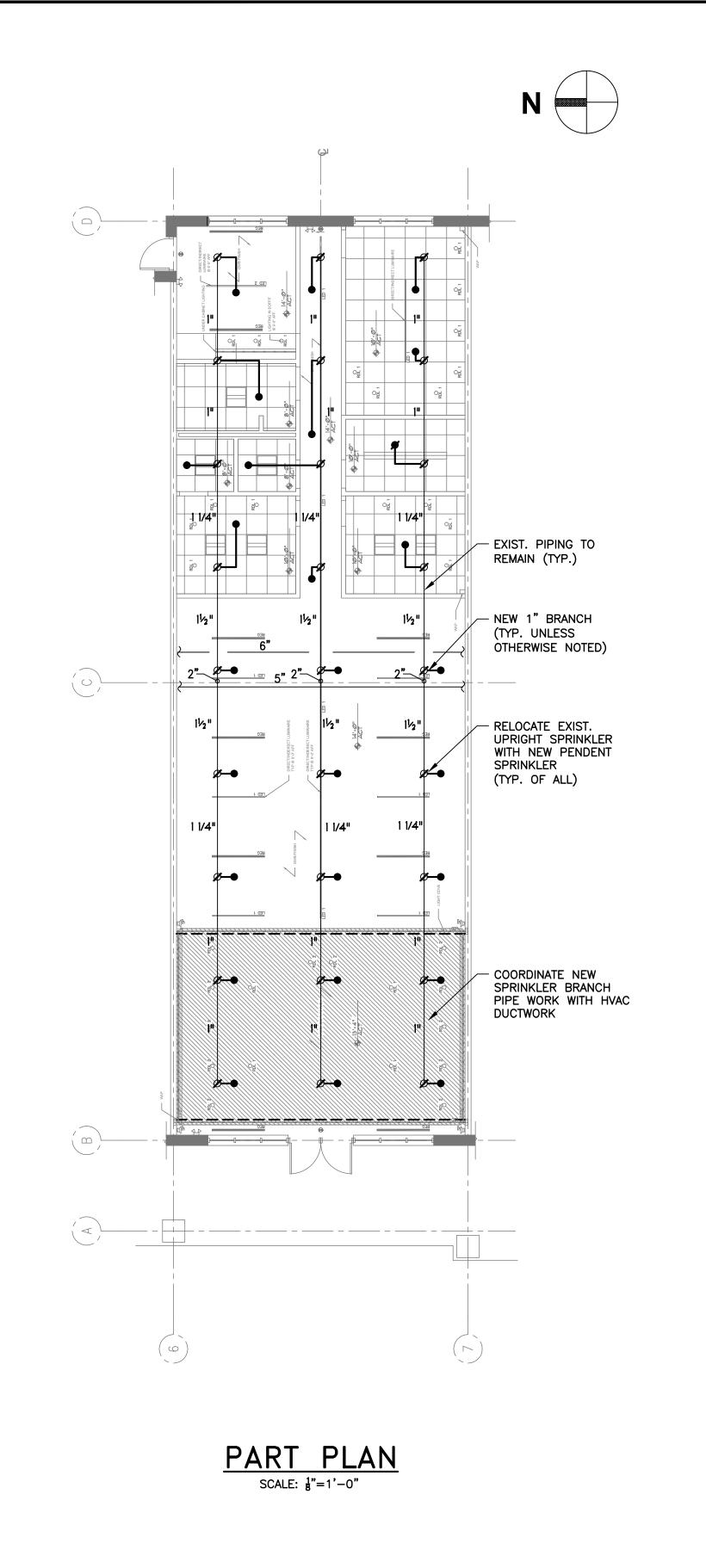
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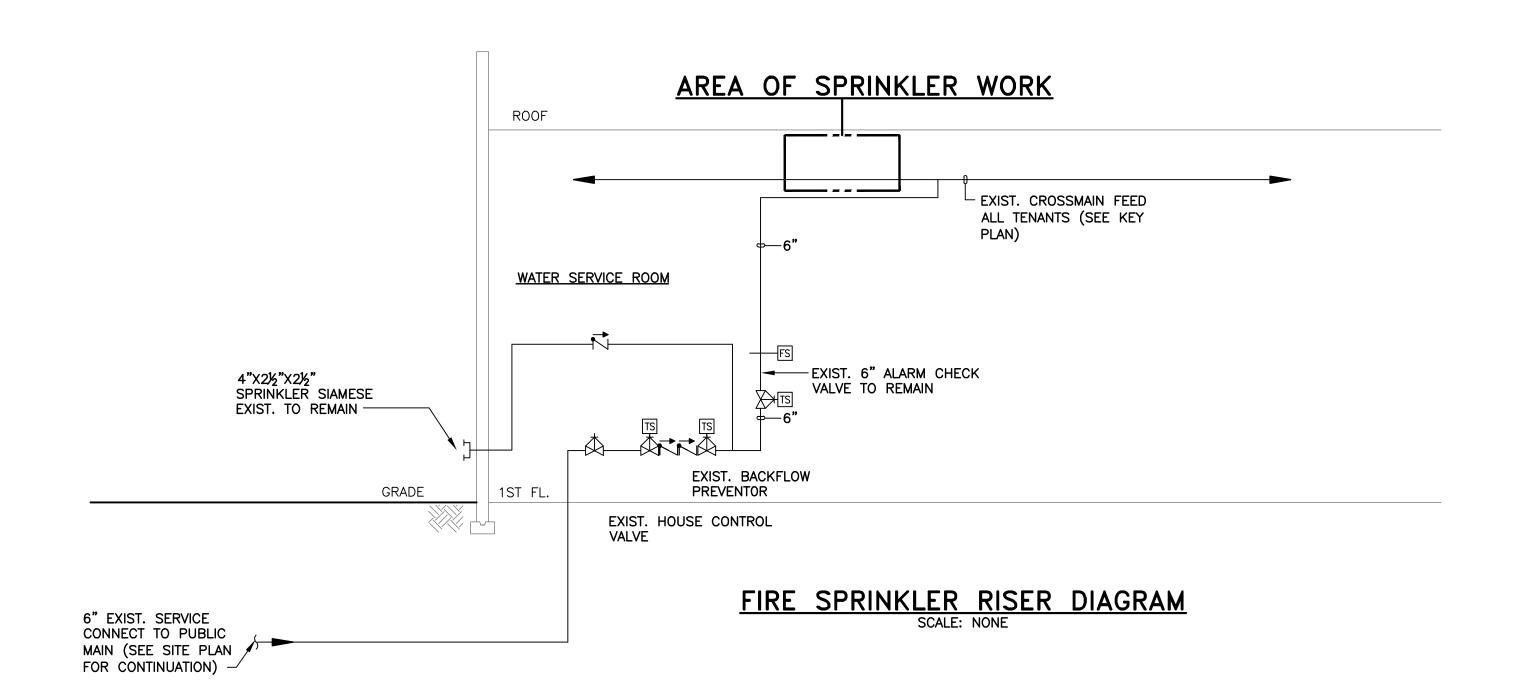
BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

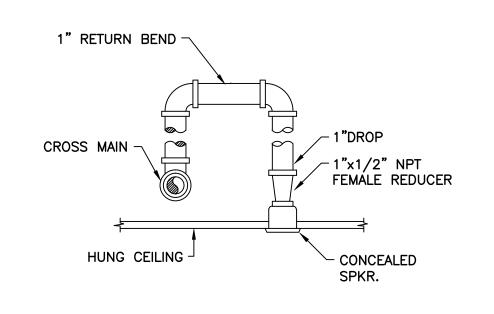
FIRE	PRO	ΓΕСΤΙ	ON	SPECIFICATIONS,	
LEGE	NDS	AND	NO	TES	

PROJECT ENGINEER: HM	PROJECT NO. CE2355/
DESIGNED BY:	JOB NO. CE2355A
DRAWN BY: LM	DATE: JAN 201
CHECKED BY:	SCALE: AS SHO

014 WN

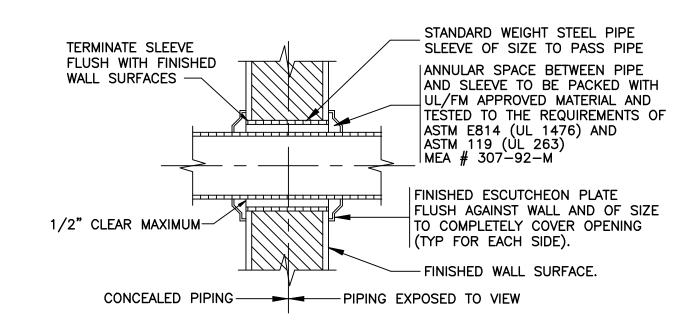








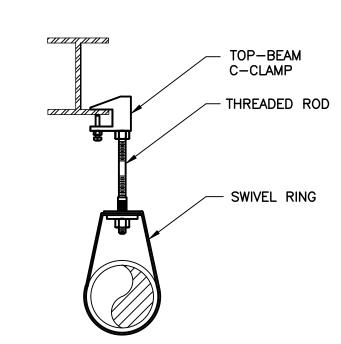
SPRINKLER INSTALLATION DETAILS



NOTES: 1. SEAL OR CAULK SLEEVES THRU
FIRE WALLS IN A SMOKE TIGHT MANNER.

2. PENETRATIONS THROUGH FIRE RATED
CONSTRUCTION MUST BE FIRESTOPPED
USING LISTED AND APPROVED FIRESTOP

PIPE PENETRATING THROUGH FIRE RATED WALL OR FLOOR



HANGER	ROD	SIZE
UP TO AND INCLUDING 4"		3/8" ROD
5", 6" AND 8"		1/2" ROD

PIPE HANGING DETAIL

NO.	DATE	REVISION DESCRIPTION	INT.
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EMPOWER SOLAR

BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

FIRE	PROTECTION	PART	PLAN,	RISER
AND	DETAILS			

		drawn by: LM
FIRE	PROTECTION	CHECKED BY

PROJECT ENGINEER:
MH

CE2355A

DESIGNED BY:
LM

DRAWN BY:
LM

DATE:
JAN 2014

CHECKED BY:
LM

SCALE:
AS SHOWN

P-100 DRAWING

- 2. ALL WORK SHOWN ON THESE PLANS SHALL BE PROVIDED UNDER THIS CONTRACT UNLESS SPECIFICALLY CALLED OUT OTHERWISE.
- 3. ALL WORK SHOWN ON THESE PLANS SHALL BE NEW UNLESS SPECIFICALLY CALLED OUT AS EXISTING.
- 4. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK SHALL BE NECESSARY FOR THE PERFORMANCE OF GENERAL WORK. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY CHANGES REQUIRED BASED ON EXISTING CONDITIONS, FOR PROPER DEMOLITION OF EXISTING WORK AND INCLUDE ALL MATERIALS AND LABOR IN HIS BID PRICE. NO ALLOWANCE WILL BE MADE FOR FAILURE TO DO SO.
- 5. THE DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL DUCTWORK, PIPING AND EQUIPMENT AND INDICATE THE REQUIRED SIZE AND POINTS OF TERMINATION OF THE DUCTWORK AND PIPING AND SUGGEST PROPER ROUTING OF SAME. HOWEVER, IT IS NOT THE INTENTION OF THE DRAWINGS TO SHOW ALL NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO INSTALL HIS WORK IN SUCH A MANNER THAT IT WILL CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR WITHOUT FURTHER CONSTRUCTION OR COST.
- 6. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATING, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES OF MAGNITUDE WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- 7. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHEN NECESSARY. EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN CRATED SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AREAS AVAILABLE. ASCERTAIN FROM BUILDING OWNER AT WHAT TIMES OF DAY EQUIPMENT COULD BE MOVED THROUGH THE BUILDING.
- 8. COORDINATE THE EXACT SIZE AND LOCATION OF THE NEW OPENINGS WITH EXISTING STRUCTURE. PATCH AND INSULATE AS REQUIRED. THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF NEW PIPING, CONDUIT, DUCTWORK, ETC. THROUGH EXISTING FIRE/ SMOKE BARRIERS. FIRE/SMOKE STOPPING SHALL BE 3M FIRE BARRIER CP 25 N/S CAULK UNLESS OTHERWISE NOTED.
- 9. IT IS THE INTENT OF THIS CONTRACT TO KEEP REMAINING SYSTEMS LEFT IN GOOD WORKING ORDER, READY FOR OPERATION, INCLUDING NECESSARY LABOR AND MATERIALS.
- 10. THE CONTRACTOR SHALL TAKE PRECAUTIONS AGAINST DAMAGING OR DISRUPTING BUILDING SYSTEMS, WIRING, GAS PIPING OR CONTROL TUBING. ANY DAMAGE TO THESE ITEMS SHALL BE REPAIRED AT THE CONTRACTOR'S COST, WITHIN COST, WITHIN THIS CONTRACT PERIOD FOR SUBSTANTIAL COMPLETION.
- 11. THE CONTRACTOR SHALL REPAIR AND RESTORE TO ORIGINAL CONDITION ANY EXISTING EQUIPMENT OR MATERIALS DAMAGED IN THE PROCESS OF INSTALLATION, AND DEMOLITION TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE.
- 12. THE CONTRACTOR SHALL MAKE REPAIRS USING THE SAME MATERIALS, AT THE CONTRACTOR'S
- 13. THE CONTRACTOR SHALL INCUR ALL COSTS AND BURDENS ASSOCIATED WITH LOST OR STOLEN EQUIPMENT AND MATERIALS.
- 14. DAILY, DURING DEMOLITION AND DURING THE CONSTRUCTION PERIOD, THE CONTRACTOR SHALL REMOVE ALL RUBBISH AND EXCESS MATERIAL ACCUMULATED AS A RESULT OF HIS OPERATIONS. ALL AREAS AND EQUIPMENT AFFECTED UNDER THIS CONTRACT SHALL BE CLEAN OF DUST AND DEBRIS BEFORE FINAL ACCEPTANCE BY THE OWNER.
- 15. PROVIDE FOR LEGAL REMOVAL AND DISPOSAL OF ALL RUBBISH AND DEBRIS FROM THE BUILDING AND SITE. PROTECT ALL WORK NOT SLATED FOR DEMOLITION.
- 16. THIS CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL OTHER TRADES.
- 17. OBTAIN ALL PERMITS, PAY ALL FEES, CONNECTION CHARGES, ETC.
- 18. PAINT AND TOUCH-UP ALL SURFACES MARRED BY PERFORMANCE OF THE WORK.
- 19. COORDINATE MOBILIZATION, WORK PROGRESS AND COMPLETION OF WORK WITH LANDLORD AND

AC	AIR CONDITIONING UNIT
ACCU	AIR COOLED CONDENSING

AHU AIR HANDLING UNIT

BC BLOWER COIL

воттом

BOD BOTTOM OF DUCT

BTUH BTU/HR

BSMT BASEMENT

CAP. CAPACITY

CART. CARTRIDGE

CLG COOLING

DB DRY BULB

DISCH DISCHARGE

DN DOWN

EA. EACH

EX EXHAUST FAN

EF EXHAUST FAN

EFF. EFFICIENCY

AL ACOUSTICAL DUCT LINING

CFM CUBIC FEET PER MINUTE

C.M. CONSTRUCTION MANAGER

DTR DUAL TEMPERATURE RETURN

EAT ENTERING AIR TEMPERATURE

EER ENERGY EFFICIENCY RATIO

EBB ELECTRIC BASEBOARD RADIATOR

EAL EXHAUST AIR LOUVER

CU CONDENSING UNIT

CO CLEAN OUT DOOR

ACCU AIR COOLED CONDENSING UNIT AD ACCESS DOOR AFF ABOVE FINISHED FLOOR

*F DEGREES FAHRENHEIT

FD FIRE DAMPER FD/AD FIRE DAMPER W/ ACCESS DOOR FLA FULL LOAD AMPS FPS FEET PER SECOND

ABBREVIATIONS

ESP EXTERNAL STATIC PRESSURE

FPM FEET PER MINUTE

HP VOLTS/PHASE

FT FEET FT.W.G. FEET WATER GAUGE G.C. GENERAL CONTRACTOR GX GENERAL EXHAUST FAN H HEIGHT

HG HOT GAS HP HORSEPOWER HVU HEATING AND VENTILATING UNIT IN. INCHES

IN.W.G. INCHES WATER GAUGE L LENGTH LAT LEAVING AIR TEMPERATURE LBG LINEAR BAR GRILLE LIQ LIQUID

LWT LEAVING WATER TEMPERATURE MAX. MAXIMUM MBH THOUSAND BTUH MCA MINIMUM CIRCUIT AMPACITY MIN. MINIMUM

NA NOT APPLICABLE NC NORMALLY CLOSED NO NORMALLY OPEN

LEGEND

_____ NEW DUCTWORK 1" ACOUSTICAL LINING IN NEW DUCTWORK RECTANGULAR SUPPLY DUCT DOWN RECTANGULAR SUPPLY DUCT UP

RECTANGULAR RETURN DUCT DOWN RECTANGULAR RETURN DUCT UP

4-WAY SUPPLY DIFFUSER (C.D.) 3-WAY SUPPLY DIFFUSER (C.D.)

2-WAY SUPPLY DIFFUSER (C.D.) RETURN GRILLE / REGISTER (C.R.)

AIR FLOW RATE IN CFM THERMOSTAT/TEMPERATURE SENSOR WIRELESS SENSOR

MOTORIZED DAMPER FLEXIBLE DUCT CONNECTION

	Ϋ́	PRESSURE GAUGE		
	•	THERMOMETER		NEW PIPING
₩	্ _, আ	SAFETY RELIEF VALVE		PLAN ELBOW PIPE DOWN
•	©	CARBON MONOXIDE SENSOR		PIPE UP
	©	NATURAL GAS SENSOR	ı	PLAN TEE
	R	REFRIGERANT GAS SENSOR	∴ I I	TEE UP
	Ū	MANUAL AIR VENT	101	
	S	SWITCH	, 	TEE DOWN
	0	90° ELBOW W/ RADIUS 1.5 TIMES DUCT WIDTH		CAPPED PIPE
	\Box	SQUARE ELBOW WITH TURNING VANES	*	NEW CONNECTION
-	FD/AD	FIRE DAMPER WITH ACCESS DOOR IN DUCT		
<u>(</u> s	<u> </u>	SMOKE DETECTOR WITH ACCESS DOOR IN DUCT		
	~	EXHAUST/RETURN/FRESH AIR INTAKE ARROW		
	∠ SR	SUPPLY REGISTER		

	•	
REMARKS		
		NOTES:
ROL OPTION G		1. ALL (PLAQI
S 2,4,5, &6		2. ALL (

NECK DIAMETER

(INCHES)

10

COMMON AREA DIFFUSERS, TILED OR GYPBOARD CEILINGS-BASED ON NAILOR MODEL UNI UE FACE DIFFUSER, FOR ACOUSTIC TILE LAY—IN AND (SURFACE MOUNT FRAME FOR GYP BOARD)

0-120

121-220

225-380

AIR FLOW RATE | DISCHARGE BLOW PATTERN

(CFM RANGE) (SEE NOTES 3 & 4 BELOW)

4-WAY

4-WAY

4-WAY

2. ALL OFFICE DIFFUSERS TO BE RICKARD THERMALLY POWERED VAV DIFFUSER MODEL# VSD-4.

CEILING DIFFUSER SCHEDULE

MOD SIZE

12x12 MOD

24x24 MOD

24X24 MOD

- 3. ALL CORRIDOR DIFFUSERS TO BE 2-WAY OPPOSITE BLOW.
- 4. FOR 3-WAY DIFFUSERS PROVIDE NEXT LARGER NECK DIAMETER AS LISTED FOR 4-WAY DIFFUSER. FOR 2-WAY DIFFUSERS PROVIDE TWO SIZES LARGER NECK DIAMETER LISTED FOR 4-WAY DIFFUSER.

RETUR	N GRILLE SCH	HEDULE
TYPE	MAX. CFM	NECK SIZE
RETURN	300	12 x 12
RETURN	500	24 × 12
RETURN	1500	24 × 24
NOTE:		

BASED ON NAILOR MODEL 6155H - LAY IN AND SURFACE MOUNT.

		Ε	LEC	TRIC	HEA	TER S	SCHED	ULE				
TAG NO.	LOCATION	TYPE	CAI	PACITY		ELEC	TRICAL DATA		MANUF.	MODEL NO.	WEIGHT	REMARKS
			CFM	BTU/HR	KW	AMPS	MOTOR HP	VOLTS/PHASE			LBS	
EDH-1	SHOWROOM CEILING	OPEN COIL DUCT MOUNTED	1200	34,100	5.0			208/3/60	INDEECO	QUA-14x12		CONTROL OPTION G
EBB-1	PANTRY	FLOOR MOUNTED FLAT TOP PEDESTAL		13,640	4.0			208/1/60	ARCHITECTURAL HEATING	LBF-PD#8500		NOTES 2,4,5, &6
EBB-2	CONFERENCE RM.	FLOOR MOUNTED FLAT TOP PEDESTAL		13,640	4.0			208/1/60	ARCHITECTURAL HEATING	LBF-PD#8500		NOTES 2,4,5, &6
NOTES:												

1. PROVIDE WALL MOUNTED (2-STAGE) LOW VOLTAGE THERMOSTAT.

2. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.

4. PROVIDE LEFT & RIGHT SIDE END CAPS.

5. PROVIDE BUILT IN THERMOSTAT THROUGH DISCHARGE GRILLE.

No. NUMBER

OPER. OPERATING

P PUMP

PH PHASE

PLEAT. PLEATED

PRESS. PRESSURE

RET. RETURN

SUP. SUPPLY

TYP. TYPICAL

V VOLTS

VEL. VELOCITY

VOL. VOLUME

W WIDTH

WB WET BULB

RF RETURN FAN

TEMP. TEMPERATURE

T.O.F. TOP OF FLOOR

UH UNIT HEATER

OAI OUTSIDE AIR INTAKE

PF PROPELLER FAN

PD PUMP DISCHARGE

PSI POUNDS PER SQUARE INCH

RPM REVOLUTIONS PER MINUTE

SP STATIC PRESSURE

T.G. TRANSFER GRILLE

TX TOILET EXHAUST FAN

HV HEATING AND VENTILATING UNIT

6. FINISH AS SELECTED BY ARCHHITECT.

		\	/ARIABLE	REFRI	GEF	RANT	r voli	JME	H	EAT	Pl	JMF	S	SYS	TEM SC	HED	ULE	- -		
					DX C	OOL'G		F/	AN.		AIR	SIDE			ELECTRIC	CAL				
ZONE			UNIT	NOMINAL	CC	DIL		• • •		E	AT	LA	ν T							NOTEC
DESIG	LOCATION	SERVICE	CONFIGURATION	TONS	TOTAL CAP. MBH	SENS. CAP. MBH	HEATING CAP. MBH	VOL. FLOW CFM	EXT. SP IN WG	DB *F	WB •F	DB *F	WB *F	FLA	VOLTS/PH/Hz	MCA	МОР	WEIGHT	MANUFACTURER: MODEL NO.	NOTES
AC-1	CONFERENCE ROOM	CONF ROOM	CEILING CASETTE	2	24	18.9	27.0	620	NA	75	63	55	54		208/1/60	0.50	15.0	150	DAIKIN FCQ24PAVJU	1,2,3,4,5,&6
AC-2	SERVER ROOM	SERVER ROOM	WALL MOUNT	1.5	18		20.0	400	NA	75	63	55	54		208/1/60	0.5	20.0	35	DAIKIN FAQ18PVJU	1,2,3,4,5,&6

- 1. PROVIDE BUILT-IN CONDENSATE PUMP. 2. PROVIDE WALL MOUNTED PROGRAMMABLE CONTROLLER 3. PROVIDE DISCONNECT SWITCH. 4. PROVIDE 1/4"ø THREADED RODS & RUBBER IN SHEAR VIBRATION ISOLATORS.
- 5. EXPOSED WIRING & REFRIG PIPING TO BE RUN IN SLIM-DUCT ENCLOSURE. 6. DAIKIN APPLIED TO PROVIDE ALL SHOP DRAWING SUBMITALS, START-UP SERVICE AND TRAINING

		,	AIR CO	OOLED	CON	DEN	SING UN	NIT S	SCHEDUL	E.			
					AMBIENT	No.	ELEC	TRICAL [DATA	WEIGHT	EER	NOTES	MANUFACTURER:
SYSTEM NO.	LOCATION	SERVICE	NOMINAL TONS	HEATING CAPACITY BTUH	AIR TEMP.	OF COMP.	MCA	MFA	VOLTS/Ph/Hz		Ø ARI	NOTES	MODEL NO.
CU-1	ROOF	AC-1	2	27,000	95	1	16.5	20	208/1/60	150	16.8	1 THRU 8	DAIKIN RZQ24PVJU
CU-2	ROOF	AC-2	1.5	20,000	95	1	16.5	20	208/1/60	150	16.8	1 THRU 8	DAIKIN FAQ18PVJU

1. REFER TO DETAILS FOR IN-LINE PIPING COMPONENTS

3. PROVIDE LOW AMBIENT DOWN TO 0 DEGREES.

2. UNIT TO BE MOUNTED ON PREFABRICATED STEEL EQUIPMENT SUPPORTS.

- 4. DAIKIN NY TO PROVIDE SUBMITTALS & START UP
- 5. PROVIDE CONDENSER FIN GUARDS. 6. PROVIDE SQUARE D DISCONNECT SWITCH.
- 7. VIBRATION ISOLATION FOR CONDENSING UNIT TO BE BRIDGE BEARING RUBBER PADS: MASON "SUPER W" 6x6 MINIMUM 4 POINTS
- 8. PROVIDE THE FOLLOWING:
- 1. LIMITED 5 YEAR COMPRESSOR WARRANTY. 2. LIMITED 1 YEAR LABOR WARRANTY.

RETURN/EXHAUST	REGISTERS SCHED.
CFM RANGE	NECK SIZE
0 - 150	8 x 8
151 – 250	10 x 10
251 - 350	12 x 12
351 – 450	14 x 14
451 - 600	16 x 16
601 - 800	18 x 18
801 — 1000	20 x 20
1001 — 1200	22 x 22

- 1. PROVIDE NAILOR MODEL 6155H-O. 2. USE FOR DUCTED RETURN/EXHAUST AIR.
- 3. REFER TO INDIVIDUAL FLOOR PLANS FOR AIR VOLUME.

