MECHANICAL SYMBOLS LIST

AC–1 / TXF–1	EQUIPMENT SYMBOL
DUCT ACCESSORIES	
M	MOTORIZED DAMPER W/ ACCESS DOOR
BD	BACKDRAFT DAMPER
	FIRE DAMPER W/ ACCESS DOOR
VD VD	VOLUME DAMPER W/ ACCESS DOOR
HVAC PIPING	
STS	NEW STEAM SUPPLY PIPING
STR	NEW STEAM RETURN PIPING
	FLUID FLOW DIRECTION
	PIPE TURNING DOWN
	PIPE GOING UP
CONTROLS AND SENSORS	
T	THERMOSTAT
CO	CO DETECTOR
M	METHANE DETECTOR
S	SMOKE DETECTOR
PIPE FITTINGS AND EQUIPMENT	
P	PRESSURE GAUGE W/ COCK
T	TEMPERATURE GAUGE
	UNION
	GATE VALVE
	GLOBE VALVE
	STRAINER
	SWING CHECK VALVE
	AIR VENT

MECHANICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
B	BOILER
BDD	BACKDRAFT DAMPER
CEER	COMBINED ENERGY EFFICIENCY RATIO
CFM	CUBIC FEET OF AIR PER MINUTE
COP	COEFFICIENT OF PERFORMANCE
CP	CONDENSATE PUMP
CD	CONDENSATE DRAIN PIPE
DN	DOWN
EER	ENERGY EFFICIENCY RATIO
ET	EXPANSION TANK
EG	EXHAUST GRILLE
FC	FLEXIBLE CONNECTION
FD/AD	FIRE DAMPER W/ACCESS DOOR
FD	FIRE DAMPER W/FUSIBLE LINK
FSD	FIRE SMOKE DAMPER
GV	GAS VENT
HS	HYDRO SEPERATOR
HSPF	HEATING SEASONAL PERFORMANCE FACTOR
HWHT	HOT WATER HEATER
KX	KITCHEN EXHAUST
KXF	KITCHEN EXHAUST FAN
RAD	RADIATOR
RXF	RECYCLE ROOM EXHAUST
OAI	OUTSIDE AIR INTAKE RISER
OAF	OUTSIDE AIR INTAKE FAN
P	BOILER PUMP
RX	RECYCLE ROOM EXHAUST
RXF	RECYCLE ROOM EXHAUST FAN
SG	SUPPLY GRILLE
SEER	SEASONAL ENERGY EFFICIENCY RATIO
STR	STEAM RETURN
STS	STEAM SUPPLY
TX	TOILET EXHAUST
TXF	TOILET EXHAUST FAN
VD	VOLUME DAMPER
WUH	WATER UNIT HEATER

DUCTWORK

=======	AIR DUCT W/ 1.5" ACOUSTICAL LINING
FC FC	FLEXIBLE CONNECTION
24X12	RECTANGULAR DUCT (WIDTH X DEPTH)
ø12	ROUND DUCT (DIAMETER)
	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	RETURN AIR RECTANGULAR DUCT CROSS SECTION
	ROUND DUCT CROSS SECTION

MECHANICAL DRAWING LIST

NATURAL VENTILATION CODE OF NEW YORK CITY COMPLIANCE

ALL OCCUPIED RESIDENTIAL AREAS ARE NATURALLY VENTILATED ACCORDING TO THE 2014 NEW YORK CITY BUILDING CODE SECTION 1203.4. OPERABLE WINDOW AREA IS GREATER THEN 5% OF THE OCCUPIED FLOOR AREA.

NYC BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF THE CITY OF NEW YORK BUILDING CODE, EFFECTIVE JULY 1, 2014 AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. THE CONTRACTOR SHALL ENGAGE THE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.

2. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2014 BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].

3. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.

4. SPECIAL INSPECTIONS: (TR–1)

   THE FOLLOWING SYSTEMS SHALL BE INSPECTED IN ACCORDANCE WITH THE SECTION CITED FROM THE 2014 NYC BUILDING CODE.

   A. MECHANICAL SYSTEMS – BC 1704.16
   B. HIGH TEMPERATURE HOT WATER PIPING SYSTEMS – BC 1704.18.
   C. HEATING SYSTEMS – BC 1704.25
   D. FIRE RESISTING PENETRATION AND JOINTS – BC 1704.27

5. ENERGY CODE PROGRESS INSPECTIONS: (TR–8)

   THE FOLLOWING PROGRESS INSPECTIONS FOR HVAC SYSTEMS SHALL BE PERFORMED AS REQUIRED BY THE SECTIONS CITED FROM THE 2014 NYC BUILDING CODE.

   A. SHUT OFF DAMPER
   B. HVAC AND SERVICE WATER HEATING EQUIPMENT
   C. HVAC AND SERVICE WATER HEATING SYSTEM CONTROLS
   D. HVAC INSULATION AND SEALING.
   E. MAINTENANCE INFORMATION
   F. PERMANENT CERTIFICATE

6. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION MC 107 AND THE FOLLOWING SECTIONS OF THE 2014 NEW YORK CITY MECHANICAL CODE:

   A. VENTILATION SYSTEM BALANCING MC 403.8
   B. BOILERS AND PRESSURE VESSELS – MC 1011
   C. HYDRONIC PIPING SYSTEMS – MC 1208
   D. HIGH TEMPERATURE HOT WATER PIPING SYSTEMS – MC 1210

7. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:

   A. STANDARDS OF HEATING – MC 309.1
   B. NYC NOISE CONTROL CODE: 24–227
   C. DUCT CONSTRUCTION AND INSTALLATION– MC 603
   D. AIR INTAKES, EXHAUSTS AND RELIEFS – MC 401.5
   E. AIR FILTERS – MC 605
   F. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS – MC 513
   G. BOILERS – MC 1004
   H. PIPING AND INSULATION – MC 1201–1203 & 1204
   I. GAS FIRED EQUIPMENT – FUEL GAS CODE

8. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.

9. VENTILATION FOR ALL AREA SHALL COMPLY WITH MC 401.

10. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY MC 403.3

11. ALL FIRE DAMPERS SHALL BE ACCEPTED FOR USE BY THE NEW YORK CITY DEPARTMENT OF BUILDINGS. FIRE DAMPERS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH UL 555, STANDARDS FOR FIRE DAMPERS AND CEILING DAMPERS.

12. COMBINATION FIRE/SMOKE DAMPERS AND SMOKE DAMPERS SHALL BE ACCEPTED FOR USE BY NEW YORK CITY DEPARTMENT OF BUILDINGS AND SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH UL 555S.

13. SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION MC 606 TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN.

14. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE–RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.

15. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

16. SMOKE DETECTOR SHALL MEET UL268A.

17. MECHANICAL SYSTEMS SHALL BE COMMISSIONED PER 2016 NYCECC C403.2.2, C408.2.1, C408.2.5.4. FINAL COMMISSIONING REPORT SHALL BE DUE WITHIN 18 MONTHS OF RECEIPT OF CERTIFICATE OF OCCUPANCY.

18. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.

SCOPE OF WORK

SCOPE OF WORK

1. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.

2. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

3. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

GENERAL NOTES

1. CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.

2. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

3. BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF–DAYS WITHOUT PRIOR WRITTEN APPROVAL.

4. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

5. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

6. CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

7. DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL MAKE ALLOWANCE IN PRICING FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECT TO APPROVAL OF ARCHITECT.

8. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI–ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.

9. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.

10. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).

11. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.

12 INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

13. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.

14. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.

15. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

16. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

17. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.

20. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.

21. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

22. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

23. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

24. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

25. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

DEFINITIONS:

1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

N

GENERAL HVAC NOTES

GENERAL:

1. PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.

2. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.

3. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.

4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.

5. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.

6. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

7. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.

8. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.

9. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.

10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

11. PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO, AND WITHIN 50 FT. OF, ISOLATED EQUIPMENT (EXCEPT AT BASE ELBOW SUPPORTS AND ANCHOR POINTS) THROUGHOUT MECHANICAL EQUIPMENT ROOMS.

12. LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP– AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.

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

14. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

15. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.

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

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

18. ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C–CLAMPS SHALL NOT BE PERMITTED.

19. ALL ROOF–MOUNTED EQUIPMENT CURBS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.

20. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.

21. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.

22. REFER TO TYPICAL DETAILS FOR PIPING, AND EQUIPMENT INSTALLATION.

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

24. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

HVAC DUCTWORK – SHEET METAL

1. CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.

2. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.

3. PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.

4. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS AND ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.

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

6. PROVIDE ALL 90–DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN KITCHEN EXHAUSTS SHALL BE OF UN–VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1–1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.

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

8. ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

9. PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL FIRE DAMPERS, VOLUME DAMPERS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.

10. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.

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

PIPING

1. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE PIPING SYSTEMS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED AND REQUIRED BY CODE.

2. UNLESS OTHERWISE NOTED, ALL HEATING WATER PIPING SHALL BE 3/4 IN. SIZE.

3. PROVIDE AN AIR VENT AT THE HIGH POINT OF EACH DROP IN THE HEATING–WATER. ALL PIPING SHALL GRADE TO LOW POINTS. PROVIDE HOSE END DRAIN VALVES AT THE BOTTOM OF ALL RISERS AND LOW POINTS.

4. UNLESS OTHERWISE NOTED, ALL PIPING IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE OR SLAB, WITH SPACE FOR INSULATION IF REQUIRED.

5. INSTALL PIPING SO ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

6. ALL VALVES SHALL BE INSTALLED SO THAT THE VALVE REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING ON THE EQUIPMENT SIDE OF THE VALVE IS REMOVED.

7. ALL BALANCING VALVES AND BUTTERFLY VALVES SHALL BE PROVIDED WITH POSITION INDICATORS AND THE MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS).

8. ALL VALVES (EXCEPT CONTROL VALVES) AND STRAINERS SHALL BE THE FULL SIZE OF THE PIPE BEFORE REDUCING IN SIZE TO MAKE CONNECTIONS TO EQUIPMENT AND CONTROLS.

9. UNIONS AND/OR FLANGES SHALL BE INSTALLED AT EACH PIECE OF EQUIPMENT, IN BYPASSES, AND IN LONG PIPING RUNS (100 FT. OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATION AND REPAIRS.

10. PROVIDE CONDENSATE DRIPS AT THE BOTTOM OF RADIATORS, ETC., AT THE END OF MAINS AND LOW POINTS, AND AHEAD OF ALL PRESSURE REGULATORS, CONTROL VALVES, ISOLATION VALVES, AND EXPANSION JOINTS.

11. INSTALL ALL PIPING WITHOUT FORCING OR SPRINGING.

12. ALL PIPING SHALL CLEAR DOORS AND WINDOWS.

13. ALL VALVES SHALL BE ADJUSTED FOR SMOOTH AND EASY OPERATION.

14. ALL PIPING SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

15. PROVIDE FLEXIBLE CONNECTIONS IN ALL PIPING SYSTEMS CONNECTED TO PUMPS, AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION, ISOLATION, EXCEPT WATER COILS. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AS CLOSE TO THE EQUIPMENT AS POSSIBLE OR AS INDICATED ON THE DRAWINGS.

SPECIFICATIONS

SECTION 0001 – NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

A. THE BIDDER BY MAKING A BID REPRESENTS THAT:

THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.

B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.

C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.

D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.

E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

1.2 EXISTING CONDITIONS AND COORDINATION

A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.

B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

1.3 RESPONSIBILITIES

A. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.

B. THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON–TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.

C. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT–DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE–ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT–DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

SECTION 0101 – QUALITY OF WORK

1.1 WORKMANSHIP

A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.

B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.

C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

1.2 CODE COMPLIANCE

A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

END OF SECTION 0101

SECTION 0102 –REQUIRED DOCUMENTS

1.1 SHOP DRAWINGS

A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.

1.2 SUBMITTALS

A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.

1.3 RECORD DRAWINGS

A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER WITHIN 90 DAYS DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.

1.4 EQUIPMENT OPERATING INSTRUCTIONS

A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS,EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT WITHIN 90 DAYS OF SYSTEM ACCEPTANCE.

B. THESE INSTRUCTIONS SHALL BE TYPED ON 8–1/2 IN. X 11 IN. PAPER AND BOUND IN THREE–RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.

C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

SECTION 078413–PENETRATION FIRE–STOPPING

1.1 QUALITY ASSURANCE

A. INSTALLER QUALIFICATIONS: AN FM GLOBAL–APPROVED FIRE–STOP CONTRACTOR OR A UL–QUALIFIED FIRE–STOP CONTRACTOR.

B. FIRE–TEST–RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL

1.2 PENETRATION FIRESTOPPING

A. PENETRATIONS IN FIRE–RESISTANCE–RATED WALLS: F–RATINGS PER ASTM E 814 OR UL 1479.

B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F– AND T–RATINGS PER ASTM E 814 OR UL 1479:

C. PENETRATIONS IN SMOKE BARRIERS: L–RATINGS PER UL 1479.

D. W–RATINGS: PER UL 1479.

1.3 INSTALLATION

A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.

1.4 FIELD QUALITY CONTROL

A. INSPECTION OF INSTALLED FIRE–STOPPING: BY OWNER–ENGAGED AGENCY ACCORDING TO ASTM E 2174.

1.5 THROUGH–PENETRATION FIRESTOP SYSTEM SCHEDULE

WHERE UL–CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.

FOR THE FOLLOWING SYSTEMS:

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

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

1.6 MANUFACTURERS

1. HILTI CONSTRUCTION CHEMICAL, INC
2. TREMCO INC.
3. 3M FIRE PROTECTION PRODUCTS

END OF SECTION 078413

SECTION 230517 – SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

1.1 SLEEVE–SEAL SYSTEMS

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

1. SEALING ELEMENTS: EPDM RUBBER OR NBR.
2. PRESSURE PLATES: CARBON STEEL, PLASTIC, STAINLESS STEEL.
3. CONNECTING BOLTS AND NUTS: CARBON STEEL WITH CORROSION–RESISTANT COATING, STAINLESS STEEL.

B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. ADVANCE PRODUCTS & SYSTEMS, INC.
2. CALPICO, INC.
3. METRAFLEX COMPANY (THE).
4. PIPELINE SEAL AND INSULATOR, INC.
5. PROCO PRODUCTS, INC.

1.2 SLEEVE–SEAL FITTINGS

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

B. 1.3 GROUT

C. NON–SHRINK, FACTORY PACKAGED.

1.3 SLEEVE AND SLEEVE–SEAL SCHEDULE

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

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

END OF SECTION 230517

SECTION 230518 – ESCUTCHEONS FOR HVAC PIPING

PART 2 – PRODUCTS

2.1 ESCUTCHEONS

A. ONE–PIECE, CAST–BRASS TYPE: WITH POLISHED, CHROME–PLATED AND ROUGH–BRASS FINISH AND SETSCREW FASTENER.

B. ONE–PIECE, DEEP–PATTERN TYPE: DEEP–DRAWN, BOX–SHAPED BRASS WITH CHROME–PLATED FINISH AND SPRING–CLIP FASTENERS.

C. ONE–PIECE, STAMPED–STEEL TYPE: WITH CHROME–PLATED FINISH AND SPRING–CLIP FASTENERS.

2.2 FLOOR PLATES

A. ONE–PIECE FLOOR PLATES: CAST–IRON FLANGE WITH HOLES FOR FASTENERS.

PART 3 – EXECUTION

3.1 INSTALLATION

A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.

B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.

1. ESCUTCHEONS FOR NEW PIPING:
   a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE–PIECE, DEEP–PATTERN TYPE.
   b. INSULATED PIPING: ONE–PIECE, STAMPED–STEEL TYPE.
   c. BARE PIPING AT WALL AND FLOOR PENETRATIONS IN FINISHED SPACES: ONE–PIECE, CAST–BRASS TYPE WITH POLISHED, CHROME–PLATED FINISH OR STAMPED–STEEL TYPE.
   d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE–PIECE, CAST–BRASS TYPE WITH POLISHED, CHROME–PLATED FINISH OR STAMPED–STEEL TYPE.

3.2 FIELD QUALITY CONTROL

A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.

END OF SECTION 230518

SECTION 230529 – HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.
2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.
3. DESIGN HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.

1.2 SUBMITTALS

A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER

1.3 QUALITY ASSURANCE

A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE – STEEL."

1.4 COMPONENTS

A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL

B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL

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

D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER

E. FIBERGLASS STRUT SYSTEMS: COOPER B–LINE

F. THERMAL–HANGER SHIELD INSERTS:

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

N

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

I. EQUIPMENT SUPPORTS.

END OF SECTION 230529

SECTION 230548 – VIBRATION AND CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 – GENERAL

1.1 COMPONENTS

A. VIBRATION ISOLATORS:

1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS
2. MOUNTS: DOUBLE–DEFLECTION TYPE.
3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS CAST–DUCTILE–IRON HOUSING.
4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN–SPRING TYPE.
5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN–SPRING TYPE.
6. HOUSED SPRING MOUNTS: DUCTILE–IRON OR STEEL HOUSING, WITH INTEGRAL.
7. ELASTOMERIC HANGERS: DOUBLE–DEFLECTION TYPE.
8. SPRING HANGERS: COMBINATION COIL–SPRING AND ELASTOMERIC–INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.
9. SPRING HANGERS WITH VERTICAL–LIMIT STOP: COMBINATION COIL–SPRING AND ELASTOMERIC–INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL–LIMIT STOP.
10. PIPE RISER RESILIENT SUPPORT: ALL–DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.
11. RESILIENT PIPE GUIDES.

B. AIR–MOUNTING SYSTEMS:

1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED–AIR BELLOWS.
2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED–AIR BELLOWS.

C. RESTRAINED VIBRATION ISOLATION ROOF–CURB RAILS: FACTORY–ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR– AND WATERTIGHT CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.

D. VIBRATION ISOLATION EQUIPMENT BASES:

1. STEEL BASE: FACTORY–FABRICATED, WELDED, STRUCTURAL–STEEL BASES AND RAILS.
2. INERTIA BASE: FACTORY–FABRICATED, WELDED, STRUCTURAL–STEEL BASES AND RAILS READY FOR FIELD–APPLIED, CAST–IN–PLACE CONCRETE

.

E. RESTRAINT DEVICES:

1. SNUBBERS: WELDED STRUCTURAL–STEEL SHAPES AND REPLACEABLE RESILIENT ISOLATION WASHERS AND BUSHINGS.
2. CHANNEL SUPPORT SYSTEM: MFMA–3 SLOTTED STEEL CHANNELS.
3. RESTRAINT CABLES: GALVANIZED OR STAINLESS STEEL CABLES.
4. ANCHOR BOLTS: MECHANICAL OR ADHESIVE TYPE.
5. RESILIENT ISOLATION WASHERS AND BUSHINGS: MOLDED NEOPRENE.

1.2 FIELD QUALITY CONTROL

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

PART–2 PRODUCTS

1.3 VIBRATION ISOLATORS

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. ACE MOUNTINGS CO., INC.
2. AMBER/BOOTH COMPANY, INC.
3. CALIFORNIA DYNAMICS CORPORATION.
4. COOPER B–LINE, INC.; A DIVISION OF COOPER INDUSTRIES.
5. HILTI, INC.
6. ISOLATION TECHNOLOGY, INC.
7. KINETICS NOISE CONTROL.
8. LOOS & CO.; CABLEWARE DIVISION.
9. MASON INDUSTRIES.
10. TOLCO INCORPORATED; A BRAND OF NIBCO INC.
11. UNISTRUT; TYCO INTERNATIONAL, LTD.
12. VIBRATION ELIMINATOR CO., INC.
13. VIBRATION ISOLATION.
14. VIBRATION MOUNTINGS & CONTROLS, INC.

END OF SECTION 230548

SECTION 230593 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

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

1. AIR SYSTEMS: CONSTANT–VOLUME
2. HYDRONIC SYSTEMS: CONSTANT–FLOW.

1.2 QUALITY ASSURANCE

A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.

1.2 EXECUTION

A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.

B. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.

C. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.

D. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

E. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS S3ECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.

F. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.

G. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.

H. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.

I. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

SECTION 230713 – DUCT INSULATION

1.1 QUALITY ASSURANCE

SURFACE–BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME–SPREAD INDEX OF 25, AND SMOKE–DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE–DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTME 84.

1.2 FIELD QUALITY CONTROL

A. FIELD INSPECTIONS: BY OWNER–ENGAGED AGENCY.

1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;

A. CONCEALED, RECTANGULAR, ROUND AND FLAT–OVAL, SUPPLY–RETURN, OUTDOOR–AND EXHAUST–AIR DUCT AND AIR PLENUM INSULATION:L–FIBER BLANKET, MINERAL–FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:

UNCONDITIONED SPACES WITHIN BUILDING:	R–6
WITHIN BUILDING ENVELOPE ASSEMBLY:	R–8
OUTSIDE OF BUILDING:	R–8

1.4 ITEMS NOT INSULATED:

1. FIBROUS–GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.
3. FACTORY–INSILATED FLEXIBLE DUCTS.
4. FACTORY–INSULATED PLENUMS AND CASINGS.
5. FLEXIBLE CONNECTORS.
6. VIBRATION–CONTROL DEVICES.
7. 'FACTORY–INSULATED ACCESS PANELS AND DOORS.
8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

PRODUCTS

A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:

1. JOHNS–MANVILLE
2. OWENS–CORNING

1.5 ACOUSTICAL TREATMENT

1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R–6 AS MANUFACTURED BY DUCTMATE, 1–1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED,

END OF SECTION 230713

SECTION 233113 – METAL DUCTS

1.1 CONSTRUCTION

A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2–1/2 INCH WG PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.

B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:

1. DUCTWORK SHALL BE TRANSVERSELY JOINTED BY CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1–1/2"X1–1/2"X1/8" GALVANIZED ANGLES, TACK–WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET, OVERLAPPED AT CORNERS, GASKET SIMILAR TO 3M–1202 OR APPROVED EQUAL.
2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.
3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6' CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR.
4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEALING COMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30–03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30–02 AND COVERED WITH APPROVED SEALING TAPE.
5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWG A5.2.
6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.

C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:

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

D. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3–6 AND AS SHOWN IN FIG. 3–1 AND 3–2 FOR ROUND DUCTWORK.

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

1.2 MATERIALS

A. SINGLE–WALL RECTANGULAR DUCTS AND FITTINGS.

B. DOUBLE–WALL RECTANGULAR DUCTS AND FITTINGS.

1. FIBROUS–GLASS OR FLEXIBLE ELASTOMERIC DUCT LINER FOR INTERSTITIAL INSULATION.
2. PERFORATED INNER DUCT.

C. SINGLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.

D. DOUBLE–WALL ROUND AND FLAT–OVAL DUCTS AND FITTINGS.

1. FIBROUS–GLASS OR FLEXIBLE ELASTOMERIC DUCT LINER FOR INTERSTITIAL INSULATION.
2. PERFORATED INNER DUCT.

E. SHEET METAL MATERIALS:

1. GALVANIZED SHEET STEEL.
2. PVC–COATED, GALVANIZED SHEET STEEL.
3. CARBON–STEEL SHEETS.
4. STAINLESS–STEEL SHEETS.
5. ALUMINUM SHEETS.
6. FACTORY–APPLIED ANTI–MICROBIAL COATING.

F. DUCT LINER:

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

G. SEALANT MATERIALS:

1. TWO–PART TAPE SEALING SYSTEM.
2. WATER–BASED JOINT AND SEAM SEALANT.
3. SOLVENT–BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
5. FLANGE GASKETS.
6. ROUND DUCT JOINT O–RING SEALS.

1.3 DUCT CLEANING

A. CLEAN THE FOLLOWING ITEMS:

1. AIR OUTLETS AND INLETS.
2. SUPPLY, RETURN, AND EXHAUST FANS.
3. DAMPERS, ACTUATORS, AND TURNING VANES.
4. SUPPLY–AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.

END OF SECTION 233113

1. NOISE CONTROL

A. ALL ROOM NC LEVELS SHALL BE 35 OR LESS.

B. PROVIDE SOUND LINING FOR THE FOLLOWING DUCTWORK:

1) ALL EXPOSED INTERIOR SUPPLY DUCTWORK.
2) ALSO WHERE NOTED ON A DRAWING.

C. SOUND LINING IN DUCTWORK: FIBROUS GLASS, MINIMUM 3 LB DENSITY, 1 IN. THICKNESS, MAXIMUM 0.25 K FACTOR AT 75 DEG F MEAN TEMPERATURE WITH ACRYLIC COATED FINISH FACTORY APPLIED EDGE COATING AND STENCILED IN ACCORDANCE WITH NFPA 90. FLAMESPREAD SHALL BE A MAXIMUM OF 25. LINING SHALL NOT SUPPORT MICROBIAL GROWTH AND SHALL BE TESTED IN ACCORDANCE WITH ASTM C 1071 AND ASTM G21/G22. SIMILAR TO MANVILLE PERMACOTE LINA COUSTIC.

D. ALL SOUND LINING, ADHESIVES, FACES AND ACCESSORIES TO BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, EXCEPT AS OTHERWISE NOTED.

2 DUCTWORK INSULATION

A. INSULATE ALL DUCTWORK IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

INSULATION SCHEDULE – DUCTWORK

SERVICE	LOCATION	THICKNESS	TYPE	FINISH
SUPPLY VAPORSEAL	EXTERIOR	2"	D–3	DUCT WRAP

B. NON–INSULATED DUCTWORK:

1) WHERE SOUND LINING IS OF MINIMUM THICKNESS SPECIFIED FOR INSULATION.

C. MATERIAL:

1) TYPE D–3: MINIMUM 6 LB FIBERGLASS BOARD. MAXIMUM 0.22 K–FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY APPLIED ALL PURPOSE OR ALL SERVICE FACING. SIMILAR TO MANVILLE 817 SPIN–GLAS AP

D. INSTALLATION:

FIBERGLASS BLANKET: 2 IN. LAP STRIPS AT ALL SEAMS.

2) SECURE BOTTOM OF ALL DUCTS OVER 24 IN. WIDE WITH MIN. 2 ROWS OF WELD PINS 12 IN. ON CENTER. SECURE ALL SEAMS WITH FOIL VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE.

4) FIBERGLASS BOARD: SEAL JOINTS AND BREAKS IN FACING WITH 3 IN. WIDE TAPE TO MATCH FACING AND ADHERE WITH VAPOR SEAL ADHESIVE. APPLY 5 IN. WIDE TAPE AT CORNERS, WELD PINS ON TOP, SIDES AND BOTTOM.

3. PIPING INSULATION

A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

INSULATION SCHEDULE – PIPING

SERVICE	SIZE	THICKNESS	MATERIAL	FINISH
HOT (105 TO 212 °F)	UP TO 1.5"	1.5"	P–1	F–1
	ABOVE 1.5"	2"	P–1	
HOT FITTINGS & VALVES (100 TO 212 °F)	UP TO 1.5"	1.5"	P–4	F–1
	ABOVE 1.5"	2"		
REFRIGERANT PIPING		1.5"	P–6	
CONDENSER DRAIN PIPING (IF RUNNING THROUGH EXTERIOR WALL)		1.0"	P–6	

B. PIPING, VALVES AND FITTINGS TO BE INSULATED:

1) PIPING SYSTEMS – 0 TO 55 DEG F INCLUDING:.
   a. CONDENSATE DRAIN PIPING.
2) PIPING SYSTEMS – 100 TO 200 DEG F INCLUDING:
   a. WATER SUPPLY AND RETURN.
   b. PUMPED CONDENSATE DISCHARGE.
3) PROTECTIVE COVERINGS SHALL BE INSTALLED ON AREAS OF INSULATION THAT ARE EXPOSED TO WEATHER OR SUBJECT TO MECHANICAL DAMAGE. THE PROTECTIVE COVERING SHALL BE:

   a. ARMA–CHEK SILVER" MULTI–LAYER LAMINATE OF ALUMINUM, COATED WITH A UV PROTECTIVE FILM AND BACKED WITH A FLEXIBLE PVC FILM. THE MATERIAL SHOULD BE ADHERED WITH ARMAFLEX 520 ADHESIVE OR EQUIVALENT, AND ALL JOINS AND SEAMS SECURED WITH "ARMA–CHEK SILVER TAPE". INSTALLATION SHALL BE IN ALL CASES TO THE MANUFACTURER'S RECOMMENDATIONS.