				EXH	AUST	FA	N S	SCHE	DULE				
				FAN	DATA			ELECTRIC	CAL DATA				
FAN	LOCATION	SERVICE	VOLUME	EXT.	DRIVE	EAN		HP		WEIGHT	ROOF	MANUFACTURER	NOTES
NO.	200	0202	FLOW	SP	TYPE	FAN RPM	BHP	(WATTS)	VOLTS/Ph/Hz	LBS.	OPN'G	& MODEL NO.	
			CFM	IN.WG				(WAI 15)			(INCHES)		
TX-1	ROOF	TOILET ROOMS	350	0.375	BELT	1238	.08	1/6 HP	120/1/60	50	13-1/2 SQ.	COOK#80C2B	1,23&4
GX-1	ROOF	PANTRY	460	0.375	BELT	1404	.12	1/6 HP	120/1/60	50	13-1/2 SQ.	COOK#80C2B	1,2,3&5

- 1. PROVIDE ALL FANS WITH UNIT MOUNTED (NEMA 1) DISCONNECT.
- 2. PROVIDE 16" HIGH CANTED ROOF CURB AND BACKDRAFT DAMPER.
- 3. PROVIDE ALL FANS WITH HINGED BASE KIT.
- 4. TOILET EXHAUST FAN SHALL ENERGIZE VIA ROOM OCCUPANCY SENSOR WITH 15 MINUTE TIME DELAY.
- 5. PANTRY EXHAUST FAN SHALL ENERGIZE VIA ROOM WALL SWITCH WITH PILOT LIGHT.

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EMPOWER SOLAR

BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

MECHAINCAL	GENERAL NOTES
LEGEND AND	SCHEDULES
DISCIPLINE: MECHAINCAL	

CE2355A CE2355A DATE: JAN 2014 SCALE: AS SHOWN

HVAC SPECIFICATIONS

A. GENERAL

- 1. WORK SHALL CONFORM TO THE REQUIREMENTS OF APPLICABLE GOVERNMENTAL REGULATIONS AND SHALL BEAR APPROVAL CERTIFICATES AS APPLICABLE.
- 2. WORK SHALL CONFORM TO THE STANDARD OF THE BUILDING AND BE APPROVED BY THE BUILDING'S REPRESENTATIVE BEFORE COMMENCING WORK.
- ALL WORK SHOWN ON THESE PLANS SHALL BE NEW UNLESS SPECIFICALLY CALLED OUT AS EXISTING.
- 4. PROVIDE ALL CUTTING, PATCHING, FLASHING, COUNTER FLASHING, SLEEVES AND SEALS REQUIRED FOR WORK UNDER THIS CONTRACT UNLESS OTHERWISE NOTED.
- ROOF PENETRATIONS SHALL BE MINIMUM REQUIRED FOR DUCTWORK AND PIPING PENETRATION ONLY. DO NOT REMOVE ANY OTHER ROOFING MATERIAL. SEAL AROUND DUCTWORK PENETRATION TO LIMIT SOUND TRANSMISSION. WHERE FEASIBLE PROVIDE PIPING AND ELECTRICAL CONNECTIONS THRU CURB TO AVOID ADDITIONAL ROOF PENETRATIONS.
- 6. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS AND WALLS WITH APPROVED FIRESTOPPING MATERIALS. MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL IS ACCEPTABLE WHERE ALLOWABLE BY CODE AND THE AUTHORITY HAVING JURISDICTION.
- 7. AT ALL TIMES SAFELY GUARD AND PROTECT NEW WORK AND EXISTING WORK. ALL EXISTING WORK NOT INDICATED FOR DEMOLITION SHALL BE PROTECTED FROM DAMAGE. IF EXISTING OR NEW WORK IS DAMAGED, CONTRACTOR SHALL MAKE REPAIRS USING SAME MATERIALS AT THE CONTRACTOR'S COST.
- 8. PROVIDE ALL MECHANICAL EQUIPMENT WITH A DISCONNECT SWITCH. PROVIDE ALL BOILERS AND WATER HEATERS WITH WALL MOUNTED SHUT OFF SWITCH.
- 9. ADDITIONAL STRUCTURAL ENGINEERING DESIGN IS PROVIDED BY OTHERS. REFER TO ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS FOR ADDITIONAL STRUCTURAL DESIGN REQUIREMENTS.

NOTICE TO BIDDERS

- 1. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS UPON WHICH THE CONTRACTOR SHALL SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR PROVISIONS.
- 2. WHEN CONFLICTS OCCUR IN THE SPECIFICATIONS OR IN THE DRAWINGS, OR BETWEEN EITHER, THE ITEMS OF GREATER QUANTITY OR HIGHER COST SHALL BE PROVIDED. PROVIDE WRITTEN REQUEST TO THIS OFFICE IN A TIMELY FASHION FOR CLARIFICATION AS REQUIRED.
- 3. THE CONTRACTOR SHALL COORDINATE THE WORK OR ADJUST SAME TO THAT OF OTHER TRADES, IN ORDER THAT CONFLICTS IN SPACE LOCATIONS DO NOT OCCUR.
- THE WORK UNDER THIS CONTRACT SHALL BE PERFORMED SIMULTANEOUSLY WITH THE WORK OF OTHER TRADES, SO AS NOT TO DELAY THE OVERALL PROGRESS OF WORK AND SO CONFLICTS IN SPACE LOCATIONS DO NOT OCCUR.
- 5. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK SHALL BE NECESSARY FOR THE PERFORMANCE OF GENERAL WORK. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THIS CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY CHANGES REQUIRED BASED ON EXISTING CONDITIONS FOR PROPER INSTALLATION OF NEW WORK, AND INCLUDE ALL MATERIALS AND LABOR IN HIS BID PRICE. NO ALLOWANCE WILL BE MADE FOR FAILURE TO DO SO.
- 6. THE DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL ARRANGEMENT OF THE VENTILATION AND AIR CONDITIONING SYSTEMS. DETAILS OF CONSTRUCTION AND OF WORKMANSHIP WHERE NOT SPECIFICALLY DESCRIBED HEREIN OR INDICATED ON THE DRAWINGS SHALL BE SUBJECT TO THE ENGINEER'S APPROVAL. IT IS THE INTENT OF THESE SPECIFICATIONS TO PROVIDE COMPLETE SYSTEMS, LEFT IN GOOD WORKING ORDER, READY FOR OPERATION, INCLUDING NECESSARY LABOR AND MATERIALS, WHETHER OR NOT SPECIFICALLY SHOWN ON THE DRAWINGS OR MENTIONED HEREIN. IT IS NOT THE INTENTION OF THESE DRAWINGS TO SHOW ALL NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO INSTALL HIS WORK IN SUCH A MANNER TO AVOID OBSTRUCTIONS. PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR WITHOUT FURTHER COST OR INSTRUCTIONS.
- BEFORE SUBMITTING PROPOSAL BIDDERS SHALL CAREFULLY EXAMINE FIELD CONDITIONS AND CONTRACT DRAWINGS OF ALL TRADES. SUBMISSION OF PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT REQUIRED EXAMINATION HAS BEEN MADE. LATER CLAIMS FOR EXTRA LABOR, EQUIPMENT AND MATERIALS REQUIRED DUE TO DIFFICULTIES WHICH COULD HAVE BEEN FORESEEN, WILL NOT BE RECOGNIZED.
- CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO A CONDITION ACCEPTABLE TO THE ENGINEER.
- 9. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS AND WALLS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL.
- 10. DAILY DURING CONSTRUCTION, THE MECHANICAL CONTRACTOR SHALL REMOVE ALL RUBBISH AND EXCESS MATERIAL ACCUMULATED AS A RESULT OF HIS OPERATIONS. ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE WIPED CLEAN OF DUST, GLUE, PAINT AND DEBRIS BEFORE FINAL ACCEPTANCE BY THE OWNER. REMOVE ALL UNNECESSARY MANUFACTURER STICKERS.
- 11. BEFORE COMPLETION OF THIS PROJECT, THE MECHANICAL CONTRACTOR SHALL TEST ALL EQUIPMENT WHICH NORMALLY REQUIRES OPERATION, ALL EQUIPMENT SHALL BE OPERATED SUFFICIENTLY LONG TO PROVE TO THE OWNER THAT EACH UNIT PERFORMS SATISFACTORILY AND MEETS THE REQUIREMENTS SPECIFIED.
- 12. REVIEW WITH THE ENGINEER AND THE BUILDING MANAGER ANY CONDITION WHICH PREVENTS ADEQUATE ACCESSIBILITY FOR MAINTENANCE PRIOR TO INSTALLATION OF THE WORK. ALL EQUIPMENT AND/OR ACCESSORIES THAT ARE INSTALLED WITHOUT PROPER ACCESS, IN THE OPINION OF THE BUILDING MANAGER, AND INSTALLED WITHOUT THE BUILDING MANAGER'S AND/OR ENGINEER'S APPROVAL, SHALL BE REMOVED AND REVISED AS DIRECTED BY THE BUILDING MANAGER AND/OR ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
- 13. THIS CONTRACTOR SHALL REPAIR AND RESTORE TO ORIGINAL CONDITION ANY EXISTING EQUIPMENT OR MATERIALS DAMAGED IN THE PROCESS OF INSTALLATION. TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVES.

C. SCOPE OF WORK

- PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR'S SERVICES NECESSARY FOR A COMPLETE SAFE INSTALLATION OF ALL WORK INDICATED IN CONTRACT DOCUMENTS, IN FULL CONFORMITY WITH REQUIREMENTS OF BUILDING CODES AND OF ALL AUTHORITIES HAVING JURISDICTION, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- a. NEW SUPPLY AND RETURN DUCTED AIR DISTRIBUTION SYSTEM CONNECTED TO LANDLORD SUPPLIED
- ROOFTOP UNIT. VARIOUS ELECTRIC HEATING APPLIANCES.
- c. NEW DX SPLIT AIR CONDITIONING UNITS (CONDENSING UNITS ON ROOF) FOR UPS AND CONFERENCE
- NEW DUCTED TOILET EXHAUST SYSTEMS AND CONTROLLERS.
- NEW GENERAL EXHAUST SYSTEMS AND CONTROLLERS.
- NEW THERMOSTATS AND ELECTRICAL CONTROLS. RECORD DRAWINGS
- TESTING AND BALANCING OF SYSTEMS AND FURNISHING BALANCING REPORT. CUTTING AND ROUGH PATCHING REQUIRED FOR THE WORK OF THIS TRADE.
- D. SHOP DRAWINGS AND EQUIPMENT SUBMISSIONS
 - 1. PRIOR TO ORDERING EQUIPMENT OR START OF INSTALLATION OF SYSTEM COMPONENTS, SUBMIT REQUIRED OR REQUESTED SHOP DRAWINGS FOR ALL EQUIPMENT, INSULATION, PIPING, MATERIALS, SHOP STANDARDS, FITTINGS, ACCESSORIES AND SYSTEMS FOR REVIEW PRIOR TO INSTALLATION. SUBMIT FOUR (4) COPIES OF SHOP DRAWINGS. FOR DRAWINGS LARGER THAN 8 1/2" X 11" OR IF ADDITIONAL COPIES ARE REQUESTED AND/OR REQUIRED, A REPRODUCIBLE ORIGINAL SHALL BE SUBMITTED WITH PRINTS. ANY WORK INSTALLED WITHOUT SHOP DRAWING REVIEW BY ENGINEER SHALL BE REMOVED AND REPLACED WITH PROPER EQUIPMENT AT THIS CONTRACTOR'S EXPENSE.
 - 2. ALL SHOP DRAWINGS SHALL BE BASED UPON FIELD MEASUREMENTS. ARCHITECTURAL/ENGINEERING BACKGROUNDS ARE NOT ACCEPTABLE.

3. SHEET METAL AND PIPING SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING:

- DRAWING SCALE SHALL BE MINIMUM 3/8" = 1'-0"
- BOTTOM OF DUCT ELEVATIONS c. INDICATE STEEL, BAR JOISTS, LIGHTING FIXTURES, DIFFUSERS, GRILLES, REGISTERS, SPRINKLER HEADS.
- ACCESS PANELS, ETC... d. DRAWINGS SHALL INDICATE ALL DIMENSIONS, SHOP STANDARDS, MATERIALS OF CONSTRUCTION AND METHODS OF ASSEMBLY.
- 4. EQUIPMENT, ASSOCIATED DEVICES AND MATERIALS SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING:
- a. EQUIPMENT CUT SHEETS AND DATA SHEETS THAT INDICATE CAPACITIES AND PERFORMANCE DATA. b. IN LETTER FORM, MANUFACTURER'S NAMES FOR ACCESSORIES AND INCIDENTALS NOT COVERED BY SHOP DRAWINGS.
- ELECTRIC WIRING DIAGRAMS AND AUTOMATIC CONTROL DIAGRAMS AND SEQUENCE OF OPERATION. THE WIRING DIAGRAMS MUST BE COMPLETE AND COORDINATED WITH THE EQUIPMENT ACTUALLY INSTALLED.
- 5. SUBMIT A SCHEDULE OF DIFFUSERS, GRILLES AND REGISTERS WITH MANUFACTURERS' MODELS, SIZES, AIR VOLUME, THROW, NOISE CRITERIA, ACCESSORIES, FINISHES, ETC...
- a. IT IS THIS CONTRACTOR'S RESPONSIBILITY TO COORDINATE BORDER/FRAME TYPE OF AIR DEVICES SUCH THAT IT IS COMPATIBLE WITH CEILING AND/OR GRID INDICATED ON LATEST ARCHITECTURAL DRAWINGS.

E. SUBSTITUTIONS

- BASE ALL BIDS ON THE EQUIPMENT AND MANUFACTURERS LISTED. IF SUBSTITUTION IS PROPOSED, MAKE APPLICATION TO THE OWNER IN WRITING STATING THE COST DIFFERENTIAL INVOLVED.
- a. IT IS THE INTENT OF THESE SPECIFICATIONS THAT WHEREVER A MANUFACTURER IS SPECIFIED AND SUBSTITUTIONS ARE MADE, THEY SHALL CONFORM IN ALL RESPECTS TO THE SPECIFIED ITEM. CRITERIA AS
- DELINEATED FOR EQUIPMENT SHALL BE INTERPRETED AS MINIMUM PERFORMANCE REQUIREMENTS. b. APPROVAL OF SUBMISSIONS DOES NOT CONSTITUTE A REMOVAL OF CONTRACTOR'S OBLIGATION TO PROVIDE A COMPLETE AND PROPERLY FUNCTIONING SYSTEM. CONTRACTOR SHALL BE RESPONSIBLE TO MAKE SUITABLE CORRECTIONS TO INSTALLATIONS MADE IN ERROR DUE TO THEIR LACK OF COORDINATION WITH FIELD CONDITIONS, ACCESS REQUIREMENTS OF NEW AND EXISTING EQUIPMENT, NEW WORK OF
- OTHER TRADES OR LACK OF UNDERSTANDING OF PROPER SYSTEM FUNCTION. c. SUBMISSION OF ANY SUBSTITUTIONS NOT PREVIOUSLY APPROVED WITH BID SHALL BE ACCOMPANIED BY LETTER EXPLAINING REASON AND APPLICABLE CREDIT. CONTRACTOR SHALL BEAR ASSOCIATED COSTS FOR REVISING AND RE-FILING OF DRAWINGS AS A RESULT OF SUBSTITUTION.

AS-BUILT DRAWINGS

- AT THE COMPLETION OF PROJECT PROVIDE "AS-BUILT" DRAWINGS CONSISTING OF A COMPLETE SET OF MYLAR TRANSPARENCIES, DEPICTING IN A NEAT AND ACCURATE MANNER, EXACTLY HOW ALL SYSTEMS WERE INSTALLED AND A COMPLETE RECORD OF ALL CHANGES MADE TO THE ORIGINAL DESIGN OF THE WORK. DUCT AND PIPING DRAWINGS SHALL BE DOUBLE LINE. DRAWINGS SHALL PROVIDE AN ACCURATE AND COMPLETE RECORD OF THE WORK AS INSTALLED.
- 2. TWO (2) COPIES OF CONTRACT CLOSE-OUT DOCUMENTS SHALL BE SUBMITTED IN A THREE-RING BINDER LABELED CLEARLY WITH PROJECT NAME AND ADDRESS. CONTENTS INCLUDE BUT ARE NOT LIMITED TO THE
 - a. A MINIMUM OF FOUR (4) SETS OF DETAILED CONSTRUCTION SHOP DRAWINGS FOR DUCTWORK LAYOUT, PIPING LAYOUT, EQUIPMENT AND SYSTEMS. DRAWINGS SHALL INDICATE ALL DIMENSIONS, SHOP STANDARDS, MATERIALS OF CONSTRUCTION AND METHODS OF ASSEMBLY. DRAWINGS SHALL BE AT A 3/8"=1'-0" SCALE.
- PIPING SHOP DRAWING PREFERABLY OVERLAID WITH SHEET METAL DRAWING. INCLUDE ELEVATIONS EQUIPMENT PIPED AND ISOLATION VALVE LOCATIONS.
- c. HVAC EQUIPMENT INCLUDING OPERATING AND MAINTENANCE INSTRUCTIONS, WARRANTIES AND ENGINEERING
- AIR AND WATER BALANCING REPORTS WITH RAISED STAMPED SEAL FROM LICENSED BALANCER. e. ALL OF THE ABOVE SHALL BE IN ACCORDANCE WITH ENGINEER'S COMMENTS DURING THE SUBMISSION
- OPERATING AND MAINTENANCE INSTRUCTIONS

PROCESS.

- AFTER FINAL TEST AND ADJUSTMENTS FULLY INSTRUCT OWNER'S OPERATING PERSONNEL IN ALL DETAILS OF OPERATION FOR EQUIPMENT INSTALLED. A SIGNED RECEIPT THAT SHALL BE OBTAINED FROM THE OPERATOR SHALL BE CONSTRUED AS EVIDENCE THAT INSTRUCTIONS WERE SATISFACTORY.
- OPERATING AND MAINTENANCE MANUAL SHALL INCLUDE THE FOLLOWING:
 - a. FURNISH TWO (2) COPIES OF WRITTEN DESCRIPTIONS OF ALL SYSTEMS COVERING ALL MANUAL OPERATING AND MAINTENANCE PROCEDURES, AUTOMATIC CONTROL DESCRIPTIONS AND AUTOMATIC CON TEMPERATURE AND PRESSURE SETTINGS. WRITTEN DESCRIPTIONS SHALL INCLUDE LUBRICATION SCHEDULES, PARTS LIST, PERFORMANCE SERVICE FOR EQUIPMENT, FILTER SIZE/QUANTITY SCHEDULE, ETC. WHEN
 - MANUFACTURERS' STANDARD INSTRUCTIONS ARE UTILIZED, THEY SHALL BE CLEARLY MARKED. c. NEW EQUIPMENT INSTALLATION MANUALS THAT INCLUDE MANUFACTURER'S EQUIPMENT PARTS LIST OF ALL FUNCTIONAL COMPONENTS OF THE SYSTEM LISTED ON THE EQUIPMENT SCHEDULES. DRAWINGS. CONTROL DIAGRAMS AND WIRING DIAGRAMS OR CONTROLLERS. LIST SHALL GIVE SYSTEM NUMBER, UNIT NUMBER, MANUFACTURER'S MODEL NUMBER, AND MANUFACTURER'S DRAWING NUMBER.
- d. FURNISH ONE CLEAN COPY OF EACH FULLY CORRECTED AND PROCESSED SHOP DRAWING.

CODES. PERMITS AND INSPECTIONS

- 1. ALL WORK SHALL MEET OR EXCEED LATEST REQUIREMENT OF NATIONAL, STATE, COUNTY, MUNICIPAL AND OTHER AUTHORITIES HAVING JURISDICTION OF THE WORK OF THIS PROJECT.
- 2. ANY PORTION OF THE WORK WHICH IS NOT SUBJECT TO APPROVAL OF AN AUTHORITY HAVING JURISDICTION SHALL BE PROVIDED IN ACCORDANCE WITH NATIONAL FIRE PROTECTION ASSOCIATION
- COMPLY WITH APPLICABLE UTILITY COMPANY RULES AND REGULATIONS.
- 4. COMPLY WITH OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) REQUIREMENTS.
- 5. ANY ELECTRICAL INSTALLATION PERFORMED UNDER THIS CONTRACT SHALL COMPLY WITH ALL LOCAL AND STATE CODES IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (NEC).
- 6. SECURE PERMITS AND INSPECTION CERTIFICATES AND TRANSMIT SAME TO THE OWNER AT THE COMPLETION OF THE WORK.
- PROVIDE SEISMIC DETAILS AND CALCULATIONS IN ACCORDANCE WITH THE STATE BUILDING CODE. DETAILS AND CALCULATIONS MUST BE SIGNED AND SEALED BY LICENCED PROFESSIONAL ENGINEER.

CODE APPROVAL

- UPON COMPLETION OF THIS VENTILATING SYSTEM, A TEST SHALL BE CONDUCTED IN THE PRESENCE AND UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT BEFORE THE SYSTEM IS APPROVED.
- 2. THE LICENSED PROFESSIONAL ENGINEER OR REGISTERED ARCHITECT WHO CONDUCTS THE TEST SHALL CERTIFY THAT THE SYSTEM COMPLIES WITH APPLICABLE LAWS AND SHALL ALSO FILE WITH THIS CERTIFICATION A REPORT OF THE TEST. THE TEST AND REPORT SHALL BE MADE IN A MANNER SATISFACTORY TO THE OWNERS REPRESENTATIVE.
- 3. A STATEMENT SHALL BE FILED BY THE OWNER THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING NORMAL OCCUPANCY OF THE STRUCTURE THAT'S PROVIDED IN THE APPLICABLE SECTIONS OF THE CODE.
- 4. FIRE DAMPERS SHALL BE APPROVED BY THE BOARD OF STANDARDS AND APPEALS AND SHALL BEAR THE UNDERWRITER'S LABORATORIES (UL) SEAL AS REQUIRED.
- VENTILATION SYSTEM INSTALLED WILL COMPLY WITH RULES OF THE BUILDING DEPARTMENT IN EFFECT.

GUARANTEE AND SERVICE

THIS CONTRACTOR SHALL GUARANTEE AND SERVICE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE FINAL ACCEPTANCE OF THE INSTALLATION.

- 2. THIS CONTRACTOR SHALL, DURING THE PERIOD OF THE GUARANTEE, REPLACE OR REPAIR AT CONTRACTORS EXPENSE ANY PIECE OF EQUIPMENT AND/OR MATERIAL THAT IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE PERFORMED THE SAME DAY OF NOTIFICATION IN AN EMERGENCY FASHION WHEN NOTIFIED BY THE OWNER OR AUTHORIZED REPRESENTATIVE. THIS CONTRACTOR SHALL ALSO REPAIR ALL DAMAGE TO SURROUNDING WORK CAUSED BY THE FAILURE, REPAIR OR REPLACEMENT OF DEFECTIVE EQUIPMENT.
- 3. ALL REFRIGERATION COMPRESSORS SHALL HAVE A FACTORY GUARANTEE INCLUDING PARTS AND LABOR FOR FIVE YEARS TOTAL FROM DATE OF FINAL ACCEPTANCE.
- 4. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED THE EQUIPMENT BALANCED THE VARIOUS SYSTEMS, SUBMITTED AS-BUILT DRAWINGS, SUBMITTED OPERATIONS AND MAINTENANCE MANUALS. DEMONSTRATED THAT IT FULFILLS THE REQUIREMENT OF THE DRAWINGS AND SPECIFICATIONS, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVALS.
- FOR ALL APPLICABLE EQUIPMENT. THIS CONTRACTOR SHALL COMPLETE ALL WARRANTY AND PRODUCT REGISTRATION INFORMATION AND SUBMIT TO MANUFACTURER. THIS CONTRACTOR SHALL FORWARD A COPY OF THE COMPLETED FORMS TO THE OWNER FOR THEIR RECORDS.
- 6. FOR ALL EQUIPMENT AND PARTS THAT HAVE LONGER MANUFACTURER WARRANTIES; THE WARRANTY PERIOD SHALL START AFTER FINAL ACCEPTANCE. IF NECESSARY THIS CONTRACTOR SHALL PROVIDE EXTENDED WARRANTIES FROM MANUFACTURERS TO ACCOMMODATE THIS REQUIREMENT.

K. SPECIAL CONDITIONS

- THIS CONTRACTOR SHALL SCHEDULE CONNECTION TO EXISTING SYSTEMS AT A TIME THAT WILL BE CONVENIENT FOR THE OWNER AND CAUSE MINIMUM DISRUPTION TO ALL PARTIES INVOLVED.
- 2. EQUIPMENT DELIVERIES AND USE OF FREIGHT ELEVATORS SHALL BE SCHEDULED WITH MANAGEMENT TO AVOID INCONVENIENCE TO BUILDING OPERATION AND TO OWNER.
- 3. DURING CONSTRUCTION, ALL RETURN AIR OUTLETS SHALL BE COVERED WITH GAUZE MESH AND TAPED SECURELY TO PREVENT THE ENTRANCE OF DUST AND CONSTRUCTION DEBRIS INTO THE AIR DUCT SYSTEMS.
- 4. CLEAN, SERVICE, REPAIR OR REPLACE AS NECESSARY ALL VARIABLE AIR VOLUME BOXES, SUPPLY AIR PRV DAMPERS, BUILDING REHEAT COILS, ETC., SERVING THE INTENDED SPACE UNDER CONSTRUCTION.
- 5. DISCONNECT SMOKE DETECTORS AT EACH RETURN AIR INTAKE AS REQUIRED. WHEN WORK IS COMPLETED, REINSTALL AND RECONNECT TO BUILDING FIRE ALARM CONTROL PANEL.
- WORK INCLUDED UNDER OTHER SECTIONS OF WORK
- 1. ITEMS OF WORK WHICH SHALL BE INCLUDED UNDER OTHER SECTIONS OF WORK ARE AS FOLLOWS:
- 2. ACCESS DOORS IN FINISHED CONSTRUCTION
- 3. ELECTRICAL WIRING FOR POWER
- 4. DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR. THIS CONTRACTOR SHALL INSTALL IN AIR SYSTEMS AS REQUIRED.
- 5. FINISH PAINTING OF EQUIPMENT (EXCEPT FACTORY SUPPLIED AND SPECIFIED).
- 6. CONCRETE FOUNDATIONS, BASES OR CURBS
- SUB-FLASHING OF ROOF OPENINGS

M. ACCESS DOORS IN FINISHED CONSTRUCTION

- 1. THIS CONTRACTOR SHALL PREPARE A LIST OF ALL ACCESS DOORS REQUIRED FOR PROPER OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT, VALVES, DAMPERS, CONTROLS, CLEANOUTS AND OTHER SIMILAR DEVICES INSTALLED UNDER THIS CONTRACT, PRIOR TO INSTALLATION OF WALLS AND CEILINGS THIS CONTRACTOR SHALL SUITABLY FIELD TAG AND IDENTIFY ALL CONCEALED EQUIPMENT, VALVES, DAMPERS, ETC., WHICH REQUIRE ACCESS DOOR PROVISIONS. GENERAL CONTRACTOR SHALL PROVIDE ACCESS DOORS IN
- 2. ACCESS DOORS SHALL BE AT LEAST 16"X16" WITH AIRTIGHT FOAM GASKETS. THE DOORS SHALL BE PIANO HINGED AND SHALL HAVE A FLUSH OPERATING CAM LATCH LOCKING DEVICE. THE DOORS SHALL BE AS MANUFACTURED BY KARP ASSOCIATION.
 - FOR WALLS AND ACOUSTICAL CEILING TILES PROVIDE KARP DSC-214M
 - FOR PLASTER CEILINGS PROVIDE KARP KSTDW
 - FOR FIRE RATED INSTALLATIONS PROVIDE WITH FIRE RATED ACCESS DOOR d. COLOR, FINISH, SIZE AND EXACT LOCATION SHALL BE REVIEWED BY ARCHITECT

METAL DUCTS

- DUCTWORK
 - FURNISH, INSTALL AND FABRICATE ALL DUCTWORK IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA LOW PRESSURE AND MEDIUM PRESSURE DUCT CONSTRUCTION STANDARD MANUALS, USING PRIME SHEETS OF GALVANIZED STEEL, BLACK IRON, COPPER, ALUMINUM OR STAINLESS STEEL AS APPROPRIATE.
 - 1) GALVANIZED STEEL DUCTS SHALL COMPLY WITH: ASTM A525 AND ASTM A527 GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, HAVING G60 ZINC COATING IN CONFORMANCE WITH ASTM A90.
 - 2) ALUMINUM DUCTS SHALL COMPLY WITH: ASTM B209; ALUMINUM SHEET, ALLOY 3003-H14. ALUMINUM CONNECTORS AND BAR STOCK: ALLOY 6061-T6 OR OF EQUIVALENT STRENGTH.
 - CONSTRUCT T'S, BENDS, AND ELBOWS WITH A FULL RADIUS THROAT OF NOT LESS THAN 1-1/2 TIMES WIDTH OF DUCT ON CENTERLINE. WHERE NOT POSSIBLE DUE TO LIMITED SPACE AND WHERE RECTANGULAR ELBOWS ARE USED. PROVIDE DOUBLE AIR FOIL TURNING VANES ON MAXIMUM 4" CENTERS. WHERE ACOUSTICAL LINING IS INDICATED, PROVIDE TURNING VANES OF PERFORATED METAL WITH GLASS FIBER INSULATION. NO SHARP ANGLED FITTINGS (MORE THAN 15 DEGREES) SHALL BE USED.
 - c. ALL DUCT SYSTEMS SHALL BE TIGHT AND FREE FROM LEAKS AND VIBRATION. ALL JOINTS IN DUCTWORK SHALL BE SEALED AIRTIGHT WITH APPROPRIATE DUCT SEALERS, WRAPPED WITH DUCT TAPE AND COATED WITH A SECOND COAT OF SEALER. THIS INCLUDES ALL SUPPLY, RETURN AND EXHAUST DUCTWORK. DUCT SEALER 3M No.900 SHALL BE USED AND SHALL BE TESTED FOR AIR TIGHTNESS AFTER INSTALLATION. MAINTAIN A LEAKAGE RATE OF NO GREATER THAN 5%. LONGITUDINAL JOINTS SHALL BE FORMED USING THE PITTSBURGH LOCKING SEAM.
 - 1) TOTAL AIR VOLUME FOR LOW PRESSURE DUCT SYSTEMS SHALL BE AT LEAST 95% OF FAN SUPPLY WHEN MEASURED BY DUCT TRAVERSES TAKEN WITH A PITOT TUBE AND WATER MANOMETER.
 - INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15 DEGREES DIVERGENCE UPSTREAM OF EQUIPMENT AND 45 DEGREES CONVERGENCE DOWNSTREAM.
 - e. DRIVE SLIPS AND SNAP LOCK CONNECTIONS ARE NOT PERMITTED.

DUCTWORK AS REQUIRED.

- f. DUCTWORK LAYOUTS AND ROUTES AS SHOWN ON THE DRAWING ARE SCHEMATIC; THEREFORE, CHANGES IN DUCT SIZES AND/OR LOCATIONS SHALL BE MADE WHERE NECESSARY TO CONFORM TO SPACE CONDITIONS OR OBTAIN MAXIMUM HEADROOM CONDITIONS WITHOUT ADDITIONAL COST TO THE
- AIR DIFFUSERS AND GRILLES SHALL BE LOCATED IN CONFORMANCE TO ARCHITECTURAL REFLECTED CEILING PLANS,
- 1) CEILING DIFFUSERS, REGISTERS AND GRILLES SHALL BE LOCATED IN THE CENTER OF CEILING
- TILE, EXTEND DUCTWORK AS REQUIRED. 2) CENTER AND LOCATE AIR OUTLETS/INLETS IN A NEAT AND SYMMETRICAL MANNER. EXTEND

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- h. WHERE DUCTS ARE SPECIFIED OR INDICATED ON PLAN TO BE ACOUSTICALLY LINED, THE DUCT SHALL BE INCREASED IN SIZE SO THAT THE CLEAR INSIDE LINING DIMENSIONS MATCH THE DUCT SIZES ON THE DRAWINGS.
- MAXIMUM LENGTH OF FLEXIBLE DUCTWORK SHALL BE 3 FEET AND ONLY PROVIDED WHERE SPECIFICALLY CALLED OUT ON DRAWINGS.
- . MINIMUM DUCT GAUGE THICKNESS SHALL BE 24.
- k. ALL EXPOSED DUCTWORK SHALL BE PRIMED WITH GLIDDEN #5229 GALVANIZED PRIMER OR APPROVED EQUAL AND SHALL BE PROVIDED TWO COATS OF PAINT THAT IS SPECIFICALLY DESIGNED, MANUFACTURED AND WARRANTIED FOR THE APPLICATION. COLOR AND PAINT SHALL BE APPROVED BY OWNERS REPRESENTATIVE.
- I. FOR DUCTS WITH WIRE MESH SCREEN OPENINGS, EGG CRATE OPENINGS OR OTHER OPENINGS WHERE OCCUPANTS CAN SEE THE INSIDE OF THE DUCT, THIS CONTRACTOR SHALL SPRAY PAINT THE INSIDE OF THE DUCT FLAT BLACK. PROVIDE TWO COATS OF SPRAY PAINT ON THE INSIDE SURFACE OF THE DUCT ONLY AND SPRAY PAINT FAR ENOUGH INSIDE THE DUCT SO THAT OCCUPANTS CAN ONLY SEE BLACK PAINT AND NO INTERNAL DUCTWORK.

2. ROUND DUCTWORK

- a. ALL ROUND DUCTWORK SHALL BE CONSTRUCTED FROM A "PAINT GRIP" GALVANIZED STEEL WITH SPIRAL WOUND SEAM. DUCTWORK SHALL BE PROVIDE WITH ONE INCH THICK ACOUSTICAL FIBERGLASS BLANKET AND PERFORATED METAL LINER. ACOUSTICAL LINING SHALL HAVE THERMAL CONDUCTIVITY "K" FACTOR OF 0.27 BTU/HR/DEGREES F/SQ.FT.
- b. ALL ROUND DUCTWORK SHALL BE CONNECTED TO ONE ANOTHER WITH SLIP JOINTS AND POP RIVETED TOGETHER IN SYMMETRICAL ORDER. ALL DUCT TO DUCT JOINTS SHALL BE MADE WITH SPINEL SEAM ROTATED SO THAT THE SEAM FORMS A CONTINUOUS HELICAL PATTERN ACROSS THE
- c. ALL ELBOWS SHALL BE STANDING SEAM GORED ELBOWS ACOUSTICAL LINED WITH PERFORATED METAL LINER.
- d. ALL REDUCTIONS IN DUCT RUNS HALL BE MADE WITH CONCENTRIC REDUCERS.
- e. ALL TAPS FOR BRANCH DUCTWORK SHALL BE MADE WITH STRAIGHT BODY 90 DEGREE CONICAL TAP AND VOLUME DAMPER.
- f. ALL DIFFUSER COLLARS SHALL BE ATTACHED TO DUCTWORK WITH POP RIVETS WITH A FINISHING FILET OF ELASTOMER SEALER APPLIED TO THE COLLAR DUCT JUNCTION.

O. NOT USED

P. DUCTWORK ACCESSORIES

- 1. ALL BRANCHES AND TAKE-OFFS SHALL BE EQUIPPED WITH OPPOSED BLADE TYPE VOLUME DAMPERS.
- 2. PROVIDE DAMPERS WHERE REQUIRED FOR PROPERLY BALANCING THE SYSTEM, WITH LOCKABLE, MARKED QUADRANT. DAMPERS SHALL BE OF THE SAME MATERIAL AS THE DUCT IN WHICH THEY ARE INSTALLED AND SHALL BE SUPPLIED AT THE JUNCTION OF A MAIN DUCT AND EACH BRANCH DUCT.
- 3. TURNING VANES: FABRICATE TO COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE".
- 4. FLEXIBLE CONNECTORS: GLASS FABRIC DOUBLE COATED WITH POLYCHLOROPRENE. MINIMUM WEIGHT: 26 OZ./SQ. YD.

Q. DUCT INSULATION

- . INSULATION SHALL BE APPLIED TO DUCTWORK OF MATERIALS AS SPECIFIED HEREIN AND FOR APPLICABLE SYSTEMS OF THIS PROJECT. INSULATION MATERIAL AND THICKNESS SHALL CONFORM TO THE LATEST ENERGY CODE HAVING JURISDICTION.
- 2. INSULATION SHALL BE CONTINUOUS THROUGH WALL AND SLAB OPENINGS.
- 3. INSULATION OF COLD SURFACES WHERE VAPOR BARRIER JACKETS ARE SPECIFIED SHALL BE APPLIED WITH AN UNBROKEN VAPOR SEAL. HANGERS AND SUPPORTS THAT ARE SECURED TO COLD SURFACES SHALL BE ADEQUATELY INSULATED TO PREVENT CONDENSATION.
 - a. ALL NEW AND EXISTING SHEET METAL SUPPLY DUCTWORK SHALL BE INSULATED WITH 1-1/2" THICK FLEXIBLE DUCT INSULATION, 0.75 LB/CU.FT. DENSITY WITH A MAX. K FACTOR OF .30 AT 75° MEAN TEMPERATURE, WITH REINFORCED FOIL FACED, FLAME RESISTANT, ALUMINUM FOIL VAPOR BARRIER. INSULATION AND FACING WILL HAVE A COMBINED FLAME SPREAD RATING NO GREATER THAN 25 AND SMOKE DEVELOPED RATING NOT EXCEEDING 50. ALL INSULATION SHALL BE SECURED WITH DUCT ADHESIVE AND SEEMS SEALED BY TWO-INCH SEALING LIP WITH ADHESIVE AND FASTENED WITH 14 GAUGE COPPER WIRE ON 12" CENTERS. ON DUCTS OVER 24" WIDE, WELDED PINS AND CLIPS SHALL BE USED ON THE UNDERSIDE FOR FASTENING INSULATION. ALL JOINTS AND CLIPS SHALL BE SEALED WITH MATCHING STRIPS OF VINYL COATED VAPOR BARRIER LAMINATE SIMILAR TO OWENS CORNING 24 ASJ FOR DUCTS.

R. ACOUSTICAL TREATMENT

- 1. FURNISH AND INSTALL ACOUSTICAL LINING IN DUCTWORK PLENUMS AND CASINGS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN.
- 2. MANUFACTURER: OWENS CORNING FIBERGLASS DUCT LINERBOARD.
- 3. MATERIAL: SEMI—RIGID GLASS FIBER DUCTING WITH BINDER COAT ON AIR SIDE, MAXIMUM K FACTOR OF 0.26 AT 75 DEGREE F MINIMUM FOR USE AT AIR VELOCITIES UP TO 6000 FPM. ACOUSTICAL LINING SHALL HAVE A FLAME SPREAD RATING NO GREATER THAN 25 AND SMOKE DEVELOPED RATING NOT EXCEEDING 50. BINDER COAT TO BE BLACK FOR DETECTION OF DAMAGE TO BINDER SURFACE.
- 4. INSTALLATION: INSTALL LINER IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. COMPLETELY COVER ALL PORTIONS OF DUCTWORK PLENUMS AND CASINGS WITH APPROVED ADHESIVE. INSTALL LINER WITH ALL TRAVERSE JOINTS NEATLY BUTTED HAVING NO INTERRUPTIONS OR GAPS. COVER ALL EXPOSED EDGES, JOINTS, MECHANICAL FASTENERS AND ANY DAMAGED AREAS WITH ADHESIVE. ADDITIONALLY, SECURE LINER WITH APPROVED MECHANICAL FASTENERS INSTALLED IN ACCORDANCE WITH SMACNA DUCT LINER APPLICATION STANDARD.
- 5. ALL AIR CONDITIONING SUPPLY AIR DUCTWORK SHALL BE ACOUSTICALLY LINED FOR A MINIMUM DISTANCE OF 15 FEET DOWNSTREAM OF A FAN DISCHARGE WITH A MINIMUM OF ONE INCH THICK ACOUSTICAL LINING.

 ALL RETURN/EXHAUST FAN DUCTWORK SHALL BE ACOUSTICALLY LINED FOR A MINIMUM DISTANCE OF 15 FEET OF THE FAN'S INTAKE AND DISCHARGE OPENINGS WITH A MINIMUM OF ONE INCH THICK ACOUSTICAL LINING.
- NOT USED
- NOT USED NOT USED NOT USED
- W. NOT USED X. NOT USED
- REFRIGERANT PIPING
 - 1. ALL REFRIGERANT TUBING SHALL BE TYPE AC&R CLEANED, DEHYDRATED AND CAPPED COPPER. TUBE SIZES SHOWN ARE OUTSIDE DIAMETERS. ALL FITTINGS ARE TO BE WROUGHT COPPER TYPE WHICH MEET ANSI B16.22 SPECIFICATIONS AND COMPLY WITH ASTM TEST PROCEDURES. ALL JOINTS ARE TO BE BRAZED WITH SILFOS—5 OR EQUIVALENT. AFTER PIPING IS COMPLETED, SYSTEM IS TO BE PRESSURE TESTED FOR LEAKS. HIGH SIDE REFRIGERANT LINES ARE TO BE NITROGEN TESTED TO 300 PSIG AND LOW SIDE TO 150 PSIG. TEST PRESSURES MUST HOLD FOR 30 MINUTES. ALL INTERCONNECTING REFRIGERANT LINES ARE TO BE DEHYDRATED AND EVACUATED TO 500 MICRONS, VACUUM PUMP TO BE SHUT DOWN AND VACUUM LEVEL TO BE MONITORED FOR A PERIOD OF SIX HOURS. IF VACUUM LEVEL RISE EXCEEDS THE LIMIT, THE SYSTEM SHOULD BE CHECKED FOR SMALL LEAKS, REPAIRED AND RETESTED.

OF THE ENGINEER.

- 2. DURING BRAZING OPERATIONS, FLOW AN INERT GAS SUCH AS NITROGEN THROUGH THE REFRIGERATION PIPING SYSTEM TO PREVENT SCALING AND CONTAMINATION OF INTERNAL PIPING WALLS.
- TRAPS ARE TO BE PROVIDED AT THE BASE OF ALL SUCTION GAS RISERS TO INSURE THE POSITIVE RETURN OF OIL TO THE COMPRESSOR. OIL TRAPS SHALL BE CONSTRUCTED AS SHALLOW AS POSSIBLE TO MINIMIZE THE TRAPPED VOLUME TO AVOID THE CREATION OF LARGE SLUGS OF LIQUID.
- 4. INVERTED TRAPS SHALL BE INSTALLED AT THE TOP OF EACH SUCTION OR HOT GAS RISER TO CHECK THE BACKFLOW OF OIL DOWN THE RISER FROM THE HORIZONTAL RUN DOWNSTREAM.
- 5. WHENEVER THE LIFT OF A RISER WILL EXCEED APPROXIMATELY 20 FEET, PROVIDE INTERMEDIATE TRAPS TO ALLOW THE OIL TO TRAVEL UP IN STAGES.
- 6. ALL REFRIGERANT LINES EXPOSED TO OUTDOOR ELEMENTS AND ALL SUCTION LINES THROUGHOUT SHALL BE WRAPPED IN 1" THICK ARMAFLEX INSULATION. ALL JOINTS SHALL BE MITERED AND TAPED TO ENSURE PROPER VAPOR SEAL. ALL SEAMS ARE TO BE SEALED WITH MANUFACTURER'S RECOMMENDED ADHESIVE. REFER TO SPECIFICATION FOR OUTDOOR PIPING.
- 7. PROVIDE ADEQUATELY SIZED REFRIGERANT LINE SIGHT GLASS AND FILTER DRYERS AS REQUIRED.
- REFRIGERANT PIPING TO BE INSTALLED AND SIZED IN ACCORDANCE TO EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUBMIT LAYOUT OF REFRIGERANT PIPING TO BE INSTALLED IN FIELD. INDICATE ACTUAL ROUTE, ELEVATIONS, LENGTHS, ELBOWS, DEVICES AND EQUIPMENT FOR VERIFICATION OF PIPE SIZE AND INSTALLATION.
- 9. PROVIDE ALL REFRIGERANT PIPING IN COMPLETE ACCORDANCE WITH ALL REQUIREMENTS IN ASHRAE STANDARD 15, 34 AND THE LOCAL MECHANICAL CODE CHAPTER ON REFRIGERATION. ALL REFRIGERANT PIPING SHALL BE BE ENCLOSED BY SHAFTS IN ACCORDANCE WITH ASHRAE STANDARD 15, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
- 10. COMPLY WITH ALL REFRIGERANT QUANTITY LIMITS. PROVIDE PLENUM RETURNS, TRANSFER DUCTS (WITH APPLICABLE FD/AD IF REQUIRED), PERMANENT OPENINGS, UNDERCUT DOORS AND/OR HVAC DUCTS AS REQUIRED TO COMPLY.

Z. NOT USED

AB. HANGERS AND SUPPORTS

- 1. PROVIDE ALL HANGERS, HANGER ROD SUPPORTS, INSERTS, ATTACHMENT, CLAMPS, GUIDES, BOLTS, RODS, NUTS, WASHERS, SUPPLEMENTAL STEEL, ANCHORS AND OTHER ACCESSORIES TO SUPPORT SYSTEM LOADS.
- 2. PROVIDE 2" VERTICAL ADJUSTMENT FOR ALL HANGERS. PROVIDE ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, BRANCH PIPING OVER 5 FEET AND AT LOADS DUE TO VALVES, STRAINERS AND OTHER ACCESSORIES.
- HANGER ROD: ASTM A36; STEEL; THREADED BOTH ENDS; THREADED ALL ONE END OR CONTINUOUSLY THREADED. THREADED RODS SHALL BE GALVANIZED.
- 4. PROVIDE DUCT HANGERS IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA LOW PRESSURE AND MEDIUM PRESSURE DUCT CONSTRUCTION STANDARD MANUALS.
- 5. SUPPORT HORIZONTAL DUCTS WITH HANGERS SECURED TO STRUCTURAL STEEL ABOVE. INSTALL ADDITIONAL STEEL AS REQUIRED.
 - a. PROVIDE HANGERS AND FASTENINGS ADEQUATE TO INSURE PERMANENT STABILITY AND IN COMPLIANCE WITH LOCAL CODE REQUIREMENTS. WHERE REQUIRED, PROVIDE SUPPLEMENTARY STEEL ANGLES OR CHANNELS. DO NOT HANG OR SUPPORT DUCTWORK FROM ANY EQUIPMENT, SUSPENDED CEILING SYSTEM OR ANY SUCH INSTALLATION OTHER THAN FROM SLAB, METAL DECK OR SUPPLEMENTAL SUPPORTS ORIGINATING FROM THE BUILDING STRUCTURE.

6. PIPE HANGERS AND SUPPORTS

- a. PROVIDE PIPE HANGERS IN ACCORDANCE WITH ANSI/MSS SP-69.
- b. PROVIDE PIPING HANGERS, SUPPORTS, ANCHORS AND GUIDES HAVING A BUILT—IN SAFETY FACTOR OF FIVE (5); IN CONFORMANCE TO THE LATEST ANSI B31.9 CODE FOR PRESSURE PIPING AND MSS STANDARD PRACTICE SP—58 AND SP—69. ALL HANGER SPECIFICATIONS SHALL BE FURNISHED WITH ZINC CHROMATE PRIME PAINT FINISH.
- c. SUPPORT HANGERS FROM BUILDING STEEL FRAMING WITH APPROVED TYPE CLAMP INSERT. PROVIDE ADDITIONAL STEEL SUPPORTS BETWEEN EXISTING FRAMING MEMBERS AS REQUIRED. ALL PIPE HANGING RODS, INSERTS AND CLAMPS SHALL BE U.L. APPROVED FOR THEIR RESPECTIVE USES. DO NOT HANG PIPING FROM ANY OTHER CONSTRUCTION OR CEILING SYSTEM SUPPORT. ONLY FROM BUILDING STEEL, INTERMEDIATE SUPPLEMENTAL STEEL OR SLAB.
- d. FURNISH AND INSTALL SPRING ISOLATED PIPE HANGERS WITHIN 20' DOWNSTREAM AND UPSTREAM OF ALL PUMPS AND EQUIPMENT TO BE PIPED.
- e. LOAD DISTRIBUTION: INSTALL HANGERS AND SUPPORTS SO THAT PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT.
- f. PROVIDE PROTECTIVE SADDLES TO SUPPORT INSULATED PIPING.
- g. PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND SO MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9, "BUILDING SERVICES PIPING", ARE NOT EXCEEDED.

AD. MECHANICAL IDENTIFICATION OF EQUIPMENT AND CONTROLS

- 1. ALL EQUIPMENT SHALL BE STENCILED OR LABELED WITH LAMACOID PLATES SCREWED THEREON WHICH SHALL INDICATE SYSTEMS SERVICE.
- 2. ALL PIPING SHALL BE LABELED IN ACCORDANCE WITH ASME 13.1 LABEL STANDARDS.
- 3. ALL PIPING SYSTEMS SHALL BE IDENTIFIED INDICATING THEIR SERVICE AND DIRECTION OF FLOW WITH PVC PIPING BANDS ON A MAXIMUM OF 25 FEET ON STRAIGHT RUNS, AT ALL BRANCHES, VALVE LOCATIONS, ON BOTH SIDES OF PENETRATIONS AND ON ALL EXTERIOR PIPING.
- 4. ALL VALVES SHALL BE TAGGED WITH 2" BRASS PLATED TAGS AND CHAINS AND VALVES CHART SCHEDULE FRAMED AND WALL MOUNTED WHERE DIRECTED.
- 5. MOTOR STARTERS SHALL BE PROVIDED WITH LAMACOID PLATES WHICH INDICATE SYSTEM SERVED.

AE. ELECTRICAL WIRING AND WIRING DIAGRAMS

- 1. ELECTRICAL WIRING FOR 120 VOLT POWER AND GREATER SHALL BE BY THE ELECTRICAL CONTRACTOR. WIRING FOR AUTOMATIC TEMPERATURE, SAFETY AND INTERLOCKING CONTROLS FOR MOTORS, MOTOR STARTER AND OTHER MECHANICAL AND CONTROL DEVICES SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR UNDER THIS CONTRACT WORK. AT TIME OF BID THIS CONTRACTOR IS REQUIRED TO INDICATE THE NUMBER OF 120 VOLT (AND GREATER) POINTS OF POWER CONNECTION REQUIRED FOR PRICING AND INSTALLATION BY THE ELECTRICAL CONTRACTOR.
- 2. THE MECHANICAL CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL TERMINAL POINT TO TERMINAL POINT, COMPLETELY COORDINATED AND INTEGRATED WIRING DIAGRAMS FOR ALL WIRING REQUIRING FIELD INSTALLATIONS IN ACCORDANCE WITH THE SEQUENCE OF OPERATION.
- 3. SPECIFIC WIRING DIAGRAMS OF FACTORY INSTALLED EQUIPMENT WIRING SHALL ALSO BE SUBMITTED FOR APPROVAL AND FURNISHED TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION REQUIREMENTS AND OTHER USES.