   OR

   b. HIGH DENSITY RUBBER CLADDING OF THE "ARMA–CHECK R" TYPE BONDED USING AN APPROPRIATE FULL CONTACT ADHESIVE WITH A MINIMUM 50 MM OVERLAP AT ALL BUTT JOINTS AND LONGITUDINAL SEAMS. A WEATHER–PROOF MASTIC SEALANT SHALL BE APPLIED OVER ALL SEAMS AND JOINTS. ALL MATERIAL SHALL BE OVERLAPPED AND STAGGERED IN SUCH A WAY AS TO ENSURE A WATERSHED IS ALWAYS PROVIDED. INSTALLATION SHALL BE IN ALL CASES TO THE MANUFACTURER'S RECOMMENDATIONS. ALL EXCESS ADHESIVE VISIBLE ON THE SURFACE OF THE COMPLETED ASSEMBLY SHALL BE REMOVED USING AN APPROPRIATE CLEANING MATERIAL.

   OR

   c. METAL CLADDING, COMPRISED OF COATED SHEET METAL, WITH ALL EXTERNAL JOINTS AND FIXING MADE WEATHER–PROOF WITH SILICONE SEALANT.

C. MATERIAL:

1) TYPE P–1: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.24 K–FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY–APPLIED FIRE–RETARDANT FOIL–SKRIM–KRAFT FACING. ALL SERVICE JACKET. SIMILAR TO OWENS–CORNING 650 ASJ.
2) TYPE P–3: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS FITTING, MAXIMUM 0.23 K–FACTOR AT 75 DEG F MEAN TEMPERATURE SIMILAR TO EPOLUX HAMFAB MOLDED FITTINGS.
3) TYPE P–4: MINIMUM 1 LB DENSITY FIBERGLASS FITTING INSERTS, MAXIMUM 0.27 K–FACTOR AT 75 DEG F MEAN TEMPERATURE SIMILAR TO MANVILLE HI–LO TEMP INSULATION INSERTS.
4) TYPE P–6: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K–FACTOR AT 75 DEG F MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE. SIMILAR TO ARMSTRONG ARMAFLEX II.

N

D. FINISH:

1) TYPE F–1: FITTING COVER, MOLDED WHITE PVC JACKET, UL CLASS 1, MAXIMUM PERMEANCE 0.05 SIMILAR TO MANVILLE ZESTRON.
2) TYPE F–2: WHITE VAPOR BARRIER COATING WITH 10X10 OR 20X20 MESH WHITE GLASS, POLYESTER OR NYLON CLOTH REINFORCING MEMBRANE, MINIMUM 31 MIL DRY FILM THICKNESS, SIMILAR TO FOSTER TITE–FIT, UL LABEL.
3) TYPE F–4: ALUMINUM JACKETING WITH MINIMUM 0.016 IN. WALL THICKNESS AND LONGITUDINAL JOINTS WITH LOCK SEAMS.
4) TYPE F–6: WHITE FINISHING AND INSULATING CEMENT APPLIED OVER HEXAGONAL WIRE MESH. CEMENT SIMILAR TO KEENE SUPERSLICK.

E. INSTALLATION:

1) BEFORE APPLYING INSULATION ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.
2) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.
3) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS FOR PROTECTION AT ALL HANGINGS.
4) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.

4. VIBRATION ISOLATION

A. GENERAL:

1) PROVIDE ISOLATION FOR EQUIPMENT, PIPING AND DUCTWORK.
2) INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3) PROVIDE LEVELING DEVICES AND APPROVED RESILIENT RESTRAINING DEVICES AS REQUIRED TO LIMIT EQUIPMENT AND PIPING MOTION IN EXCESS OF 1/4".
4) ACCEPTABLE MANUFACTURERS:
   a. MASON INDUSTRIES, INC.
   b. VIBRATION ELIMINATOR CO.
   c. KORFUND DYNAMICS CORP.

B. CEILING–HUNG FANS AND EQUIPMENT:

1) PROVIDE SPRING HANGER ROD ISOLATORS. STEEL COMPRESSION SPRING AND NEOPRENE SOUND PAD WITHIN A STEEL RETAINER BOX. SIMILAR TO MASON TYPE PCHS.
2) 1 IN. MINIMUM STATIC DEFLECTION. 1/2 IN. MINIMUM RESERVE DEFLECTION. FACTORY–PRELOADED TO 75% OF RATED LOAD.
3) PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE EQUIPMENT OR STRUCTURE CANNOT SUPPORT POINT LOADS.

C. FLOOR MOUNTED EQUIPMENT HAVING INTERNAL ISOLATION:

1) PROVIDE 5/16 IN.–THICK NEOPRENE ACOUSTICAL BASE PADS OF RIB.

5. MOTORS:

A. MOTORS (UNDER HVAC WORK): IN ACCORDANCE WITH NEMA, IEEE AND ANSI C50 STANDARDS:

1) STANDARD EFFICIENCY UNLESS OTHERWISE NOTED.
2) 1.15 SERVICE FACTOR.
3) SQUIRREL CAGE INDUCTION, OPEN DRIPPROOF TYPE, 1750 RPM, NEMA TYPE B INSULATION CLASS, CONTINUOUS DUTY, EXCEPT AS NOTED.

SEQUENCE OF OPERATIONS

FIRE AND SMOKE DAMPER

a) SMOKE DETECTION/TEST/POWER FAILURE OPERATION

WHEN SMOKE IS DETECTED (VIA A SMOKE DETECTOR), DURING TESTING OR IF POWER FAILURE OCCURS, THE DAMPER WILL CLOSE AND REMAIN CLOSED. WHEN THE SMOKE SIGNAL CEASES (SMOKE DETECTOR RESET),THE TEST IS COMPLETED OR POWER IS RESTORED THE DAMPER WILL AUTOMATICALLY RESET TO THE OPEN POSITION. THE DAMPER AUTOMATICALLY RESETS IF NUISANCE ALARMS OCCUR AND THE SYSTEM IS RESET.

b) FIRE OPERATION

WHEN TEMPERATURES IN EXCESS OF 165°F/74°C (212°F/100°C,250°F/121°C OR 350°F/177°C OPTIONAL) ARE DETECTED, THE DAMPER WILL CLOSE AND LOCK. AT NO TIME SHALL THE DAMPER BE DISENGAGED FROM THE ACTUATOR. UPON CESSATION OF THE FIRE CONDITIONS, THE DAMPER CAN BE REOPENED BY PRESSING THE RESET BUTTON LOCATED ON THE DAMPER ASSEMBLY.

7. PIPING – GENERAL REQUIREMENTS

A. COMPLETE WITH: PIPE, FITTINGS, VALVES, STRAINERS, MOTORIZED VALVE OPERATORS, STRAINERS, HANGERS, SUPPORTS, GUIDE, SLEEVES, AND ACCESSORIES.

B. ALL ITEMS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES AND STANDARDS:

1) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).
2) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM).
3) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
4) MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTING INDUSTRY (MSS).

ALL PRESSURIZED PIPING TO BE TESTED HYDROSTATICALLY TO 300 PSI OR 150% OF OPERATING PRESSURE, WHICHEVER IS GREATER, BUT NEVER EXCEED TEST PRESSURE ANSI B16.1 BASIS. TEST DURATION TO BE 2 HOURS WITH NO PRESSURE CHANGE CORRECTED FOR TEMPERATURE CHANGE. REPAIR OR REPLACE LEAKS OR DEFECTS WITHOUT ADDITIONAL COST.

C. PROVIDE DIELECTRIC FITTINGS WHERE DISSIMILAR METALS ARE TO BE JOINED.

D. PIPE SUPPORTS:

1) PROVIDE ADEQUATE SUPPORT FOR PIPE AND CONTENTS TO PREVENT SAGGING, VIBRATION, OR SWAYING AND ALLOW FOR EXPANSION AND CONTRACTION. PROVIDE SUPPLEMENTAL STEEL AS REQUIRED WHERE STRUCTURE CANNOT SUPPORT POINT LOADS.
2) HORIZONTAL PIPING TO BE SUPPORTED BY FORGED STEEL ADJUSTABLE CLEVIS TYPE HANGER. MAXIMUM SPACING AS FOLLOWS:
   a. STEEL 1 IN. AND SMALLER: 7 FT.
   b. STEEL 1–1/4 IN. AND LARGER: 10 FT.
   d. COPPER 3 IN. AND SMALLER: 7 FT.
   e. ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, RUNOUTS, AND CONCENTRATED LOADS DUE TO VALVES, ETC.

E. LOW TEMPERATURE HOT WATER FROM 100 TO 200 DEG F.

1) PIPE: ANNEALED–TEMPER COPPER TUBING, ASTM B–88, TYPE K, WITH BRAZED JOINTS.
2) ALT. (ONLY IF ALLOWED BY BUILDING) PIPE: STEEL IN ACCORDANCE WITH ASTM A53 OR A120, WITH SCHEDULE 40 WALL THICKNESS TO 10 IN.
   a. RUNOUTS TO EQUIPMENT AND COILS: COPPER, TYPE L, HARD DRAWN IN ACCORDANCE WITH ASTM B88.
3) FITTINGS:
   a. COPPER TYPE K: WROUGHT COPPER, SILVER BRAZED, ASME B16.22.
   b. 2 IN. AND SMALLER: 125 LB WSP CAST IRON THREADED FITTINGS SHALL BE IN ACCORDANCE WITH ANSI B16.4., CAST IRON FLANGED FITTINGS SHALL BE IN ACCORDANCE WITH ANSI B16.1.
   c. 2–1/2 IN. AND LARGER WELDED: BUTT WELD FITTINGS SAME WEIGHT AS PIPING AND IN ACCORDANCE WITH ANSI B16.9.
   d. COPPER TYPE L: WROUGHT COPPER, SOLDERED 95/5 ANTIMONY, ASME B16.22.
4) VALVES:
   a. BALL VALVES:
   BRONZE, TWO PIECES BODY CONSTRUCTION, 600 PSIG WOG/ 150 WSP, STAINLESS STEEL BALL AND STEM, FULL PORT, MILWAUKEE BA–400S THREADED ENDS, BA–450S SOLDERED ENDS, OR EQUAL.

a. GATE VALVES:

2 IN. AND SMALLER: BRONZE THREADED ENDS, SOLID WEDGE, INSIDE SCREW, TRAVELING STEM UNION BONNET. 300 LB WSP: JENKINS FIG. 47U, OR EQUAL.

2–1/2 IN. AND LARGER: IRON BODY, BRONZE MOUNTED, SOLID WEDGE OS&Y RISING SPINDLE FLANGED. 300 LB WSP. JENKINS FIG. 651–C, OR EQUAL.

b. GLOBE VALVES:

1) 2 IN. AND SMALLER: BRONZE, REGRIND–RENEW, 500 BRINELL STAINLESS STEEL PLUG DISC AND 425 BRINELL SEAT RING, UNION BONNET. 300 LB WSP JENKINS FIG. 546P, OR EQUAL.
2) 2–1/2 IN. AND LARGER: REGRIND–RENEW, IRON BODY, LEVEL BRONZE DISC AND SEAT RING OS&Y FLANGED, 300 LB WSP JENKINS FIG. 613C, OR EQUAL.
   a. Y–TYPE STRAINERS:
1) PROVIDE SCREWED ENDS TO 2 IN. AND FLANGED 2–1/2 IN. AND LARGE WITH BODY AS FOLLOWS: TO 300 PSIG: 300 LB WSP CLASS, CAST IRON.
2) SCREENS TO BE 316 STAINLESS STEEL.
3) PROVIDE 1/2 IN. DRAIN VALVE WITH CAPPED HOSE CONNECTION AT ALL LOW POINTS. PROVIDE 3/4 IN. GATE VALVE TO DRAIN SYSTEMS IN EQUIPMENT ROOMS.
4) PROVIDE MANUAL AIR VENTS LINE SIZE AIR CHAMBER WITH 1/2 IN. GLOBE VALVE AT ALL HIGH POINTS AND WHERE FLOW DIRECTION CHANGES FROM HORIZONTAL TO DOWNWARD.
5) PITCH WATER PIPING EXCEPT AS NOTED:
   a. UP TO 1 IN.: 1 IN. IN 40 FT.
   b. 1–1/2 IN. AND LARGER: 1 IN. IN 100 FT.

M. CONDENSATE DRAIN PIPING

1) PIPE: ASTM B88, HARD DRAWN COPPER TUBING TYPE "L".
2) FITTINGS: SOLDERED JOINT FITTINGS, 95/5 SOLDER.
3) PITCH, EXCEPT AS NOTED:
   a. 1 IN. IN 4 FT PREFERRED.
   b. 1 IN. IN 8 FT MINIMUM.
4) SWING CHECK VALVES: AT CONDENSATE PUMP DISCHARGE. 300 LB WOG, BRONZE BODY SOLDER ENDS, REGRIND BRONZE DISC TO BE USED WITH COPPER TUBING. JENKINS FIG. 1222.

E. SEQUENCE OF OPERATION:

1) AC UNITS: UNIT SHALL BE STARTED AND STOPPED BY WALL MOUNTED PROGRAMMABLE THERMOSTAT. DURING "ON" MODE UNIT THERMOSTAT SHALL ENERGIZE COMPRESSOR(S) AND SUPPLY FAN TO MAINTAIN ROOM SET POINT OF 75°F ADJUSTABLE; WHEN ROOM TEMPERATURE DROPS BELOW SET POINT COMPRESSOR(S) SHALL DE–ENERGIZE AND FAN SHALL REMAIN ON.
   a. AC UNIT SETPOINTS SHALL BE GENERALLY AS FOLLOWS AND SUBJECT TO REVIEW BY THE CLIENT:

	SETPOINTS			
ITEM	NOMINAL	SENSITIVITY	HI–ALARM	LO–ALARM
TEMP.	72°F	+2°	80°F	60°F
RH	45%	+5%	60%	35%

   b. COORDINATE ALL WORK ASSOCIATED WITH THE AC UNITS AND ACCESSORIES (IE UNIVERSAL MONITORING PANEL, CONDENSATE PUMP, MOTORIZED DAMPERS, ETC.) WITH THE MANUFACTURER AND ALL POWER SOURCE WIRING AND INTERFACING WITH DIVISION 16. CONTROL AND INTERLOCK WIRING SHALL BE DONE BY DIVISION 15. DIVISION 15 SHALL FURNISH AND MOUNT ALL STARTERS, ETC. AND DIVISION 16 SHALL PROVIDE POWER. DIVISION 15 AND UNIT MANUFACTURER SHALL FURNISH ALL REQUIRED WIRING DIAGRAMS. DIAGRAMS SHOWN ARE FOR GUIDANCE ONLY. MECHANICAL CONTRACTOR, DIVISION 15, IS RESPONSIBLE FOR PROPER WIRING AND OPERATION OF ALL EQUIPMENT.
   c. SETPOINTS SHALL BE ADJUSTED TO AVOID NUISANCE ALARMS. WHEN POSSIBLE SELECTED ALARMS SHALL CLOSE UNIT COMMON ALARM TERMINALS TO ACTIVATE SWITCHOVER PANEL (SEE BELOW) TO SHUTDOWN PROBLEM SYSTEM.
   d. HVAC MAINTENANCE ALARMS: DIRTY FILTER ALARMS WILL SOUND AN ALARM AT THE INDIVIDUAL AC UNITS EXCEPT AS NOTED, INDIVIDUALLY AT THE BUILDING BMS PANELS. THIS ALARM GROUP WILL NOT SHUTDOWN AC UNITS OR CAUSE SWINGOVER TO THE STANDBY AC SYSTEM.
   e. UNITS SHALL INCORPORATE A LEAD/LAG CAPABILITY WITH WEEKLY CHANGE OVER.
   f. UNITS SHALL HAVE AUTOMATIC DAMPER IN SUPPLY DISCHARGE. DAMPERS SHALL OPEN WHEN UNIT IS RUNNING AND SHUT WHEN UNIT SHUTS DOWN.
4) FANS: TURNED ON OR OFF THROUGH ON–OFF SWITCH AND SHALL OPERATE CONTINUOUSLY. WHERE THERE ARE DAMPERS (MOTORIZED OR FSD) IN THE DUCTWORK SYSTEM SERVED BY THE FAN, THEY SHALL BE INTERLOCKED WITH THE FAN TO OPEN WHEN THE FAN IS OPERATING ONLY. IF FSD IS INSTALLED IN THE SYSTEM, THE FAN SHALL SHUT DOWN WHENEVER THE FSD CLOSES ON AN ALARM CONDITION.
5) PUMPS:
   a. LEAD/LAG AUTOMATIC ALTERNATION PANEL SHALL ENERGIZE THE LEAD PUMP FIRST. SWITCHOVER TO LAG PUMP OPERATION SHALL BE FOR THE FOLLOWING REASONS:

1) PRIMARY PUMP HAS FAILED OR LOST POWER.
2) BI–WEEKLY SCHEDULE HAS COMMENCED TO ALTERNATE LEAD PUMP OPERATION TO MAINTAIN EVEN WEAR AND TEAR.
3) INDICATOR LIGHT SHALL ILLUMINATE ON PANEL SHOWING WHICH PUMP IS ON.

   e. IF ANY OF THE TWO(2) PUMPS HAVE FAILED, AN ALARM SHALL SOUND AT PANEL AND BE COMMUNICATED TO THE TENANT'S ALARM PANEL AND IT NETWORK

THERMOSTATIC CONTROLS:

A. GENERAL:

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE INDIVIDUALLY CONTROLLED BY THERMOSTATIC CONTROLS RESPONDING TO TEMPERATURE WITHIN THE ZONE. FOR THE PURPOSES OF SECTION 6.4.3.1, A DWELLING UNIT SHALL BE PERMITTED TO BE CONSIDERED A SINGLE ZONE.

B. DEAD BAND:

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEAD BAND OF AT LEAST 5°F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTIONS:

THERMOSTATS THAT REQUIRE MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.

C. SETBACK CONTROLS:

HEATING SYSTEMS LOCATED IN CLIMATE ZONES 2–8 SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES ABOVE A HEATING SETPOINT ADJUSTABLE DOWN TO 55°F OR LOWER. COOLING SYSTEMS LOCATED IN CLIMATE ZONES 1B, 2B, AND 3B SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES BELOW A COOLING SETPOINT ADJUSTABLE UP TO 90°F OR HIGHER OR TO PREVENT HIGH SPACE HUMIDITY LEVELS.

D. AUTOMATIC SHUTDOWN:

HVAC SYSTEMS SHALL BE EQUIPPED WITH AT LEAST ONE OF THE FOLLOWING:CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER DIFFERENT TIME SCHEDULES FOR SEVEN DIFFERENT DAY–TYPES PER WEEK, ARE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST TEN HOURS, AND INCLUDE AN ACCESSIBLE MANUAL OVERRIDE, OR EQUIVALENT FUNCTION, THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO TWO HOURS.

EXCEPTION:

RESIDENTIAL OCCUPANCIES MAY USE CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER TWO DIFFERENT TIME SCHEDULES PER WEEK.

E. SETPOINT OVERLAP RESTRICTION:

WHERE HEATING AND COOLING TO A ZONE ARE CONTROLLED BY SEPARATE ZONE THERMOSTATIC CONTROLS LOCATED WITHIN THE ZONE, MEANS (SUCH AS LIMIT SWITCHES, MECHANICAL STOPS, OR, FOR DDC SYSTEMS, SOFTWARE PROGRAMMING) SHALL BE PROVIDED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT MINUS ANY APPLICABLE PROPORTIONAL BAND.

F. HEAT PUMP SUPPLEMENTARY HEAT :

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

FAN:

MODEL G

ROOF EXHAUST FANS SHALL BE CENTRIFUGAL DIRECT DRIVE TYPE. THE FAN HOUSING AND SHROUD SHALL BE CONSTRUCTED OF HEAVY GAUGE ALUMINUM WITH A RIGID INTERNAL SUPPORT STRUCTURE. THE FAN SHROUD SHALL HAVE A ROLLED BEAD FOR ADDED STRENGTH. THE FAN WHEEL SHALL BE CENTRIFUGAL BACKWARD INCLINED, CONSTRUCTED OF ALUMINUM AND SHALL INCLUDE A WHEEL CONE CAREFULLY MATCHED TO THE INLET CONE FOR PRECISE RUNNING TOLERANCES. WHEELS SHALL BE STATICALLY AND DYNAMICALLY BALANCED. MOTORS SHALL BE MOUNTED OUT OF THE AIRSTREAM ON VIBRATION ISOLATORS. FRESH AIR FOR MOTOR COOLING SHALL BE DRAWN INTO THE MOTOR COMPARTMENT FROM AN AREA FREE OF DISCHARGE CONTAMINANTS. MOTORS SHALL BE READILY ACCESSIBLE FOR MAINTENANCE. A DISCONNECT SWITCH SHALL BE FACTORY INSTALLED AND WIRED FROM THE MOTOR COMPARTMENT FOR EASE OF ELECTRICAL WIRING. GALVANIZED RIGID WIRE PROTECTS THE FAN'S DISCHARGE FROM BIRDS OR SMALL OBJECTS.

ALL FANS SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR SOUND AND AIR PERFORMANCE.
EACH FAN SHALL BEAR A PERMANENTLY AFFIXED MANUFACTURER'S NAMEPLATE CONTAINING THE MODEL NUMBER AND INDIVIDUAL SERIAL NUMBER FOR FUTURE IDENTIFICATION.

FANS SHALL BE MODEL G AS MANUFACTURED BY GREENHECK.

MODELS CSP–A
DUCT MOUNTED EXHAUST, SUPPLY OR RETURN AIR FANS SHALL BE OF THE CENTRIFUGAL DIRECT DRIVE TYPE. THE FAN HOUSING SHALL BE CONSTRUCTED OF HEAVY–GAUGE GALVANIZED STEEL. THE HOUSING INTERIOR SHALL BE LINED WITH 0.5 IN. ACOUSTICAL INSULATION. THE OUTLET DUCT COLLAR SHALL INCLUDE AN ALUMINUM BACKDRAFT DAMPER AND SHALL BE ADAPTABLE FOR HORIZONTAL OR VERTICAL DISCHARGE. THE ACCESS FOR WIRING SHALL BE EXTERNAL. THE MOTOR DISCONNECT SHALL BE INTERNAL AND OF THE PLUG–IN TYPE.

THE MOTOR SHALL BE MOUNTED ON VIBRATION ISOLATORS. THE FAN WHEEL SHALL BE OF THE FORWARD–CURVED CENTRIFUGAL TYPE AND DYNAMICALLY BALANCED. ALL FANS SHALL BEAR THE AMCA CERTIFIED RATINGS PROGRAM AMCA AIR PERFORMANCE SEAL AND SHALL BE UL/CUL LISTED. CEILING OR WALL MOUNT FANS SHALL BE MODEL CSP AS MANUFACTURED BY GREENHECK FAN CORPORATION, SCHOFIELD, WISCONSIN.

SPECIFICATIONS– PEERLESS BOILER

GENERAL REQUIREMENTS:–

A. THE BOILER(S) SHALL BE OF A LOW PRESSURE, CAST IRON, WET BASE FORCED DRAFT DESIGN AND SHALL BE TESTED AND RATED IN ACCORDANCE WITH THE CURRENT EDITION OF THE HYDRONICS INSTITUTE DIVISION OF GAMA "TESTING AND RATING STANDARD FOR HEATING BOILERS".

B. THE BOILER(S) SHALL BE LISTED IN THE I=B=R RATINGS DIRECTORY AND SHALL BE CAPABLE OF DEVELOPING FULL I=B=R LISTED OUTPUT AT 100 PERCENT FIRING RATE, AND SHALL BEAR THE I=B=R EMBLEM.

C. THE BOILER(S) WILL BE PEERLESS MODEL SC/SCT–08 FOR GAS FIRING WITH AN I=B=R GROSS OUTPUT OF 527 MBH AND A NET I=B=R STEAM RATING OF 395 MBH.

D. THE BOILER(S) SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PROVISIONS OF SECTION IV OF THE ASME BOILER AND PRESSURE VESSEL CODE AND SHALL BE STAMPED WITH THE REQUIRED ASME SYMBOL. EACH BOILER SECTION SHALL BE HYDROSTATICALLY PRESSURE TESTED FOR A MAXIMUM ALLOWABLE WORKING PRESSURE OF (30) (50) PSIG FOR WATER AND 15 PSIG FOR STEAM.

E. THE BOILER(S) SHALL BE FIELD ASSEMBLED AND HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. ALL WORK SHALL BE COMPLETED IN A NEAT AND WORKMANLIKE MANNER.

F. OPTIONAL FACTORY ASSEMBLED SECTIONS: (SC/SCT–07 THRU 10) THE BOILER(S) SHALL BE PROVIDED WITH FACTORY ASSEMBLED SECTIONS. THE SECTIONS SHALL BE ASSEMBLED WITH STEEL PUSH NIPPLES AND HIGH TEMPERATURE SEALING ROPE SHALL BE USED TO PROVIDE A PERMANENT GAS–TIGHT SEAL BETWEEN THE SECTIONS.
THE BOILER(S) SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH SECTION IV OF THE ASME BOILER AND PRESSURE VESSEL CODE FOR A MAXIMUM ALLOWABLE WORKING PRESSURE OF (30) (50) PSIG FOR WATER AND 15 PSIG FOR STEAM.

G. OPTIONAL FACTORY PACKAGED BOILERS:
THE BOILER(S) SHALL BE COMPLETELY FACTORY PACKAGED WITH JACKET, BURNER, TRIM AND CONTROLS MOUNTED AND WIRED. THE BOILER SECTIONS SHALL BE ASSEMBLED WITH STEEL PUSH NIPPLES AND HIGH TEMPERATURE SEALING ROPE SHALL BE USED TO PROVIDE A PERMANENT GAS–TIGHT SEAL BETWEEN THE SECTIONS. THE BOILER(S) SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH SECTION IV OF THE ASME BOILER AND PRESSURE VESSEL CODE FOR A MAXIMUM ALLOWABLE WORKING PRESSURE OF (30) (50) PSIG FOR WATER AND 15 PSIG FOR STEAM. THE BOILER(S) SHALL BE FIRE–TESTED (OPTIONAL) FOR A FUNCTIONAL CHECK OF ALL COMPONENTS PRIOR TO SHIPMENT.

BOILER CONSTRUCTION FEATURES

A. THE SC/SCT–07 THRU 10 SHALL HAVE A FACTORY ASSEMBLED SPLIT BLOCK OF SECTIONS FOR EASE OF HANDLING.

B. THE BOILER SECTIONS SHALL BE ASSEMBLED WITH STEEL PUSH NIPPLES TO PROVIDE A PERMANENT WATER–TIGHT SEAL BETWEEN THE SECTIONS.

C. EACH SECTION SHALL BE EVENLY SPACED WITH SPACING PADS AND HIGH TEMPERATURE SEALING ROPE SHALL BE USED TO PROVIDE A PERMANENT GAS–TIGHT SEAL BETWEEN THE SECTIONS.

D. THE BOILER SECTIONS SHALL BE OF A WET BASE DESIGN TO PROVIDE A COMPLETE WATER BACKED HEATING SURFACE AROUND THE COMBUSTION CHAMBER AREA FOR MAXIMUM HEAT TRANSFER AND LOW FLOOR TEMPERATURES.

E. THE BOILER(S) SHALL BE FURNISHED WITH CLEANOUT PLATES AND HIGH TEMPERATURE GASKETS TO SEAL THE CLEANOUT OPENINGS LOCATED ON THE LEFT SIDE OF THE BOILER(S). THE CLEANOUT PLATES SHALL BE EASILY REMOVABLE TO PERMIT INSPECTION AND CLEANING OF THE FLUEWAYS.

F. THE BOILER(S) SHALL BE FURNISHED WITH A TOP OUTLET FLUE COLLECTOR CONSTRUCTED OF CORROSION RESISTANT ALUMINIZED STEEL AND SHALL INCLUDE AN ADJUSTABLE DAMPER WHICH IS CAPABLE OF BEING SECURELY LOCKED IN POSITION TO PRESSURIZE THE BOILER FOR FORCED DRAFT OPERATION. THE FLUE COLLECTOR SHALL BE SEALED TO THE TOP OF THE BOILER SECTIONS WITH HIGH TEMPERATURE SEALING ROPE.