ELECTRICAL AUTOMATIC TEMPERATURE CONTROL (ATC)

1. EM POWER SHALL EMPLOY A CONTROLS CONTRACTOR FOR THIS PROJECT. ALL EQUIPMENT NEEDING CONTROL THERMOSTATS, CONTROL WIRING, AND PROGRAMMING TO BE DONE UNDER THE THIS TENANT'S DIRECTION

AJ. SEQUENCE OF OPERATION

- 1. EXISTING ROOFTOP AIR CONDITIONING UNIT "AC-6" CONTROL SEQUENCE
 - a. THIS AIR CONDITIONING SYSTEM SHALL BE PROVIDED WITH A PROGRAMMABLE THERMOSTAT HAVING A 7-DAY TIMECLOCK TO START AND STOP THE UNIT. THE TIMECLOCK SHALL HAVE HOLIDAY AND WEEKEND SKIP, MANUAL OVERRIDE SWITCH AND 10-HOUR SPRING-WOUND TIME RESERVE MECHANISM. PROVIDE A REMOTE OVERRIDE SWITCH WITH 0 TO 6 HOUR TIMER MOUNTED IN SWITCH AND LOCATED AS DIRECTED BY OWNERS REPRESENTATIVE. THERMOSTAT SHALL BE SIMILAR TO HONEYWELL T7300 PROGRAMMABLE THERMOSTAT.
 - b. WHEN OUTDOOR AIR ENTHALPY IS GREATER THAN RETURN AIR, OUTDOOR AIR DAMPER TO GO TO MINIMUM POSITION AND RETURN AIR DAMPER TO OPEN AND WALL THERMOSTAT TO CONTROL MECHANICAL COOLING (CONSULT UNIT MANUFACTURER FOR NUMBER OF MECHANICAL COOLING STACES)
 - c. WHEN OUTDOOR AIR ENTHALPY IS LESS THAN RETURN AIR, OUTDOOR AIR DAMPER AND RETURN AIR DAMPER TO MODULATE TO MAINTAIN WALL THERMOSTAT SET POINT. A LOW LIMIT SENSOR IN THE MIXED AIR STREAM SHALL PREVENT THE ECONOMIZER CYCLE MIXED AIR TEMPERATURE FROM DROPPING BELOW 52°F. (TO PROTECT AGAINST COIL FREEZE UP). THE ECONOMIZER CYCLE SHALL NOT BE FUNCTIONAL IF THE OUTDOOR AIR TEMPERATURE IS ABOVE 70°F.
 - d. WHEN THE WALL THERMOSTAT CALLS FOR HEATING, THE OUTDOOR AIR DAMPER TO BE CLOSED TO MINIMUM POSITION AND RETURN AIR DAMPER TO OPEN.
 - e. A REMOTE SENSOR CONTROL WILL PROVIDE LOW AMBIENT LOCKOUT AND LOCKOUT THE REFRIGERANT COMPRESSORS AT 50 DEGREES F (ADJUSTABLE) SETPOINT.
 - f. A REMOTE DAMPER POSITION POTENTIOMETER WILL BE PROVIDED TO ALLOW ADDITIONAL SETTING OF OUTSIDE AIR DAMPER OTHER THAN MINIMUM POSITION.
 - g. SMOKE DETECTION
 - 1) DUCT MOUNTED SMOKE DETECTOR SHALL BE PROVIDED IN THE SUPPLY AND RETURN DUCT OF THIS SYSTEM TO STOP THE AC UNIT WHEN SMOKE IS SENSED (FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR AND INSTALLED BY THIS CONTRACTOR).
 - 2) WHEN SMOKE IS SENSED BY THE SMOKE DETECTOR SERVING ITS AIR CONDITIONING UNIT, A SIGNAL SHALL BE SENT TO THE BASE BUILDING FIRE ALARM CONTROL PANEL. A SIGNAL WILL THEN BE SENT FROM THE BASE BUILDING FIRE ALARM CONTROL PANEL TO SHUT DOWN THE AIR CONDITIONING UNIT AND ALL ASSOCIATED FANS AND DEVICES.
 - h. PROVIDE EACH HVAC UNIT WITH SHUT DOWN RELAY INTERLOCKED WITH FIRE ALARM CONTROL PANEL FOR SHUT DOWN.
 - i. FAN TO RUN CONTINUOUSLY DURING OCCUPIED MODE. HEATING SET POINT WILL BE 70 F. COOLING SET POINT WILL BE 75 F. THE ZONE TEMPERATURE SENSORS WILL INTERFACE WITH THE THERMOSTAT TO MAINTAIN ITS TEMPERATURE SETTING THRU THE UNIT MICRO CONTROLS, WITH NIGHT SET—BACK CAPABILITIES FOR COOLING/HEATING IN OCCUPIED MODES.
 - j. UNITS MUST BE PROGRAMMED FOR MORNING WARM UP A MINIMUM OF 1 HOUR (ADJUSTABLE) PRIOR TO OCCUPIED MODE.
 - k. DUAL ENTHALPY CONTROLLED ECONOMIZER SHALL INCLUDE THE FACTORY INSTALLED COMPARATIVE ENTHALPY SENSORS LOCATED IN THE RETURN AND OUTDOOR AIR STREAMS. CONTROLLER SHALL COMPARE ENTHALPIES AND PROPORTIONALLY ADJUST THE OUTDOOR AIR LEVELS ACCORDINGLY.

L. DAIIKIN SPLIT STSTEMS AC-1 / AC-2

EACH SPLIT SYSTEM (INDOOER UNIT) HAS A DEDICATED REMOTE WALL MOUNTED HARD WIRED CONTROLLER. THE WALL MOUNTED CONTROLLER / THERMOSTAT WILL DETERMINE COOLING OR HEATING AUTOMATICALLY FOR ITS SYSTEM. EACH INDOOR REMOTE CONTROLLER MUST BE PROGRAMMED BY THE USER FOR TIME OF DAY START / STOP AND SET—BACK HEATING MODE (CONF RM) HOWEVER, THE SERVER RM WILL BE IN COOLING MODE 24/7/365. EACH REMOTE CONTROLLER HAS INDEPENDENT TEMPERATURE SETTINGS FOR COOLING AND FOR HEATING FOR

- OCCUPIED AND UNOCCUPIED TIMES.

 EACH REMOTE CONTROLLER HAS INDEPENDENT TIME SCHEDULING SETTINGS FOR COOLING AND FOR HEATING, FOR OCCUPIED AND UNOCCUPIED TIMES.
- EACH REMOTE CONTROLLER HAS INDEPENDENT FAN SPEED SETTINGS.

 TRAINING OF OFFICE PERSONAL TO BE PERFORMED BY DAIKIN APPLIED TECHNICIANS.

AK. TESTING, ADJUSTING AND BALANCING

- I. REQUEST FROM BUILDING ENGINEER TIME FOR TESTING TO BE PERFORMED. REQUEST THAT BUILDING SYSTEMS BE SET AT 100 % CAPACITY. BALANCE AIR FLOW TO ALL OUTLETS TO PROVIDE AIR QUANTITIES NOTED. SUBMIT A DETAILED BALANCING REPORT, SHOWING INSTRUMENTS USED, VAV BOX INLET AND OUTLET STATIC PRESSURE AND EXHAUST FANS, SUPPLY, RETURN TEMPERATURES AND ACTUAL VERSUS DESIGN AIR QUANTITIES FROM DIFFUSERS, GRILLES, REGISTERS, ETC. AFTER ADJUSTMENTS.
- 2. MAKE ALL REQUIRED ADJUSTMENTS OF AIR AND WATER SYSTEM DEVICES UNTIL ALL SPECIFIED PERFORMANCES ARE MET.
- 3. AIR AND WATER SYSTEM BALANCING SHALL BE PERFORMED BY AN INDEPENDENT TESTING AND BALANCING FIRM CERTIFIED AND REGISTERED BY THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) HAVING A MINIMUM OF FIVE YEARS' EXPERIENCE. SUBMIT EVIDENCE OF QUALIFICATIONS. TESTING AND BALANCING REPORTS SHALL BEAR THE NEBB STAMP AND SEAL AS REQUIRED.
- 4. WITHIN 90 DAYS OF OWNER OCCUPANCY OR AS DIRECTED BY THE OWNER, THE TESTING AND BALANCING CONTRACTOR SHALL PERFORM ADDITIONAL TESTING AND BALANCING TO VERIFY THAT BALANCED CONDITIONS ARE BEING MAINTAINED THROUGHOUT AND TO CORRECT UNUSUAL CONDITIONS.
- 5. IF INITIAL TESTING AND BALANCING WAS NOT PERFORMED DURING PEAK SUMMER AND PEAK WINTER OUTDOOR CONDITIONS, THEN THE TESTING AND BALANCING CONTRACTOR SHALL PERFORM ADDITIONAL TESTING AND BALANCING DURING PEAK SUMMER AND PEAK WINTER OUTDOOR CONDITIONS.

6. AIR BALANCING

MECHAINCAL

- a. PROVIDE VOLUME DAMPERS AS REQUIRED FOR FINAL BALANCING OF AIR SYSTEMS.
- b. EXISTING AIR VOLUME QUANTITIES AND TEMPERATURES AT THE POINTS OF CONNECTIONS OF NEW DUCTS WITH EXISTING DUCT RISERS AND OTHER SOURCES SHALL BE MEASURED AND RECORDED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE AND SHALL BE FORWARDED TO THE CONSULTING ENGINEER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- c. THE QUANTITY OF AIR DISCHARGED OR EXHAUSTED BY EACH OUTLET SHALL BE WITHIN 10% OF THE AMOUNT SHOWN ON DRAWINGS
- d. BALANCE ALL SUPPLY, RETURN, FRESH AIR INTAKE AND EXHAUST DUCTWORK TO THE QUANTITIES INDICATED ON THE DRAWINGS WITH FOLLOWING TOLERANCES:
 - 1) FANS DESIGN VOLUME PLUS 5%.
- 2) LEAKAGE 5% MAXIMUM.
- 3) OUTLETS DESIGN VOLUME PLUS 5%.

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EMPOWER SOLAR

BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

MECHANICAL SPECFICATIONS SHEET 2

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JD

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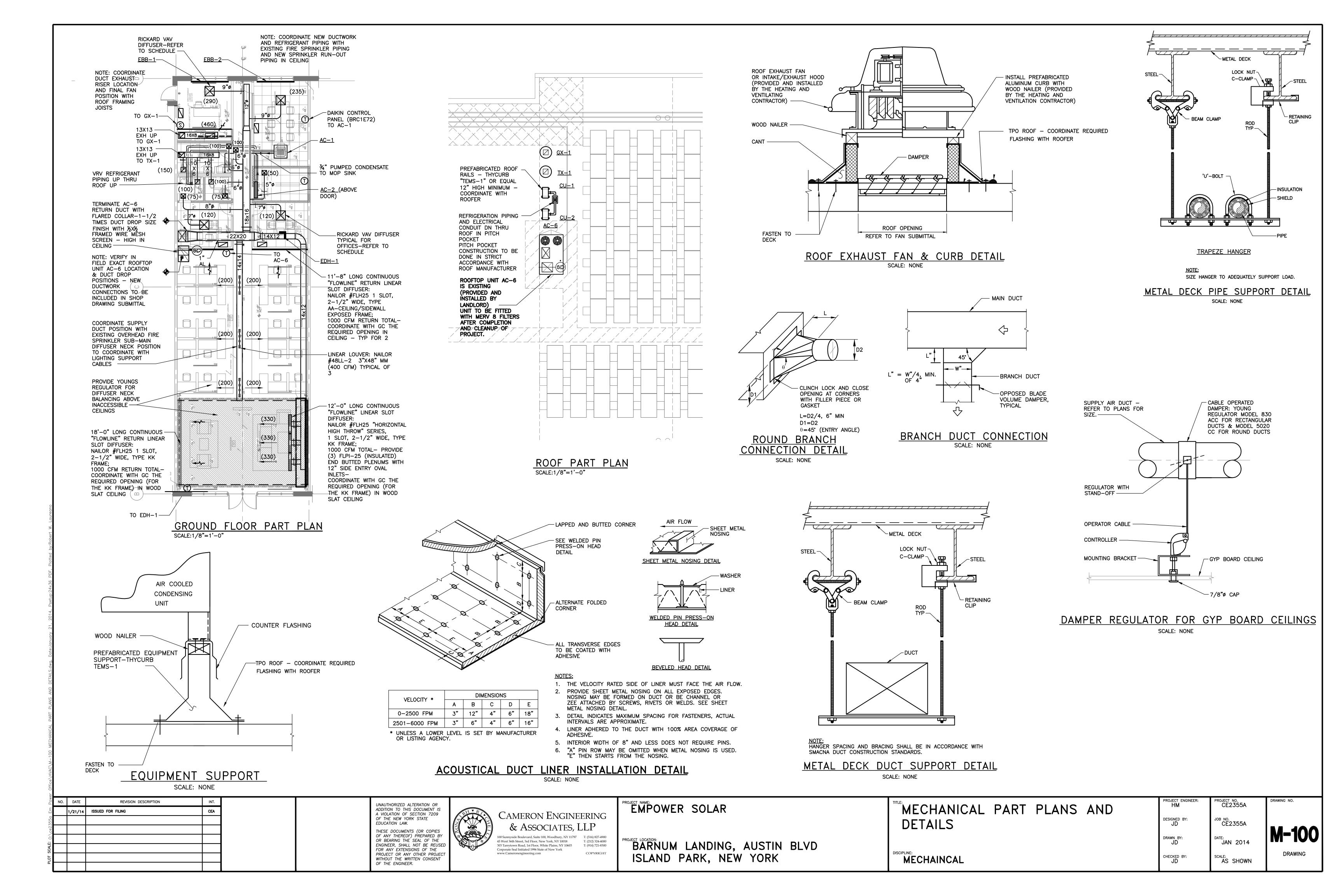
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CHECKED BY: SCALE:

JD AS SHOWN



SCOPE OF WORK AND GENERAL ELECTRICAL NOTES

- 1. AT A MINIMUM, THE CONTRACTOR SHALL FOLLOW AND PROVIDE MATERIAL AND SERVICES FROM THE FOLLOWING SCOPE OF WORK. IN ADDITION TO THIS ABBREVIATED SCOPE OF WORK, THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND SERVICES OUTLINED ON THE CONTRACT DRAWINGS AND IN THE CONTRACT SPECIFICATIONS. WORK SHALL BE IN ACCORDANCE WITH THE 2008 NYC BUILDING CODE AND THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.
- 2. THE ELECTRICAL CONTRACTOR SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS, VISIT THE SITE OF THE WORK AND FULLY BECOME INFORMED AS TO ALL CONDITIONS AND MATTERS THAT CAN, IN ANY WAY, AFFECT THE WORK OR THE COST THEREOF. SHOULD THE ELECTRICAL CONTRACTOR FIND DISCREPANCIES BETWEEN EXISTING CONDITIONS AND NEW WORK FROM THE DRAWINGS, SPECIFICATIONS OR OTHER DOCUMENTS, OR BE IN DOUBT AS TO THEIR MEANING, NOTIFY THE OWNER'S REPRESENTATIVE AT ONCE, IN WRITING, OF ANY DISCREPANCIES AND OBTAIN CLARIFICATION PRIOR TO SUBMITTING ANY BID. ABSENCE OF SUCH NOTIFICATION SHALL BE INTERPRETED TO INDICATE NO DISCREPANCIES OR CONFLICTS ADDITIONAL COMPENSATION SHALL NOT BE GRANTED AFTER AWARD OF CONTRACT FOR ANY WORK NECESSARY TO COMPLY WITH THESE REQUIREMENTS.
- 3. CONDITIONS AT THE SITE: THE ACT OF SUBMITTING A BID SHALL BE EVIDENCE THAT THE ELECTRICAL CONTRACTOR HAS EXAMINED THE SITE AND FAMILIARIZED HIMSELF WITH ALL EXISTING CONDITIONS WITHIN THE SCOPE OF THIS WORK AND ACCEPTED SUCH CONDITIONS, AND MADE ALLOWANCES THEREFORE IN PREPARING AND SUBMITTING HIS BID.
- 4. ELECTRICAL DRAWINGS: LOCATIONS OF EQUIPMENT ARE SHOWN TO SCALE WHERE POSSIBLE BUT MAY BE DISTORTED FOR CLARITY. IT IS NOT WITHIN THE SCOPE OF THE DRAWINGS TO SHOW ALL NECESSARY BENDS, OFFSETS AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF ELECTRICAL CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, RESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR.
- 5. THE DRAWINGS MAY NOT SHOW COMPLETE OR ACCURATE DETAILS OF THE EXISTING BUILDINGS IN EVERY RESPECT. EXACT LOCATIONS AND RELATIONSHIPS ARE TO BE DETERMINED IN FIELD AND SHALL BE TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE. THE ELECTRICAL CONTRACTOR SHALL VERIFY AND BE RESPONSIBLE FOR ALL FIELD MEASUREMENTS.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF GENERAL ELECTRICAL WORK. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY MODIFICATIONS REQUIRED BASED ON EXISTING CONDITIONS, FOR DEMOLITION OF EXISTING WORK AND INCLUDE ALL MATERIALS AND LABOR IN HIS BID PRICE.
- COOPERATION WITH OTHER CONTRACTORS: THE ELECTRICAL CONTRACTOR SHALL EXAMINE ALL CONTRACT DRAWINGS AND COOPERATE WITH ALL OTHER CONTRACTORS PROVIDING LABOR, MATERIALS AND ALL WORK, SO THAT THE WORK AS A WHOLE SHALL BE EXECUTED AND COMPLETED WITHOUT CONFLICT OR DELAY. VERIFY WITH OTHER TRADES THE LOCATIONS OF MOTORS, EQUIPMENT, VOLTAGE AND PHASE, BEFORE COMMENCING ANY WORK. WORK INSTALLED IMPROPERLY DUE TO NON-COORDINATION SHALL BE CHANGED BY THE ELECTRICAL CONTRACTOR AT HIS OWN EXPENSE.
- 8. FURNISH AND INSTALL ALL NECESSARY PULLBOXES AND CONDUIT SUPPORTS, WHERE NOTED AND AS REQUIRED BY APPLICABLE CODES. ALL LOW TENSION CONDUIT, FIRE ALARM CONDUIT, ETC. WHICH HAVE RUNS IN EXCESS OF 200 FEET IN LENGTH AND/OR CONSTRAINING BENDS IN EXCESS OF 270 DEGREES SHALL BE PROVIDED WITH A PULLBOX. ALL PULLBOXES SHALL BE LABELED FOR THEIR INTENDED USE OR VOLTAGE LEVEL, AND ALL WIRE AND CABLE PROVIDED UNDER THIS SECTION SHALL BE TAGGED AT ALL PULLBOXES. PROVIDE ACCESS DOORS WHERE REQUIRED. COORDINATE WITH GENERAL CONSTRUCTION WORK.
- 9. SUBMIT SHOP DRAWINGS TO THE OWNER'S REPRESENTATIVE FOR REVIEW PRIOR TO START OF ANY WORK. ANY WORK OR EQUIPMENT INSTALLED PRIOR TO APPROVAL OF RELEVANT SHOP DRAWINGS FOUND TO BE UNACCEPTABLE SHALL BE REMOVED AND MODIFIED AT THE CONTRACTOR'S SOLE EXPENSE INCLUDING ANY RESULTANT SCHEDULING DELAYS EXPERIENCED BY ANY TRADE.
- 10. PREPARE AND FURNISH TO OWNER'S REPRESENTATIVE FOR REVIEW 'AS-BUILT' PLANS ALL WORK INSTALLED.
- 11. ELECTRICAL CONTRACTOR TO COORDINATE ALL DISCONNECT SWITCH REQUIREMENTS AND LOCATIONS WITH HVAC CONTRACTOR, AND/OR THE OWNER'S REPRESENTATIVE.
- 12. ELECTRICAL CONTRACTOR SHALL VERIFY PHASE LOAD BALANCING ON POWER PANELS UPON COMPLETION OF THE ELECTRICAL INSTALLATION.
- 13. ALL CONDUIT AND CABLE HOMERUNS SHALL CONSIST OF THREE CIRCUITS MAXIMUM TO THE PANELBOARD, UNLESS OTHERWISE NOTED. COMBINING OF MULTIPLE HOMERUNS IN A SINGLI CONDUIT SHALL NOT BE PERMITTED.
- 14. ALL 120 VOLT OR 208 VOLT BRANCH CIRCUIT RUNS IN EXCESS OF 100 FEET FROM THE PANEL TO THE DEVICE SHALL BE PROVIDED WITH #10 MINIMUM AWG WIRE FOR ITS ENTIRE LENGTH.
- 15. ALL WORK, WHETHER SHOWN OR INFERRED, UNLESS SPECIFICALLY QUESTIONED, SHALL BE CONSIDERED FULLY UNDERSTOOD IN ALL RESPECTS BY THE ELECTRICAL CONTRACTOR. AND THE ELECTRICAL CONTRACTOR SHALL THEREBY BE RESPONSIBLE FOR ANY INTERPRETATIONS OR CONSEQUENCES THEREOF FOR ALL WORK ON ALL DRAWINGS.
- 16. ALL INSTRUMENTS, APPARATUS AND EQUIPMENT SHALL BE TESTED AND PROVED TO BE ELECTRICALLY AND MECHANICALLY WITHOUT DEFECTS. THE ELECTRICAL SYSTEM SHALL BE TESTED FOR GROUNDS OR SHORTS. IF THERE IS TROUBLE WITHIN THE CIRCUIT WIRING, ALL SHORTED OR GROUNDED WIRES SHALL BE REPLACED AND THEN RETESTED. ALL METERS, CABLES, EQUIPMENT OR APPARATUS NECESSARY FOR MAKING ALL TESTS SHALL BE PROVIDED BY THE ELECTRICAL
- 17. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SCHEDULING DELIVERY, RECEIVING, UNLOADING, STORING, UNCRATING, SETTING IN PLACE, AND PROTECTING FROM DAMAGE, VANDALISM, THEFT OR WEATHER DURING CONSTRUCTION FOR ALL NEW EQUIPMENT PROVIDED BY THE ELECTRICAL CONTRACTOR OR PROVIDED BY OTHER PARTIES TO THE ELECTRICAL CONTRACTOR FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR.
- 18. THE ELECTRICAL INSTALLATION IS TO BE IN THE STRICT ACCORDANCE WILL ALL APPLICABLE LOCAL, STATE AND FEDERAL RULES, REGULATIONS AND CODES OR ANY OTHER AUTHORITIES HAVING LAWFUL JURISDICTION, INCLUDING ANY LOCAL UTILITY COMPANY REQUIREMENTS.
- 19. ALL EQUIPMENT/DEVICES PROVIDED BY THE ELECTRICAL CONTRACTOR SHALL BE NEW AND OF FIRST QUALITY AND SHALL BEAR THE APPROPRIATE UL OR CSA APPROVED LABELS FOR SPECIFIC PURPOSE. ALL MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE (NEC).
- 20. ALL WIRE AND CABLE SHALL BE COPPER WITH 600 VOLT INSULATION. MINIMUM WIRE SIZE SHALL BE SIZE #12 AWG (WITH THE EXCEPTION OF CONTROL WIRING). WIRE SIZE #10 AWG AND SMALLER SHALL BE SOLID AND ALL CABLE SIZE #8 AWG AND ABOVE SHALL BE STRANDED, WITH "TYPES" AS FOLLOWS: "THHN" GREATER THEN OR EQUAL TO #12 AWG FEEDER AND BRANCH CIRCUIT WIRING ABOVE FINISHED FLOORS AND AREAS NOT SUBJECT TO MOISTURE; "XHHW" FEEDER AND BRANCH CIRCUIT WIRE IN FINISHED FLOORS AND/OR SUBGRADE RUNS OR AREAS SUBJECT TO MOISTURE.
- 21. NO HOLES OR RECESSES MAY BE CUT IN WALLS, FLOORS, CEILINGS, OR ANY PART OF THE BUILDING TO ADMIT CONDUIT OR OTHER WORK OF THIS CONTRACT WITHOUT PRIOR SUBMISSION TO AND REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. WORK SHALL BE PERFORMED BY COMPETENT PERSONS SKILLED IN THIS FIELD IN A NEAT AND CRAFTSMAN LIKE MANNER. ANY CUTTING, DRILLING, CORING, ETC. SHALL BE DONE WET TO MINIMIZE THE SPREAD OF DUST. PROVIDE DUST PROTECTION AS APPROVED BY OWNER'S REPRESENTATIVE. THE PORTIONS CUT MUST BE RESTORED TO THEIR ORIGINAL CONDITION AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL INCLUDE ALL COSTS FOR ALL CUTTING AND PATCHING REQUIRED FOR THE ELECTRICAL WORK IN HIS BID. EXACT LOCATION OF CONDUIT PENETRATION(S) SHALL BE DETERMINED IN FIELD.
- 22. PROVIDE AND INSTALL SLEEVES FOR PENETRATIONS THROUGH BLOCK OR CONCRETE WALLS AND

- 23. ACCESS TO WORK AREAS. INCLUDING WORK SCHEDULED THEREIN. MUST HAVE PRIOR APPROVAL OF OWNER'S REPRESENTATIVE. ANY WORK REQUIRING EQUIPMENT SHUTDOWN MUST BE COORDINATED WITH THE OWNER'S REPRESENTATIVE PRIOR TO DEACTIVATION. ALL EXISTING EQUIPMENT IS TO REMAIN OPERATIONAL DURING THE CONSTRUCTION PERIOD. ANY TEMPORARY WIRING OR REROUTING OF CIRCUITRY TO ACHIEVE THIS SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. SHUT DOWN OF EXISTING SERVICES SHALL ONLY BE PERMITTED UPON APPROVAL FROM THE OWNER'S REPRESENTATIVE AND THEN ONLY FOR THE DATE AND DURATION AGREED UPON.
- 24. PERMITS, INSPECTIONS AND TESTS: OBTAIN ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS FOR THE EXECUTION OF ELECTRICAL WORK. PROVIDE ALL INSTRUMENTS AND PERFORM ALL TESTS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. CORRECT ALL FAILURES AND REPLACE ANY DAMAGED PORTIONS OF THE WORK RESULTING FROM TESTS. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE TESTS.
- 25. GROUNDING: ALL WORK SHALL BE PERMANENTLY AND EFFECTUALLY GROUNDED WHETHER OR NOT SUCH CONNECTIONS ARE SPECIFICALLY SHOWN OR SPECIFIED. GROUND RESISTANCE AT ANY POINT SHALL NOT EXCEED 25 OHMS.
- 26. CUTTING AND PATCHING: THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING OF ROUGH OR FINISH WORK REQUIRED BY ELECTRICAL INSTALLATIONS. PATCHING SHALL BE OF THE SAME MATERIAL, FINISH, AND WORKMANSHIP AS THE ORIGINAL WORK.
- 27. CLEANING AND CLEANUP: ALL MATERIAL INSTALLED UNDER THIS SECTION OF THE WORK SHALL BE CLEANED OF GREASE, OIL, PLASTER, DIRT/DUST AND THE LIKE. ALL GREASE AND OIL SHALL BE CLEANED FROM FLOORS, CEILINGS, AND WALLS AND ALL UNUSED CONSTRUCTION MATERIAL AND DEBRIS SHALL BE LEGALLY REMOVED, TRANSPORTED AND DISPOSED OF OFF-SITE.
- 28. ELECTRICAL CONTRACTOR SHALL NOT REDUCE SIZING OF CONDUITS TO SUIT WIRE FILL CAPACITY.
- 29. ALL CONDUIT USED FOR THIS PROJECT SHALL BE 3/4" MINIMUM, EMT. UNLESS OTHERWISE NOTED. PVC SCHEDULE 40 CONDUIT MAY BE USED FOR SUBGRADE AND IN SLAB RUNS. SEE PIPE PENETRATION AND CONDUIT TRANSITION DETAILS.
- 30. ALL SUSPENDED CONDUITS SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE BY MEANS OF APPROVED CONDUIT FASTENERS, HANGERS, STRAPS, SUPPORTS, CLAMPS, ETC., FIRMLY ANCHORED IN PLACE AND SPACED AT INTERVALS NOT TO EXCEED 10'-0".
- 31. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL RODS, ANGLES, RAILS, STRUTS, BRACE PLATES, PLATFORMS, ETC., REQUIRED FOR SUSPENSION OR SUPPORT OF CONDUIT AND EQUIPMENT AND ALL STRAPS, CLAMPS, THREADED RODS, TURNBUCKLES, ANCHORS, ETC. AND MISCELLANEOUS SPECIALTIES REQUIRED FOR THE ATTACHMENT OF HANGERS AND SUPPORTS TO THE STRUCTURE.
- 32. ALL CONDUIT INSTALLED (SPARE OR UTILIZED) SHALL HAVE A MINIMUM, ONE (1) 14 AWG ZINC-COATED STEEL OR MONOFILAMENT PLASTIC PULL LINE WITH NOT LESS THAN 200LB TENSILE STRENGTH CHARACTERISTICS. LEAVE 12" (MINIMUM) OF SLACK AT EACH END OF CONDUIT
- 33. ALL CONDUIT SHALL BE ROUTED PARALLEL OR PERPENDICULAR TO WALLS AND STRUCTURAL MEMBERS WITH 90° BENDS.
- 34. SPARE WIRES INSTALLED SHALL BE NEATLY COILED, BOUND AND PLACED IN SPACE AVAILABLE. LEAVE AT A MINIMUM, 8' OF SLACK AT EACH DESTINATION.
- 35. PULL BOXES, JUNCTION BOXES, CONDUIT BODIES AND EXPANSION JOINTS SHALL BE INSTALLED AS PER NFPA 70.
- 36. IDENTIFICATIONS: IDENTIFY EACH INDIVIDUALLY MOUNTED MOTOR, STARTER, DISCONNECT SWITCH, DISTRIBUTION PANEL, CONTROL PANELS, ETC. WITH A NAMEPLATE BEARING THE DESCRIPTION AND TAG OF THE EQUIPMENT CONTROLLED. THIS SHALL INCLUDE THE AFOREMENTIONED DEVICES PROVIDED BY OTHER CONTRACTORS.
- 37. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATING, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS, WITH NO MATERIAL COMPROMISE IN QUALITY, MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES OF MAGNITUDE AND/OR CHANGES WHICH RESULT IN EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL BY THE OWNER'S REPRESENTATIVE.
- 38. ANY DAMAGE, TO EXISTING STRUCTURES, UTILITIES, VEGETATION, ETC. NOT SCHEDULED FOR DEMOLITION OR REMOVAL, INCURRED DURING CONSTRUCTION, WHETHER INCIDENTAL OR ACCIDENTAL, SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
- 39. FMC (FLEXIBLE METAL CONDUIT) SHALL ONLY BE UTILIZED FOR MOTOR AND TERMINATIONS. NO MORE THAN 6' OF FMC SHALL BE UTILIZED PER CONNECTION AS ABOVE MENTIONED.