G. THE BOILER(S) SHALL BE PROVIDED WITH A FIBROUS CERAMIC REFRACTORY CHAMBER LINER AND A PRE–FORMED CERAMIC FIBER REFRACTORY TARGET WALL TO PROTECT THE BASE OF THE FIREBOX AND THE BACK SECTION.

H. THE BOILER(S) SHALL BE PROVIDED WITH AN INSULATED BURNER MOUNTING PLATE WITH THE NECESSARY TAPPINGS FOR MOUNTING THE BURNER(S). THE PLATE(S) SHALL INCLUDE A PYREX GLASS FLAME OBSERVATION PORT TO PERMIT VISUAL INSPECTION OF THE BURNER FLAME.

I. THE BOILER(S) SHALL BE PROVIDED WITH AN INSULATED STEEL JACKET WITH A PAINTED FINISH.

BOILER FOUNDATION

A. A CONCRETE HOUSEKEEPING PAD SHALL BE PROVIDED AS RECOMMENDED BY THE BOILER MANUFACTURER IF THE BOILER ROOM FLOOR IS NOT LEVEL OR IF ADDITIONAL STRUCTURAL SUPPORT IS NEEDED.

BOILER TRIM AND CONTROLS

FOR STEAM BOILERS:
A. THE BOILER(S) SHALL BE PROVIDED WITH A SAFETY VALVE SET TO RELIEVE AT 15 PSIG. THE VALVE SHALL CONFORM TO SECTION IV OF THE ASME BOILER AND PRESSURE VESSEL CODE.

B. THE BOILER(S) SHALL BE PROVIDED WITH A COMPOUND STEAM GAUGE TO INDICATE BOILER PRESSURE.

C. THE BOILER(S) SHALL BE PROVIDED WITH A WATER GAUGE GLASS AND GAUGE COCKS.

D. THE BOILER(S) SHALL BE PROVIDED WITH AN OPERATING PRESSURE CONTROL AND A MANUAL RESET HIGH LIMIT PRESSURE CONTROL.

E. THE BOILER(S) SHALL BE PROVIDED WITH A (FLOAT TYPE) (PROBE TYPE) LOW WATER CUT–OFF.

N

BURNER OPERATING CHARACTERISTICS

FOR GAS BURNERS:
A. THE GAS BURNER(S) SHALL BE ARRANGED FOR ON–OFF OPERATION WITH ONE–POSITION AIR CONTROL. THE BURNER(S) SHALL BE FURNISHED WITH A PRE–WIRED CONTROL PANEL INCORPORATING AN ELECTRONIC COMBUSTION CONTROL WITH PRE–PURGE TIMING AND AN ULTRAVIOLET FLAME DETECTOR. THE BURNER SHALL INCLUDE DUAL GAS VALVES, PROVEN GAS PILOT AND AN AIR FLOW SAFETY SWITCH.

B. THE GAS BURNER(S) SHALL BE DESIGNED TO OPERATE AT RATED INPUT WITH A 9.5% CO2 WHEN FIRING NATURAL GAS.

SEQUENCE OF BOILER– PEERLESS BOILER

A. CHECK THE PIPING

1. WATER/STEAM PIPING
a) THE BOILER MUST HAVE BEEN HYDROSTATICALLY TESTED.
b) CHECK THE ATTACHED PIPING FOR JOINT TIGHTNESS.
c) CONTINUE MONITORING AS YOU PROCEED THROUGH START UP.

2. GAS PIPING
a) MAKE SURE THE GAS SYSTEM PIPING AND THE CONNECTIONS TO THE BOILER GAS CONTROL TRAIN(S) HAVE BEEN LEAK TESTED.
b) AFTER THE BOILER IS IN OPERATION, CHECK THE TIGHTNESS OF ALL JOINTS IN THE BOILER GAS PIPING WITH A SOAP SUDS SOLUTION.
c) PURGE THE GAS PIPING OF ALL AIR UP TO THE BOILER GAS CONTROL TRAIN.

B. FILL THE BOILER

1. GRAVITY SYSTEMS – FILL THE BOILER TO THE NORMAL WATER LINE.
2. PUMPED RETURN SYSTEMS WITH CONDENSATE UNIT FILL THE BOILER USING THE BOILER FEED UNIT. VERIFY THE UNIT MAINTAINS A WATER LEVEL THAT IS VISIBLE IN THE GAUGE GLASS AND DOES NOT EXCEED THE NORMAL WATER LEVEL.
3. CHECK ALL JOINTS AND FITTINGS IN THE SYSTEM PIPING FOR LEAKS AND REPAIR AS NECESSARY.
4. IF THE WATER HARDNESS IS HIGH, USE WATER TREATMENT TO REDUCE THE DEPOSITION OF MINERALS IN THE BOILER.
5 IF THE WATER PH IS OUT OF 7.5 TO 11 RANGE, ADD WATER TREATMENT CHEMICALS TO BRING WITHIN RANGE, IF REQUIRED.

C. RUN BURNER CHECK–OUT

1. BEFORE FIRING THE BURNER, OPEN THE DAMPER AT THE FLUE COLLECTOR.
2. FOLLOW THE INSTRUCTIONS IN THE BURNER MANUAL FOR STARTING THE BURNER, ADJUSTING AIR OPENINGS AND FUEL PERFORM IGNITION SYSTEM AND FLAME SUPERVISORY CONTROL TEST AND CHECKOUT AS DESCRIBED IN THE MANUAL.
3. AFTER THE BURNER IS SET AT RATE, CLOSE THE DAMPER UNTIL THE PRESSURE READING AT THE TEST OPENING IS BETWEEN 0" AND 0.1" WC POSITIVE.
4. ADJUST THE BURNER AS NEEDED FOR A CO2 READING OF:
a) OIL BURNERS: CO2 APPROXIMATELY 12.5% OR 1% LESS THAN THE LEVEL AT WHICH THE SMOKE READING GOES ABOVE A TRACE ON THE BACHARACH SCALE.
b) GAS BURNERS: 9% TO 10% WITH CO LESS THAN 50 PPM.
5. INSPECT ALL FLUE GAS JOINTS (SECTIONS, ATTACHMENTS, BREECHING AND VENT) FOR GAS TIGHTNESS. REMOVE THE JACKET PANELS IN ORDER TO THOROUGHLY INSPECT ALL ROPE
c) SEAL JOINTS BETWEEN THE SECTIONS.

D. CHECK BOILER CONTROLS

1. LIMIT AND OPERATING TEMPERATURE CONTROLS
a) LOWER THE SETTING OF EACH CONTROL UNTIL THE BURNER SHUTS DOWN.
2. LOW WATER CUTOFFS
a) TEST PROBE TYPE CONTROLS BY USING THE PUSH–TO–TEST BUTTON.
b) TEST FLOAT TYPE CONTROLS.
3. FOLLOW ADDITIONAL INSTRUCTIONS IN THE BURNER MANUAL FOR PROVING THE BURNER COMPONENT OPERATION.
4. CHECK ALL CONTROLS TO MAKE SURE THEY FUNCTION CORRECTLY.
5. AFTER ALL CONTROLS HAVE BEEN PROVEN, SET THE OPERATING AND HIGH LIMIT TEMPERATURE CONTROLS TO THE TEMPERATURES DESIRED.

E. CLEAN THE BOILER

1. CLEAN THE BOILER AS DESCRIBED BELOW NO LATER THAN ONE WEEK AFTER THE INITIAL START–UP. CLEANING WILL BE MORE EFFECTIVE IF THE BOILER OPERATES A DAY OR TWO TO LOOSEN SEDIMENT AND IMPURITIES IN THE SYSTEM.
2. FOLLOW THE CLEANING INSTRUCTIONS IN SECTION "G. CLEAN THE BOILERS" IN THE MAINTENANCE SECTION OF THIS MANUAL.
3. THE BOILER MUST BE CLEANED TO REMOVE ANY ACCUMULATION OF OIL, GREASE, SLUDGE, ETC. THAT MAY BE IN THE SYSTEM. THESE SUBSTANCES CAN CAUSE FOAMING AND SURGING OF THE BOILER WATER, PRODUCING UNSTABLE WATER LINE AND WATER CARRYOVER TO THE SYSTEM.
4. THE PIPING FOR A 2" SKIM VALVE MUST BE DONE AS SHOWN IN THIS MANUAL, WITH THE SKIM VALVE MOUNTED OFF THE POP SAFETY VALVE TEE ON THE REAR OF THE BOILER.
5. USE COMMON WASHING SODA (SUCH AS ARM AND HAMMER SUPER WASHING SODA). MIX THE SODA WITH WATER IN A 10 QUART PAIL. USE A PROPORTION OF ONE POUND OF WASHING SODA FOR EACH 800 SQUARE FEET EDR NET BOILER RATING. REMOVE THE POP SAFETY VALVE AND POUR THE WASHING SODA SOLUTION INTO THE BOILER THROUGH THE POP SAFETY VALVE TEE. REPLACE POP SAFETY VALVE.
6. CONNECT A 2 INCH DRAIN LINE OFF OF THE SKIM VALVE, RUN TO A POINT OF SAFE DISCHARGE.
7. CLOSE ALL VALVES TO THE SYSTEM. PROVIDE A MEANS OF CONTINUOUS FRESH WATER TO THE BOILER FOR THE CLEANING PROCESS.
8. OPEN THE SKIM VALVE. FILL THE BOILER UNTIL WATER BEGINS TO FLOW OUT OF THE VALVE.
9. TURN BURNER ON AND ALLOW THE BOILER WATER TO HEAT UP TO JUST BELOW STEAMING (180° TO 200° F). CYCLE THE BURNER TO MAINTAIN TEMPERATURE DURING SKIMMING. DO NOT ALLOW THE BOILER TO STEAM. STEAMING MIXES UP THE CONTAMINANTS IN THE WATER INSTEAD OF FLOATING THEM AT THE SURFACE.
10. OPEN THE MAKE–UP WATER VALVE TO CONTINUOUSLY FEED WATER TO THE BOILER. ALLOW WATER TO FLOW OUT THE SKIM TAPPING.
11. CONTINUE SKIMMING THE BOILER UNTIL THE WATER FLOWING FROM THE SKIM TAPPING FLOWS CLEAR. THIS WILL TAKE SOME TIME, POSSIBLY SEVERAL HOURS FOR A DIRTY SYSTEM.
12. AFTER SKIMMING IS COMPLETE, CLOSE THE SKIM VALVE AND TURN OFF THE BOILER.
AGAIN ONE OR TWO TIMES TO MAKE SURE ALL OF THE SODA HAS BEEN WASHED OUT.
15. RESTORE PIPING TO NORMAL. PIPE A NIPPLE AND CAP IN THE SKIM VALVE.
16. NOTE: IF THE GAUGE GLASS BECOMES DIRTY AGAIN, THIS INDICATES MORE CONTAMINANTS HAVE WORKED LOOSE IN THE SYSTEM. REPEAT THE CLEANING AND SKIMMING
17. PROCESS AS NEEDED TO CLEAN THE SYSTEM.

SEQUENCE OF OPERATION– HOT WATER HEATER VENT/COMBUSTION AIR INTAKE.

1. WHEN THE CONTROL SYSTEM IS FIRST POWERED, DURING BOOT UP, IT WILL DISPLAY WATER HEATER MODEL INFORMATION DURING INITIALIZATION. AFTER A FEW MOMENTS THE CONTROL SYSTEM LCD TOUCH DISPLAY WHICH IS PART OF THE UIM (USER INTERFACE MODULE) WILL DISPLAY THE DEFAULT SCREEN KNOWN AS THE "DESKTOP" SCREEN.

2. IF THE CONTROL SYSTEM DETERMINES THAT THE ACTUAL WATER TEMPERATURE INSIDE THE TANK IS BELOW THE PROGRAMMED OPERATING SET POINT MINUS THE DIFFERENTIAL SETTING, A HEATING CYCLE IS ACTIVATED.

3. THE CONTROL SYSTEM THEN PERFORMS SELECTED DIAGNOSTIC SYSTEM CHECKS THIS INCLUDES CONFIRMING THE BLOCKED EXHAUST, BLOCKED INTAKE AND ECO (ENERGY CUT OUT) SWITCH CONTACTS ARE CLOSED.

4. IF ALL DIAGNOSTIC CHECKS ARE SUCCESSFULLY PASSED, THE CONTROL SYSTEM ENERGIZES THE COMBUSTION BLOWER FOR PRE–PURGE.

5. THE CONTROL SYSTEM ENERGIZES THE SPARK IGNITION TRANSFORMER.

6. AFTER A FEW SECONDS, THE CONTROL SYSTEM ENERGIZES THE 24V GAS CONTROL VALVE ALLOWING GAS TO FLOW TO THE MAIN BURNER.

7. THE CONTROL SYSTEM MONITORS THE FLAME SENSOR TO CONFIRM A FLAME IS PRESENT AT THE MAIN BURNER. IF A FLAME IS NOT VERIFIED DURING THE IGNITION TRIAL PERIOD THE CONTROL SYSTEM WILL TRY FOR IGNITION UP TO TWO MORE TIMES. IF FLAME CAN NOT BE VERIFIED AFTER THREE TRIALS FOR IGNITION, THE CONTROL SYSTEM WILL LOCK OUT AND DISPLAY THE "IGNITION FAILURE" FAULT MESSAGE.

8. IF A FLAME IS VERIFIED, THE CONTROL SYSTEM WILL DE–ENERGIZE THE SPARK IGNITION TRANSFORMER AND ENTER THE HEATING MODE WHERE IT WILL CONTINUE HEATING THE WATER UNTIL THE OPERATING SET POINT IS REACHED. AT THIS POINT, THE CONTROL SYSTEM WILL DE–ENERGIZE THE 24–VOLT GAS VALVE AND ENTER THE POST–PURGE CYCLE (APPROXIMATELY 60 SECONDS).

9. THE COMBUSTION BLOWER WILL RUN FOR THE DURATION OF THE POSTPURGE CYCLE TO PURGE THE WATER HEATER OF ALL COMBUSTION GASES WHEN THE POST–PURGE CYCLE IS COMPLETE, THE BLOWER IS DE–ENERGIZED AND WILL COAST TO A STOP.

10. THE CONTROL SYSTEM NOW ENTERS THE STANDBY MODE WHILE CONTINUING TO MONITOR THE INTERNAL STORAGE TANK WATER TEMPERATURE AND THE STATE OF OTHER SYSTEM DEVICES. IF THE TANK TEMPERATURE DROPS BELOW THE OPERATING SET POINT MINUS THE DIFFERENTIAL SETTING, THE CONTROL WILL AUTOMATICALLY RETURN TO STEP 2 AND REPEAT THE OPERATING CYCLE.

–LIFE SAFETY PANEL SEQUENCE OF OPERATION:

SHOULD A BREAK GLASS STATION–CO OR METHANE DETECTOR ARE ENABLED, THE CONTROL PANEL WILL BREAK POWER TO EACH OF THE BOILERS THROUGH A RELAY CONTACTOR FACTORY MOUNTED AND WIRED IN THE LSP. AN AUDIBLE ALARMS WILL SOUND AND INDICATOR LIGHT WILL ILLUMINATE INDICATING WHICH SAFETY WAS ENABLED.

A MANUAL RESET ON THE PANEL MUST BE PUSHED BEFORE BOILERS ARE ALLOWED TO START UP ONCE AGAIN.

IF ANY OF THE 4–WATER SENSORS ARE ENABLED THE LIFE SAFETY PANEL WILL SET OFF AN AUDIBLE ALARM. THE ALARM WILL NOT TURN OFF BOILERS.

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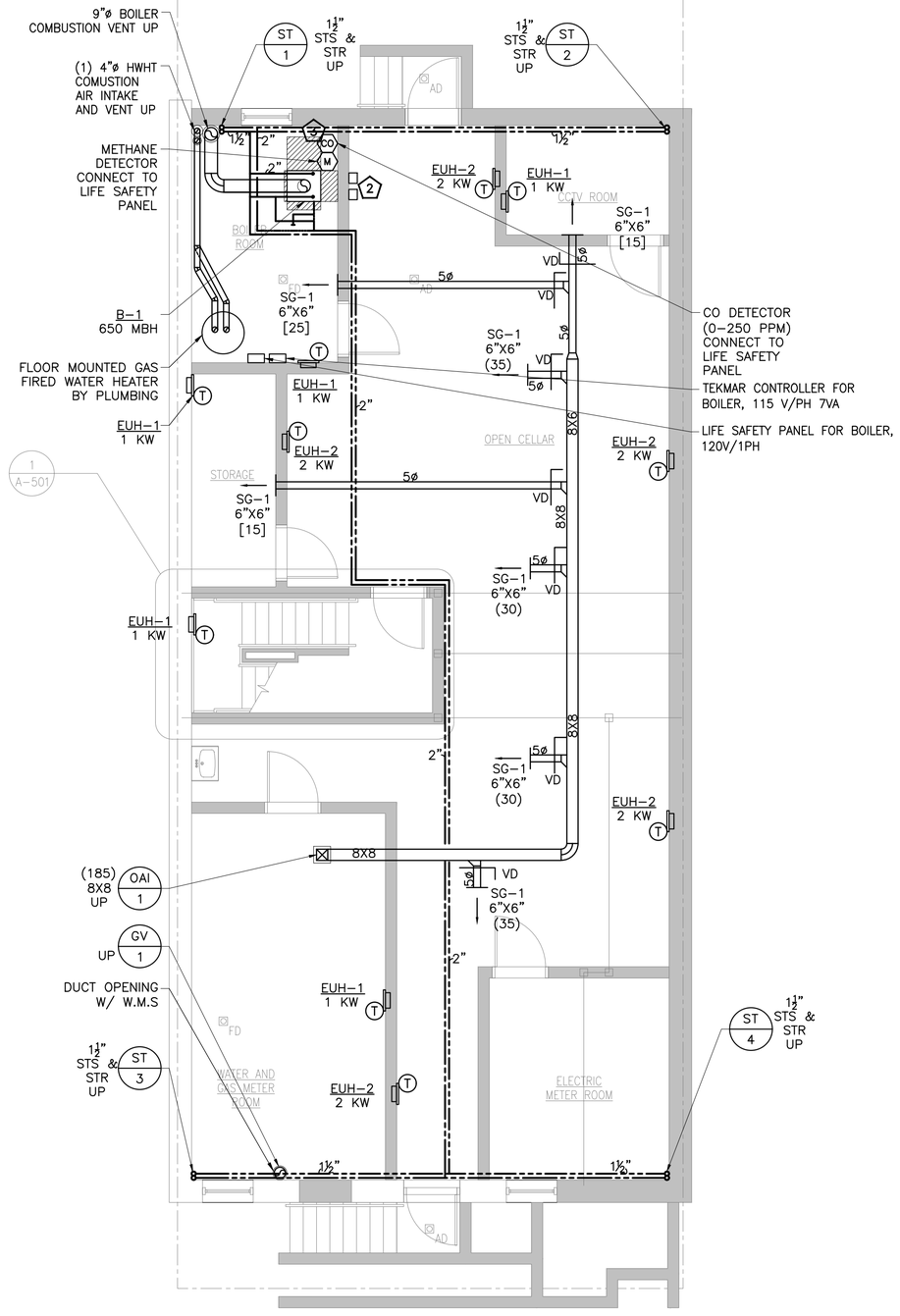
KEY NOTES:

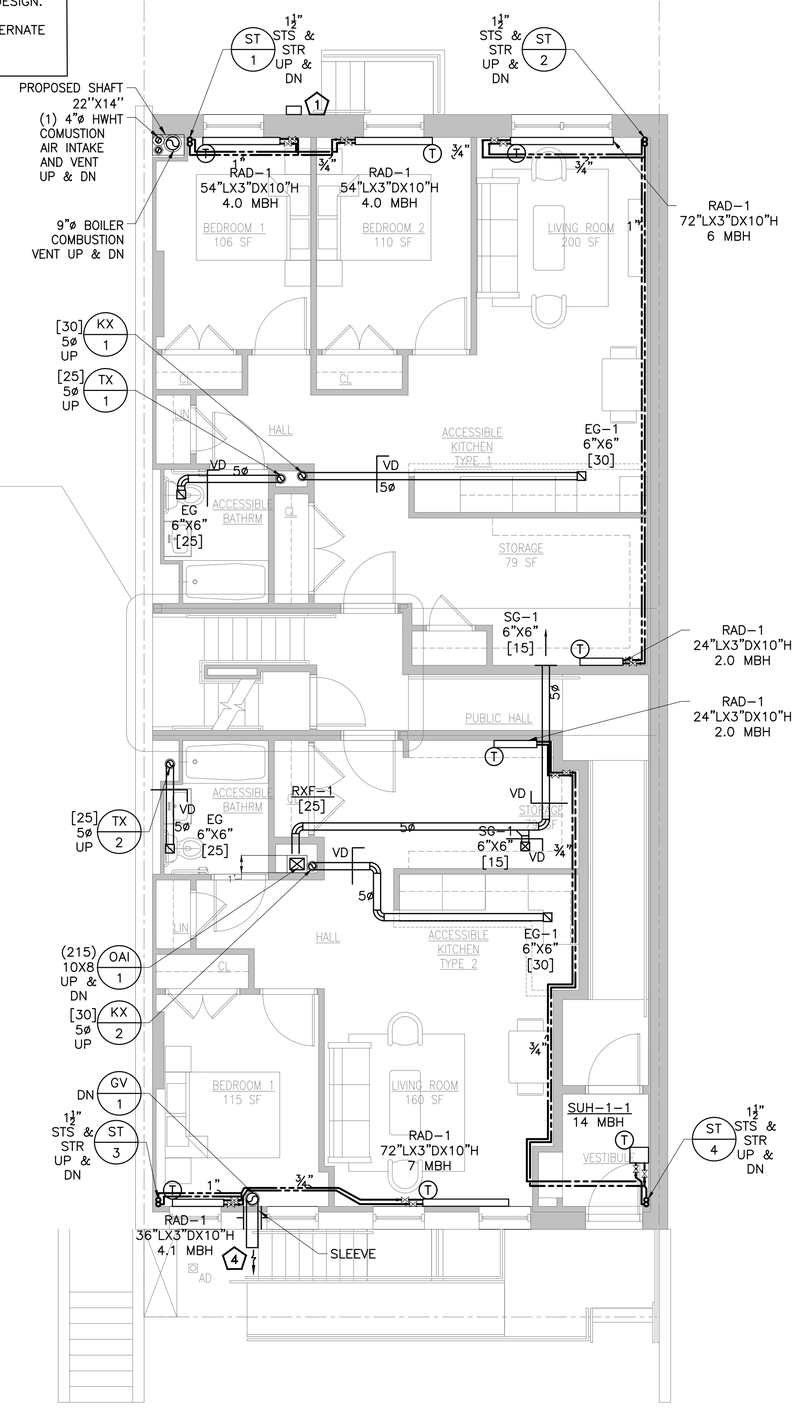
1. OUTDOOR AIR TEMP.SENSOR WIRED TO TEKMAR CONTROLLER, LOCATE OUTDOOR TEMP.SENSOR OUT OF DIRECT SUN LIGHT & AWAY FROM ANY HEAT SOURCE.
2. BREAK GLASS SWITCH CONNECT TO LIFE SAFETY PANEL, QUANTITY: 2
3. CONTRACTOR TO PROVIDE LEAK DETECTOR SENSOR FOR BOILER AND CONNECT TO LIFE SAFETY SYSTEM.
4. PROVIDE PERFORATED PLATE AT SIDEWALL 24" ABOVE GROUND LEVEL W/ FREE AREA NOT LESS THAN 30 SQ. INCHES.

NOTES:

1. PROVIDE DANFOSS VALVE AT EACH RADIATOR AND WATER UNIT HEATER SUPPLY LINE, AND CIRCUIT SETTER IN THE RETURN LINE AT EACH RADIATOR AND WATER UNIT HEATER.
2. OUTDOOR AIR INTAKE, EXHAUST OPENINGS, STAIRWAY VENTS SHALL BE PROVIDED WITH CLASS I MOTORIZED DAMPERS.THE DAMPERS SHALL HAVE AN AIR LEAKAGE RATE NOT GREATER THAN 4 CFM/FT2 OF DAMPER SURFACE AREA AT 1.0 INCH WATER GAUGE AND SHALL BE LABELED BY AN APPROVED AGENCY WHEN TESTED IN ACCORDANCE WITH AMCA 500D.
3. PROVIDE 2" INSULATION FOR OUTSIDE AND COMBUSTION AIR INTAKE.
4. PROVIDE FIRE RATED ENCLOSURE TO THE GAS VENT.
5. REFER TO SCHEDULE FOR ALTERNATE SINGLE BOILER DESIGN.
6. REFER TO SCHEDULE FOR SPECIFICATIONS OF ALTERNATE BASEBOARD HEATER DESIGN.