TYPICAL RACEWAY SYMBOLS (NOT ALL RACEWAYS APPLY TO THIS PROJECT)

---- EXISTING CONDUIT TO BE REMOVED

EXISTING CONDUIT/EQUIPMENT TO REMAIN

CONCEALED CONDUIT OR MC CABLE (AS INDICATED) CONCEALED OR EXPOSED CONDUIT(S) WITH CABLES OR PULL ROPE AS

INDICATED. MINIMUM CONDUIT SIZE 3/4". UNDERGROUND CONDUIT(S) WITH CABLES OR PULL ROPE AS INDICATED. MINIMUM CONDUIT SIZE 3/4".

CONDUIT TURNING UP

CONDUIT TURNING DOWN

---- UNDERGROUND CCTV WITH CABLES OR PULL ROPE AS INDICATED.

--- GROUNDING CONDUCTOR SIZE PER NEC OR LARGER WHERE INDICATED _____ EXPOSED CONDUITS WITH CAMERA STATION WIRING. INSTALL CONCEALED IN FINISHED

AREAS WHEREVER POSSIBLE.

HOMERUN CONCEALED IN WALLS OR CEILINGS. NUMERAL INDICATES 3 2 1 PANELBOARD AND CIRCUIT GROUND AND NEUTRAL(S) WIRE INCLUDED. (#,#,#) THREE PHASE CIRCUIT, (#,#) SINGLE PHASE CIRCUIT #,#,# MULTIPLE NEUTRAL-HOT LEG CIRCUITS. 2#12+1#12G-3/4°C FOR ONE HOMERUN CIRCUIT, TYP. U.O.N.

3#12+1#12G-3/4°C FOR TWO HOMERUN CIRCUITS. TYP. U.O.N. 4#12+1#12G-3/4"C FOR THREE HOMERUN CIRCUITS, TYP. U.O.N.

CONDUIT STUB-UP WITH FLEXIBLE EQUIPMENT CONNECTION

FLEXIBLE EQUIPMENT CONNECTION

TYPICAL LEGEND

(NOT ALL WIRING DEVICES APPLY TO THIS PROJECT)

POWER SYMBOLS

20A, 125V FLUSH WALL-MOUNTED DUPLEX RECEPTACLE 'C' = ABOVE COUNTER TOP, 'UN' = UNDER COUNTER TOP COORDINATE MOUNTING HEIGHT WITH ARCHITECT (TYP. FOR ALL RECEPT.)

20A, 125V FLUSH WALL-MOUNTED QUAD RECEPTACLE.

20A, 125V FLUSH WALL-MOUNTED GENERAL PURPOSE DUPLEX RECEPTACLE: ARCH 'GFI' = DENOTES GROUND FAULT INTERRUPTER

WALL-MOUNTED SPECIAL PURPOSE RECEPTACLE: 'A' = INDICATES TYPE OR MATCH NEMA CONFIGURATION WITH EQUIPMENT

'WC' = WATER COOLER 20A, 125V FLUSH WALL-MOUNTED DUPLEX RECEPTACLE:

CONTROLLED FROM WALL SWITCH 'a' 20A, 125V FLUSH WALL-MOUNTED EMERGENCY PURPOSE DUPLEX RECEPTACLE: 'EM' = DENOTES ON GENERATOR POWER CIRCUIT

20A, 125V FLUSH WALL-MOUNTED SINGLE RECEPTACLE:

20A, 125V FLUSH WALL-MOUNTED ISOLATED GROUND QUAD RECEPTACLE

20A, 125V FLUSH WALL-MOUNTED COMBINATION WALL SWITCH AND DUPLEX RECEPTACLE IN SINGLE BOX.

20A, 125V SURFACE WALL-MOUNTED DUPLEX RECEPTACLE.

20A. 125V FLUSH WALL-MOUNTED SURGE SUPPRESSION DUPLEX RECEPTACLE.

20A, 125V FLUSH FLOOR-MOUNTED POKE-THRU QUAD RECEPTACLE. 'V' = VOICE FEED. 'D' = DATA FEED

20A. 125V FLUSH FLOOR-MOUNTED JUNCTION BOX OR POKE-THRU FOR ELECTRIFIED FURNITURE POWER FEED. 'V' = VOICE FEED, 'D' = DATA FEED

20A, 125 FLUSH FLOOR-MOUNTED DUPLEX RECEPTACLE.

20A, 125 FLUSH FLOOR-MOUNTED QUAD RECEPTACLE.

FLOOR MOUNTED COMBINATION VOICE/DATA & 20A, 125V DUPLEX RECEPTACLE: '2' = NUMBER OF CABLES

FLUSH FLOOR-MOUNTED SPECIAL PURPOSE RECEPTACLE: 'A' = INDICATES TYPE OR MATCH NEMA CONFIGURATION WITH EQUIPMENT 20A, 125V FLUSH CEILING-MOUNTED QUAD RECEPTACLE

20A, 125V FLUSH CEILING-MOUNTED DUPLEX RECEPTACLE.

PLUG-IN SURFACE METAL RACEWAY, DUAL PLUG-IN (POWER/DATA/VOICE) 'A' = SPECIAL PURPOSE RECEPTACLE WHERE INDICATED

20A, 277V THERMAL OVERLOAD MOTOR HORSEPOWER RATED DISCONNECT SWITCH-TOGGLE TYPE. MATCH RATING WITH EQUIPMENT 20A. 277V MOTOR HORSEPOWER RATED DISCONNECT SWITCH-TOGGLE TYPE

MATCH RATING WITH EQUIPMENT 20A, 277V, DISCONNECT SWITCH-TOGGLE TYPE. MATCH RATING WITH EQUIPMENT '2P' = TWO POLE SWITCH

JUNCTION BOX WITH FINAL EQUIPMENT CONNECTION. 'C' = CEILING (TYP.)

J FLOOR JUNCTION BOX WITH FINAL EQUIPMENT CONNECTION. JUNCTION BOX WITH FINAL EQUIPMENT CONNECTION.

SURFACE MOUNTED ELECTRICAL PANEL

RECESSED MOUNTED ELECTRICAL PANEL

EXISTING SURFACE MOUNTED ELECTRICAL PANEL

EXISTING RECESSED MOUNTED ELECTRICAL PANEL

LOW VOLTAGE TRANSFORMER SURFACE MOUNTED ELECTRICAL POWER DISTRIBUTION PANELBOARD

EXISTING SURFACE MOUNTED POWER ELECTRICAL DISTRIBUTION PANELBOARD

TRANSFORMER MOTOR CONTROLLER/STARTER

XXAF COMBINATION MOTOR CONTROLLER AND DISCONNECT SWITCH.

SWITCH AMPS/# OF POLES, VOLTAGE RATING AS REQUIRED (XAS FUSED HORSEPOWER RATED, DISCONNECT SWITCH. HEAVY DUTY AS REQUIRED. XXAF PROVIDE SWITCH AMPERE, NUMBER OF POLES AND VOLTAGE RATING AS

XXAS UNFUSED HORSEPOWER RATED, DISCONNECT SWITCH. HEAVY DUTY AS REQUIRED. PROVIDE SWITCH AMPERE, NUMBER OF POLES, VOLTAGE RATING AS REQUIRED.

CB 100A ENCLOSED CIRCUIT BREAKER. NA = NON-AUTOMATIC MOTOR. NUMBER INDICATES HORSE POWER

PULL BOX, SIZE AS REQUIRED

TYPICAL ABBREVIATIONS

A/C

AWG

C/B

CRAC

DPH1

DWG

ELEC

F.@

FDS

H/L

HVAC

KVA

LTG

MBB MBP

MECH

MISC

NEC

NEMA

P-1

PLIC

PNL

REC RM

STD

UPS

WATTS

SPECS

IN, (")

GND, G

BLDG

(NOT ALL ABBREVIATIONS APPLY TO THIS PROJECT)

ARCHITECTURAL

CIRCUIT BREAKER

EMPTY CONDUIT

CENTER TO CENTER

BUILDING

CONDUIT

DRAWING

ELECTRIC

FUSED AT

FLOOR

FEET

ALTERNATING CURRENT

PHASE "A" AND "C" ONLY.

AIR CONDITIONER UNIT #1

COMPUTER ROOM AC UNIT

DISTRIBUTION PANEL H-1

ABOVE FINISHED FLOOR

AMERICAN WIRE GAUGE

LIGHTING/SWITCHING

(NOT ALL SWITCHING APPLY TO THIS PROJECT) SINGLE POLE GENERAL PROPOSE SWITCH 2 = DOUBLE POLE SWITCH 3 = THREE-WAY SWITCH

4 = FOUR-WAY SWITCHD = DIMMER SWITCHa = CONTROLLING LIGHT ZONE OR RECEPTACLE P = PILOT LIGHT SWITCH

T = TIME CONTROLLED SWITCH

MO = MOMENTARY CONTACT SWITCH K = KEY OPERATED SWITCHOS = AUTOMATIC WALL SWITCH/OCCUPANCY SENSOR COMBINATION VA = WSD PDT VA [WHITE] WALL SWITCH DECORATOR VACANCY

DT = WSD PDT [WHITE] WALL SWITCH DECORATOR SENSOR -

CD = CH[6 BUTTONS] [WHITE] [PLATE COLOR-WHITE] LC&D CHELSEADIGITAL SWITCH

PI = WSD [WHITE] WALL SWITCH DECORATOR SENSOR -PASSIVE INFRARED (PIR)

SENSOR-PASSIVE DUAL TECHNOLOGY (PDT)

DUAL TECHNOLOGY (PDT)

SA = sPODM SA [WHITE] ON/OFF TOGGLE, MANUAL ON

FUSED DISCONNECT SWITCH GROUND (INDICATES GREEN GROUND CONDUCTOR) HIGH LEG "B" IS 240 VOLTS

HORSEPOWER HEATING VENTILATING AND AIR CONDITIONING

INCHES JUNCTION BOX KILOVOLT AMPERES LIGHTING MANUAL BYPASS BREAKER

MANUAL BYPASS PANEL MECHANICAL **MISCELLANEOUS** NFUTRAL

NATIONAL ELECTRIC CODE NATIONAL ELECTRICAL MANUFACTURERS ASSOC. ON NIGHT LIGHT CIRCUIT

POLES CIRCULATION PUMP #1 POWERLOGIC INTERFACE CABINET PANEL RECEPTACLE

SPECIFICATIONS STANDARD TYPICAL UNINTERRUPTIBLE POWER SUPPLY

VOLTS WATTS WEATHERPROOF PHASE

ROOM

VOICE/DATA/P.A

(NOT ALL DEVICES APPLY TO THIS PROJECT) COMBINATION VOICE/DATA OUTLET WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING

VOICE OUTLET WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6" INTO NEAREST ACCESSIBLE CEILING DATA OUTLET WITH 3/4" CONDUIT TERMINATED IN A 90 DEG. BEND 6"

FLUSH CEILING MOUNTED VOICE OUTLET

INTO NEAREST ACCESSIBLE CEILING: F=FAX

FLUSH FLOOR MOUNTED VOICE OUTLET: F=FAX, P=PEDESTAL MOUNTED VOICE OUTLET

FLUSH CEILING MOUNTED DATA OUTLET FLUSH FLOOR MOUNTED DATA OUTLET: F=FAX, P=PEDESTAL MOUNTED VOICE

FLUSH CEILING MOUNTED COMBINATION VOICE/DATA OUTLET

FLUSH FLOOR-MOUNTED POKE-THRU COMBINATION VOICE/DATA OUTLET: F=FAX, P=PEDESTAL MOUNTED VOICE OUTLET MICROPHONE OUTLET LOCATION: F=FLOOR MOUNTED

CEILING MOUNTED PUBLIC ADDRESS SPEAKER: D=DUAL HORN

(NOT ALL DEVICES APPLY TO THIS PROJECT)

FIRE ALARM

SMOKE DETECTOR S= SOUNDER BASE HEAT DETECTOR

CO CARBON MONOXIDE DETECTOR

D DUCT DETEC DUCT DETECTOR HORN/STROBE COMBINATION

MULT TONE HORN 3 TONES

(ALARM, SMOKE AND WATER FLOW) BELL (TROUBLE)

F MANUAL PULL STATION MM SINGLE MONITOR MODULE

DMM DUAL MONITOR MODULE

FS WATER FLOW SWITCH TS TAMPER SWITCH

(FAFDS) FIRE ALARM FUSED DISCONNECT SWITCH

FSR FAN SHUT DOWN RELAY FACP FIRE ALARM CONTROL PANEL

FARA FIRE ALARM REMOTE ANNUNCIATOR LED LED INDICATOR LIGHT

FD FIRE/SMOKE DAMPER (SV) SOLENOID VALVE

R RELAY

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ELECTRICAL LEGENDS AND NOTES

ELECTRICAL

DESIGNED BY: OB NO. CE2355A DRAWN BY: JAN 2014 CHECKED BY: AS SHOWN

CE2355A

DRAWING

ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

A. SCOPE OF WORK:

- 1. WORK INCLUDED: THIS SECTION INCLUDES FURNISHING ALL REQUIRED LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR'S SERVICES NECESSARY FOR A COMPLETE INSTALLATION AS INDICATED ON THE DRAWINGS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
 - a. PREPARATION AND SUBMISSION OF SHOP DRAWINGS.
 - SUBMIT AS-BUILT DRAWINGS, OPERATING AND MAINTENANCE INSTRUCTIONS AND MANUALS. MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATIONS DURING THE PROGRESS OF THE WORK INCLUDING PROVIDING TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES, CONNECTIONS AND EQUIPMENT REQUIRED.
- d. TEMPORARY LIGHT AND POWER DURING CONSTRUCTION.
- e. COMPLETE WIRING SYSTEM FOR LIGHTING AND POWER EQUIPMENT AS SHOWN ON DRAWINGS. INCLUDING MAIN SWITCHBOARD, PANELBOARDS, CONDUITS, WIRES, OUTLETS, WIRING DEVICES, FOR A COMPLETE AND FULLY OPERABLE SYSTEM.
- COMPLETE CONNECTION OF ALL MOTORS, APPARATUS AND ELECTRICALLY OPERATED DEVICES.
- DISCONNECTS, STARTERS, RELAYS, CONDUIT, WIRING AND ALL CONNECTIONS AS REQUIRED TO ALL ELECTRICALLY OPERATED EQUIPMENT INCLUDED IN THE FINAL INSTALLATION UNDER PROVISIONS THAT THIS SECTION OF THE WORK, INCLUDING THE FOLLOWING:
- HEATING, VENTILATION AND COOLING EQUIPMENT, REFER TO MECHANICAL DRAWINGS
- FOR ADDITIONAL REQUIRED ELECTRICAL WORK. PLUMBING EQUIPMENT, REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL REQUIRED ELECTRICAL WORK.
- MANUFACTURING EQUIPMENT. COORDINATE REQUIREMENTS AND LOCATIONS WITH OWNER'S REPRESENTATIVE. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION CONCERNING COMPRESSED AIR,
- FIRE ALARM SYSTEM, COORDINATE REQUIREMENTS AND LOCATIONS WITH OWNER'S REPRESENTATIVE.
- PROVIDE NEW LIGHTING FIXTURES AND LAMPS INCLUDING EXIT AND EMERGENCY LIGHTING; COMPLETE WITH ALL HANGERS, SUPPORTS AND ACCESSORIES.
- PROVIDE WALL SWITCHES, RECEPTACLES, TELEPHONE AND SIGNAL OUTLETS, WIRING DEVICES, ETC.
- PROVIDE LIGHTING AND POWER NEW BRANCH CIRCUITS, WIRING, CONDUIT, RACEWAYS,
- PROVIDE OUTLET BOXES, COVER PLATES.
- PROVIDE IDENTIFICATION LABELS, TAGS, CHARTS AND DIAGRAMS. m. CUTTING, CHANNELING, CHASING REQUIRED TO ACCOMMODATE THE INSTALLATION OF
- ELECTRICAL WORK AND PATCHING. EXCEPT WHERE PROVIDED UNDER GENERAL CONDITION. PROVIDE HVAC POWER WIRING INCLUDING CONDUIT, JUNCTION BOXES AND PULL BOXES
- ETC., TO MOTOR CONTROLLERS AND FINAL CONNECTION TO HVAC EQUIPMENT. PROVIDE GROUNDING OF ALL ELECTRICAL SYSTEMS AND EQUIPMENT REQUIRED BY CODE.
- PROVIDE LIGHTING PANELS. FUSED DISCONNECTS, WIRING TROUGHS, ETC. PROVIDE BALANCE LOADS ON PANELBOARDS.
- HVAC ELECTRICAL INTERLOCKS.
- s. FIRE ALARM SYSTEM.
- INSTALLATION & WIRING OF A/V PANELS, INFRASTRUCTURE FOR A/V SYSTEM.
- u. EMPTY CONDUIT FOR TELEPHONE AND DATA. v. EMPTY CONDUIT FOR SECURITY SYSTEM.
- w. EMPTY CONDUIT FOR CABLE TV SYSTEM.

B. INTERPRETATION OF DOCUMENTS:

- 1. AS USED IN THE DRAWINGS AND SPECIFICATIONS FOR ELECTRICAL WORK, CERTAIN NON-TECHNICAL WORDS SHALL BE UNDERSTOOD TO HAVE SPECIFIC MEANINGS AS FOLLOWS REGARDLESS OF INDICATION TO THE CONTRARY IN THE GENERAL CONDITIONS OF OTHER DOCUMENTS GOVERNING THE ELECTRICAL WORK:
- a. "ELECTRICAL CONTRACTOR", "THIS CONTRACTOR" THE PARTY OR PARTIES WHO HAVE BEEN DULY AWARDED THE CONTRACT FOR AND ARE THEREBY MADE RESPONSIBLE FOR THE ELECTRICAL WORK AS DESCRIBED HEREIN.
- "THIS CONTRACT", "THE CONTRACT" THE AGREEMENT COVERING THE WORK TO BE PERFORMED BY "THIS CONTRACTOR".
- "EQUAL". "SATISFACTORY". "ACCEPTED". "ACCEPTABLE". "EQUIVALENT" ACCEPTABLE FOR USE ON THE PROJECT, AS DETERMINED BY THE ENGINEER BASED ON DOCUMENTS PRESENTED FOR SUCH DETERMINATION.
- 'THESE SPECIFICATIONS", "THIS SECTION, PART, DIVISION" (OF THE SPECIFICATION) THE DOCUMENT SPECIFYING THE WORK TO BE PERFORMED BY "THIS CONTRACTOR".
- e. "THE ELECTRICAL WORK", "THIS WORK" ALL LABOR, MATERIALS, EQUIPMENT APPARATUS. CONTROLS. ACCESSORIES. AND OTHER ITEMS REQUIRED FOR A PROPER AND COMPLETE INSTALLATION BY THE "ELECTRICAL CONTRACTOR".
- f. "ARCHITECT'. "ENGINEER" 'OWNER'S REPRESENTATIVE" THE PARTY OR PARTIES RESPONSIBLE FOR INTERPRETING, ACCEPTING AND OTHERWISE RULING ON THE PERFORMANCE UNDER "THIS CONTRACT".
- a. "FURNISH" PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT, ALL AS PART OF THE "ELECTRICAL WORK".
- h. 'INSTALL" UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT, ALL AS PART OF THE "ELECTRICAL WORK".
- "PROVIDE' 'FURNISH" AND "INSTALL' "NEW" - MANUFACTURED WITHIN THE PAST TWO YEARS AND NEVER BEEN USED.

C. SUBMITTALS:

- 1. PROPOSED MATERIALS: CONTRACTOR SHALL SUBMIT A COMPLETE LIST OF ALL MATERIALS PROPOSED TO BE FURNISHED AND INSTALLED UNDER THIS SECTION:
- PREPARE DETAILED SHOP DRAWINGS SHOWING ALL WIRE, CONDUIT AND CIRCUIT BREAKERS OR SWITCH SIZES ON ALL BRANCH CIRCUIT HOME RUN TAGS AFTER ACCEPTANCES OF BID AND PRIOR TO BEGINNING ANY WORK, INCLUDE ALL COSTS IN
- BASE BID. PROVIDE PANEL LOAD SCHEDULES AND SERVICE LOAD SUMMARY.
- PROVIDE ELECTRICAL RISER DIAGRAM INDICATING ALL PANELS, FEEDER SIZES, GROUNDING,
- PERFORM ALL WORK TO MEET THE REQUIREMENTS OF THE PHASING AND SCHEDULING AS OUTLINED BY THE ARCHITECT.
- 2. MANUFACTURER'S SPECIFICATIONS AND CATALOG CUTS SHALL BE SUBMITTED TO DEMONSTRATE COMPLIANCE WITH THE SPECIFIED REQUIREMENTS. PROVIDE A MINIMUM OF 4 (FOUR) COPIES TO BE REVIEWED BY GENERAL CONTRACTOR PRIOR TO ENGINEER'S REVIEW.
- 3. SUBMIT SHOP DRAWING OF THE FOLLOWING:
- a. PANELBOARDS DISCONNECT SWITCHES
- FUSES CONDUIT & RACEWAYS
- WIRE & CABLES LIGHTING FIXTURES
- WIRING DEVICES FIRE ALARM DEVICES NAMEPLATES
- VACANCY SENSORS SWITCHES.
- CIRCUIT BREAKERS m. JUNCTION BOXES

REVISION DESCRIPTION

n. PULL BOXES

NO. DATE

4. OBTAIN APPROVAL FROM THE ARCHITECT/ENGINEER OF SHOP DRAWINGS FOR THE ELECTRICAL SYSTEM LAYOUT AND ALL ELECTRICAL EQUIPMENT PRIOR TO BEGINNING ANY WORK. APPROVAL OR CORRECTIONS BY THE ARCHITECT/ENGINEER SHALL IN NO WAY RELIEVE THIS CONTRACTOR OF RESPONSIBILITY FOR CORRECTNESS OF ANY WORK, MAIN SWICHBOARD SHOP DRAWINGS APPROVAL SHALL BE OBTAIN FROM THE ELECTRICAL SERVING AGENCY, AS WELL AS THE ARCHITECT/ENGINEER, PRIOR TO FABRICATION OF SWITCHBOARD.

D. AS-BUILT DRAWINGS:

- 1. AT THE COMPLETION OF PROJECT PROVIDE "AS-BUILT" DRAWINGS CONSISTING OF A COMPLETE SET OF MYLAR TRANSPARENCIES AND ELECTRONIC DISK IN AUTOCAD 2008. DEPICTING IN A NEAT AND ACCURATE MANNER, EXACTLY HOW ALL SYSTEMS WERE INSTALLED AND A COMPLETE RECORD OF ALL CHANGES MADE TO THE ORIGINAL DESIGN OF THE WORK. DRAWINGS SHALL PROVIDE AN ACCURATE AND COMPLETE RECORD OF THE WORK AS INSTALLED.
- 2. TWO (2) COPIES OF CONTRACT CLOSE-OUT DOCUMENTS SHALL BE SUBMITTED IN A THREE-RING BINDER LABELED CLEARLY WITH PROJECT NAME AND ADDRESS. CONTENTS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:
 - a. A MINIMUM OF FOUR (4) SETS OF DETAILED CONSTRUCTION SHOP DRAWINGS FOR POWER LAYOUT, LIGHTING LAYOUT, EQUIPMENT AND SYSTEMS. DRAWINGS SHALL INDICATE ALL DIMENSIONS, MATERIALS OF CONSTRUCTION AND METHODS OF ASSEMBLY. DRAWINGS SHALL BE AT A 1/8"=1'-0" SCALE.
 - DISTRIBUTION BOARDS, PANELBOARD AND ELECTRICAL EQUIPMENT INCLUDING OPERATING AND MAINTENANCE INSTRUCTIONS, WARRANTIES AND ENGINEERING DATA.
- c. NEW FIRE ALARM SYSTEM AS PER INSTALLATION.
- d. ALL OF THE ABOVE SHALL BE IN ACCORDANCE WITH ENGINEER'S COMMENTS DURING THE SUBMISSION PROCESS.

E. OPERATING AND MAINTENANCE INSTRUCTIONS:

- 1. AFTER FINAL TEST AND ADJUSTMENTS FULLY INSTRUCT OWNER'S OPERATING PERSONNEL IN ALL DETAILS OF OPERATION FOR EQUIPMENT INSTALLED. A SIGNED RECEIPT THAT SHALL BE OBTAINED FROM THE OPERATOR SHALL BE CONSTRUED AS EVIDENCE THAT INSTRUCTIONS WERE SATISFACTORY.
- 2. OPERATING AND MAINTENANCE MANUAL SHALL INCLUDE THE FOLLOWING:
- a. FURNISH TWO (2) COPIES OF WRITTEN DESCRIPTIONS OF ALL SYSTEMS COVERING ALL MANUAL OPERATING AND MAINTENANCE PROCEDURES. WRITTEN DESCRIPTIONS SHALL INCLUDE SCHEDULES, PARTS LIST, PERFORMANCE SERVICE FOR EQUIPMENT, ETC. WHEN MANUFACTURERS' STANDARD INSTRUCTIONS ARE UTILIZED, THEY SHALL BE CLEARLY
- NEW EQUIPMENT INSTALLATION MANUALS THAT INCLUDE MANUFACTURER'S EQUIPMENT PARTS LIST OF ALL FUNCTIONAL COMPONENTS OF THE SYSTEM LISTED ON THE EQUIPMENT SCHEDULES, DRAWINGS, CONTROL DIAGRAMS AND WIRING DIAGRAMS OR CONTROLLERS. LIST SHALL GIVE SYSTEM NUMBER, UNIT NUMBER, MANUFACTURER'S MODEL NUMBER, AND MANUFACTURER'S DRAWING NUMBER.
- FURNISH ONE CLEAN COPY OF EACH FULLY CORRECTED AND PROCESSED SHOP

F. SUBSTITUTIONS:

- 1. BASE ALL BIDS ON THE EQUIPMENT AND MANUFACTURERS LISTED. IF SUBSTITUTION IS PROPOSED, MAKE APPLICATION TO THE OWNER IN WRITING STATING THE COST DIFFERENTIAL INVOLVED.
- a. IT IS THE INTENT OF THESE SPECIFICATIONS THAT WHEREVER A MANUFACTURE IS SPECIFIED AND SUBSTITUTIONS ARE MADE, THEY SHALL CONFORM IN ALL RESPECTS TO THE SPECIFIED ITEM. CRITERIA AS DELINEATED FOR EQUIPMENT SHALL BE INTERPRETED AS MINIMUM PERFORMANCE REQUIREMENTS.
- b. APPROVAL OF SUBMISSIONS DOES NOT CONSTITUTE A REMOVAL OF CONTRACTOR'S OBLIGATION TO PROVIDE A COMPLETE AND PROPERLY FUNCTIONING SYSTEM. CONTRACTOR SHALL BE RESPONSIBLE TO MAKE SUITABLE CORRECTIONS TO INSTALLATIONS MADE IN ERROR DUE TO THEIR LACK OF COORDINATION WITH FIELD CONDITIONS, ACCESS REQUIREMENTS OF NEW AND EXISTING EQUIPMENT, NEW WORK OF OTHER TRADES OR LACK OF UNDERSTANDING OF PROPER SYSTEM FUNCTION.
- c. SUBMISSION OF ANY SUBSTITUTIONS NOT PREVIOUSLY APPROVED WITH BID SHALL BE ACCOMPANIED BY LETTER EXPLAINING REASON AND APPLICABLE CREDIT. CONTRACTOR SHALL BEAR ASSOCIATED COSTS FOR REVISING AND REFILLING OF DRAWINGS AS A RESULT OF SUBSTITUTION.

G. QUALITY ASSURANCE:

- 1. PERMITS, INSPECTIONS AND TEST: OBTAIN ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS FOR THE EXECUTION OF ELECTRICAL WORK. FURNISH ALL INSTRUMENTS AND PERFORM ALL TESTS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. CORRECT ALL FAILURES AND REPLACE ANY DAMAGED PORTIONS OF THE WORK RESULTING FROM TESTS. THIS CONTRACTOR SHALL PAY FOR ALL COSTS.
- 2. CODES: THE ELECTRICAL WORK SHALL CONFORM, COMPLY AND BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF ALL LOCAL CODES, RULES AND REGULATIONS. THE NATIONAL ELECTRICAL CODE, STANDARDS OF THE NATIONAL BOARD OF UNDERWRITERS, OSHA CODE AND ALL AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL SECURE ALL CERTIFICATES OF REQUIRED ORDINANCES AND DELIVER THEM TO THE OWNER'S REPRESENTATIVE. IN CASE OF CONFLICT BETWEEN REQUIREMENTS, THE MOST RESTRICTIVE/STRINGENT SHALL APPLY.
- 3. TESTS: INSULATION RESISTANCE TESTS SHALL BE PERFORMED ON ALL WIRING AND EQUIPMENT. MEASURED INSULATION RESISTANCE SHALL CONFORM TO REQUIREMENTS OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE.
- 4. WORKMANSHIP: ALL WORK SHALL BE FIRST CLASS IN EVERY RESPECT, ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER BY SKILLED ELECTRICIANS IN THE WORK USING THE BEST PRACTICES OF THEIR TRADE AND UNDER CONTINUOUS COMPETENT SUPERVISION. THE WORK SHALL BE WELL ORGANIZED IN ADVANCE OF OPERATION, AND CARRIED OUT EFFICIENTLY WITHOUT DELAYS WHICH WILL IMPEDE PROGRESS OR THE QUALITY OF THE WORK OF OTHER TRADES AND THE JOB AS A WHOLE. ANY MATERIAL AND EQUIPMENT NOT SO INSTALLED SHALL BE REMOVED AND REPLACED IN A SATISFACTORY MANNER. ALL EXPENSES INCIDENTAL THERETO SHALL BE BORNE BY THIS

- 5. MATERIALS: ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY AND APPROVED FOR THE PURPOSE INTENDED. ALL MATERIALS SHALL BE LISTED BY THE UNDERWRITERS LABORATORIES WHERE APPLICABLE, MEET OR EXCEED NEMA STANDARDS; AND CONFORM WITH THE SPECIFIED CODES AND STANDARDS. DEFECTIVE OR DAMAGE MATERIAL SHALL BE REPLACED. OR REPAIRED IN A MANNER APPROVED BY THE OWNER.
- 6. TEMPORARY SERVICE AND CONSTRUCTION: CONTRACTOR TO USE EXISITING SERVICE FOR TEMPORARY POWER DURING DEMOLITION AND CONSTRUCTION FOR ALL TRADES.
- 7. GROUNDING: ALL WORK SHALL BE PERMANENTLY AND EFFECTUALLY GROUNDED WHETHER OR NOT SUCH CONNECTIONS ARE SPECIFICALLY SHOWN OR SPECIFIED
- 8. DRAWINGS: ARCHITECTURAL AND STRUCTURAL DRAWINGS TAKE PRECEDENCE OVER ELECTRICAL DRAWINGS AND THE DRAWINGS OF OTHER TRADES TAKE PRECEDENCE FOR THE WORK OF THAT TRADE. ELECTRICAL DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC AND INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALE DIMENSIONS SHALL NOT BE USED. THE FINAL, EXACT LOCATION AND ELEVATION OF ALL LIGHTING FIXTURES, OUTLETS AND EQUIPMENT'S, ETC., SHALL BE AS DIRECTED BY THE ARCHITECT AND OWNER'S REPRESENTATIVE. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES, REGULATIONS, BUILDING STANDARDS AND THE BEST PRACTICES OF THE TRADE FOR INSTALLATION OF ELECTRICAL WORK. IT SHALL BE THE RESPONSIBILITY OF ELECTRICAL CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE. PRESERVE HEADROOM AND KEEP OPENING AND PASSAGEWAYS CLEAR.
- 9. EQUIPMENT: TRADE NAMES AND CATALOG NUMBERS MENTIONED ARE INTENDED TO INDICATE GRADE OR QUALITY OF EQUIPMENT AND MATERIALS DESIRED AND SUCH EQUIPMENT AND MATERIALS ARE ONLY APPROVED FOR INSTALLATION SUBJECT TO FULL COMPLIANCE WITH THE SPECIFICATIONS.

H. FEES:

1. THIS CONTRACTOR SHALL INCLUDE IN HIS BID THE COST OF ALL REQUIRED PERMITS, FEES, INSPECTIONS, TEST AND CERTIFICATES OF APPROVAL.

I. COORDINATION:

- 1. THIS CONTRACTOR SHALL EXAMINE ALL THE CONTRACT DRAWINGS, COORDINATE HIS WORK WITH OTHER TRADES AND CONFER WITH OTHER CONTRACTORS WHOSE WORK MIGHT AFFECT THIS INSTALLATION. CONTRACTOR SHALL ARRANGE ALL PARTS OF THIS WORK AND EQUIPMENT IN PROPER RELATION TO THE WORK AND EQUIPMENT OF OTHERS AND WITH BUILDING CONSTRUCTION AND ARCHITECTURAL FINISH SO THAT IT WILL HARMONIZE IN SERVICE AND APPEARANCE. CONTRACTOR SHALL COOPERATE WITH ALL OTHER CONTRACTOR'S FURNISHING LABOR, MATERIALS AND ALL WORK, SO THAT THE WORK AS A WHOLE BE EXECUTED AND COMPLETED WITHOUT CONFLICT OR DELAY. IN THE EVENT OF ANY MECHANICAL OBSTRUCTION SUCH AS PLUMBING LINES OR AIR CONDITIONING DUCTS, IN WAY OF ANY WORK, VERIFY WITH OTHER AFFECTED TRADES AND ARCHITECT BEFORE COMMENCING ANY WORK, ALSO VERIFY WITH OTHER TRADES THE LOCATION OF MOTORS, EQUIPMENT, VOLTAGE AND PHASE, BEFORE COMMENCING ANY WORK. NOTIFY THE ARCHITECT/ENGINEER ABOUT ANY CHANGES OR DISCREPANCIES, WORK INSTALLED IMPROPERLY DUE TO NON-COORDINATION SHALL BE CHANGED BY THIS CONTRACTOR AT HIS OWN EXPENSE.
- 2. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL NEW FIRE ALARM DEVICES PROVIDE WIRING REQUIRED TO FURNISH A COMPLETE FIRE ALARM SYSTEM WHICH MEETS LOCAL FIRE MARSHAL'S REQUIREMENTS ETC.
- 3. THE ELECTRICAL CONTRACTOR SHALL RECEIVE, SET AND MOUNT ALL POWER TEMPERATURE AND SAFETY CONTROLS, INCLUDING ALL CONTACTORS, RELAYS, DAMPERS, ETC., WHICH SHALL BE FURNISHED AS DEFINED IN THE MECHANICAL SPECIFICATIONS AND DRAWINGS. IT SHALL BE THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXTENT OF NECESSARY WIRING BY REVIEW OF THE MECHANICAL PLANS AND SPECIFICATIONS AND THE DEFINITIONS THEREIN.

J. SPECIAL REQUIREMENTS:

- 1. MAINTENANCE OF EXISTING FACILITIES AND CONDUCT OF WORK.
- 2. NO WORK SHALL BE LEFT INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE WORK INTERFERE WITH OR CUTOFF ANY OF THE EXISTING SERVICES WITHOUT THE OWNER'S WRITTEN PERMISSION.
- 3. PROVIDE, ERECT, MAINTAIN AND BE RESPONSIBLE FOR THE SAFE AND LEGAL USE OF ALL SCAFFOLDING OR ADDITIONAL BRACING AND SERVICES THAT MAY BE REQUIRED FOR THE DELIVERY OR ERECTION OF THE EQUIPMENT AND CONSTRUCTION MATERIALS PROVIDED OR INSTALLED UNDER THIS CONTRACT. DETERMINE THE SPECIFIC ARRANGEMENTS FOR FURNISHING AND USE OF ALL SUCH SCAFFOLDING EQUIPMENT, AND REMOVE SUCH EQUIPMENT WHEN IT IS NO LONGER REQUIRED.
- 4. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BUILDING UTILITIES AND SERVICE SYSTEMS INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE ARCHITECT / OWNER REPRESENTATIVE AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON.
- K. WORK INCLUDED UNDER OTHER SECTIONS OF WORK:
 - 1. ITEMS OF WORK WHICH SHALL BE INCLUDED UNDER OTHER SECTIONS OF WORK ARE AS
 - a. ACCESS DOORS IN FINISHED CONSTRUCTION
 - b. CONTROL WIRING FOR HVAC UNITS / EQUIPMENT'S
 - c. FINISH PAINTING OF EQUIPMENT (EXCEPT FACTORY SUPPLIED AND SPECIFIED).
 - d. COMBUSTION WIRING OF BOILER CONTROLS.
- L. NOTICE TO BIDDERS:
- 1. DAILY DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL REMOVE ALL RUBBISH AND EXCESS MATERIAL ACCUMULATED AS A RESULT OF HIS OPERATIONS. ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE WIPED CLEAN OF DUST AND DEBRIS BEFORE FINAL ACCEPTANCE BY THE OWNER.

- 2. BEFORE COMPLETION OF THIS PROJECT, THE ELECTRICAL CONTRACTOR SHALL TEST ALL EQUIPMENT WHICH NORMALLY REQUIRES OPERATION. ALL EQUIPMENT SHALL BE OPERATED SUFFICIENTLY LONG TO PROVE TO THE OWNER THAT EACH EQUIPMENT PERFORMS SATISFACTORILY AND MEETS THE REQUIREMENTS SPECIFIED.
- 3. REVIEW WITH THE ENGINEER AND THE BUILDING MANAGER ANY CONDITION WHICH PREVENTS ADEQUATE ACCESSIBILITY FOR MAINTENANCE PRIOR TO INSTALLATION OF THE WORK. ALL EQUIPMENT AND/OR ACCESSORIES THAT ARE INSTALLED WITHOUT PROPER ACCESS, IN THE OPINION OF THE BUILDING MANAGER, AND INSTALLED WITHOUT THE BUILDING MANAGER'S AND/OR ENGINEER'S APPROVAL, SHALL BE REMOVED AND REVISED AS DIRECTED BY THE BUILDING MANAGER AND / OR ENGINEER AT NO ADDITIONAL COST TO THE OWNER.

PART 2 - PRODUCTS

A. CONDUIT AND RACEWAYS:

- 1. ALL WIRING SHALL BE INSTALLED IN CONDUIT SYSTEM IN ACCORDANCE TO THE NATIONAL ELECTRICAL CODE (NEC) AND THE FOLLOWING:
- 2. PANELBOARD FEEDERS SHALL BE INSTALLED IN RGS (RIGID GALVANIZED STEEL) AND BRANCH CIRCUITING IN EMT (ELECTRIC METALLIC TUBING) CONDUIT WHERE PERMITTED BY CODE, MINIMUM SIZE CONDUIT SHALL BE 3/4" TRADE SIZE, UNLESS OTHERWISE NOTED OR INDICATED ON THE DRAWINGS.
- 3. RIGID GALVANIZED STEEL CONDUIT SHALL BE USED PER CODE INCLUDING BUT NOT LIMITED TO WHEN WORK IS SUBJECTED TO MECHANICAL INJURY, WHERE EXCESSIVE MOISTURE IS CONTINUOUSLY OR FREQUENTLY PRESENT AND IN LOCATIONS WHERE WALLS ARE FREQUENTLY WASHED. RIGID STEEL CONDUIT FITTINGS SHALL BE GALVANIZED OR CADMIUM PLATED.
- 4. ELECTRIC METALLIC TUBING MAY BE USED IN HUNG CEILINGS AND DRY WALL OR BLOCK CONSTRUCTION. IT SHALL NOT BE USED EXPOSED OR EMBEDDED IN CONCRETE WALLS OR SLABS. FITTINGS SHALL BE COMPRESSION TYPE; SET SCREW TYPE SHALL NOT BE PERMITTED.
- 5. FLEXIBLE STEEL CONDUIT AND METAL CLAD (MC) CABLE MAYBE INSTALLED WHERE PERMITTED BY CODE FOR BRANCH CIRCUITING CONCEALED IN CEILINGS AND WALLS AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE BUILDING MANAGEMENT STANDARDS.
- a. TYPE MC (METAL CLAD) CABLE MAYBE USED FOR GENERAL 15 AND 20 AMPERE LIGHTING AND UTILITY BRANCH CIRCUIT WIRING IN ACCORDANCE WITH THE PROVISIONS OF THE NATIONAL ELECTRICAL CODE (NEC). USE SHALL BE LIMITED TO CONCEALED DRY LOCATIONS WITH CABLES SUITABLY SECURED AND SUPPORTED AT INTERVALS NOT EXCEEDING 3 1/2 FEET. CABLE SHALL BE INSTALLED IN SUCH MANNER AS TO PRECLUDE RESTING UPON FINISHED CEILING CONSTRUCTION OR IMPAIR REMOVAL OF ANY ACCESSIBLE OUTLET, WITH ALL CONNECTION FITTINGS FOR THE LOCK-NUT-TYPE. WIRING FROM THE FIRST OUTLET POWERED FROM THE BRANCH CIRCUIT (HOMERUN) TO THE PANELBOARD IN RIGID IMC OR EMT CONDUIT OF THE INCH MINIMUM SIZE. TYPE MC (METAL CLAD) CABLE SHALL NOT BE USED FOR HOMERUN CONNECTION TO LIGHTING FIXTURE SUPPLY LEADS, EMBEDDED IN SLABS, MASONRY CONSTRUCTION OR PERIPHERAL ENCLOSURES.
- 6. FINAL CONNECTIONS TO MOTORS AND OTHER VIBRATING EQUIPMENT'S SHALL BE MADE IN LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT.
- 7. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTIONS FROM OUTLET BOXES TO RECESSED LIGHTING FIXTURES, LENGTH OF FIXTURE LEAD SHALL NOT BE LESS THAN 4 FEET AND NOT MORE THAN 6 FEET FROM OUTLET BOX TO FIXTURE.
- 8. CONDUIT RUN IN FINISHED AREAS SHALL BE RUN CONCEALED AND HUNG IN FURRED CEILING. METAL AND DRYWALL PARTITIONS, BAR-JOIST CONSTRUCTION AND MASONRY.
- 9. CONDUIT RUNS EXPOSED IN UNFINISHED AREAS SHALL BE RUN PARALLEL TO WALLS AND
- TYPE "EXJ" OR "AXJ" BONDING JUMPER WHERE REQUIRED.

10. PROVIDE CONDUIT EXPANSION FITTINGS. O.Z. TYPE "EX" OR "AX" TOGETHER WITH AN O.Z.

- 11. WIRE MOLDING AND EXPOSED CONDUIT ARE NOT PERMITTED IN FINISHED AREAS. 12. ALL CONDUIT LARGER THAN 2 INCHES SHALL BE RIGID STEEL.
- 13. FITTINGS SHALL BE AS FOLLOWS:
- a. RIGID CONDUIT: THREADED TYPE HOT DIPPED GALVANIZED MALLEABLE IRON.
- b. EMT CONDUIT: STEEL, CONCRETE AND RAIN TIGHT COMPRESSION TYPE COUPLINGS AND CONNECTORS WITH INSULATED THROATS. THOMAS & BETTS SERIES 5120 AND 5123 OR APPROVED EQUAL. INDENTOR AND SET SCREW TYPE FITTINGS SHALL NOT BE USED.
- c. FLEXIBLE STEEL CONDUIT: STEEL WITH NYLON INSULATED THROATS, THOMAS & BETTS SERIES 31101 OR APPROVED EQUAL.
- LIQUID TIGHT FLEXIBLE STEEL CONDUIT: STEEL, LIQUID TIGHT WITH NYLON INSULATED THROATS, THOMAS & BETTS SERIES 5331 OR APPROVED EQUAL.
- e. BUSHING FOR CONDUITS ONE INCH OR LARGER SHALL BE OF THE INSULATED TYPE 0.Z. TYPE "B" OR APPROVED EQUAL
- f. GROUNDING BUSHINGS SHALL BE O.Z. TYPE "BLG" OR APPROVED EQUAL. CONDUIT TERMINATION'S SHALL HAVE DOUBLE LOCKNUTS, EXCEPT CONDUIT FOR

TELEPHONE, SIGNAL AND OTHER TENSION SERVICES.

14. RACEWAYS SHALL BE AS MANUFACTURED BY NATIONAL ELECTRIC PRODUCTS, TRIANGLE, PWC INC., WHEATLAND TUBE CO., APPLIED TUBE, REPUBLIC STEEL OR APPROVED EQUAL.

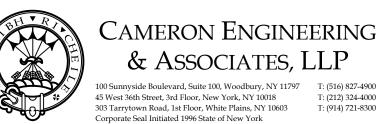
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BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

ELECTRICAL SPECFICATIONS SHEET

ELECTRICAL

DESIGNED BY: DRAWN BY CHECKED BY:

CE2355A DATE: JAN 2014

CE2355A

SCALE: AS SHOWN

DRAWING

C. WIRE AND CABLES:

- WIRE SHALL BE 600 VOLT RATED, COPPER CONDUCTORS, #12 AWG MINIMUM UNLESS OTHERWISE NOTED, TYPE THHN/THWN INSULATION. FIXTURE WIRING SHALL BE TYPE SF-1. ALL WIRE #8 AWG AND SMALLER SHALL BE SOLID, WIRE #6 AWG AND LARGER SHALL BE STRANDED. CONTROL CONDUCTORS SHALL BE #14 AWG. WIRE SHALL BE FACTORY COLOR CODED. BRANCH CIRCUITS SHALL CONTAIN THE NECESSARY NUMBER OF WIRES TO PROVIDE SWITCH CONTROL INDICATED OR
- 2. CONNECTIONS FOR CONDUCTORS #8 AWG AND SMALLER SHALL BE PRESSURE TYPE CONNECTORS, SET SCREW CONNECTOR SHALL NÖT BE USED. CONNECTORS SHALL BE THOMAS & BETTS SERIES PT-1 IDEAL, SCOTCH-LOCK, BUCHANAN OR APPROVED EQUAL.
- 3. CONTROL WIRING SHALL BE NOT LESS THAN #16 AWG, STRANDED OR SOLID AS REQUIRED BY THE APPLICATION, IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES. CONTROL WIRING SHALL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE. CABLES SHALL BE PROVIDED WITH AN OVERALL FLAME-RETARDANT EXTRUDED JACKET.
- 5. CABLES SHALL BE TAPPED IN ALL PULL BOXES, WIREWAYS AND WIRING GUTTERS OF PANELS. TAGS SHALL IDENTIFY WIRE OR FEEDER NUMBER AND/OR EQUIPMENT SERVED AS SHOWN ON DRAWINGS OR HEREIN SPECIFIED. TAG AND IDENTIFY ALL BRANCH CIRCUITS WHICH ARE LOOPED AND TERMINATED IN JUNCTION OR OUTLET BOXES. TAGS SHALL BE OF FLAME-RESISTING ADHESIVE MATERIAL, BRADY B-500 VINYL CLOTH OR APPROVED EQUAL.
- BRANCH CIRCUIT WIRING FOR SINGLE PHASE APPLICATIONS SHALL BE MULTI-WIRE, UTILIZING COMMON NEUTRALS, IN A MANNER CONSISTENT WITH THE TYPE OF SERVICE FURNISHED TO THE PROJECT. UNDER NO CIRCUMSTANCES SHALL ANY SWITCH OR CIRCUIT BREAKER BREAK A NEUTRAL
- 7. PROVIDE A GREEN INSULATED GROUND WIRE WITH ALL FEEDERS AND BRANCH CIRCUITS.
- 8. HOMERUNS AND BRANCH CIRCUIT WIRING FOR 120 VOLT SHALL BE AS FOLLOWS:

LENGTH (FT)	HOME RUN WIRE SIZE	CIRCUIT WIRE SIZE
0 TO 50	NO. 12 AWG	NO. 12 AWG
51 TO 100	NO. 10 AWG	NO. 12 AWG
101 TO 150	NO. 8 AWG	NO. 10 AWG

D. WIRE CONNECTIONS AND DEVICES:

- COPPER CABLE BRANCH TAPS FROM COPPER CABLE MAIN LINES UNDER 600 VOLTS SHALL BE MADE IN JUNCTION, PANELBOARDS OR PULLBOXES WITH APPROVED CAST COPPER ALLOY SOLDERLESS CONNECTORS IN A HI-IMPACT PHENOLIC INSULATING COVER HAVING AT LEAST TWO SPRING CLIP FASTENERS, CONNECTORS SHALL BE 0.Z. TYPE "PT" PARALLEL TAP WITH "PTC" COVER, TYPE "PM" PARALLEL LOOPED TAP WITH "PMC" COVER AND TYPE "T" CABLE TAP WITH TYPE "TC" COVER.
- 2. SPLICES (600 VOLT AND BELOW) OF COPPER CONDUCTORS SHALL BE MADE IN JUNCTION OR PULLBOXES WITH APPROVED O.Z. TYPE "TW" OR "WX" CAST COPPER ALLOY SOLDERLESS CONNECTOR IN A HI-IMPACT PHENOLIC INSULATING COPPER TYPE "TWC" OR "XWC".
- 3. CONNECTOR AND LUGS SHALL BE AS MANUFACTURED BY BURNDY, THOMAS & BETTS, O.Z. GEDNEY OR APPROVED EQUAL.