1 CELLAR MECHANICAL PLAN
SCALE: 3/16"=1'-0"



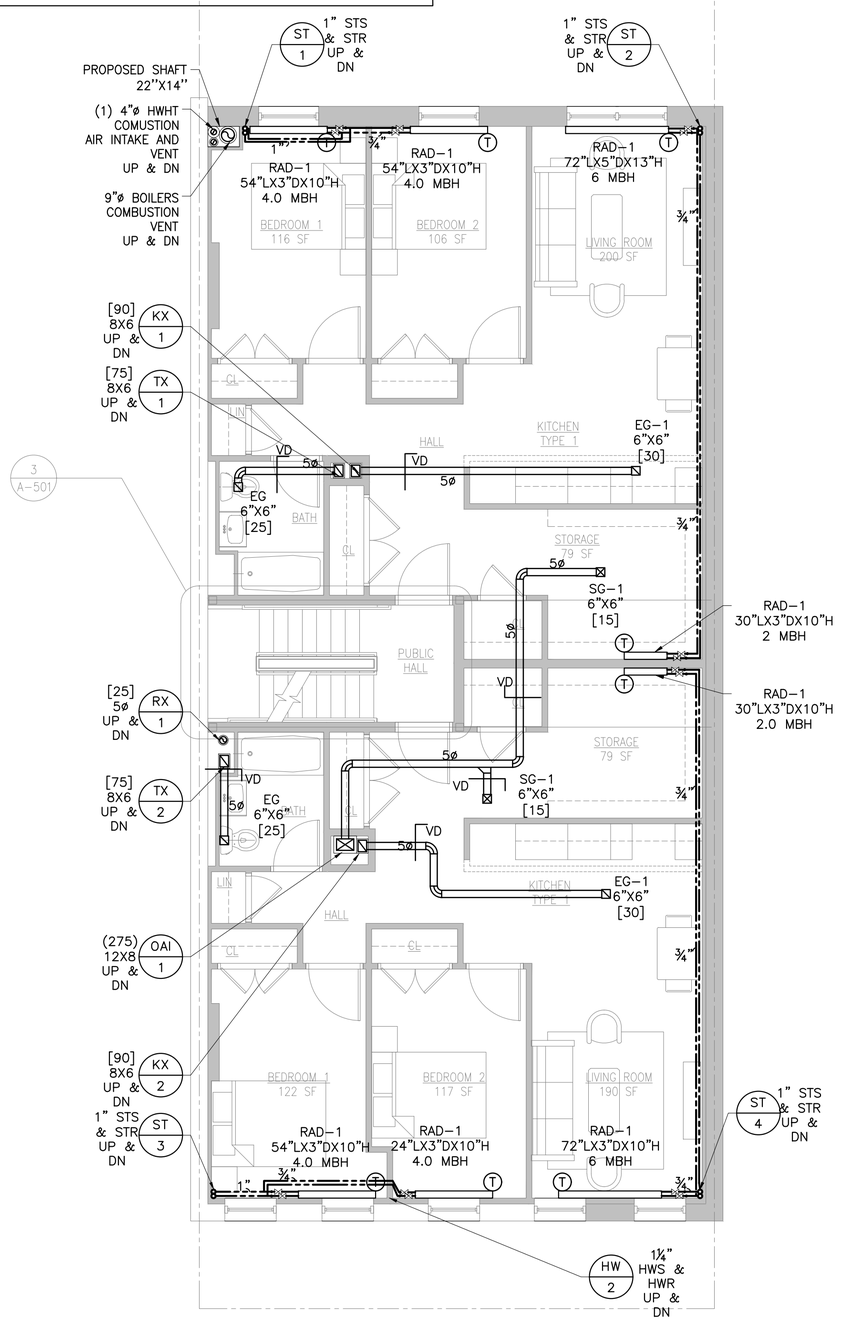
2 FIRST FLOOR MECHANICAL PLAN
SCALE: 3/16"=1'-0"

BERGEN STREET

N

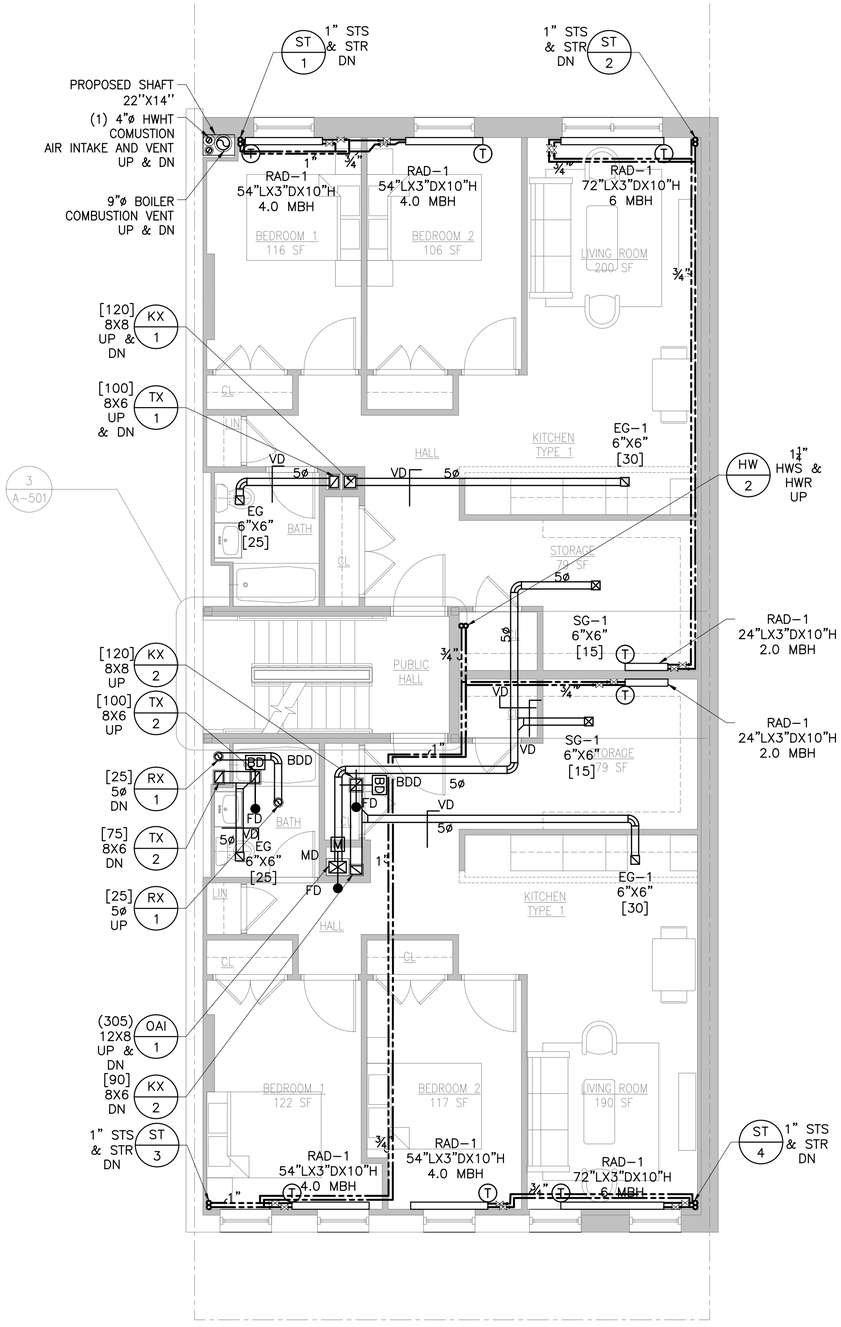
NOTES:

1. PROVIDE DANFOSS VALVE AT EACH RADIATOR SUPPLY LINE, AND CIRCUIT SETTER IN THE RETURN LINE AT EACH RADIATOR AND WATER UNIT HEATER.
2. OUTDOOR AIR INTAKE, EXHAUST OPENINGS, STAIRWAY VENTS SHALL BE PROVIDED WITH CLASS I MOTORIZED DAMPERS.THE DAMPERS SHALL HAVE AN AIR LEAKAGE RATE NOT GREATER THAN 4 CFM/FT2 OF DAMPER SURFACE AREA AT 1.0 INCH WATER GAUGE AND SHALL BE LABELED BY AN APPROVED AGENCY WHEN TESTED IN ACCORDANCE WITH AMCA 500D.
3. PROVIDE 2" INSULATION FOR OUTSIDE AND COMBUSTION AIR INTAKE.
4. ALL RISER SIZES AND CFM SHOWN ON SECOND AND THIRD FLOOR TYPICAL FLOOR PLAN ARE AS PER THIRD FLOOR PLAN.



1 SECOND AND THIRD TYPICAL FLOOR MECHANICAL PLAN

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



2 FOURTH FLOOR MECHANICAL PLAN

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

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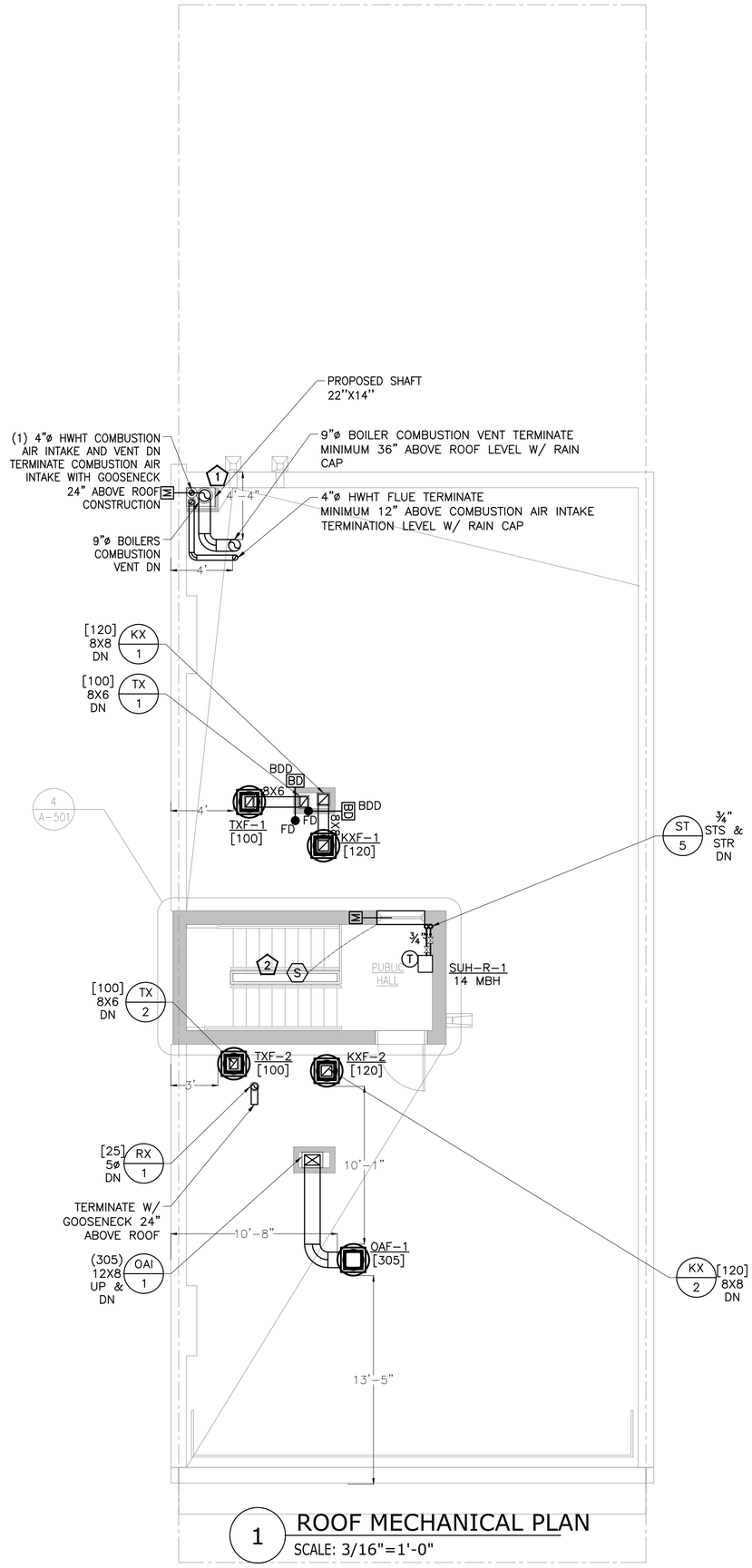


1 ROOF MECHANICAL PLAN

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

NOTES:

1. PROVIDE DANFOSS VALVE AT EACH RADIATOR/HOT WATER UNIT HEATER SUPPLY LINE CONNECTION, AND CIRCUIT SETTER IN RETURN LINE AT EACH RADIATOR AND WATER UNIT HEATER.
2. ALL EXHAUST FANS SHALL BE LOCATED MINIMUM 3 FEET FROM LOT LINE, ALL OUTDOOR AIR INTAKE FANS SHOULD BE 10 FEET FROM LOT LINE AND ANY EXHAUST.
3. PROVIDE WEATHER PROOF COATING FOR ALL EXTERIOR DUCTWORK AND PIPING INSULATION.
4. OUTDOOR AIR INTAKE, EXHAUST OPENINGS, STAIRWAY AND SHAFT VENTS SHALL BE PROVIDED WITH CLASS I MOTORIZED DAMPERS.THE DAMPERS SHALL HAVE AN AIR LEAKAGE RATE NOT GREATER THAN 4 CFM/FT² OF DAMPER SURFACE AREA AT 1.0 INCH WAER GAUGE AND SHALL BE LABELED BY AN APPROVED AGENCY WHEN TESTED IN ACCORDANCE WITH AMCA 500D.
5. PROVIDE GOOSENECK, SCREEN FOR VENT AND VENT TERMINAL SHALL BE LOCATED AT,

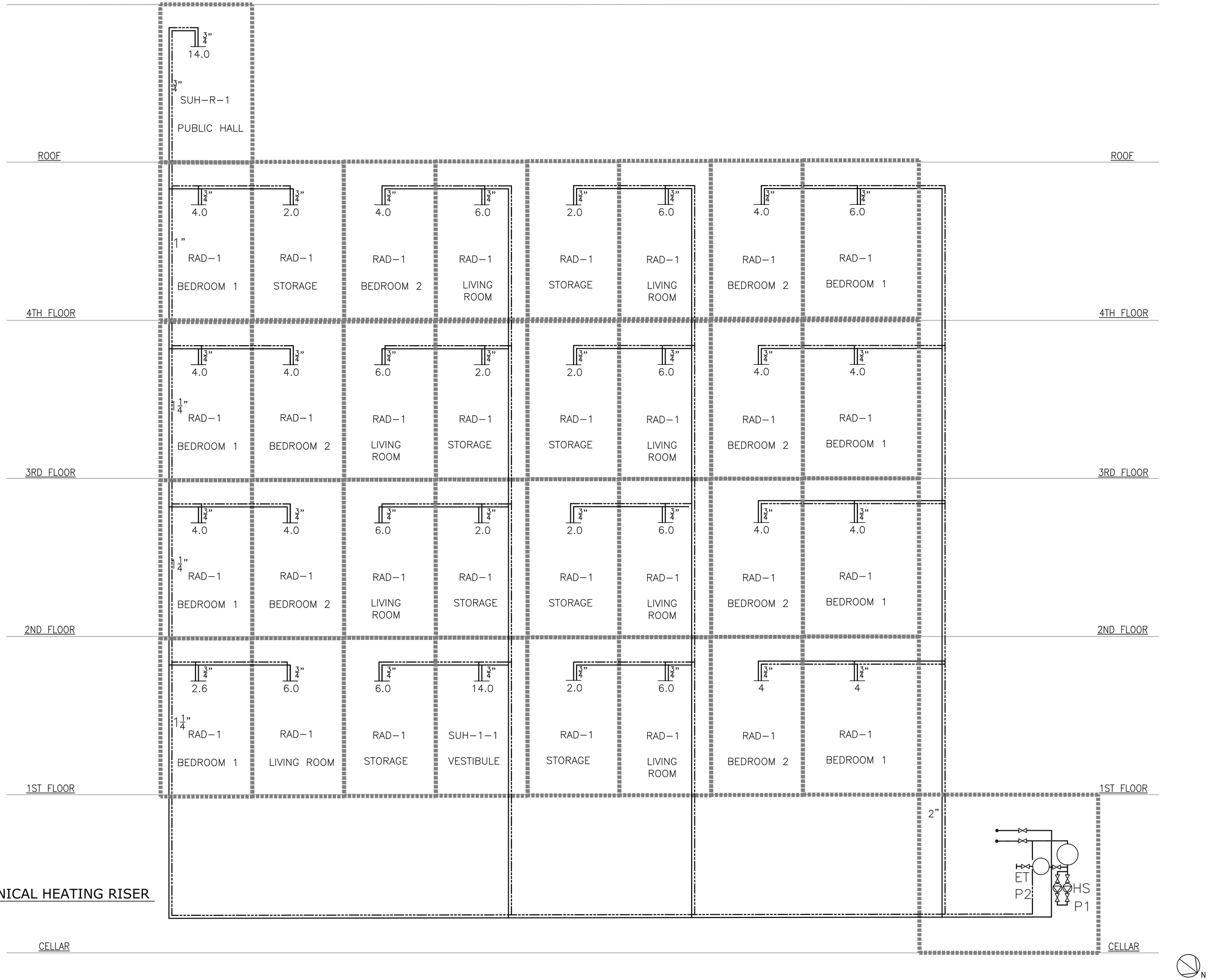
A) MINIMUM 4 FEET FROM LOT LINE.
B) EXTEND MINIMUM 4 FEET ABOVE ALL CONSTRUCTION LOCATED WITHIN 10 FEET OF CENTERLINE OF VENT OUTLET.
C) AT LEAST 12 INCH HORIZONTALLY & VERTICALLY FROM COMBUSTION AIR INTAKE.

6. PROVIDE GOOSENECK AND SCREEN FOR COMBUSTION AIR INTAKE,TERMINATE MINIMUM 24" ABOVE ROOF LEVEL.

KEY NOTES:-

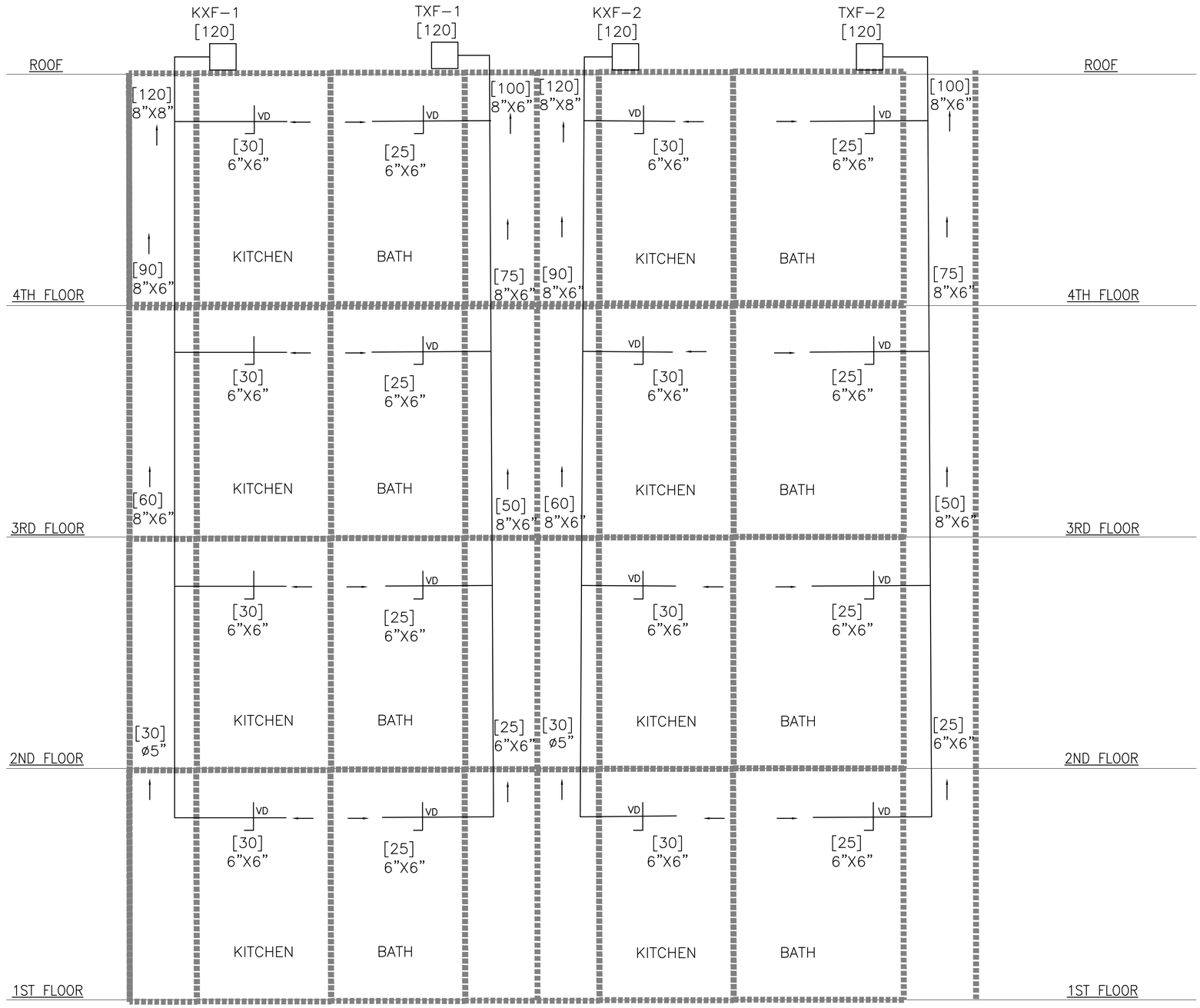
1. INTERLOCK MOTORIZED DAMPER WITH BOILERS/HWHT'S IN MECHANICAL ROOM. DAMPER SHALL CLOSE WHEN BOILERS/HWHT'S IS NOT IN OPEARTION
2. PROVIDE MIN,3.3 S.F VENT WITH LOUVER/HATCH AT THE TOP OF STAIRCASE ENCLOSURE.PROVIDE MOTORIZED DAMPER AT LOUVER/HATCH & CONNECT TO SMOKE DETECTOR ON TOP OF STAIRCASE ENCLOSURE TO 100% FULLY OPEN WHEN SMOKE DETECTOR IS TRIGGERED.NO OPENING SHALL BE LOCATED IN THE WALL WITHIN A DISTANCE OF 30 FEET VERTICALLY ABOVE VENT OPENING OR 5 FEET ON EITHER SIDE OF THE VENT OPENING.

N



1 MECHANICAL HEATING RISER

SCALE: NTS



2 MECHANICAL AIR RISER

SCALE: NTS

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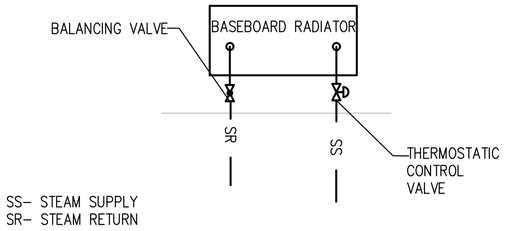
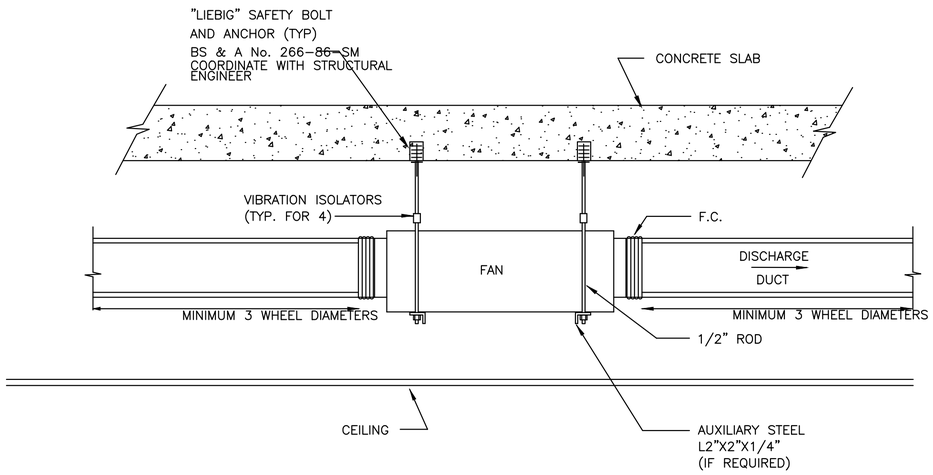
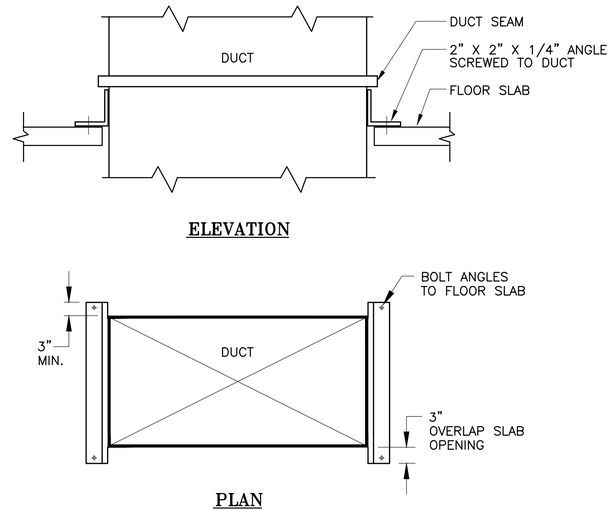


1 M-501 BASEBOARD RADIATOR
N.T.S

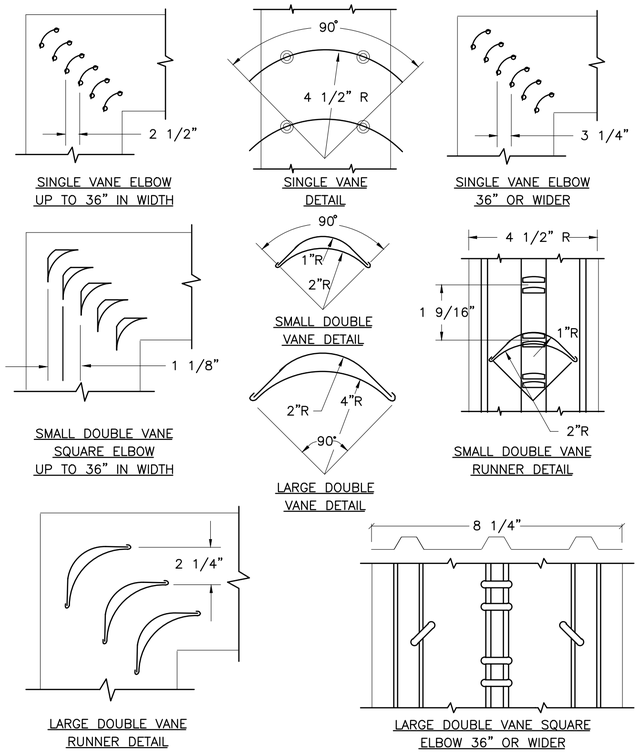


NOTE:
1. DUCT LENGTH TO BE MINIMUM THREE WHEEL DIAMETER ON DISCHARGE AND INLET.

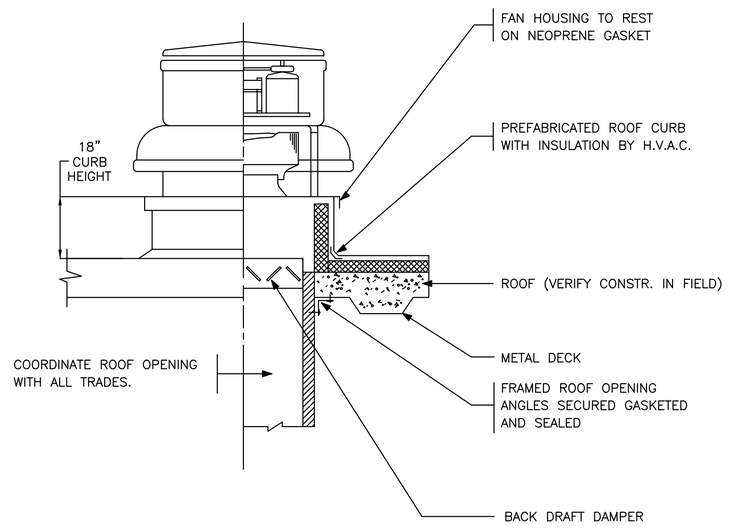
2 M-501 INLINE FAN SUPPORT DETAIL
N.T.S



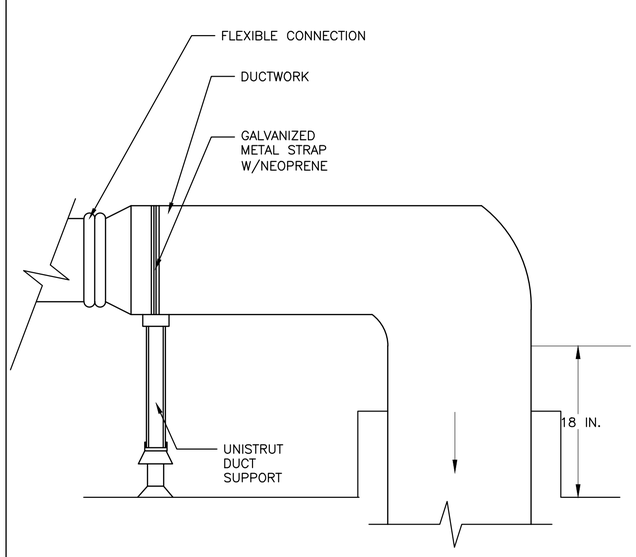
3 M-501 SUPPORT DETAIL FOR VERTICAL DUCTS
N.T.S



4 M-501 LOW VELOCITY DUCTWORK ELBOWS
N.T.S



5 M-501 TOILET EXHAUST FAN DETAIL
N.T.S



6 M-501 ROOF DUCT SUPPORT DETAIL
N.T.S

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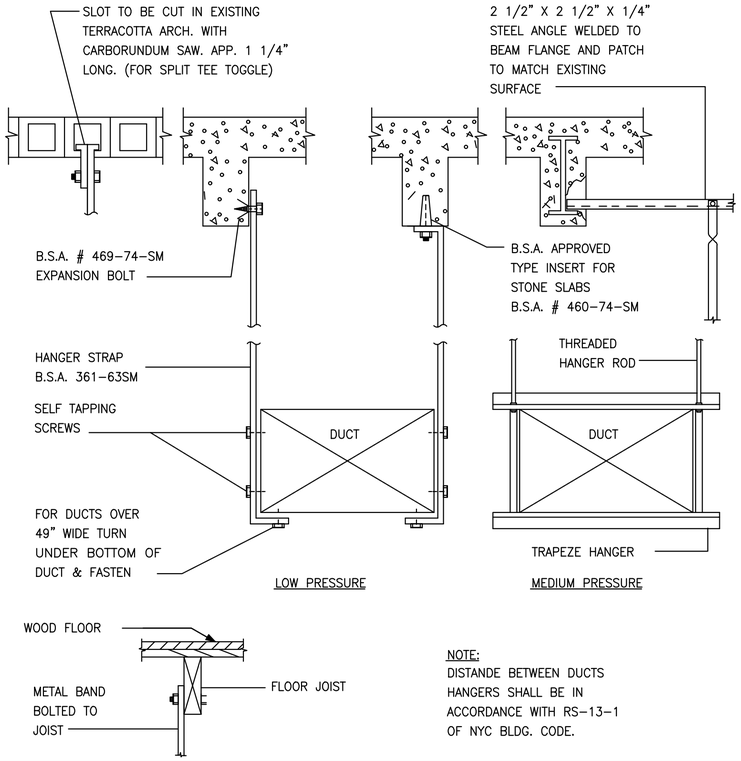
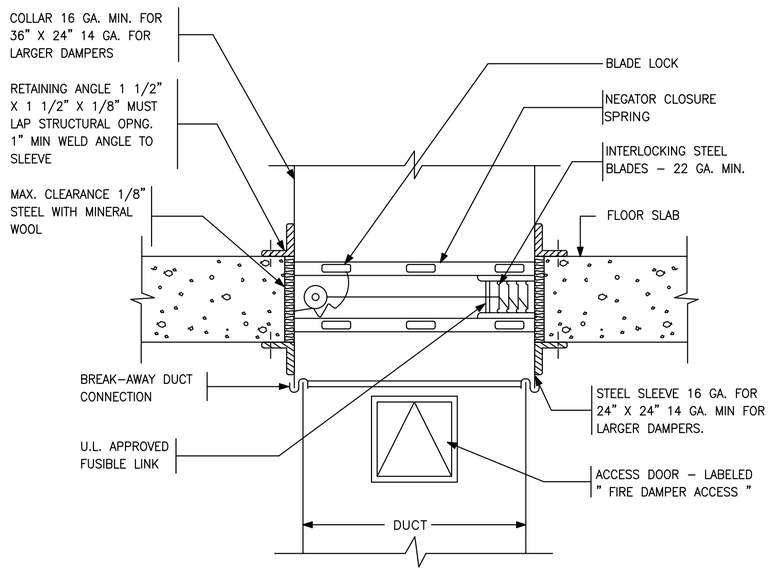
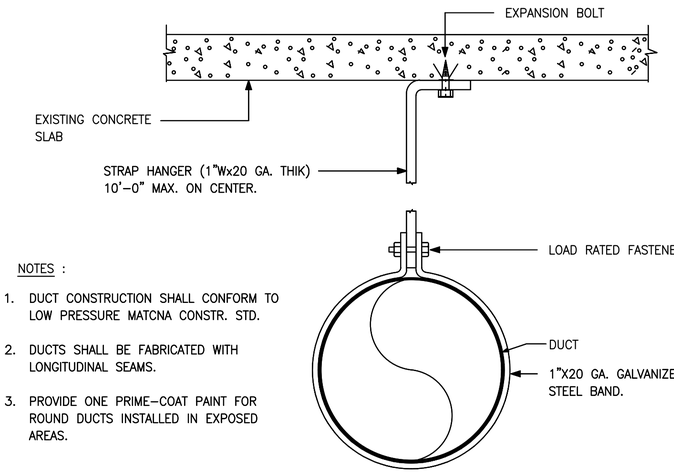


1 M-502 METHOD OF HANGING DUCTWORK N.T.S



NOTES: PRESSURE DROP ACROSS DAMPER SHALL NOT EXCEED 0.1" ESP.