E. OUTLET BOXES:

- 1. OUTLET BOXES SHALL BE CODE GAUGE HOT DIPPED GALVANIZED STAMPED STEEL, GENERALLY BOXES SHALL BE 4" SQUARE, DEPTH AS REQUIRED. EXTENSION COLLARS SHALL BE USED WHERE REQUIRED TO MEET CONSTRUCTION REQUIREMENTS. OUTLET BOXES SHALL BE PROVIDED FOR ALL INTERIOR OUTLETS FOR LIGHTING, SWITCHES, RECEPTACLES, SIGNALS AND THE LIKE.
- 2. BOXES SHALL BE AS MANUFACTURED BY APPLETON, RACO, STEEL CITY, OR APPROVED EQUAL.

F. INSULATING BUSHINGS:

ALL RIGID CONDUIT TERMINATING IN CABINETS, PANELBOARDS, PULL BOXES, ETC., SHALL HAVE INSULATING BUSHINGS O.Z. TYPE B OR TYPE BLG FOR GROUNDING BUSHINGS OR AS MANUFACTURED BY THOMAS & BETTS OR APPROVED EQUAL.

G. PULBOXES, JUNCTION BOXES AND WIREWAYS:

- ALL JUNCTION BOXES, EXCEPT THOSE IN WET LOCATIONS, SHALL BE MADE OF SHEET STEEL OF CODE THICKNESS.
- 2. UNLESS OTHERWISE SPECIFIED, ALL COVERS, TRIMS AND DOORS ON SUCH BOXES AND ALL EXPOSED BOXES, INCLUDING DOORS AND TRIMS, SHALL BE BONDERIZED OR TREATED IN SOME EQUIVALENT MANNER TO RESIST RUSTING AND SHALL BE PAINTED WITH TWO COATS OF PROTECTIVE PRIMER PAINT GRAY IN COLOR. ALL FINISH PAINTING WILL BE DONE UNDER THE ARCHITECTURAL SECTION OF THE SPECIFICATIONS.
- 3. JUNCTION BOXES SHALL BE PROVIDED WHERE INDICATED ON PLANS AND WHEREVER ELSE SUCH BOXES MAY BE DEEMED NECESSARY, PROVIDING LOCATIONS ARE ACCEPTABLE TO THE ARCHITECT, TO FACILITATE THE PULLING OF WIRES AND CABLES.
 - a. ALL SUCH BOXES SHALL BE MADE ACCESSIBLE AND BUILT IN HEAVY GAUGE STEEL, UNLESS OTHERWISE SPECIFIED. AND SHALL BE BUILT ONLY FROM DETAIL WORKING DRAWINGS. THE COVERS OF THESE BOXES SHALL BE DESIGNED FOR QUICK REMOVAL WHEN THE SYSTEM
- IS FINISHED. THE BOXES SHALL CONTAIN NO OPENINGS, EXCEPT THAT INTO WHICH THE CONDUIT PASSED. JUNCTION BOXES SHALL NOT BE EXPOSED IN FINISHED SPACES AND MEET THE APPROVAL OF
- THE OWNER. JUNCTION BOXES OCCURRING IN FINISHED AREAS SHALL HAVE THE REMOVABLE COVER PLATES FLUSH WITH FINISHED CEILING OR SHALL HAVE THE REMOVABLE COVER PLATES FLUSH WITH
- FINISHED CEILING OR SHALL BE LOCATED IN HUNG CEILING BEHIND READILY IDENTIFIABLE ACCESS DOORS. ALL CABLES WITHIN PULLBOXES SHALL BE PROPERLY TAGGED FRO IDENTIFICATION.
- SUITABLE INSULATED SUPPORTS SHALL BE PROVIDED IN ALL PULLBOXES TO SUPPORT FEEDERS PASSING THROUGH THE BOXES SO THAT THE CONDUCTORS WILL NOT REMAIN UNSUPPORTED FOR A DISTANCE GREATER THAN THREE FEET AS REQUIRED BY CODE.
- 4. SUPPORT JUNCTION BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARINGS ON CONDUITS

H. WIRING DEVICES:

1. SWITCHES:

REVISION DESCRIPTION

NO. DATE

- a. LOCAL SWITCHES SHALL BE TOGGLE TYPE RATED AT 120 VOLTS. AC RATED 20 AMPERES. QUIET-TYPE, WITH SILENT OPERATING MECHANISM. GROUNDED BEHIND COMMON PLATE WITH BARRIERED BACK BOX, TOTALLY ENCLOSED IN A MOLDED COMPOSITION BASE. ALL DEVICES SHALL BE FLUSH MOUNTED UNLESS OTHERWISE NOTED.
- b. SWITCHES SHALL BE SINGLE POLE OR THREE WAY AS INDICATED ON THE DRAWINGS.
- MANUAL-STARTING SWITCHES SHALL HAVE QUICK-MAKE, QUICK-BREAK MECHANISM OF TOGGLE TYPE AND SHALL HAVE METHOD OF LOCKING IN THE "OPEN" POSITION. SWITCHES SHALL BE OF HORSEPOWER RATED FOR MOTOR AND INDUCTIVE LOADS, CURRENT RATING, WHICH EXCEEDS THE CONNECTED LOAD. STARTERS SHALL BE MOUNTED FLUSH IN WALL. PROVIDE

- OVERLOADS WHERE REQUIRED. WATERTIGHT SWITCHES SHALL HAVE NEMA TYPE IV ENCLOSURE.
- d. DIMMER SWITCHES AS PER OR AS SPECIFIED BY THE ARCHITECT
- e. COLOR OF SWITCHES SHALL BE WHITE OR AS SPECIFIED BY THE ARCHITECT.
- f. APPROVED MANUFACTURERS: LEVITON, LUTRON, HUBBELL AND/OR SPECIFIED BY THE

2. VACANCY SENSOR:

- a. THE PASSIVE INFRARED VACANCY SENSOR SHALL PROVIDE AUTOMATIC SHUTOFF FOR SINGLE POLE LIGHTING CONTROLS, THE VACANCY SENSOR SHALL OPERATE AS A MANUAL ON SENSOR, USERS MUST PUSH THE BUTTON TO TURN LIGHTING ON. IT WILL KEEP LIGHTING ON AS LONG AS IT DETECTS OCCUPANCY.
- b. VACANCY SENSOR SHALL BE WALL MOUNTED AND/OR CEILING MOUNTED WHERE NECESSARY AND WHERE NO OBSTRUCTIONS INTERFERE WITH THE PROPER OPERATION OF THE VACANCY
- c. APPROVED MANUFACTURERS: WATTSTOPPER, # CS-50

3. RECEPTACLES:

- a. ALL RECEPTACLES INSTALLED IN THIS PROJECT SHALL BE GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FRO GROUND WIRE CONNECTION TO CONDUIT SYSTEM. INSTALL VERTICALLY MOUNTED RECEPTACLES WITH GROUNDING POLE ON
- b. DUPLEX RECEPTACLES, 20 AMPERE, 125 VOLT RATED, TOTALLY ENCLOSED IN A MOLDED COMPOSITION BASE, PARALLEL BLADE LOAD CONTACTS AND U—SHAPED GROUNDING CONTACT. COLOR TO BE DETERMINED BY ARCHITECT.
- c. SINGLE RECEPTACLES, 20 AMPERE, 125 VOLT RATED TOTALLY ENCLOSED IN A MOLDED COMPOSITION BASE, COLOR TO BE DETERMINED BY ARCHITECT.
- d. RECEPTACLES OTHER THAN DESCRIBED ABOVE SHALL BE AS INDICATED.
- e. APPROVED MANUFACTURERS: LEVITON, LUTRON, HUBBELL AND/OR SPECIFIED BY THE

4. DEVICE PLATES:

- a. PLATES FOR ALL WIRING DEVICES, EXCEPT AS SPECIFIED OTHERWISE, SHALL BE MOLDED PLASTIC. FLUSH MOUNTED DEVICES SHALL BE WHITE FINISH OF THE STRUCK-UP TYPE.
- b. PLATES FOR TELEPHONE AND DATA OUTLETS SHALL HAVE 1" BUSHED OPENING OR AS REQUIRED BY THE TELEPHONE & DATA SERVICE PROVIDER.
- c. BOXES WITHOUT DEVICES SHALL HAVE BLANK PLATES.
- d. DEVICES LOCATED AT THE SAME POINT/LOCATION SHALL BE UNDER A COMMON PLATE UNLESS OTHERWISE NOTED. VERIFY ALL PLATE TYPES WITH ARCHITECT PRIOR TO INSTALLATION.
- e. ON THE INSIDE OF EACH DEVICE PLATE, WRITE THE PANELBOARD DESIGNATION AND CIRCUIT NUMBER OF THE CIRCUIT SERVING THE DEVICE.
- 5. RECESSED FLOOR BOX FOR POWER, DATA AND AUDIO/VISUAL SOLUTIONS, 4 GANG BOX GALVANIZED STEEL. SHALLOW CONCRETE FLOOR INSTALLATION, WITH REMOVABLE VOLTAGE DIVIDERS, METALIC COVER, COLOR TO BE DETERMINED BY ARCHITECT. APPROVED MANUFACTURERS THOMAS AND BETTS 668 SERIES , WIREMOL/LEGRAND RFB SERIES AND/OR SPECIFIED BY THE ARCHITECT.

I. TAPS, SPLICES, TERMINATION'S:

- CONNECTORS FOR SPLICES, TAPS AND TERMINATION'S SHALL BE OF THE COMPRESSION TYPE AND SHALL BE THE THOMAS & BETTS SERIES 54000 OR APPROVED EQUAL. FOR COPPER CONDUCTORS #8 OR LARGER, CONNECTORS FOR COPPER CONDUCTORS #10 AND SMALLER SHALL MADE WITH APPROVED PRESSURE CONNECTORS.
- 4. ALL JOINTS SHALL BE COVERED WITH AN INSULATION EQUAL TO THAT OF THE CONDUCTORS. LUGS FOR CONNECTORS #4 AND LARGER SHALL BE OF THE TWO-BOLT TYPE. MANUFACTURES RECOMMENDED FOR THIS USE ARE HEXAGONAL DIES AND HYDRAULIC TOOLS. PRESSURE CONNECTORS SHALL BE THOMAS & BETTS SERIES PT-1, IDEAL 71B SERIES, SCOTCH-LOCK, BUCHANAN OR APPROVED EQUAL.

J. LIGHTING FIXTURES:

- PROVIDE NEW LIGHTING FIXTURES AND LAMPS AS INDICATED ON THE DRAWINGS AND SPECIFIED BY THE ARCHITECT.
- a. BALLAST: BALLAST FOR FLUORESCENT LAMPS SHALL BE AS SPECIFIED HEREIN OR ON THE DRAWINGS, HIGH POWER FACTOR, CBA, ETL APPROVED, CLASS "P". TWO LAMP BALLAST SHALL BE PROVIDED WHERE PRACTICAL THREE LAMP BALLAST SHALL NOT BE USED. ALL BALLAST AND TRANSFORMERS SHALL BE REMOVABLE TO FACILITATE REPAIRS. BALLAST SHALL BE FOR USE ON 60 Hz, 120 VOLT CIRCUITS. ALL BALLAST SHALL BE INDIVIDUALLY EQUIPPED WITH A BUILT-IN AUTOMATIC RESETTING THERMAL PROTECTOR, BALLAST SHALL BE LOW ENERGY TYPE NOT TO EXCEED 8.0 WATTS. ALL BALLAST SHALL BE APPROVED AND SHALL MEET U.L. STANDARD.
- b. APPROVED MANUFACTURERS: FIXTURES SHALL BE AS SPECIFIED ON DRAWINGS. BALLAST SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, UNIVERSAL, ADVANCE, MAGNATEK.
- 2. INCLUDE THE COST OF PURCHASING ALL FIXTURES SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE, INCLUDING PLASTER FRAMES, MOUNTING BRACKETS AND THE LIKE, AS WELL AS THE COST INVOLVED IN RECEIVING, CHECKING, CLEANING, SAFEGUARDING, WIRING, DISPOSAL OF CRATES FROM THE SITE, ETC. ASSEMBLING AND INSTALLATION OF FIXTURES SPECIFIED.
- LAMPS SHALL BE PROVIDED FOR ALL LIGHTING FIXTURES AND AS SPECIFIED IN THE LIGHTING FIXTURE SCHEDULE, UNLESS OTHERWISE INDICATED LAMPS SHALL BE AS MANUFACTURED BY GE, SYLVANIA, PHILLIPS OR APPROVED EQUAL.

K. PANELBOARDS:

- PANEL SECTIONS SHALL BE MOUNTED AWAY FROM THE BACK OF THE CABINET TRIM AND FRAMES. GUTTER SPACE SHALL BE PROVIDED ON SIDES, TOP AND BOTTOM AND SHALL OF SUFFICIENT SIZE TO PREVENT OVERCROWDING OF WIRES AND CABLES AND OVERHEATING OF THE CIRCUIT BREAKER.
- 2. PANEL CONSTRUCTION SHALL BE "DOOR WITHIN A DOOR" TYPE TO FACILITATE VIEWING OF PANEL
- 3. CABINETS SHALL BE COMPLETE WITH HINGED DOORS WITH CYLINDER LOCK, DIRECTORY FRAME WITH NONCOMBUSTIBLE TRANSPARENT COVER AND NEATLY TYPED DIRECTORY CHARTS.
- PROVIDE AND ANGLE PIECE ON THE INSIDE OF THE BOTTOM OF EACH TRIM FOR EASE INSTALLATION.
- 5. PANELS SHALL BE GENERAL PURPOSE, DEAD FRONT TYPE ASSEMBLES, FLUSH OR SURFACE MOUNTED AS INDICATED.

- 6. ALL PANELS SHALL CONTAIN A SEPARATE GROUNDING BAR.
- CABINETS AND TRIMS SHALL BE INDUSTRY STANDARD GAUGE GALVANIZED STEEL
- 8. BRANCH CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON TYPE, THERMAL MAGNETIC TRIP, SINGLE, TWO (2) OR THREE (3) POLE AS NOTED OR INDICATED ON THE DRAWINGS:
 - a. ALL MULTIPLE POLE BREAKERS SHALL BE SINGLE HANDLE, COMMON TRIP.
 - BREAKERS SHALL BE RATED 10,000 A.I.C FOR 120/208 VOLT SERVICE, UNLESS OTHERWISE
 - c. PHASE LEGS OF EACH PANEL SHALL BE BALANCED AT SUPPLY POINT. PANEL FOUND WITH UNBALANCED LOADS SHALL HAVE ITS CIRCUITS REARRANGED AS REQUIRED TO BALANCE PHASE LEGS WITHIN 10% OF EACH OTHER. THIS CONTRACTOR SHALL BALANCE PANEL ONE MONTH AFTER MOVE-IN DATE FOR ACTUAL PANEL LOAD.
- d. BRANCH CIRCUIT BREAKERS SHALL BE ARRANGED SO THAT EACH BREAKER IS READILY REMOVABLE FROM THE PANEL WITHOUT DISTURBING ADJACENT BREAKERS.
- e. PHASE LEGS SHALL BE ALTERNATELY BUSSED TO EACH CIRCUIT BREAKER IN A MANNER TO EFFECT BALANCING THE BRANCH CIRCUIT CONNECTIONS AS NEARLY AS POSSIBLE OVER EACH
- APPROVED MANUFACTURERS: ITE-SIEMENS, CUTTLER-HAMMER (EATON), SQUARE D OR APPROVED EQUAL

L. MOTOR STARTERS AND CONTROLS:

- PRE-WIRED PACKAGED TYPE EQUIPMENT. MOTOR STARTERS. CONTROL DEVICES. CONTROL PANELS AND ALARM PANELS FOR MECHANICAL EQUIPMENT'S WILL BE PROVIDED UNDER OTHER SECTIONS OF THE SPECIFICATION AND INSTALLED AND WIRED UNDER THIS SECTION OF THE SPECIFICATION. EXCEPT AS OTHERWISE NOTED OR REQUIRED UNDER UNION JURISDICTION RULINGS.
- 2. ALL UTILITY MOTOR SUCH AS FANS, PUMPS, ETC. ARE PROVIDED UNDER APPLICABLE SECTIONS OF THE SPECIFICATION. RECEIVE THESE MOTORS, HANDLE, STORE, IF REQUIRED, AND MAKE ELECTRICAL CONNECTIONS INCLUDING A CHECK FOR CORRECT ROTATION, AS WORK UNDER THIS SECTION.
- CONNECT EACH MOTOR TO A SEPARATE BRANCH CIRCUIT, EXCEPT WHERE OTHERWISE SHOWN. RUN CIRCUITS TO THE MOTOR VIA STARTING EQUIPMENT. TERMINATE CONDUIT TO MOTORS IN FINAL
- CONTROL DEVICES WHICH HAVE PIPING CONNECTIONS WILL BE INSTALLED UNDER OTHER SECTION OF THE SPECIFICATION AND WIRED UNDER THIS SECTION OF THE SPECIFICATION.
- WHERE WALL SPACE IS NOT AVAILABLE, SUITABLE ANGLE IRON FRAMEWORK SUPPORTS SHALL BE PROVIDED FOR MOUNTING OF STARTERS AND CONTROLS.
- 6. POWER WIRING SHALL BE PROVIDED TO ALL MOTORS, STARTERS, MOTOR CONTROLLERS. PROVIDE ALL REQUIRED CONTROL WIRING AND RACEWAYS FOR CONTROL WIRING EXCEPT AS SPECIFICALLY EXCLUDED HEREIN.
- 7. TAG ALL CONTROL WIRING.
- 8. WIRE PER APPROVED SHOP DRAWINGS.

CONNECTION WITH LIQUID-TIGHT FLEXIBLE CONDUIT.

- 9. PERFORM ALL REQUIRED ADJUSTMENTS, WIRING MODIFICATIONS IN CONJUNCTION WITH ANY TESTING AND OPERATION SYSTEM START-UP PROCEDURES.
- 10. WHERE SHOWN IN THE DRAWINGS OR REQUIRED, THE DISCONNECT SWITCHES SHALL BE GENERAL DUTY ENCLOSED, EXTERNALLY OPERABLE SAFETY SWITCHES, AND SHALL BE UNFUSED EXCEPT WHERE POWER RATED, AND OF THE PROPER VOLTAGE AND AMPERE RATINGS FOR THE REQUIRED MOTOR AND SHALL HAVE THE NUMBER OF POLES REQUIRED TO OPEN ALL UNGROUNDED CONDUCTORS. SWITCHES INSTALLED WHERE EXPOSED TO THE WEATHER IN FAN CASINGS OR PLENUMNS SHALL HAVE WEATHERPROOF HOUSING. MEANS SHALL BE PROVIDED FOR PADLOCKING SWITCH IN THE OPEN POSITION. DISCONNECTING DEVICES, WHEN NOT INCLUDED WITH ELECTRICALLY OPERATED EQUIPMENT FURNISHED UNDER OTHER SECTIONS OF THE SPECIFICATIONS, SHALL BE PROVIDED UNDER THIS SECTION TO COMPLY WITH CODE REQUIREMENTS.
- 11. EACH MOTOR STATER SHALL BE WIRED COMPLETE READY FOR OPERATION. PERFORM WIRING IN ACCORDANCE WITH MANUFACTURER'S WIRING DIAGRAMS AND APPROVED MECHANICAL SHOP DRAWINGS. INTERLOCK WIRING SHALL BE DONE BY MEANS OF AUXILIARY CONTACTS AND/OR
- 12. ANY REQUIRED INTERLOCKING CONTROL AND/OR TIME DELAY RELAYS. CONTROL TRANSFORMERS. REMOTE PUSH BUTTONS REQUIRED TO PERFORM FUNCTIONS INDICATED ON ELECTRICAL DRAWINGS OR PER LOCAL AUTHORITIES, SHALL BE PROVIDED AND WIRED UNDER THIS SECTION OF THE
- 13. ALL CONTROL WIRING FOR SAFETY AND OPERATIONAL CONTROLS LOCATED ON MACHINE PANELS SHALL BE PROVIDED, INCLUDING DEVICES ON OR ASSOCIATED WITH EACH UNIT. ALL CONTROL WIRING TO COMPLETE EACH MOTOR STATER CIRCUIT FOR DESIRED OPERATION SHALL BE PROVIDED INCLUDING ANY REQUIRED ELECTRIC INTERLOCK WIRING BETWEEN STARTERS, WIRING OF PE SWITCHES, EP RELAYS, DAMPER LIMIT SWITCHES, AUTOMATIC ACTUATION CONTROLS FOR PUMPS ELECTRIC SOLENOID VALVES, LEVEL CONTROLLERS, OPERATIONAL FLOAT SWITCHES, ELECTRIC OR ELECTRONIC THERMOSTATS. FREEZESTATS. SMOKE DETECTION SHUTDOWN CONTACTS. ETC.
- 14. WIRE ANY ELECTRIC HATERS INCLUDING LOCAL AND/OR REMOTE DEVICES PACKAGE TO BE FURNISHED BY MECHANICAL CONTRACTOR.
- 15. PROVIDE WIRE, CONDUIT AND CONNECTIONS FOR ANY MISCELLANEOUS ALARM SYSTEMS AS SPECIFIED UNDER MECHANICAL AND FIRE PROTECTIONS SECTIONS. INSTALLATION WHERE INDICATED OR DESIGNATED ALARM BELLS, ALARM CONTACT DEVICES; PROVIDE REQUIRED INDEPENDENT POWER SUPPLIES.
- 16. CONTROL WIRING SHALL BE CONNECTED TO BUILDING CONTROL MANAGEMENT SYSTEM. COORDINATE WITH BUILDING FOR TERMINATION OF CONTROL WIRING.

GROUNDING SYSTEM:

- THE ELECTRICAL SYSTEM AND EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRICAL CODE AND AS SPECIFIED. THE GROUNDING CONDUCTOR SHALL BE AN INSULATED COPPER WIRE OF SIZE INDICATED. WHERE SIZE IS NOT INDICATED, THE CONDUCTOR SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRICAL CODE EXCEPT THAT MINIMUM SIZE SHALL BE #12AWG. ACCESSIBLE CONNECTIONS SHALL BE MADE WITH MULTIPLE BOLT SILICON BRONZE CONNECTIONS SPECIFICALLY DESIGNED AND APPROVED FOR THE CONNECTION TO BE MADE.
- THROUGHOUT THIS SPECIFICATIONS AN EQUIPMENT GROUND CONDUCTOR (GROUNDING CONDUCTOR) SHALL BE DEEMED TO MEAN A COPPER WIRE OF THE GAUGE SHOWN, OR WHERE NOT SHOWN AS SIZED BY LOCAL CODE.
- PANELBOARDS, PULLBOXES AND ANY OTHER ENCLOSURE TERMINATING A RACEWAY RUN SHALL BE GROUNDED BY BONDING THE EQUIPMENT GROUND CONDUCTOR TO THE PROVIDED GROUND BUS OR TO THE GROUND LUG. IN ADDITION ALL INCOMING AND OUTGOING CONDUITS SHALL BE GROUNDED BY MEANS OF GROUNDING BUSHINGS. BUSHINGS SHALL BE CONNECTED TOGETHER AND TO THE PANEL OR PULLBOX CONNECTED LUG OR GROUND BAR WITH A BONDING JUMPER.
- CONDUCTOR IN THE SAME RACEWAY WITH THE MOTOR FEEDER CONNECTED TO THE GROUNDING BUSHING AT THE MOTOR TERMINAL BOX AND THE GROUND BUS IN THE MOTOR CONTROL CENTER OR THE INCOMING CONDUIT GROUNDING BUSHING OF AN INDIVIDUALLY MOUNTED MOTOR STARTER.

- 5. WHEREVER FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, A GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO THE GROUNDING BUSHING AT EACH END OF THE RUN.
- 6. ALL WORK SHALL BE PERMANENTLY AND EFFECTUALLY GROUNDED WHETHER OR NOT SUCH CONNECTIONS ARE SPECIFICALLY SHOWN OR SPECIFIED.
- 7. GROUND RESISTANCE AT ANY POINT SHALL NOT EXCEED 25 OHMS.
- GROUND CONDUCTOR SHALL BE EXTENDED IN CONDUIT TO THE NEAREST 1-1/2" OR LARGER COLD WATER MAIN AND ATTACHED THERE WITH T AND B CONDUIT HUB AND WATER PIPE CLAMPS PER THE LOCAL CODE AUTHORITY.
- 9. PROVIDE ALL REQUIRED GROUNDING FOR TELEPHONE SYSTEM.

O. DISCONNECT SWITCHES:

- 1. DISCONNECT SWITCHES SHALL BE VOLTAGE RATED TO SUIT THE CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE SUPPLIED.
- UNLESS OTHERWISE NOTED, DISCONNECT SWITCHES SHALL BE "QUICK-MAKE", "QUICK-BREACK", HEAVY DUTY TYPE NEMA 1 ENCLOSURE FOR INTERIOR INSTALLATION, FUSED OR UNFUSED AS INDICATED ON THE DRAWINGS. PROVIDE ALL FUSES AS REQUIRED O PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY WERE INTENDED. PROVIDE REJECTION TYPE FUSE CLIPS WHERE REJECTION TYPE FUSES ARE INSTALLED. PROVIDE WEATHERPROOF DISCONNECT SWITCHES WHERE INSTALLED OUTDOORS OR AS INDICATED ON DRAWINGS.
- 3. OPERATING MECHANISM SHALL BE DESIGNED SO THAT THE DISCONNECT SWITCHES MAY BE LOCKED IN THE "ON" OR "OFF" POSITIONS.
- THE SWITCH SHALL HAVE AN INTERLOCK TO PREVENT UNAUTHORIZED OPENING OF THE HINGED COVER WHEN THE SWITCH IS IN THE "ON" POSITION, AND AN INTERLOCK TO PREVENT CLOSING THE SWITCH MECHANISM WITH THE HINGE COVER OPEN.
- 4. EACH FUSIBLE SWITCH SHALL BE LEFT EQUIPPED WITH A COMPLETE SET OF UL CLASS RK5 DUAL ELEMENT FUSED FOR INDUCTIVE MOTOR LOADS AND JL CLASS RK1 FOR RESISTIVE LOADS, UNLESS OTHERWISE INDICATED. FUSES SHALL BE FUSETRONS, RATED AS INDICATED,
- 5. APPROVED MANUFACTURERS: ITE, GE SQUARE 'D' (TYPE HD), GENERAL ELECTRIC (TYPE TH) OR APPROVED EQUAL.

P. FUSES:

- FUSES SHALL BE CURRENT LIMITING TYPE CLASS RK-5 WITH A MINIMUM INTERRUPTING CAPACITY OF 200,000 RMS AMPERE AND OF THE CONTINUOS CURRENT RATINGS AS INDICATED ON THE
- 2. FUSES SHALL HAVE AVERAGE MELTING TIME-CURRENT CHARACTERISTICS TO MEET THE UNDERWRITER'S LABORATORIES (UL) REQUIREMENTS FOR CLASS "K" 0-600 AMP FUSES AND CLASS "L" OVER 600 AMP FUSES.
- 3. UPON COMPLETION OF THE WORK, PROVIDE TO THE OWNER SIX (6) SPARE FUSES OF EACH SIZE AND TYPE INSTALLED IN THE FUSED SWITCHES PROVIDED UNDER THIS CONTRACT.
- 4. APPROVED MANUFACTURERS: BUSSMAN OR SHAWMUTT.

Q. IDENTIFICATION AND TAGGING:

- 1. ALL PANELS, CABINETS, ETC. SHALL BE PROPERLY IDENTIFIED WITH PERMANENT NAMEPLATES SECURELY FASTENED WITH SCREWS TO THE FRONT OF EQUIPMENT. "STICK-ON" TYPE LETTERS OR PLATES SHALL NOT BE USED.
- IDENTIFY EQUIPMENT AND KEY EQUIPMENT COMPONENTS WITH NAMEPLATES OF BLACK LAMINATED PHENOLIC MATERIAL.
- COORDINATE NAMEPLATES WITH ACTUAL EQUIPMENT INSTALLED.
- 4. MINIMUM SIZE NAMEPLATES SHALL BE THREE INCHES LONG WITH 1/4 INCH LETTERING.
- 5. ALL CONDUCTORS IN TROUGHS, PULL BOXES, GUTTERS, ETC. SHALL BE IDENTIFIED BY MEANS OF TAGS INDICATING BOTH TERMINATING POINTS.
- 6. ALL CIRCUIT BREAKERS IN EXISTING PANELBOARDS WHICH ARE TO BE USED UNDER THIS CONTRACT SHALL HAVE NEW LOADS IDENTIFIED IN UPDATED PANEL DIRECTORY.

R. TELEPHONE AND DATA:

- CONTRACTOR SHALL PROVIDE EMPTY CONDUITS FOR THE TELEPHONE AND DATA SYSTEM, CABLES SHALL BE INSTALL BY OTHERS AS INDICATED ON THE DRAWINGS.
- 2. WALL MOUNTED TELEPHONE AND DATA OUTLETS SHALL CONSIST OF 3/4 INCH MINIMUM EMT STUBBED 6 INCHES ABOVE THE HUNG/FINISHED CEILING INCLUDING CONNECTOR AND PLASTIC BUSHING; AND TERMINATING IN GALVANIZED OUTLET BOX COMPLETE WITH PLASTER COVER. PROVIDE NYLON DRAG FOR PULLING OF TELEPHONE AND DATA CABLES. FOR TWO OUTLETS CONTRACTOR SHALL RUN 1 INCH EMT CONDUIT AND FOR THREE OUTLETS 1 1/4 INCH EMT CONDUIT. COORDINATE EXACT REQUIREMENTS WITH ARCHITECT / OWNER'S REPRESENTATIVE.
- BEFORE SUBMITTING BID CONTRACTOR SHALL VERIFY THE TELEPHONE AND DATA LAYOUT WITH THE TELEPHONE AND DATA SYSTEM INSTALLED AND INCLUDE ANY ADDITIONAL WORK ON CONDUITS AS DIRECTED BY THE TELEPHONE AND DATA INSTALLER / PROVIDER.

S. FIRE ALARM SYSTEM:

- 1. THIS CONTRACTOR SHALL PROVIDE NEW FIRE ALARM DEVICES AS SHOWN ON PLANS. WIRING AND DEVICES SHALL BE PROVIDED.
- 2. COMPLIANCE WITH ALL LOCAL AND NATIONAL AGENCIES RULES AND REGULATIONS HAVING JURISDICTION FOR APPROVAL OF THE COMPLETE FIRE ALARM SYSTEM WILL BE THE RESPONSIBILITY OF THIS CONTRACTOR.
- 3. FOR A COMPLETE FIRE ALARM SYSTEM SPECIFICATION REFER TO THE FIRE ALARM SYSTEM

T. AUDIO VISVAL (A/V) SYSTEM:

- 1. THIS CONTRACTOR SHALL PROVIDE EMPTY CONDUITS FOR A/V SYSTEM, CABLE SHALL BE PROVIDED BY OTHERS AND INSTALLED BY THIS CONTRACTOR AS INDICATED ON THE DRAWINGS.
- 2. WALL MOUNTED A/V OUTLETS SHALL CONSIST OF 3/4" INCH MINIMUM EMT STUBBED 6" INCHES ABOVE THE HUNG/FINISHED CEILING INCLUDING CONNECTOR AND PLASTIC BUSHING; AND TERMINATING IN GALVANIZED OUTLET BOX COMPLETE WITH PLASTIC COVER. PROVIDE NYLON DRAG LINE FOR PULLING OF A/V SYSTEM CABLES. CORRDINATE EXACT REQUIREMENTS WITH ARCHITECT/OWNER'S REPRESANTIVE.
- 3. BEFORE SUBMITTING BID CONTRACTOR SHALL VERIFY THE A/V SYSTEM DRAWINGS WITH THE A/V SYSTEM DRAWINGS WITH THE A/V CONTRACTOR AND INCLUDE AND SYSTEM ADDITIONAL WORK OR CONDUITS AS DIRECTED BY THE A/V CONTRACTOR/INSTALLER/PROVIDER.

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BARNUM LANDING, AUSTIN BLVD ISLAND PARK, NEW YORK

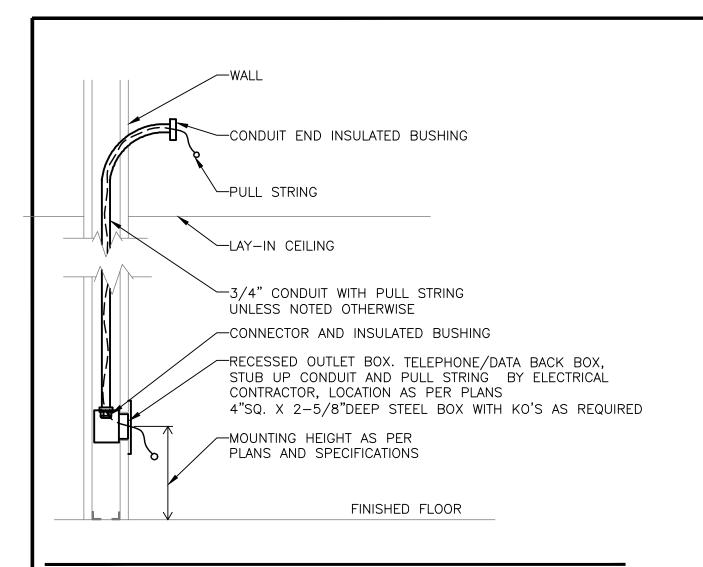
ELECTRICAL

ELECTRICAL SPECIFICATIONS SHEET

CE2355A DESIGNED BY: CE2355A DATE: JAN 2014 DRAWN BY: **GR**

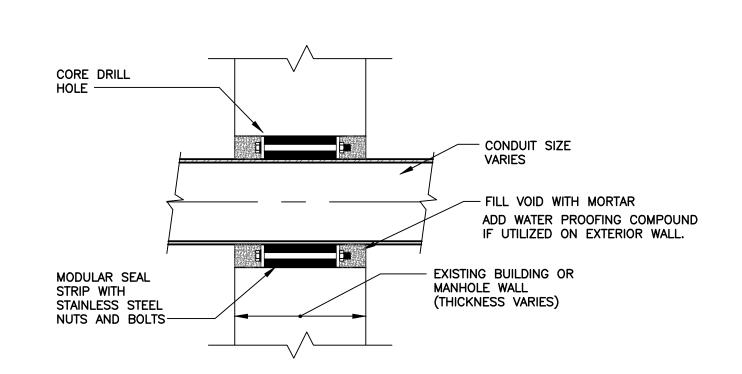
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AS SHOWN

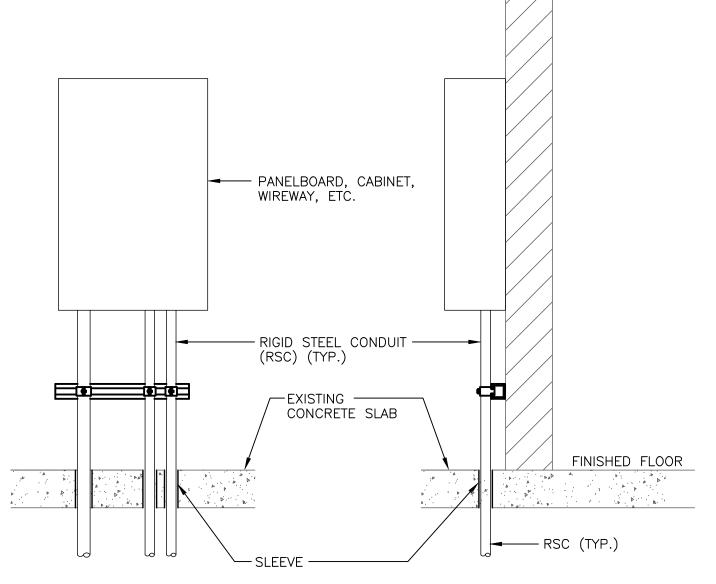


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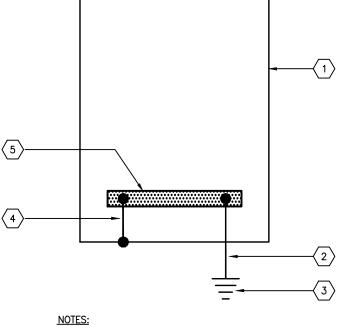
- THE ABOVE DETAIL SHOWN IS FOR REFERENCE ONLY. THE CONTRACTOR MUST ADJUST IN WHOLE OR PART AS REQUIRED TO ACCOMMODATE MILLWORK AND FIELD CONDITIONS
- ALL CONDUIT STUB UPS FOR VOICE, DATA, NURSE/EMERGENCY CALL AND CRITICAL ALARM SHALL HAVE A 90 DEGREE BEND 18" LONG, COMPRESSION CONNECTORS, AND INSULATING BUSHINGS ON BOTH ENDS. IN ROOMS WITH NO CEILINGS, THE CONDUITS SHALL BE ROUTED TO THE CLOSEST SPACE WITH CEILING.







TYPICAL ELECTRICAL EQUIPMENT INSTALLATION SCALE: NONE



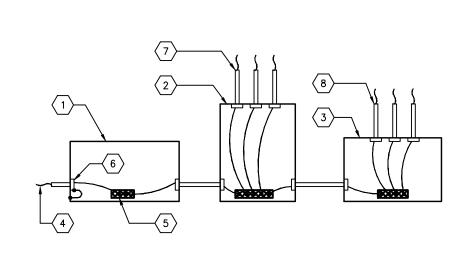
1 SERVICE EQUIPMENT ENCLOSURE

EXPANSION SHIELD PROPERLY SIZED FOR LOAD

CONCRETE ANCHOR

- 2 GROUNDING ELECTRODE CONDUCTOR
- 3 GROUNDING ELECTRODE SYSTEM
- BOND TO ENCLOSURE (NEUTRAL DISCONNECT LINK IN NYC) 5 NEUTRAL BUS

TYPICAL ENCLOSURE **GROUNDING DETAIL** SCALE: NONE



- 1 SERVICE EQUIPMENT ENCLOSURE
- 2 DISTRIBUTION PANELBOARD
- 3 LIGHTING/APPLIANCE PANELBOARD
- 4 SYSTEM GROUNDING ELECTRODE CONDUCTOR (5) GROUND BUS (TYPICAL)
- 6 GROUNDING BUSHING

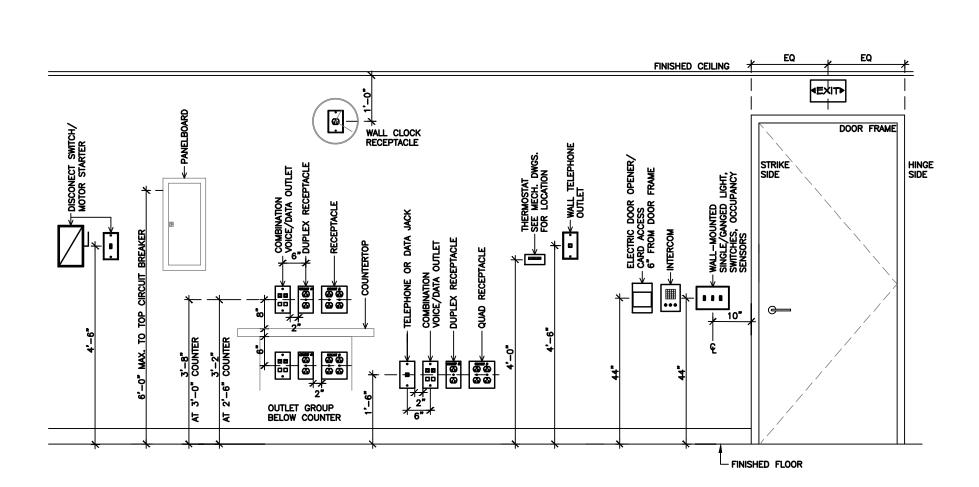
RETAINING CLIP-

C-CLAMP WITH RETAINING CLIP

- 7 FEEDER CONDUIT (TYPICAL)
- 8 BRANCH CIRCUIT CONDUIT (TYPICAL)

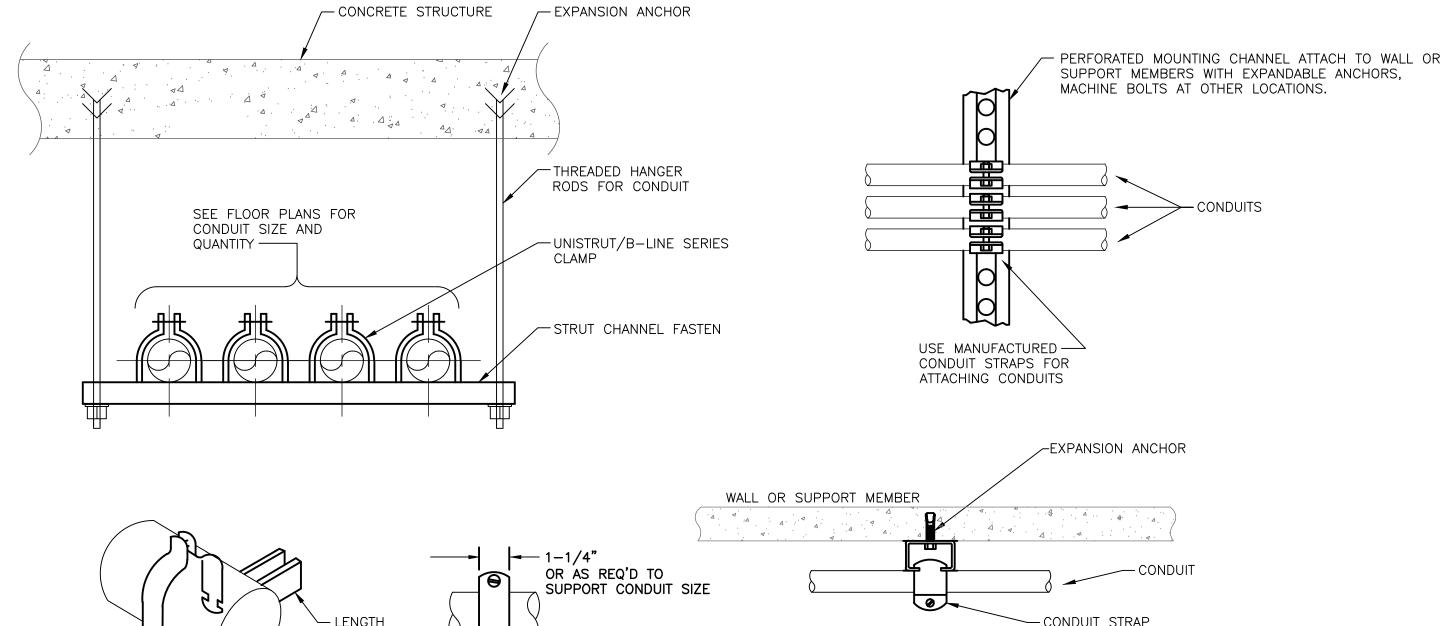
SEPARATE CONDUCTOR EQUIPMENT **GROUNDING SYSTEM**

SCALE: NONE



- 1. THE ABOVE DETAIL SHOWN IS FOR REFERENCE ONLY. ALL DIMENSIONS ARE CONSIDERED FROM FINISHED FLOOR AND, UNLESS NOTED OTHERWISE, SHALL NOT VARY. ALL NOTED DIMENSIONS ARE TO THE CENTERLINE OF THE DEVICE FROM THE FINISHED FLOOR.
- 2. ALL DIMENSIONS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS AND SHALL BE APPROVED BY ARCHITECT PRIOR INSTALLATION, DETAILS SHALL BE ADJUSTED TO CONFORM WITH ARCHITECTURAL REQUIREMENTS AS LONG AS NO CODE RESTRICTION IS VIOLATED.
- 3. ALL DEVICES INSTALLED (FORWARD AND SIDE REACH) SHALL CONFORM WITH ADA REQUIREMENTS. REFER TO ARCHITECTURAL CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
- 4. ALL DEVICES IN FINISHED AREAS SHALL BE INSTALLED IN FLUSH DEVICES BOXES. NO SURFACE BOXES SHALL BE ALLOWED WITHOUT PRIOR APPROVAL OF THE ARCHITECT/ENGINEER.
- 5. EXIT SIGNS SHALL NOT BE INSTALLED SO THAT IT BLOCKS FIRE ALARM VISUAL DEVICES.
- 6. ELECTRICAL CONTRACTOR SHALL VERIFY FINAL WORKBENCH, COUNTER. CABINET OR VANITY HEIGHTS INCLUDING BACK SPLASH, ON THE SITE WITH GENERAL CONTRACTOR PRIOR TO INSTALLATIONS OF BOXES.





TYPICAL CONDUIT SUPPORT DETAIL



- 1. SPACE MOUNTING CHANNEL AT 4'-0" INTERVALS
- 2. MOUNT CONDUITS AT HEIGHT SPECIFIED OR SHOWN IN PLANS
- 3. USE FOR SURFACE MOUNT CONDUITS.

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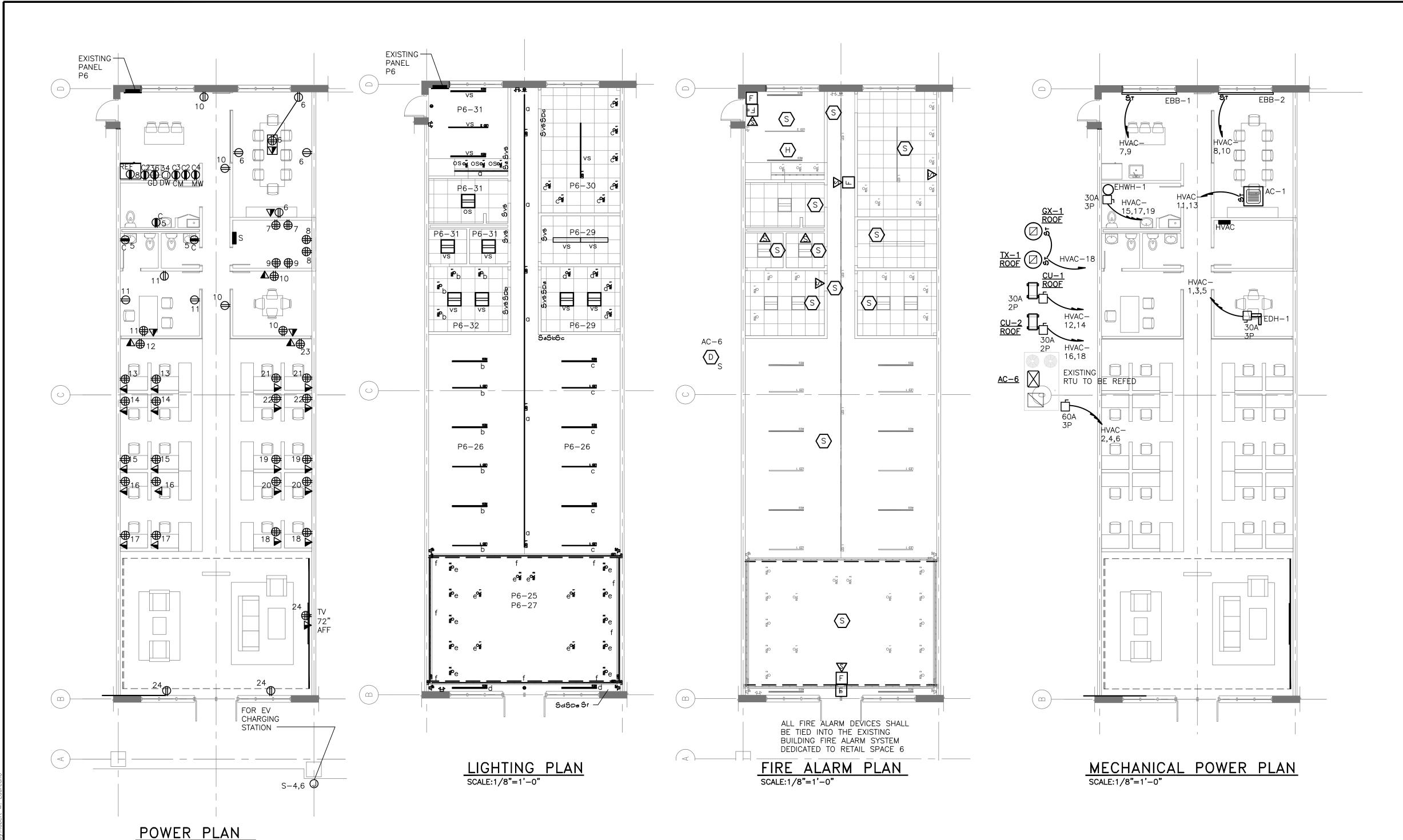
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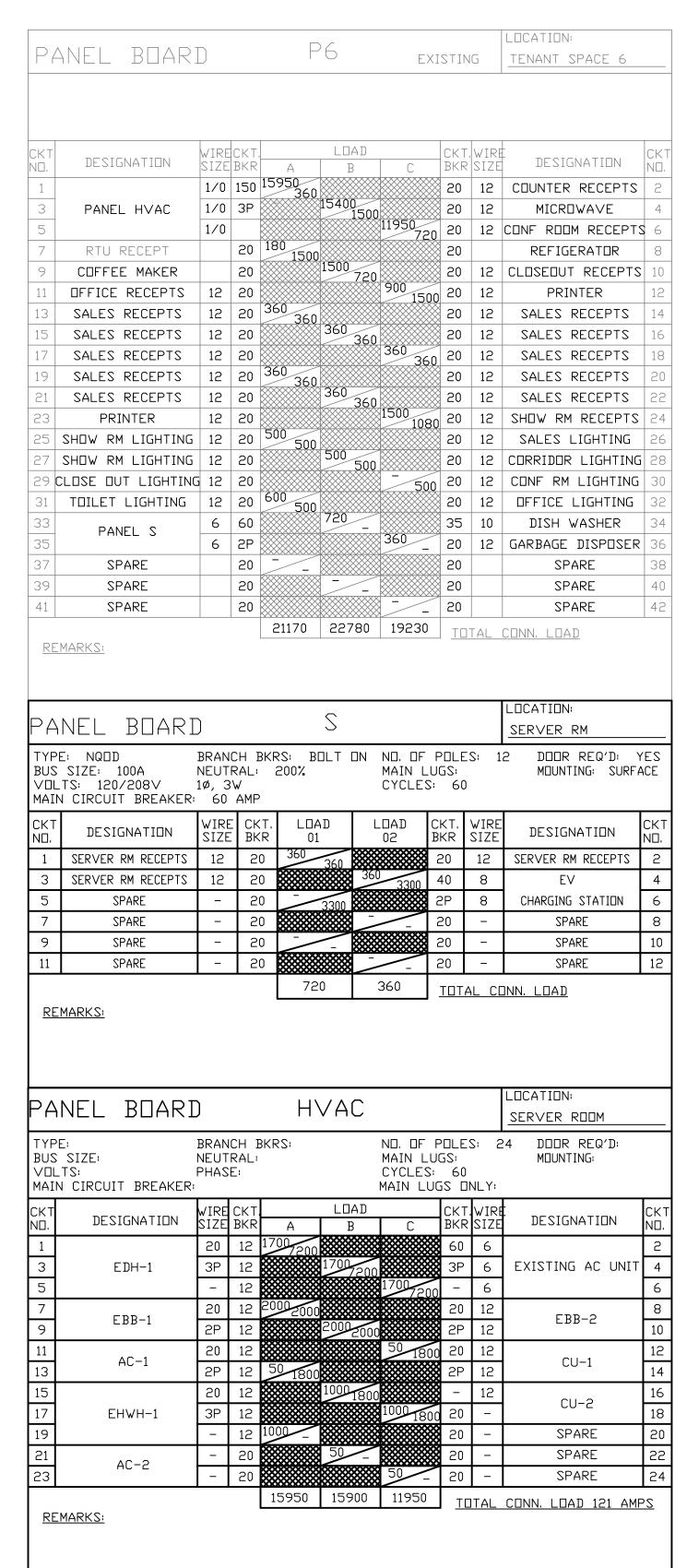
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drawn by: GR
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PROJECT NO. CE2355A JOB NO. CE2355A SCALE: AS SHOWN

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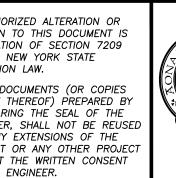
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PROJECT LOCATION: BARNUM	LAND	ING,	AUSTIN	BLVD
ISLAND	PARK,	NEW	YORK	

ELECTRICAL PLANS	PRO
LLLOTRIOAL TEARS	DES
	DRA
ELECTRICAL	СНЕ

PROJECT ENGINEER:
MH

PROJECT NO.
CE2355A

DESIGNED BY:
GR

JOB NO.
CE2355A

DRAWN BY:
GR

DATE:
JAN 2014

CHECKED BY:
GR

SCALE:
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