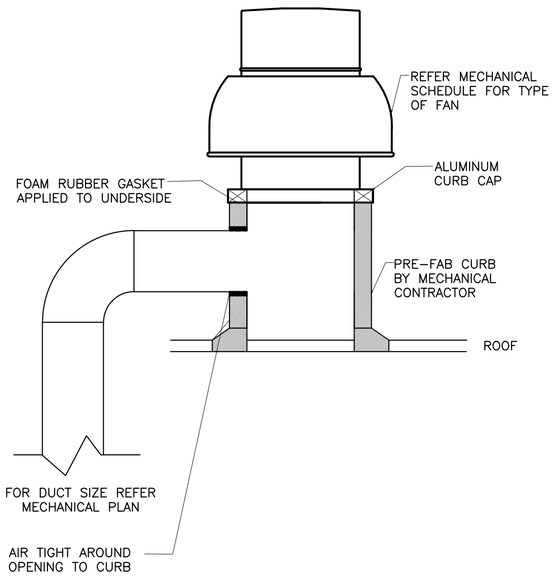
2 M-502 HORIZONTAL FIRE DAMPER DETAIL N.T.S



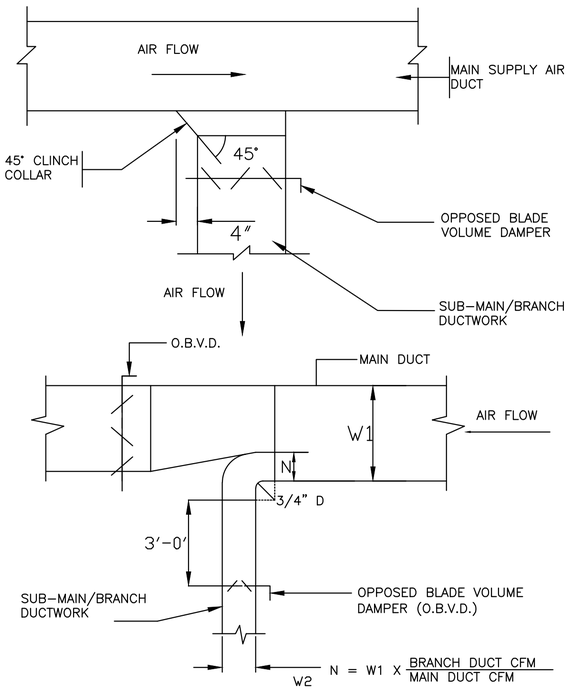
NOTES :

1. DUCT CONSTRUCTION SHALL CONFORM TO LOW PRESSURE MATCNA CONSTR. STD.
2. DUCTS SHALL BE FABRICATED WITH LONGITUDINAL SEAMS.
3. PROVIDE ONE PRIME-COAT PAINT FOR ROUND DUCTS INSTALLED IN EXPOSED AREAS.

3 M-502 METHOD OF HANGING DUCTWORK N.T.S

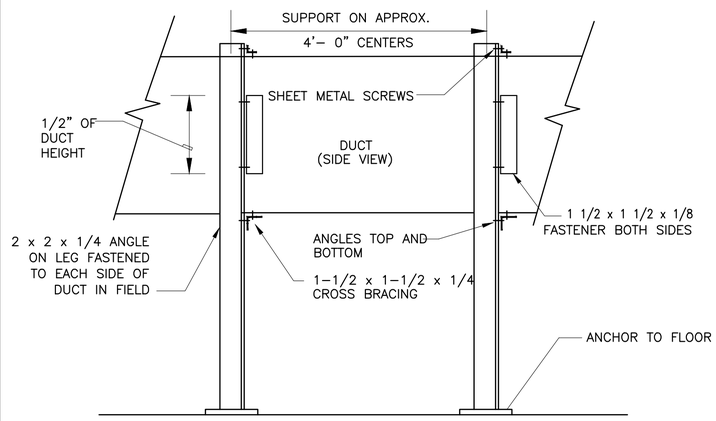


4 M-502 OAF FAN DETAIL N.T.S



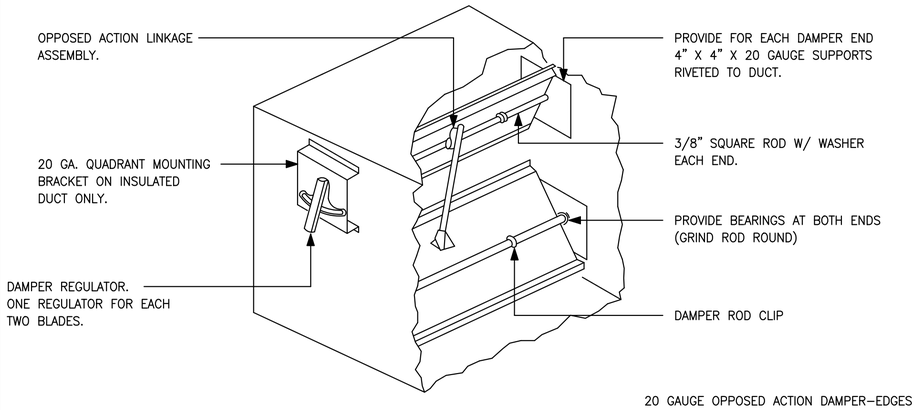
NOTE:
FURNISH THIS TYPE CONNECTION WHEN SINGLE LINE DUCTWORK IS INDICATED AS THIS

5 M-502 BRANCH DUCT CONNECTION N.T.S



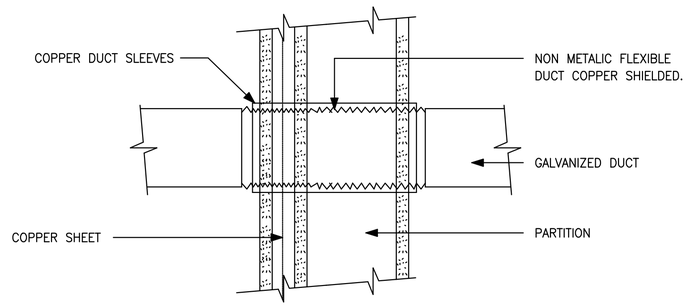
6 M-502 DUCT SUPPORT ON ROOF N.T.S

N



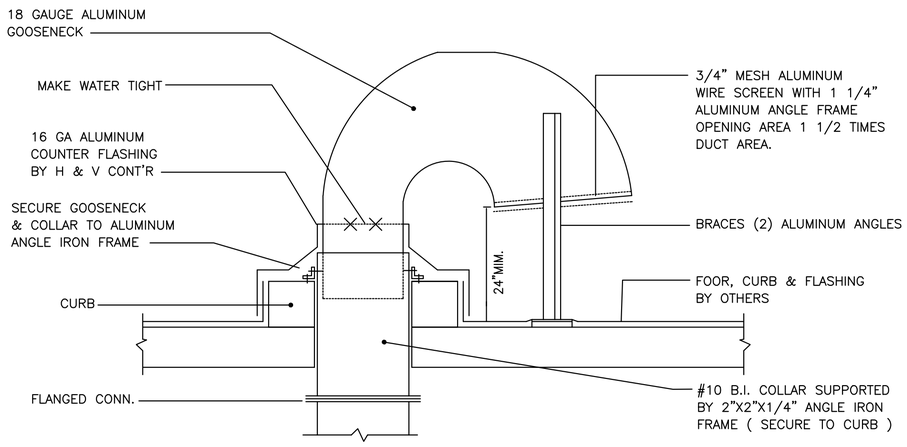
NOTE : 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.

1 / M–503 LOW PRESSURE BALANCING DAMPER N.T.S

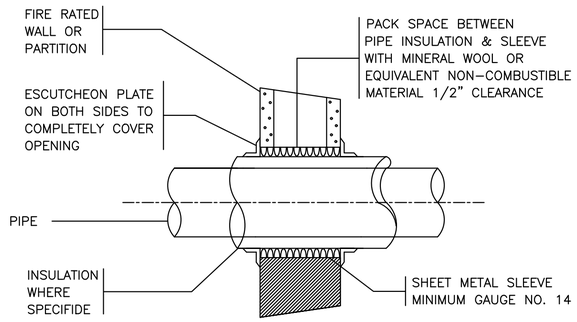


NOTES :
1. FOR WALL STRUCTURE – SEE ARCH. DWG.S.
2. COPPER DUCT SLEEVE AND COPPER SHIELDED PARTITION SHALL BE SOLIDLY CONNECTED EACH OTHER.

2 / M–503 WALL PENETRATION DETAIL N.T.S



3 / M–503 TYPICAL DETAIL OF ROOF GOOSENECK N.T.S



NOTE:

1.) THE INSTALLATION OF FIRE STOPPING MATERIALS SHALL BE SUBJECT TO CONTROLLED INSPECTION IN ACCORDANCE WITH C26–106.3.

4 / M–503 PIPE SLEEVE THRU RATED WALL N.T.S

N

PLUMBING SYMBOLS LIST

- SANITARY PIPING
- VENT PIPING
- COLD WATER PIPING
- EXIST. COLD WATER PIPING
- HOT WATER PIPING
- HOT WATER RETURN PIPING
- UNGD. SANITARY PIPING
- G — GAS PIPING
- ST — STORM WATER PIPING
- L — LEADER STORM PIPING
- P-TRAP
- PIPE UP
- PIPE DROP
- PLUGGED OUTLET/CLEANOUT
- SHUT-OFF VALVE
- CHECK VALVE
- SLEEVE
- BALANCING VALVE
- GAS PLUG VALVE
- WATER SUB-METER
- SHOCK ABSORBER

PLUMBING ABBREVIATIONS

CO	CLEANOUT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
S	SOIL
V	VENT
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
DW	DISHWASHER
BT	BATH TUB
FD	FLOOR DRAIN
VTR	VENT THROUGH ROOF
GR	GAS RANGE
UNDG	UNDERGROUND
TYP.	TYPICAL
DN	DOWN
EXIST.	EXISTING
AFF	ABOVE FINISHED FLOOR
HWHT	HOT WATER HEATER
G	GAS
SQ. FT.	SQUARE FEET
ST	STORM

BUILDING DEPARTMENT PLUMBING NOTES:

1. ALL PLUMBING SYSTEMS (SANITARY, WASTE, AND VENT WATER DISTRIBUTION SYSTEMS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2014 THE NEW YORK CITY PLUMBING CODE (NYCPC).
2. INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 702.
3. PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
4. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.
5. RODENT PROOFING AS PER PC 304.
6. MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902,PC 1102.
7. EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
8. CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708.
9. BUILDING HOUSE TRAPS SHALL BE PROVIDED AS PER SECTION PC 1002.
10. DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
11. VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
12. WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
13. THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
14. VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917.
15. THE STORM DRAINAGE PIPING SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 11 SECTION PC 1101 THROUGH 1113.
16. INSPECTION AND TESTING OF PLUMBING PIPING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 107, 312.
17. GAS METER LOCATION SHOULD BE IN ACCORDANCE OF FUEL GAS CODE APPENDIX E.
18. GAS PIPING INSTALLATION SHALL IN ACCORDANCE WITH NYC FUEL GAS CODE CHAPTER 4.

PLUMBING GENERAL NOTES:

1. AT EACH REQUEST FOR POST-APPROVAL AMENDMENT PRIOR TO PLUMBING INSPECTION, CONTRACTOR SHALL SUBMIT TO ENGINEER:FIXTURE COUNT AS REQUIRED FOR SCHEDULE B, AS-BUILT FLOOR PLANS, AND AS-BUILT RISER DIAGRAM FOR ENGINEER INSPECTION AND APPROVAL.

PLUMBING DRAWING LIST

PLUMBING SPECIFICATIONS

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS

1.01 SCOPE

A. PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.

B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.

C. OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.

D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.

E. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK.BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.

F. IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.

G. ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.

H. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.

I. MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.

J. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.

K. THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.

1.02 SUBMITTALS

A. SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.

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

B. SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.

C. THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.

D. REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA. IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.

E. SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.

F. SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.

G. FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.

H. RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER /TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.

1.03 SUBSTITUTIONS

A. ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.

B. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.

1.04 DEFINITIONS

A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.

B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.

C. PROVIDE: TO FURNISH AND INSTALL.

D. REFER TO THE NATIONAL STANDARD PLUMBING CODE FOR ADDITIONAL DEFINITIONS.

1.05 DRAWINGS

A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.

B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.

C. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.

D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.

E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.

F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

1.06 PRODUCTS

A. SANITARY AND VENT PIPING:

1. ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM 4 BANDS PER COUPLING.
2. SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO DRAIN.
3. PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLENUM SPACES.
4. ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.

B. DOMESTIC WATER PIPING:

1. ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.
2. FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.
3. JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
4. THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
5. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH NYC ENERGY CONSERVATION CODE 2016 SECTION C403.2.10 REFER BELOW TABLE.

MINIMUM PIPE INSULATION THICKNESS

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (INCHES)				
	CONDUCTIVITY BTU· IN./ (H· FT2· °F)	MEAN RATING TEMPERATURE, °F	<1	1 to < 1½	1½ to < 4	4 to < 8	<8
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0

6. WATER DISTRIBUTION SYSTEM AS PER NYC ENERGY CONSERVATION CODE 2016 C404.7, HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
   a. THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE.
   b. THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F (40°C).
7. AS PER NYC ENERGY CONSERVATION CODE 2016 C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NO DEMAND FOR HOT WATER.
8. HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER NYC ECC C404.5.1 & NYC PC 607.2 THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE (INCHES)	MIXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAV	OTHER FIXTURES
½"	2'	20'
¾"	0.5'	20'
1"	0.5'	13'
1¼"	0.5'	8'
1½"	0.5'	6'
2" OR LARGER	0.5'	4'

9. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION.
10. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

C. VALVES:

1. PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL VALVES. FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
2. ALL FIXTURES WITH THE EXCEPTION O FLUSHOMETER-EQUIPPED WATER CLOSETS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
3. ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

D. HANGERS AND SUPPORTS:

1. HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVE SUPPORTS.
4. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

E. GAS PIPING SYSTEM

1. ALL GAS PIPING WORK SHALL COMPLY WITH NYC FUEL GAS CODE 2014, LOCAL UTILITY GAS REQUIREMENTS AND NFPA 54, ANSI Z223.1.
2. FURNISH AND INSTALL ALL NECESSARY GAS PIPING TO ALL EQUIPMENT REQUIRING GAS.
3. SUPPLY INCLUDING RECONNECTION TO EXISTING ACTIVE GAS BURNING EQUIPMENT.
4. PROVIDE A LUBRICATED GAS VALVE AT ALL CONNECTIONS TO EQUIPMENT.
5. ALL GAS PIPING AND INSTALLATION SHALL BE IN ACCORDANCE WITH RULES AND REGULATIONS OF LOCAL UTILITY GAS COMPANY AND OTHER AUTHORITIES HAVING JURISDICTION.
6. PROVIDE ADEQUATE SUPPORT FOR ALL PIPING.
7. GAS PIPING SHALL BE BLACK STEEL SCHEDULE 40 THREADED PIPE CONFORMING TO ANSI B36-20.
8. FITTINGS SHALL BE MALLEABLE IRON.
9. VALVES SHALL BE NORDSTROM IRON PLUG VALVES FIG. 142.
10. PROVIDE RATED ENCLOSURE FOR GAS PIPING WHEREVER REQUIRED.

F. DOMESTIC WATER HEATER (GAS FIRED)

1. TANKS SHALL BE 85 GALLON CAPACITY AND SHALL HAVE 150 PSI WORKING PRESSURE AND BE EQUIPPED WITH GLASS LINING PERMANENTLY BONDED TO TANK INTERIOR SURFACE.
2. BURNER SHALL BE ALUMINIZED STEEL OR CAST IRON, ADJUSTABLE, OR SELF-ADJUSTING AIR-GAS MIXTURE CONTROL.
3. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH NFPA 54, NFPA 211, AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
4. THE OUTER JACKET SHALL BE STEEL WITH BAKED ENAMEL/ACRYLIC FINISH AND SHALL BE PROVIDED WITH ACCESS DOOR FOR SERVICING CONTROLS AND BURNER.
5. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

N

G. MIXING VALVES

1. VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS OR STAINLESS STEEL.

2. TYPES A, C & D VALVES: VALVE SHUTS OFF IN FULL COLD POSITION AND MUST PASS THROUGH COLD RANGE BEFORE DELIVERING WARM, AND/OR HOT WATER. TEMPERATURE LIMIT SET AT 105°F MAXIMUM DELIVERY TEMPERATURE. IF ONE SUPPLY SHOULD FAIL, THE OTHER WILL AUTOMATICALLY AND INSTANTLY SHUT DOWN. DELIVERY CAPACITY IS 5GPM @ 45 PSIG DIFFERENTIAL.

3. TYPES OF VALVES: TYPE A– THERMOSTATICALLY OPERATED BY MEANS OF BI–METALLIC STRIP, OR EXPANSION BELLOWS; TYPE B– SINGLE HANDLE MECHANICAL MIXER, OR INDIVIDUAL HOT AND COLD CONTROL VALVES; TYPE C– PRESSURE BALANCING SHOWER VALVE/PISTON OPERATED MIXING VALVE; TYPE D– BALANCED PRESSURE OPERATION, WITH INTEGRAL DIAL THERMOMETER INDICATING DELIVERED WATER TEMPERATURE.

4. EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT–OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

H. HOT WATER RE–CIRCULATING PUMP

1. IN–LINE PUMP: SINGLE STAGE VOLUTE TYPE PUMP SHALL BE MADE OF CAST IRON OR FORGED LEAD–FREE BRONZE IMPELLER.

2. THE PUMP SHALL HAVE A GROUND AND POLISHED STEEL SHAFT WITH A HARDENED INTEGRAL THRUST COLLAR. THE SHAFT SHALL BE SUPPORTED BY TWO HORIZONTAL SLEEVE BEARINGS DESIGNED TO CIRCULATE OIL. THE PUMPS ARE TO BE EQUIPPED WITH A MECHANICAL SEAL WITH CARBON SEAL FACE ROTATING AGAINST CERAMIC SEAT. THE MOTOR SHALL BE NON–OVERLOADING AT ANY POINT ON PUMP CURVE.

3. DIRECT CONNECT PUMP TO ELECTRIC MOTOR WITH FLEXIBLE COUPLING. THE MOTOR SHALL BE OF THE DRIP–PROOF, SLEEVE– BEARING, QUIET OPERATING, RUBBER–MOUNTED CONSTRUCTION. EQUIPMENT MOTOR WITH BUILT–IN THERMAL OVERLOAD PROTECTION.

4. INSTALL IN–LINE CIRCULATING PUMPS BETWEEN PIPE FLANGES IN PIPING SYSTEMS. INSTALL OVERHEAD PIPE SUPPORTS, BOTH SIDES OF IN–LINE PUMPS, INSTALLED IN HORIZONTAL PIPING RUNS.

I. SLEEVES AND ESCUTCHEONS:

1. SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS ON GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GAGE GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USG THERMAFIBER SAFING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.

2. PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GAGE STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.

J. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.

K. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'–0" IN LENGTH.

L. PROVIDE TRAP PRIMERS TO ALL FLOOR DRAIN.

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

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

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

P. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.

Q. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.

R. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.

S. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.

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

U. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.

V. WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.

W. CONNECT GAS PIPING TO ALL GAS–FIRED EQUIPMENT WITH GAS COCK AND UNION.

X. FOR ALL GAS–FIRED EQUIPMENT, VERIFY INPUT RATING AND PRESSURE REQUIREMENTS. PROVIDE GAS PRESSURE REGULATORS VENTED TO THE BUILDING EXTERIOR ON GAS SUPPLY TO ALL EQUIPMENT REQUIRING LOWER THAN LINE GAS PRESSURE.

Y. INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.

Z. PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK–CLOSING VALVES.

AA. UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR DRAINS SHALL BE MAINTAINED BY AN APPROVED TRAP PRIMING DEVICE.

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

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

AD. MAINTAIN MINIMUM 10'–0" CLEARANCE BETWEEN ALL PLUMBING V.T.R.S AND ALL OUTDOOR AIR INTAKES. OFFSET VENT STACKS AND STACK VENTS IF AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFSET IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.

2. INSTALLATION

2.01 GENERAL

A. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.

B. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.

C. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.

D. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.

E. COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.

F. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.

2.02 ABOVE GRADE

A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.

B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT–OFF VALVES AND ALL LOW POINTS IN PIPING.

C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

2.03 BELOW GRADE

A. UNDERGROUND BUILDING DRAIN PIPE SHALL CONFORM TO ONE OF STANDARDS LISTED IN TABLE 702.2 FROM NYC PLUMBING CODE.

B. FOR FLOOR CLEANOUTS FOR PIPING BELOW FLOORS, INSTALL CLEANOUT DECK PLATES WITH TOP FLUSH WITH FINISHED FLOOR.

2.04 INSULATION (PIPE AND FITTINGS)

COVER ALL HOT WATER AND HOT WATER RECIRCULATION PIPE WITH 1" THICK FOR PIPE SIZE UP TO 1¼" AND 1½" THICK FOR PIPE SIZE 1½" AND GREATER WITH MANVILLE MICRO–LOK AP–T PLUS FIBERGLASS INSULATION. COVER ALL COLD WATER PIPE WITH ½" THICK FOR PIPE SIZE UP TO 1¼" AND 1" THICK FOR PIPE SIZE 1½" AND GREATER WITH 1" MANVILLE MICRO–LOK AP–T PLUS FIBERGLASS INSULATION. FITTINGS AND VALVES SHALL BE INSULATED WITH MANVILLE ZESTON 2000 PVC INSULAT–ED FITTING COVERS. INSTALL ALL INSULATION AS PER MANUFACTURERS RECOMMENDATIONS. ALL INSULATION MATERIAL SHALL COMPLY WITH THE NEW YORK CITY BUILDING CODE REQUIREMENT OF A FLAME SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DEVELOPED RATING NOT TO EXCEED 50. ALL PIPE INSULATION SHALL COMPLY WITH 2016 NYC ENERGY CONSERVATION CODE.

2.05 PRESS JOINERY SYSTEM:

A. FITTINGS ½" – 4":

1. WHERE APPROVED BY THE LOCAL JURISDICTION, THE NIBCO® PRESS SYSTEM™ MAY BE USED AT THE CONTRACTOR'S OPTION FOR THE FOLLOWING BUILDING SERVICES PIPING –20°F TO +250°F UP TO 200 PSI:
   a. HOT AND COLD DOMESTIC WATER; FITTINGS AND VALVES SHALL BE NSF–61 APPROVED.
   b. POTABLE WATER; FITTINGS AND VALVES SHALL BE NSF–61 APPROVED.
   c. HOT WATER HEATING SERVICE

   ALL LEAD FREE WROUGHT COPPER PRESS FITTINGS SHALL BE MADE FROM COMMERCIALLY PURE COPPER MILL PRODUCTS PER ASTM B 75 ALLOY C12200. THESE FITTINGS SHALL BE THIRD–PARTY CERTIFIED TO NSF/ANSI 61 ANNEX G AND COMPLY WITH SECTION 116875 OF THE CALIFORNIA HEALTH AND SAFETY CODE AND VERMONT ACT 193. NIBCO LEAD FREE CAST DEZINCIFICATION–RESISTANT (DZR) FITTINGS SHALL BE MADE FROM A HIGH QUALITY LEAD FREE PERFORMANCE BRONZE ALLOY PER ASTM B 584 ALLOY C87850. THE PRESS FITTINGS CONNECTIONS SHALL BE COMPATIBLE WITH SEAMLESS K, L OR M COPPER TUBE MADE TO ASTM B 88. FITTINGS SHALL HAVE A MAXIMUM NON–SHOCK WORKING PRESSURE OF 200 PSI BETWEEN THE TEMPERATURES OF –20°F AND +250°F. ELASTOMERIC SEALS WITH LEAK DETECTION DESIGN SHALL BE MADE OF EPDM MATERIAL, AND THE FITTINGS SHALL BE MANUFACTURED WITH AN INBOARD BEAD DESIGN. NIBCO PRESS FITTINGS MEET ALL PERFORMANCE REQUIREMENTS OF ASME B16.22 AND B16.18ALL FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND ACCORDING TO LOCAL PLUMBING AND MECHANICAL CODES. THE PRESS–TO–CONNECT JOINT SHALL BE MADE WITH PRESSING TOOLS AND JAW SETS RECOMMENDED AND AUTHORIZED BY NIBCO. ALL FITTINGS, VALVES AND TOOLS SHALL BE PROVIDED BY SAME MANUFACTURER; NIBCO.

B. VALVES 2" AND SMALLER: BALL VALVES: (ON/OFF, ISOLATION OR THROTTLING)

1. BALL VALVES (STAINLESS STEEL BALL AND STEM) WITH MALE OR FEMALE PRESS–TO–CONNECT ENDS SHALL BE RATED AT 200 PSI CWP TO +250°F MAXIMUM. NIBCO LEAD FREE VALVES SHALL BE MANUFACTURED IN ACCORDANCE WITH MSS SP–110 AND CONSTRUCTED OF DEZINCIFICATION –RESISTANT (DZR) BRONZE BODIES AND END PIECES AND SHALL BE MADE FROM A HIGH QUALITY LEAD FREE PERFORMANCE BRONZE ALLOY PER ASTM B 584 ALLOY C87850. NO BRASS CONTAINING MORE THAN 15% ZINC SHALL BE APPROVED. VALVE SHALL HAVE REINFORCED TEFLON SEATS, BLOW–OUT PROOF STEM, SOLID STAINLESS STEEL BALL AND STEM. NO HOLLOW CHROME PLATED BALLS ACCEPTED. ALL VALVES SHALL BE FULL PORT. ALL ELASTOMERIC SEALS SHALL HAVE LEAK DETECTION DESIGN.
   a. WHERE PIPING IS TO BE INSULATED, BALL VALVES SHALL BE EQUIPPED WITH 2" EXTENDED HANDLES OF NON–THERMAL CONDUCTIVE MATERIAL. HANDLE TO HAVE EXTENDED SLEEVE INCORPORATING AN INSULATION PLUG TO PROVIDE A VAPOR BARRIER AND ALLOW VALVE OPERATION WITHOUT DISTURBING THE INSULATION, AND A MEMORY STOP, WHICH CAN BE SET AFTER INSTALLATION.
   b. ACCEPTABLE VALVES: (NSF–61, NON–INSULATED LINES): NIBCO PC585–66–LF, –HC, –LL.
   c. c. ACCEPTABLE VALVES: (NSF–61, INSULATED LINES): NIBCO PC585–66–LF–NS, –HC, –LL.

C. CHECK VALVES: (BACKFLOW PREVENTION)

VALVES WITH PRESS–TO–CONNECT ENDS SHALL BE RATED TO 200 PSI CWP AT +250°F MAXIMUM. NIBCO LEAD FREE VALVES SHALL BE MANUFACTURED IN ACCORDANCE WITH MSS SP–80 AND CONSTRUCTED OF DEZINCIFICATION–RESISTANT (DZR) BRONZE BODY & CAP SHALL BE MADE FROM A HIGH QUALITY LEAD FREE PERFORMANCE BRONZE ALLOY PER ASTM B 584 ALLOY C87850. DISC SHALL BE TFE TEFLON. ALL ELASTOMERIC SEALS SHALL HAVE LEAK DETECTION DESIGN.

a. ACCEPTABLE CHECK VALVES: NIBCO PS413–Y–LF: Y PATTERN, SWING TYPE CHECK VALVE; NIBCO PS480–Y–LF : IN–LINE SPRING LOADED SILENT CHECK VALVE

3.01 TESTING

A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.

B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.

C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.

D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.

E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.

F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.

G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.

H. ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.

I. ALL EQUIPMENT WILL BE FACTORY TESTED.

J. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.

K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.

L. TESTING REQUIREMENTS
   a. TEST ALL DOMESTIC WATER PIPING HYDROSTATICALLY TO 125 PSIG.
   b. HYDROSTATIC TEST PRESSURES SHALL REMAIN CONSTANT WITH NO VARIATION FOR 120 MINUTES.
   c. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.
   d. THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND ADJACENT TENANT OR ESB SPACES.

M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION AS STIPULATED.

N. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.

O. ALL GAS PIPING INSPECTIONS AND TESTING SHOULD BE AS PER NYC FGC 2014 SECTION 107 & 406.

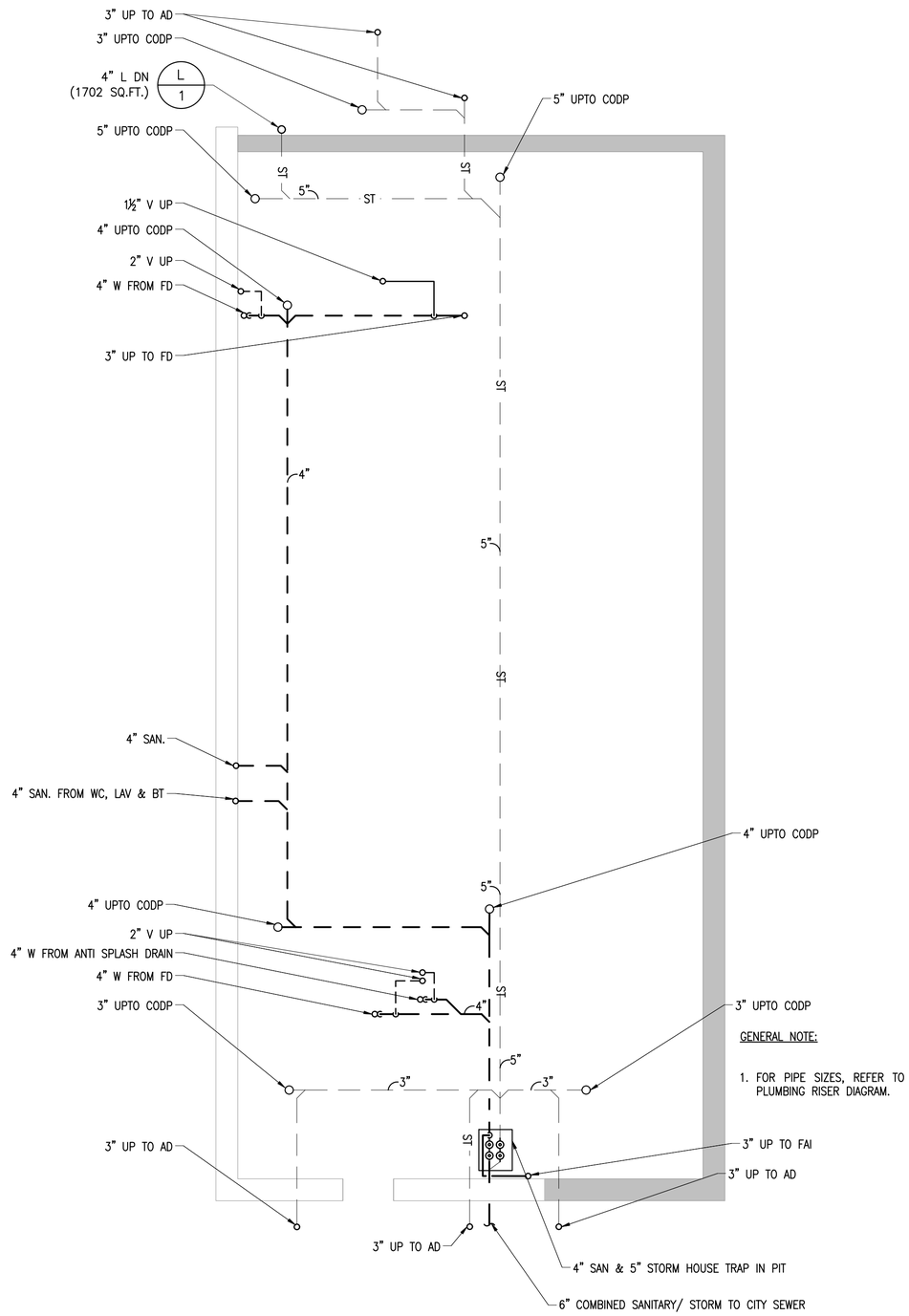
4. WARRANTY

A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROMPTLY CORRECT AND REPAIR ANY AND ALL BREAKS, FAILURES OR WEAR DUE TO FAULTY MATERIALS, WORKMANSHIP OR EQUIPMENT. ALL SETTLEMENTS OF SURFACES THAT MAY OCCUR WITHIN THAT PERIOD SHALL ALSO BE PROMPTLY REPAIRED.

N

PLUMBING ROUGHING SIZING SCHEDULE

LEGEND	PLUMBING FIXTURE	CONNECTION SIZE – INCHES						REMARKS
		TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
LAV	UNDER COUNTER LAVATORY	1½"	1½"	1½"	½"	½"	PROVIDE	P–TRAP

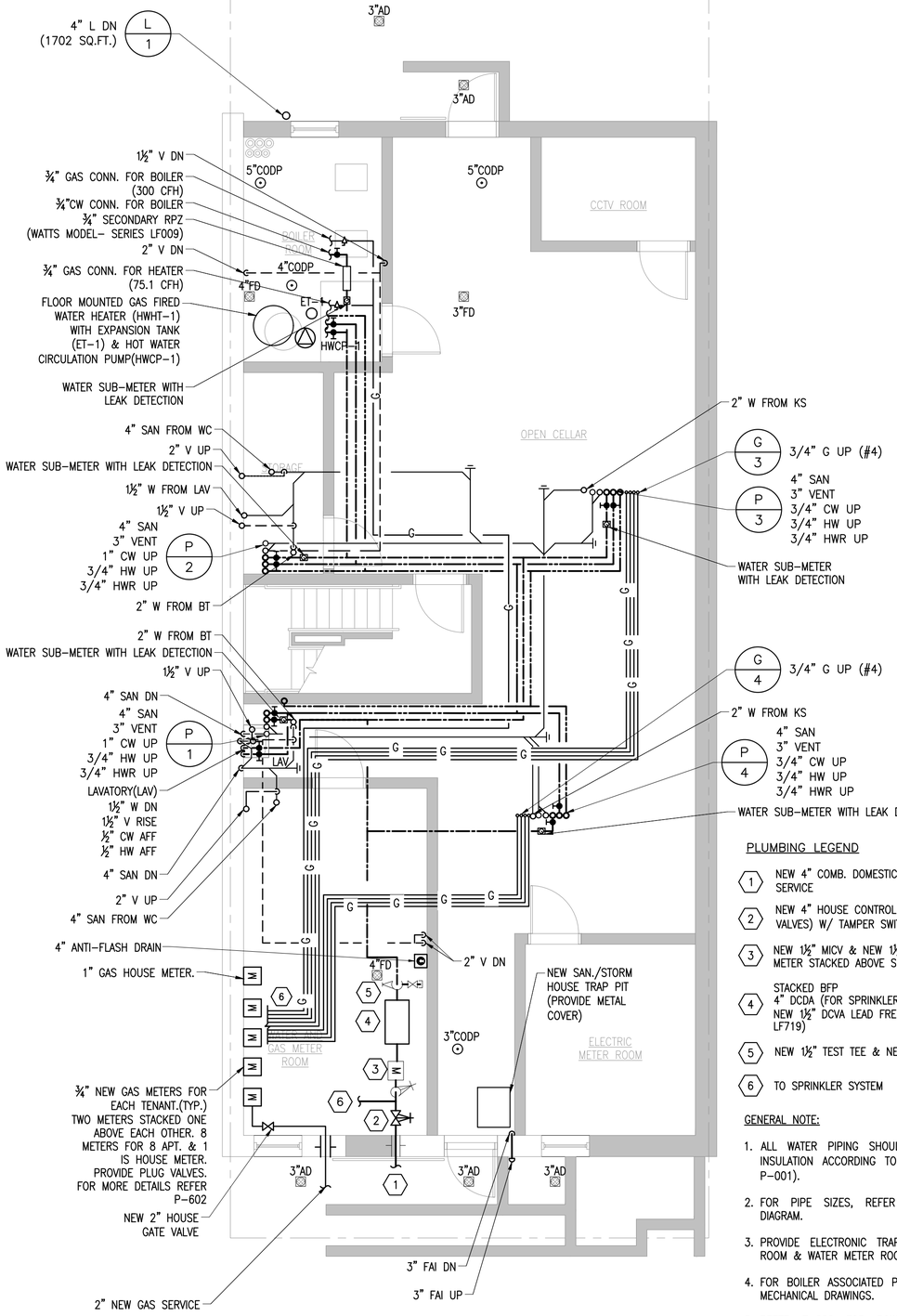


GENERAL NOTE:

1. FOR PIPE SIZES, REFER TO PLUMBING RISER DIAGRAM.

1 UNDERGROUND PLUMBING PLAN

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



2 CELLAR PLUMBING PLAN

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

PLUMBING LEGEND

1. NEW 4" COMB. DOMESTIC & FIRE WATER SERVICE
2. NEW 4" HOUSE CONTROL VALVE (OS & Y VALVES) W/ TAMPER SWITCH
3. NEW 1½" MICV & NEW 1½" APPROVED NYC WATER METER STACKED ABOVE SPRINKLER BFP
4. STACKED BFP
   4" DCDA (FOR SPRINKLER)(WATTS–774DCDA)
   NEW 1½" DCVA LEAD FREE(FOR DOMESTIC)(WATTS–LF719)
5. NEW 1½" TEST TEE & NEW 1½" MOCV
6. TO SPRINKLER SYSTEM

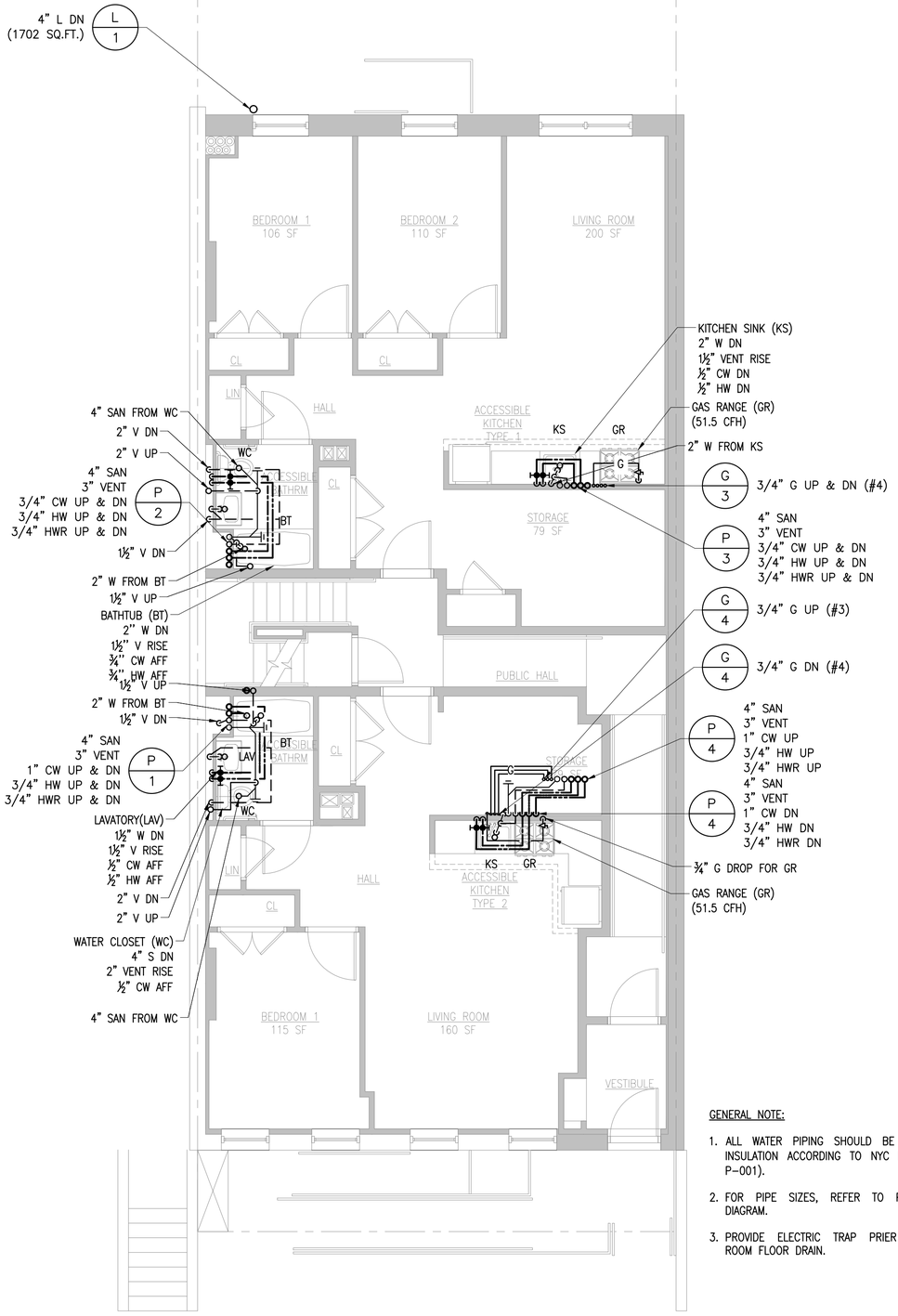
GENERAL NOTE:

1. ALL WATER PIPING SHOULD BE PROVIDED WITH INSULATION ACCORDING TO NYC ECC 2016 (REF P–001).
2. FOR PIPE SIZES, REFER TO PLUMBING RISER DIAGRAM.
3. PROVIDE ELECTRONIC TRAP PRIMER FOR BOILER ROOM & WATER METER ROOM FLOOR DRAIN.
4. FOR BOILER ASSOCIATED PIPING COORDINATE WITH MECHANICAL DRAWINGS.
5. REFER E–200 FOR POWER REQUIREMENTS OF WATER SUB–METER GATEWAY.
6. PROVIDE SUB–METER WITH REMOTE MONITOR FOR EACH RISER. INSTALLATION WILL BE AS PER MANUFACTURER'S MANUAL.(MANU.–LOTIK)
7. FOR BFP INSTALLATION AND MORE DETAILS, REFER APPROVED BFP APPLICATION DRAWINGS.

N

PLUMBING ROUGHING SIZING SCHEDULE

LEGEND	PLUMBING FIXTURE	CONNECTION SIZE – INCHES						REMARKS
		TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
WC	FLOOR MOUNTED WATER CLOSET	–	4"	2"	½"	–	–	FLUSH TANK
LAV	UNDER COUNTER LAVATORY	1½"	1½"	1½"	½"	½"	PROVIDE	P–TRAP
KS	KITCHEN SINK	2"	2"	1½"	¾"	¾"	PROVIDE	P–TRAP
BT	BATHTUB	2"	2"	1½"	¾"	¾"	PROVIDE	P–TRAP



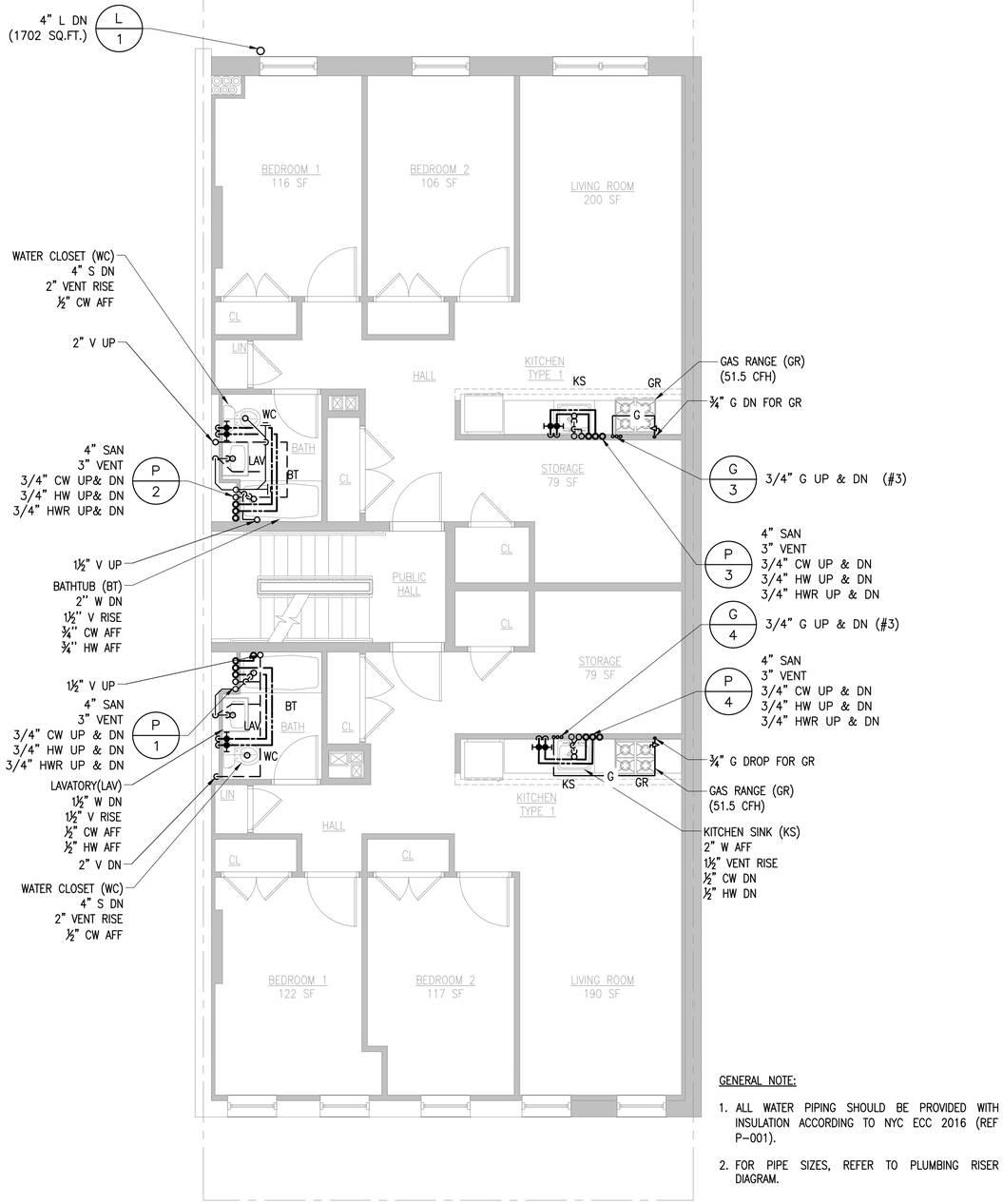
GENERAL NOTE:

1. ALL WATER PIPING SHOULD BE PROVIDED WITH INSULATION ACCORDING TO NYC ECC 2016 (REF P–001).
2. FOR PIPE SIZES, REFER TO PLUMBING RISER DIAGRAM.
3. PROVIDE ELECTRIC TRAP PRIER FOR RECYCLE ROOM FLOOR DRAIN.

1 FIRST FLOOR PLUMBING PLAN

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

BERGEN STREET



GENERAL NOTE:

1. ALL WATER PIPING SHOULD BE PROVIDED WITH INSULATION ACCORDING TO NYC ECC 2016 (REF P–001).
2. FOR PIPE SIZES, REFER TO PLUMBING RISER DIAGRAM.

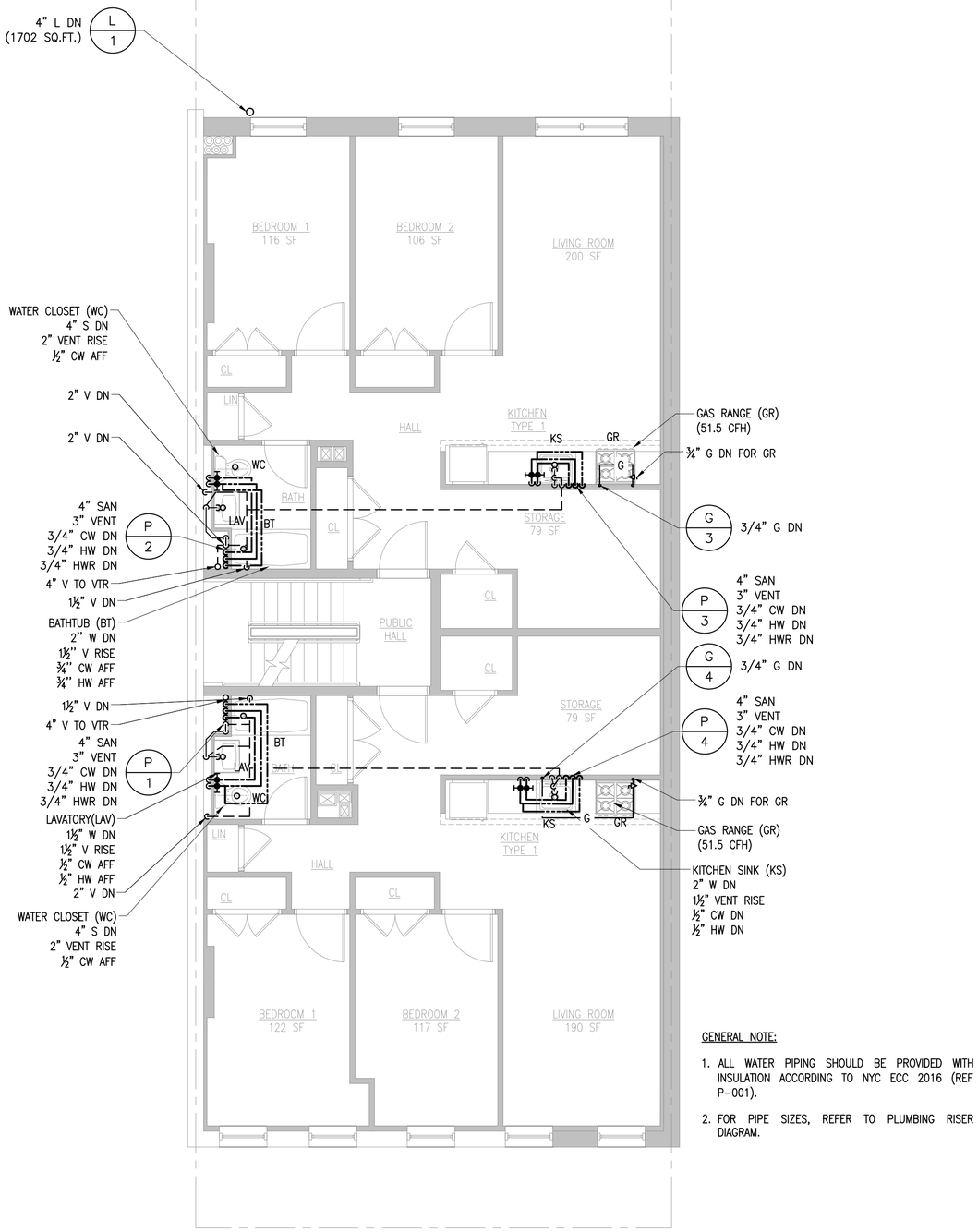
2 SECOND & THIRD FLOOR PLUMBING PLAN

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

N

PLUMBING ROUGHING SIZING SCHEDULE

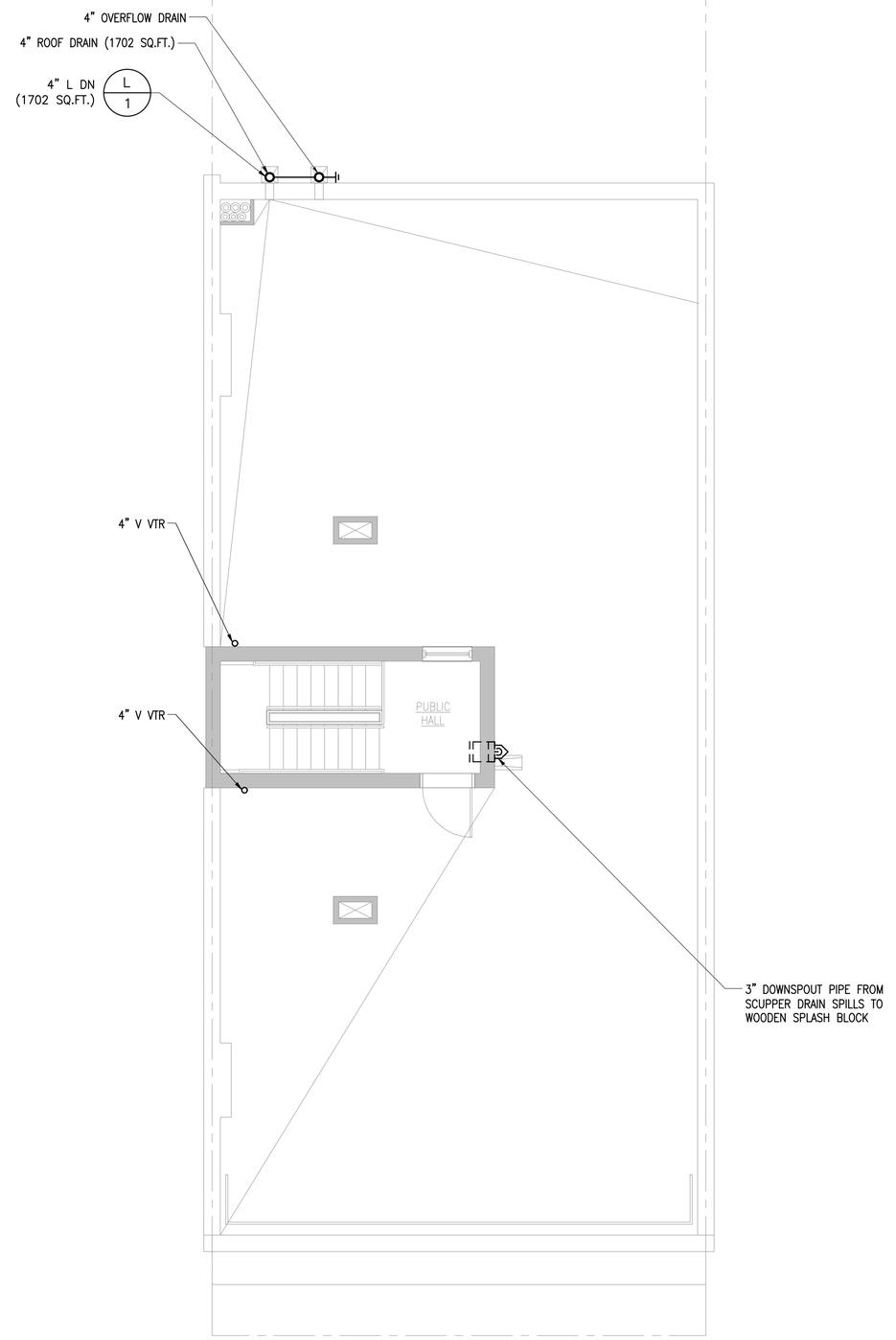
LEGEND	PLUMBING FIXTURE	CONNECTION SIZE – INCHES						REMARKS
		TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
WC	FLOOR MOUNTED WATER CLOSET	–	4"	2"	½"	–	–	FLUSH TANK
LAV	UNDER COUNTER LAVATORY	1½"	1½"	1½"	½"	½"	PROVIDE	P–TRAP
KS	KITCHEN SINK	2"	2"	1½"	¾"	¾"	PROVIDE	P–TRAP
BT	BATHTUB	2"	2"	1½"	¾"	¾"	PROVIDE	P–TRAP



GENERAL NOTE:

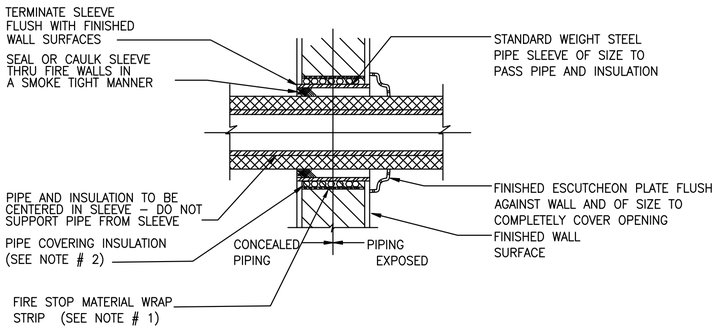
1. ALL WATER PIPING SHOULD BE PROVIDED WITH INSULATION ACCORDING TO NYC ECC 2016 (REF P–001).
2. FOR PIPE SIZES, REFER TO PLUMBING RISER DIAGRAM.

1 FOURTH FLOOR PLUMBING PLAN
SCALE-3/16"=1'-0"

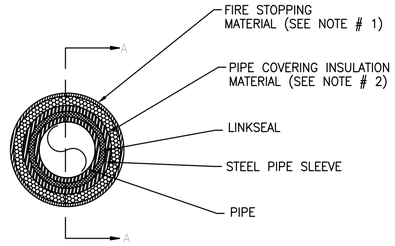


2 ROOF PLUMBING PLAN
SCALE-3/16"=1'-0"

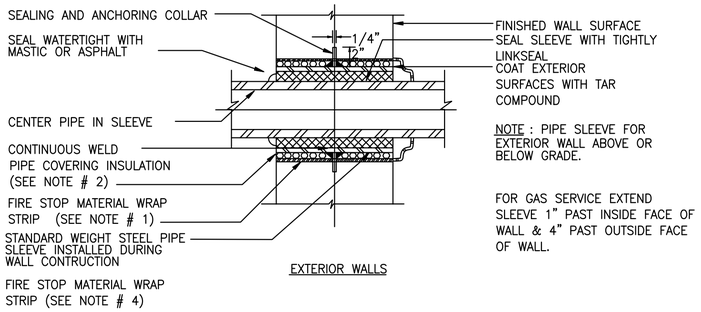
N



INTERIOR WALLS



PIPE SLEEVE VIEW



EXTERIOR WALLS

NOTE : PIPE SLEEVE FOR EXTERIOR WALL ABOVE OR BELOW GRADE.

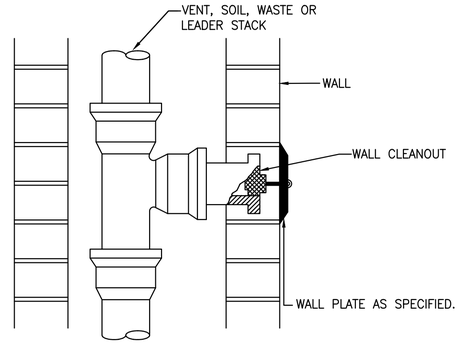
FOR GAS SERVICE EXTEND SLEEVE 1" PAST INSIDE FACE OF WALL & 4" PAST OUTSIDE FACE OF WALL.

PIPE SLEEVE THRU WALL SECTION

NOTES:

1. FIRESTOP MATERIAL WRAP STRIP SHALL BE ¼" THICK INTUMESCENT ELASTOMERIC MATERIAL FACED ON ONE SIDE WITH ALUMINUM FOIL SUPPLIED IN 2 IN. WIDE STRIPS AND WRAP AROUND THE PIPE AS PER UL MATERIAL LISTED3M COMPANY FS–195+ OR FILL CAVITY WITH CAULK OR SEALANT MIN. ¼" DIA. CONTINUOUS BEAD APPLIED TO THE WRAP STRIP/WALL INTERFACE AND TO THE EXPOSED OF THE WRAP STRIP LAYER APPROX. 3/4" FROM WALL SURFACE. AS PER UL LISTED 3M COMPANY CP25WB+, IC 15WB+, FIRE DAM 150+CAULK.
2. PIPE COVERING INSULATION SHALL BE 2" THICK HOLLOW CYLINDRICAL HEAVY DENSITY GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKETED. AS PER UL CLASSIFICATION AND MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.

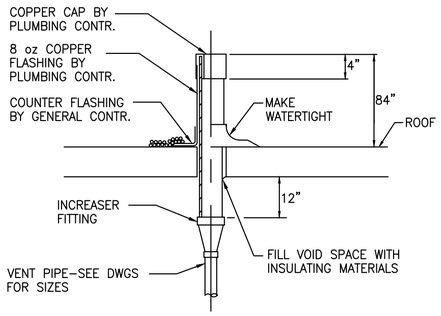
1 / P–501 PIPE SLEEVE THRU WALL SECTION N.T.S



2 / P–501 WALL CLEANOUT DETAIL N.T.S

NOTES:

1. MINIMUM SIZE OF VENT EXTENSION THROUGH ROOF TO BE 4".
2. CHANGE OF DIAMETER TO BE MADE AT LEAST 12" BELOW ROOF.
3. VENT PIPE TO EXTEND up to 7'–0" ABOVE ROOF IN ACCESSIBLE WATERTIGHT BY PROPER FLASHING.
4. ALL VENT RISERS SHALL BE OFFSET AS REQUIRED TO CLEAR ROOF STRUCTURE DUCTWORK OR MECH. ROOF TOP UNITS.
5. PLUMBING CONTRACTOR TO COORDINATE WITH OTHER TRADES.
6. ROOFING CONTRACTOR SHALL SUPPLY BOOT FLASHING FOR RUBBER ROOF SYSTEMS.



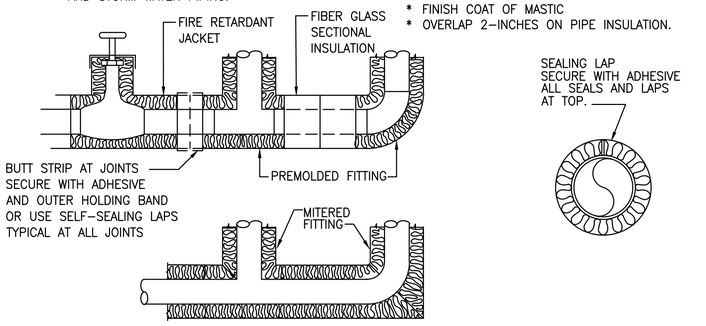
3 / P–501 VENT INCREASER DETAIL N.T.S

CONCEALED VALVES AND FITTINGS

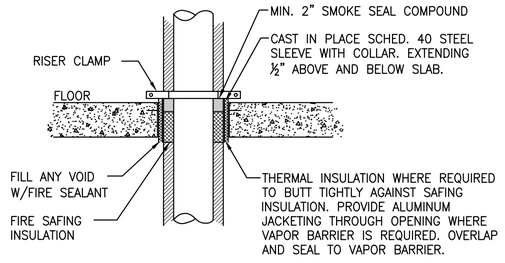
* WRAP WITH 1–INCH THICK, 1–POUND DENSITY TO REQUIRED PIPE INSULATION THICKNESS
* SECURE WITH WIRE OR TAPE.
* VAPOR SEAL COLD WATER, CHILLED WATER AND STORM WATER PIPING.

CONCEALED VALVES AND FITTINGS

* PREMOLDED FIBER GLASS OR RADIAL MITERED PIPE INSULATION
* SKIM COAT OF INSULATION CEMENT
* COAT OF MASTIC
* WRAP WITH FIBER GLASS REINFORCING CLOTH.
* FINISH COAT OF MASTIC
* OVERLAP 2–INCHES ON PIPE INSULATION.

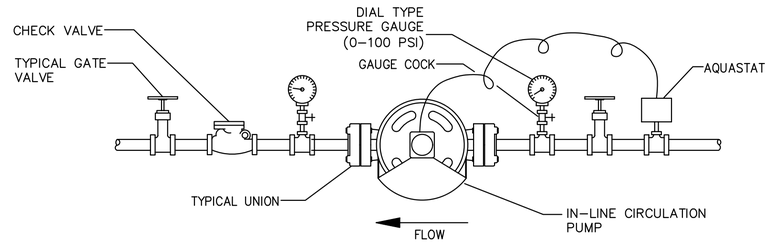


4 / P–501 INSULATION OF PIPING, VALVES AND FITTINGS FOR EXPOSED AND CONCEALED LOCATIONS N.T.S



NOTES:
1. SLEEVES TO BE SIZED AS REQUIRED FOR OVERALL PIPE DIAMETER. (INCLUDING INSULATION, WHERE APPLICABLE)
2. PIPE CLAMPS FOR COPPER PIPING SHALL BE COPPER PLATED.

5 / P–501 FLOOR PENETRATION DETAIL N.T.S



6 / P–501 INLINE RECIRCULATING PUMP DETAIL N.T.S

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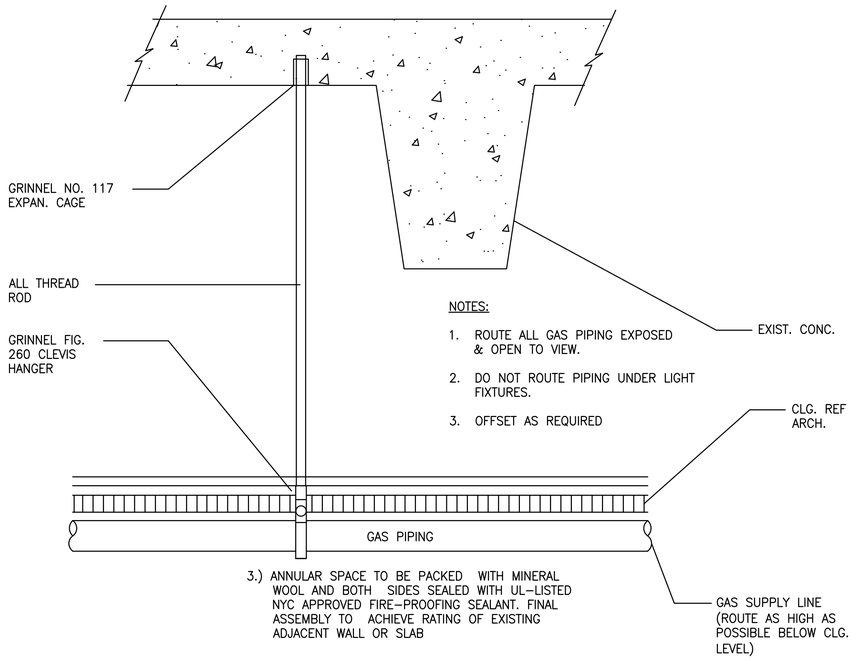
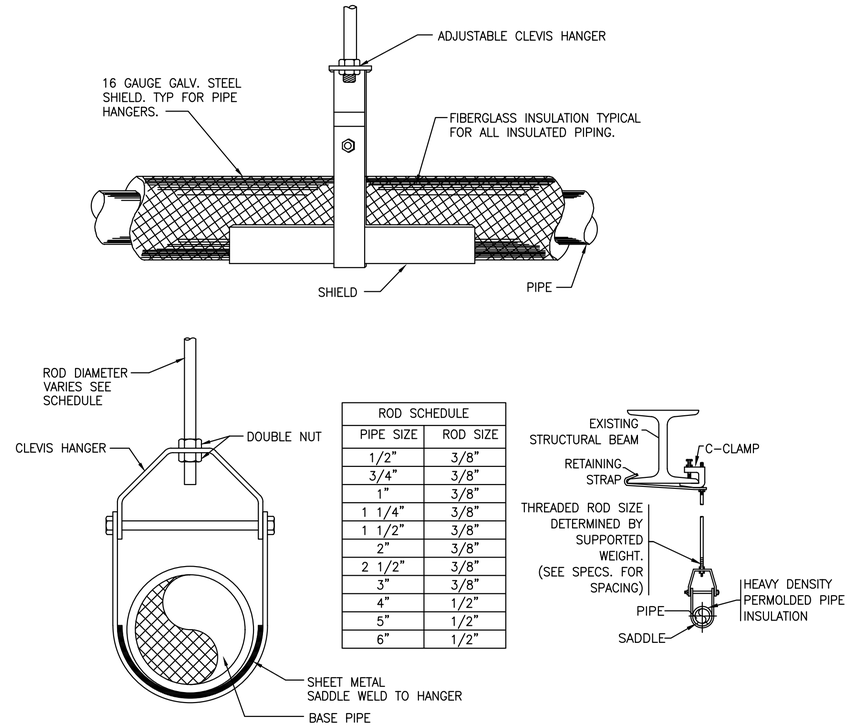
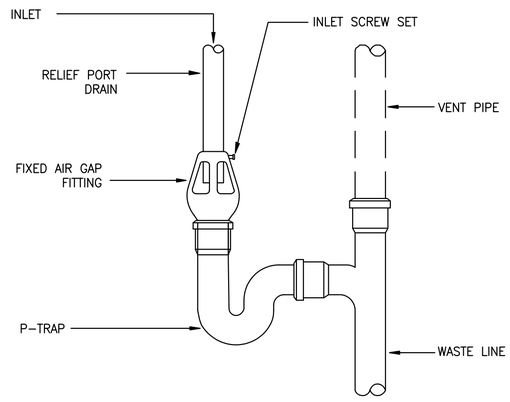


1 P–502 GAS PIPING SUPPORT DETAIL N.T.S

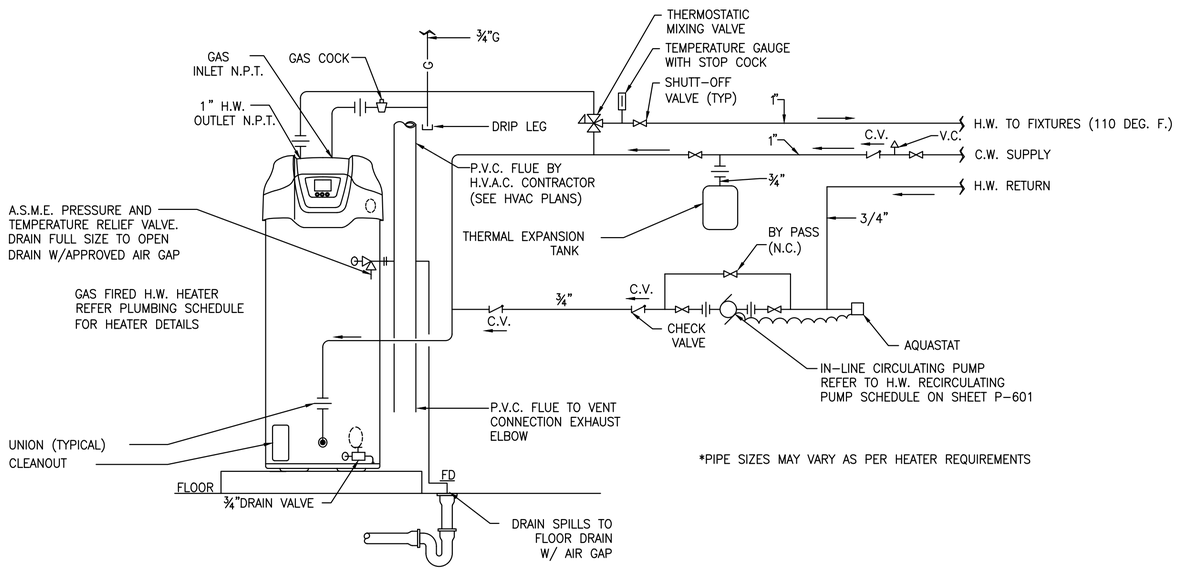


ROD SCHEDULE	
PIPE SIZE	ROD SIZE
1/2"	3/8"
3/4"	3/8"
1"	3/8"
1 1/4"	3/8"
1 1/2"	3/8"
2"	3/8"
2 1/2"	3/8"
3"	3/8"
4"	1/2"
5"	1/2"
6"	1/2"

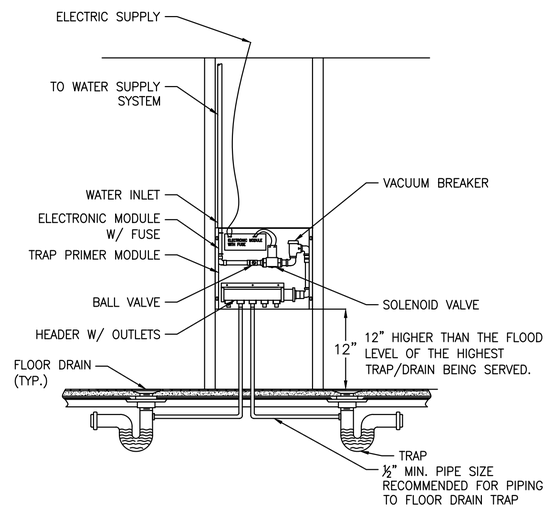
2 P–502 HANGER DETAIL N.T.S



3 P–502 FIXED AIRGAP DETAIL N.T.S



4 P–502 GAS FIRED HOT WATER HEATER (FLOOR MOUNTED) DETAIL N.T.S



ELECTRONIC
5 P–502 TRAP PRIMER DETAIL N.T.S

N

GAS FIRED WATER HEATER SCHEDULE

WATER HEATER NO.	LOCATION	NATURAL GAS		GAS CONN.	WATER CONN.	THERMAL EFFICIENCY	TEMP. SET POINT DEG. F.	STORAGE CAPACITY GALLONS.	BASED ON		REMARKS
		INPUT (MBH)	RECOVERY GPH @100° F RISE						MFR.	MODEL	
HWHT-1	CELLAR	75.1	73	½"	1¼"	–	110°F	98	A.O.SMITH	BT-100	– STORAGE TYPE GAS WATER HEATER – DIMENSION 68⅝"(HEIGHT)x27¾"(DIA.) – PROVIDE HEATER W/ EXPANSION TANK (ET-1) AND HWCP-1 AS PER SCHEDULE – PROVIDE DRAIN PAN

EXPANSION TANK SCHEDULE

ITEM	LOCATION	SERVICE	CAPACITY (GALLONS)	MODEL	DIMENSION (DIAxHEIGHT)	WEIGHT	NO. OF EXPANSION TANK
EXPANSION TANK (ET-1)	CELLAR	HOT WATER	3.2	THERM-X-TROL ST-8	9"x15"	7	1

DRAIN ACCESSORIES & SCHEDULE

BODY												STRAINER																	REMARKS
DESIGNATION	REQUIRED	SERIES NO. / ZURN / WADE / SMITH	CAST IRON	GALVANIZED	ALL BRONZE	SECONDARY CLAMP	CLAMPING DEVICE	DECK CLAMP	BACK WATER VALVE	SUMP RECIEVER	FLASHING COLLAR	CAST IRON	GALVANIZED	ALL BRONZE	NICKEL BRONZE (ADJUSTABLE)	CHROME PLATED	SEDIMENT BUCKET	SECONDARY STRAINER	POLISHED FINISH	SATIN FINISH	TRACTOR GRATE	ST. STEEL	FUNNEL TOP	FLAT TOP	DOME	RAISED LIP	EXTENSION (WHERE REQUIRED)	LESS GRATE	BRONZE TOP	IRON GRATE	POLYETHYLENE	SOLID HINGED COVER	LOCATION
FD/AD	•	Z503-Z-C-Y	•				•										•												•			REFER PLANS

NOTES:

1. ALL FLOOR DRAINS IN MECHANICAL EQUIPMENT, SHALL BE LOCATED IN COORDINATION WITH THE MECHANICAL CONTRACTOR.
2. THE CONTRACTOR SHALL VERIFY THE COMPATIBILITY OF THE DRAINS WITH THE APPROVED ROOFING AND/OR WATER PROOFING SYSTEMS PRIOR TO SUBMITTING SHOP DRAWINGS.
3. THE TOP OF ALL FLOOR DRAINS SHALL BE FLUSH WITH THE ADJACENT FINISHED FLOOR.

PLUMBING ROUGHING SIZING SCHEDULE

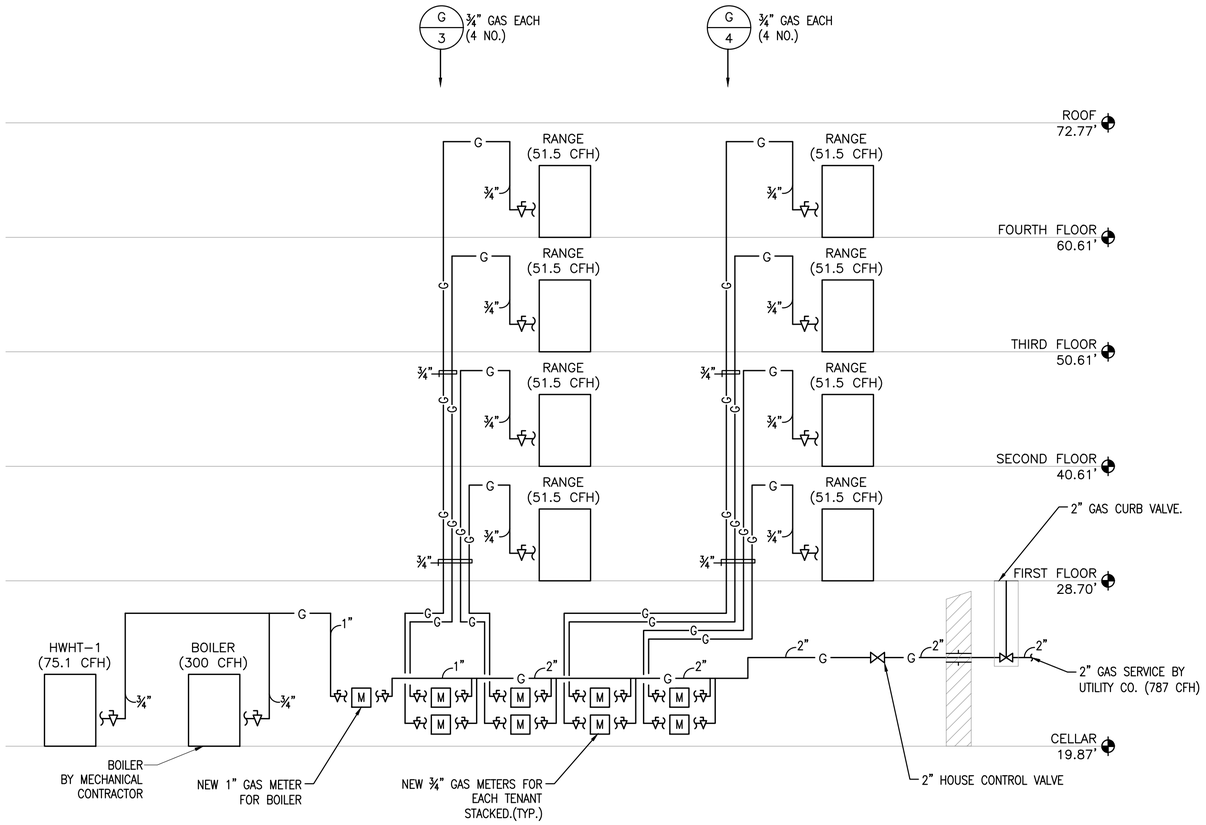
LEGEND	PLUMBING FIXTURE	CONNECTION SIZE – INCHES						REMARKS
		TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
WC	FLOOR MOUNTED WATER CLOSET	–	4"	2"	½"	–	–	FLUSH TANK
LAV	UNDER COUNTER LAVATORY	1½"	1½"	1½"	½"	½"	PROVIDE	P-TRAP
KS	KITCHEN SINK	2"	2"	1½"	¾"	¾"	PROVIDE	P-TRAP
BT	BATHTUB	2"	2"	1½"	¾"	¾"	PROVIDE	P-TRAP

NOTE: CONTRACTOR TO COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL PLUMBING FIXTURES SPECIFICATIONS AND MOUNTING HEIGHT INSTALLATION.

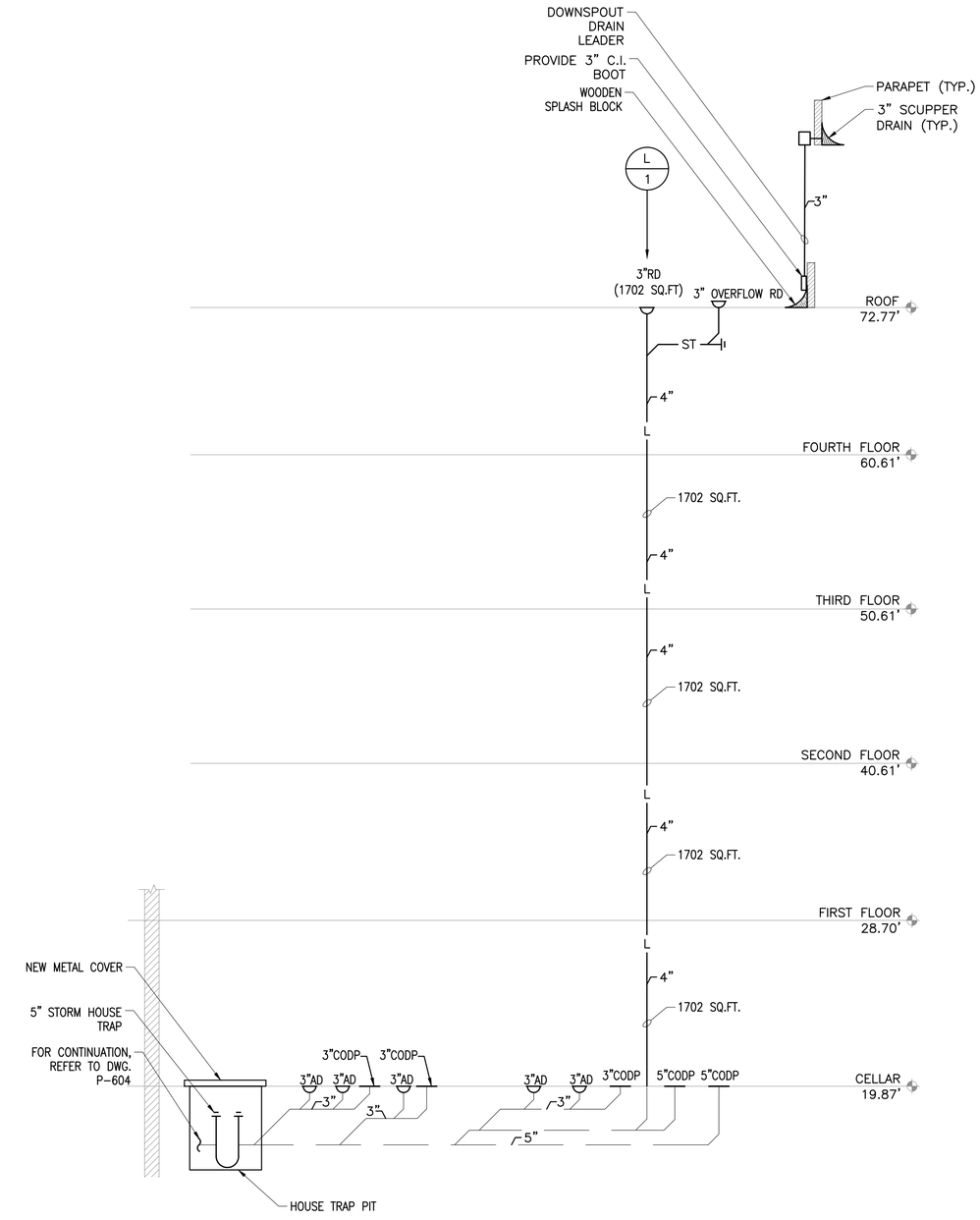
PUMP SCHEDULE

TAG	SERVICE	LOCATION	PERFORMANCE DATA			PUMP CONSTRUCTION DATA	MOTOR DATA						MFGR MODEL	REMARKS
			GPM	TDH (FT)	WATER TEMP. (°F)	PUMP TYPE	MHP PER PUMP	STARTER TYPE	V/PH/HZ	RPM	ROTATION	SERVICE FACTOR		
HWCP-1	HWR	CELLAR	10	8	120	INLINE	1/12	AQUA STAT	120/1/60	3450	PER MFG	1.0	BELL & GOSSETT SERIES 100	INLINE ON HW RETURN LINE AT WATER HEATER NEMA 1 RATED MOTOR

N



1 GAS RISER DIAGRAM
N.T.S



2 STORM RISER DIAGRAM
N.T.S

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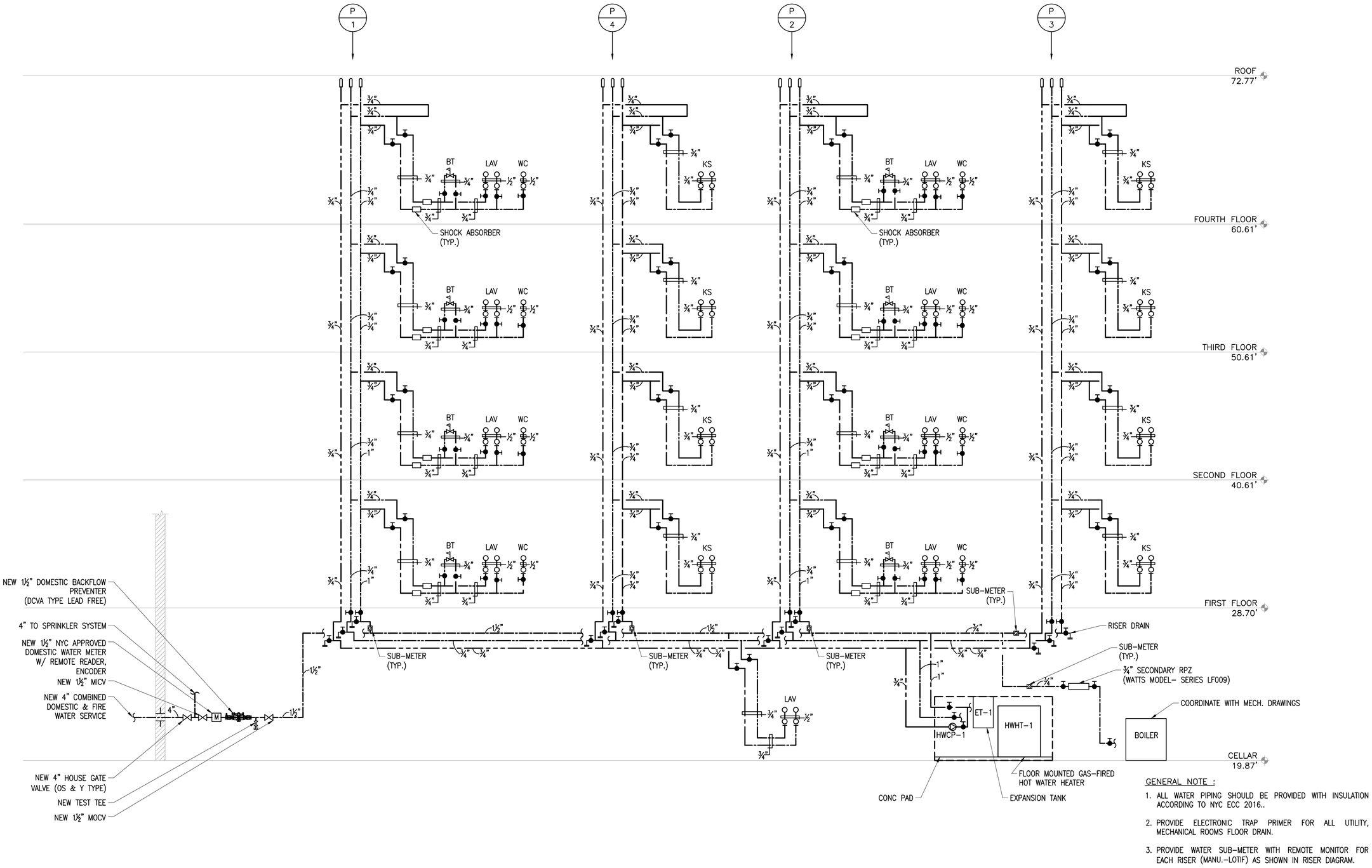


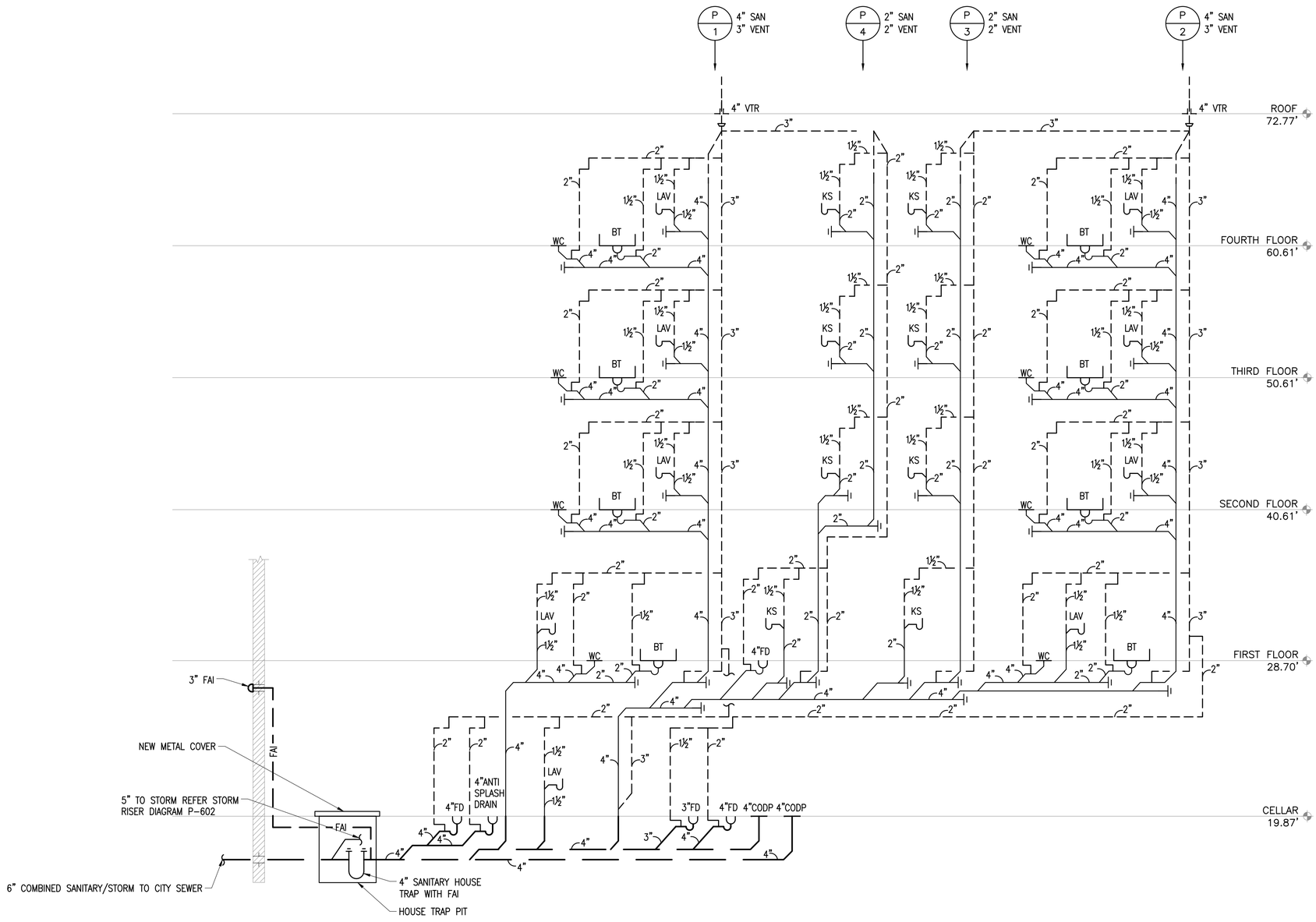
GENERAL NOTE :

1. ALL WATER PIPING SHOULD BE PROVIDED WITH INSULATION ACCORDING TO NYC ECC 2016..
2. PROVIDE ELECTRONIC TRAP PRIMER FOR ALL UTILITY, MECHANICAL ROOMS FLOOR DRAIN.
3. PROVIDE WATER SUB-METER WITH REMOTE MONITOR FOR EACH RISER (MANU.-LOTIF) AS SHOWN IN RISER DIAGRAM.

1 WATER RISER DIAGRAM

N.T.S

N



1 SANITARY RISER DIAGRAM

N.T.S

N

SPRINKLER GENERAL NOTES

1. ALL SPRINKLER WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF N.F.P.A.–13R AND ALL LOCAL AUTHORITIES.
2. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AND SHALL INSTALL NEW WORK TO CLEAR DUCTWORK AND LIGHTING FIXTURES.
3. ALL SPRINKLER WORK SHALL COMPLY WITH BUILDING STANDARDS AND REQUIREMENTS.
4. ALL SPRINKLER HEADS SHALL BE INSTALLED AT CENTER OF TILE IF CEILING IS PROVIDED.
5. GENERAL CONTRACTOR SHALL COORDINATE FINAL FURNITURE/EQUIPMENT HEIGHT ELEVATIONS AND LOCATIONS WITH SPRINKLER INSTALLATION. ENGINEER SHALL BE NOTIFIED WHEN FURNITURE/EQUIPMENT IS LESS THAN 18" TO UNDERSIDE OF CEILING.
6. THE SPRINKLER SYSTEMS ARE TO BE HYDROSTATIC TESTED FOR A (2) HOUR MINIMUM AT 200 LBS. PRESSURE AND ARE TO BE WITNESSED BY AUTHORIZED BUILDING PERSONNEL. COORDINATE ALL TESTING WITH BUILDING MANAGER.
7. PIPES SIZES SHOWN ARE BASED ON DESIGN PIPING LAYOUTS ONLY. ACTUAL PIPE SIZES SHALL BE DETERMINED BY CONTRACTORS HYDRAULIC CALCULATIONS BASED ON HIS INSTALLATION DRAWINGS. CONTRACTOR SHALL ALLOW FOR THIS AND INCLUDE THIS IN HIS CONTRACT PRICE.
8. DRAWING INDICATES SPRINKLER SYSTEM DESIGN ONLY. CONTRACTOR RESPONSIBLE FOR OFFSETS, DROPS AND RISES FOR COORDINATION WITH OTHER TRADES.
9. G.C. SHALL BE RESPONSIBLE FOR ALL FINAL TESTS AND INSPECTIONS OF COMPLETED WORK REQUIRED BY THE BUILDING MANAGEMENT PRIOR TO OCCUPANCY OF SPACE.
10. ALL SPRINKLER WORK SHALL BE TESTED AND MADE OPERATIONAL PRIOR TO CARPET AND FURNITURE INSTALLATION. G.C. SHALL REPAIR AND/OR REPLACE ALL FINISHES DAMAGED BY DEFECTIVE SPRINKLER WORK AT HIS EXPENSE.
11. ALL BURNING, CUTTING, SOLDERING AND WELDING SHALL BE COORDINATED WITH BUILDING FIRE SYSTEMS WITH BUILDING MANAGEMENT, AS REQUIRED.
12. G.C. SHALL COORDINATE ARRANGEMENTS FOR TEMPORARY DISCONNECT AND RECONNECT WITH MANAGEMENT PRIOR TO COMMENCEMENT OF WORK.
13. REFER TO ENGINEERING DRAWINGS FOR SPRINKLER HEADS, LIGHT SENSORS AND FIRE DETECTION DEVICES.
14. ALL SERVICE SHUTDOWNS SHALL BE BY BASE BUILDING ENGINEERS. MINIMUM OF 48 HOURS NOTICE IS REQUIRED TO THE BUILDING OFFICE PRIOR TO SHUT DOWN.
15. ALL WORK TO BE DONE DURING THE HOURS DESIGNATED BY OWNER.
16. UPON COMPLETION OF ALL SPRINKLER WORK, CONTRACTOR SHALL TEST AND INSPECT ENTIRE SPRINKLER SYSTEM. ENTIRE SYSTEM SHALL BE FULLY OPERATIONAL AND APPROVED IN COMPLIANCE WITH ALL AHJ.
17. UPON SUCCESSFUL COMPLETION OF ALL TESTING, CONTRACTOR SHALL PRIME AND PAINT ALL EXPOSED SPRINKLER PIPING. COLOR AND FINISH SHALL BE AS PER ARCHITECT.
18. CONTRACTOR SHALL INCLUDE IN HIS BID THE COST TO PROVIDE (5) FIVE ADDITIONAL SPRINKLERS INSTALLED. EXACT LOCATIONS OF THESE SPRINKLER HEADS SHALL BE DETERMINED IN FIELD.
19. FOR SPRINKLER WORK DONE IN ACCORDANCE WITH THE REQUIREMENTS OF N.F.P.A.–13R, HYDROSTATIC TESTS IN ACCORDANCE WITH REFERENCE STANDARD NFPA 13–2007, AS MODIFIED FOR NEW YORK CITY, ARE NECESSARY.
20. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AND SHALL INSTALL NEW WORK TO CLEAR DUCTWORK AND LIGHTING FIXTURES.
21. ALL SPRINKLER WORK SHALL COMPLY WITH BUILDING STANDARDS AND REQUIREMENTS.
22. DRAWING INDICATES SPRINKLER SYSTEM DESIGN ONLY. CONTRACTOR RESPONSIBLE FOR OFFSETS, DROPS AND RISES FOR COORDINATION WITH OTHER TRADES.
23. PIPES SIZES SHOWN ARE BASED ON SCHEDULE OF PIPE SIZE PIPING LAYOUTS ONLY. ACTUAL PIPE SIZES SHALL BE DETERMINED BY CONTRACTORS HYDRAULIC CALCULATIONS BASED ON HIS INSTALLATION DRAWINGS. CONTRACTOR SHALL ALLOW FOR THIS AND INCLUDE THIS IN HIS CONTRACT PRICE.
24. PROVIDE AUXILIARY DRAINS AT TRAPPED SECTIONS OF PIPING AS REQUIRED BY NFPA–13.
25. GENERAL CONTRACTOR SHALL COORDINATE FINAL FURNITURE/ EQUIPMENT HEIGHT ELEVATIONS AND LOCATIONS WITH SPRINKLER INSTALLATION. ENGINEER SHALL BE NOTIFIED WHEN FURNITURE/EQUIPMENT IS LESS THAN 18" TO UNDERSIDE OF CEILING PRIOR TO INSTALLATION.
26. COMPOSITE DRAWINGS

    CONTRACTOR SHALL BE GIVEN A SEPIA TRANSPARENCIES TO IMPOSE THEIR WORK FOR A COORDINATED ALLOCATION OF SPACE. PROCEDURE SHALL INCLUDE HVAC CONTRACTOR TO INDICATE DUCT WORK, PIPING, STRUCTURAL AND ARCHITECTURAL DETAILS. SEPIAS SHALL BE GIVEN TO PLUMBING, SPRINKLER AND ELECTRICAL TRADES WHO WILL DRAW HIS WORK ON DRAWINGS. HVAC CONTRACTORS SHALL HOLD A COORDINATION MEETING WITH ALL CONTRACTORS TO ELIMINATE INTERFERENCE OR CONFLICTS IN INSTALLING WORK. IF UNABLE TO EACH AGREEMENT ISSUE, ARCHITECT SHALL MAKE BINDING DECISION.
27. CONTRACTOR SHALL COORDINATE SPRINKLER MAIN AND BRANCHES WITH NEW CONSTRUCTION TO AVOID CONFLICTS WITH CEILING HEIGHTS, DUCTWORK, LIGHTING FIXTURES, BEAMS. CONTRACTOR TO ADJUST PIPING ACCORDINGLY TO ACCOMMODATE NEW CONSTRUCTION.

BUILDING DEPARTMENT SPRINKLER NOTES

1. THE INSTALLATION, COMPONENTS, SIZING, SPACING, CLEARANCES, POSITION AND TYPE OF SYSTEMS SHALL CONFORM TO THE 2014 NEW YORK CITY BUILDING CODE APPENDIX Q, SECTION BC Q102, SECTION BC Q103 AND SECTION BC903.
2. ONLY APPROVED MATERIALS SHALL BE USED AS PER CHAPTER 6 OF APPENDIX Q, SECTION BCQ102
3. DIRECT CONNECTION OF SPRINKLERS TO THE PUBLIC WATER SYSTEM SHALL CONFORM TO SECTION BCQ102.1 SEE 15.2.1 AND 15.1.1 (d).
4. SPRINKLER SHALL BE PROTECTED AGAINST FREEZING AND INJURY AS PER APPENDIX Q BCQ102, SEC 8.15.3 AND 6.2.8.
5. INSPECTION AND TESTS OF SPRINKLERS SHALL BE CONDUCTED AS SEC. 901.5 AND APPENDIX Q, SEC. BCQ102, CH. 16.
6. THE OCCUPANCY OF THE AREAS TO BE SPRINKLERED IN ACCORDANCE WITH SECTION 5.2 AND A.5.2 OF APPENDIX Q SECTION BCQ102.
7. WATER SUPPLY TEST PIPES AND GAUGES SHALL BE PROVIDED AS PER SECTION 8.16.1 AND 8.16.4 OF APPENDIX Q, SECTION BCQ102.
8. PIPING, FITTINGS, SPECIFICATIONS, PIPE SCHEDULES, SYSTEM TEST PIPES, PROTECTION AGAINST CORROSION, DAMAGE, VALVES, HANGERS, SPRINKLERS GUARDS AND SHIELDS SHALL BE AS PER APPENDIX Q SECTION BCQ102, CHAPTERS 6 AND 9.
9. STOCK OF EXTRA SPRINKLERS WILL BE FURNISHED AS PER SECTION 6.2.9 APPENDIX Q, SECTION BCQ102 (REQUIRED FOR EACH TEMPERATURE RATING).
10. SPRINKLER ALARM SHALL BE IN ACCORDANCE WITH SECTION 8.16.1 OF APPENDIX Q, SECTION BCQ102.
11. SPACING, LOCATION AND POSITION OF SPRINKLER WILL BE AS PER SECTION 8 OF APPENDIX Q, SECTION BCQ102.
12. ALL BLIND SPACES EXCEEDING 6" IN WIDTH OR DEPTH WHICH CONTAIN COMBUSTIBLE MATERIAL WILL BE SPRINKLERED.
13. ALL PIPE PASSING THROUGH WALLS WILL COMPLY WITH SECTION BC712.
14. THERE IS NO HIGH PILED STORAGE AS DEFINED IN SECTION 3–3.12 OF APPENDIX Q, SECTION BC Q102
15. DISTANCE OF SPRINKLERS FROM HEAT SOURCE SHALL BE IN AS PER TABLES 9.3.2.5 (a) AND 8.3.2.5 (b).
16. AS PER SECTION BC903.1.2 PROVIDE DEPARTMENT OF WATER SUPPLY LETTER WITH FLOW TEST DATE IF THERE IS A DIRECT CONNECTION TO THE STREET WATER SUPPLY.
17. THIS APPLICATION IS NOT FILED AS A RESULT OF ACTION BY THE FIRE COMMISSIONER AS AUTHORIZED BY BS & A TO MODIFY THE CERTIFICATE OF OCCUPANCY NOR IS SUCH ACTION PENDING.
18. ALL VALVES SHALL BE IDENTIFIED AS REQUIRED BY SECTION 6.7.4. OF APPENDIX Q, SECTION BCQ102.
19. DRAINAGE SHALL CONFORM TO SECTION 8.15.2 OF APPENDIX Q, SECTION BCQ102.
20. A ONE PIECE REDUCING FITTING OF GOOD DESIGN SHOULD BE USED WHEREVER A CHANGE IS MADE IN THE SIZE OF PIPE, AS PER SECTION 6.4.6 OF APPENDIX Q, SECTION BCQ102.
21. ALL VALVES ON CONNECTIONS TO WATER SUPPLIES TO SPRINKLER SHALL BE APPROVED O.S. & Y. OR APPROVED INDICATOR TYPE.
22. DRAIN VALVES AND TEST VALVES SHALL BE APPROVED TYPE AS PER 6.7.3 OF APPENDIX Q, SECTION BCQ102.
23. HANGERS SHOULD BE SUPPORTED BY WROUGHT IRON U TYPE OR APPROVED ADJUSTABLE HANGERS. HANGERS SHALL BE OF THE TYPE APPROVED FOR USE WITH THE PIPE OR TUBE INVOLVED, AS PER CHAPTER 9, OF APPENDIX Q, SECTION BCQ102.
24. PROVISIONS SHOULD BE MADE TO FACILITATE FLUSHING SYSTEM PIPING BY PROVIDING FLUSHING CONNECTIONS CONSISTING OF A CAPPED NIPPLE 4" LONG ON END OF A CROSS MAIN AS PER SECTION 8.14.16 OF APPENDIX Q, SECTION BCQ102.
25. SPRINKLER SHALL BE AN APPROVED TYPE AS PER SECTION 8.3 OF APPENDIX Q, SECTION BCQ102.
26. TEMPERATURE RATING SHALL COMPLY WITH SECTION 8.3.2 OF APPENDIX Q, SECTION BCQ102.
27. 18" MINIMUM CLEARANCE TO BELOW SPRINKLER DEFLECTOR AS PER SECTION 8.5.6. OF APPENDIX Q, SECTION BCQ102.
28. SPACING AND LOCATION OF SPRINKLERS SHALL COMPLY WITH CHAPTER 8 OF APPENDIX Q, SECTION BCQ102.
29. SPRINKLER SYSTEM COMPLIES WITH NFPA 13R–2007 AS MODIFIED BY APPENDIX Q, SECTION BCQ104.
30. SOURCES OF WATER SUPPLY FOR SPRINKLER SYSTEMS AS PER CHAPTER 15 OF APPENDIX Q, SECTION BCQ102 AND AS PER CHAPTER 8 OF APPENDIX Q, SECTION BCQ103.
31. PIPE SCHEDULE SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 14.5 OF APPENDIX Q, SECTION BCQ102.
32. HYDRAULICALLY DESIGNED SYSTEMS SHALL BE IN ACCORDANCE WITH CHAPTER 14 OF APPENDIX Q, SECTION BCQ102.
33. MINIMUM BRANCH PIPE SIZE TO BE ONE INCH (1").
34. THIS APPLICATION IS MADE ONLY FOR WORK INDICATED ON THE SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
35. PAINTING FOR DEDICATED SPRINKLER PIPING AND VALVES HANDLES SHOULD BE AS PER NYC BC SECTION 903.6.

SPRINKLER DRAWING LIST

SPACING BETWEEN SPRINKLER HEADS

LIGHT HAZARD: 15' MAX.
ORDNIARY HAZARD: 15' MAX

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

PROTECTION AREA OF SPRINKLER HEADS

LIGHT HAZARD	:	200 SQ. FT. (225 SQ.FT HYDRAULIC)
LIGHT HAZARD	:	130 SQ. FT.

DESIGN CRITERIA

LIGHT HAZARD PIPE SCHEDULE PER 14.5 NFPA 13–2007 ed

TOTAL SPRINKLERED AREA: 8935 SF

PROJECT DESIGNED BY PIPE SCHEDULE AS PER 2007 NFPA–13 11.2.2.3.

LESS THAN 5,000 SF
PROJECT DESIGNED BY PIPE SCHEDULE
AS PER 2007 NFPA–13 SECTION 11.2.2.3

5,000 SF AND OVER
PROJECT DESIGNED BY PIPE SCHEDULE
AS PER 2007 NFPA–13 SECTION 11.2.2.5

LIGHT HAZARD PIPE SCHEDULE - STEEL

# OF SPR. HDS	PIPE SIZE
1 – 2	1"
3	1¼"
4 – 5	1½"
6 – 10	2"
11 – 30	2½"
31 – 60	3"
60 – 100	3½"
61 – SEE SECTION 8.2	4"

SPRINKLER NOTES:

AS PER NFPA 13R,

1. 6.9.2 BATHROOMS.
   SPRINKLERS SHALL NOT BE REQUIRED IN BATHROOMS WHERE THE BATHROOM AREA DOES NOT EXCEED 55 FT².
2. 6.9.3 CLOSETS.
   SPRINKLERS SHALL NOT BE REQUIRED IN CLOTHES CLOSETS, LINEN CLOSETS, AND PANTRIES THAT MEET ALL OF THE FOLLOWING CONDITIONS:
   (1) THE AREA OF THE SPACE DOES NOT EXCEED 24 SQ. FT.
   (2) THE LEAST DIMENSION DOES NOT EXCEED 3 FT.
   (3) THE WALLS AND CEILINGS ARE SURFACED WITH NONCOMBUSTIBLE OR LIMITED–COMBUSTIBLE MATERIALS AS DEFINED IN NFPA 220, STANDARD ON TYPES OF BUILDING CONSTRUCTION.

SPRINKLER LEGEND

SP	NEW SPRINKLER PIPING
F	NEW FIRE PIPING
DR	NEW DRAIN PIPING
●	CONCEALED SPRINKLER HEAD (NEW)
⊙	UPRIGHT SPRINKLER HEAD (NEW)
	SPRINKLER CAPPED OUTLET
	SHUT–OFF VALVE
WFS	WATER FLOW SWITCH
TS	TAMPER SWITCH
FCA	FLOOR CONTROL VALVE ASSEMBLY

SPECIAL INSPECTION SPRINKLER NOTE:

1. SPECIAL INSPECTION OF SPRINKLER SYSTEM TO BE PERFORMED IN ACCORDANCE WITH NY CITY BUILDING CODE SECTION BC 1704–23.

ECC NOTES:

1. 2016 NYCECC COMPLIANCE: NEW YORK CITY CONSERVATION CODE.

   TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, ALL WORK UNDER THIS APPLICATION IS EXEMPT FROM THE NYCECC IN ACCORDANCE WITH ONE OF THE FOLLOWING: FA, FP, SD, SP, FS, EQ, CC, OT/BPP, OT/FPP

SPRINKLER BOOSTER PUMP SCHEDULE

ID. No.	DESCRIPTION	MANUFACTURER MODEL No.	LOCATION	CURRENT V	CURRENT PH	CURRENT HZ	GPM	PSI	TDH(FT)	HP	RPM	REMARKS
SBP	SPRINKLER BOOSTER PUMP	PEERLESS PUMP CO, MODEL # 3PVF8 VERTICAL INLINE CLOSE COUPLED	CELLAR–UTILITY ROOM	208	3	60	250	45	104	15	3500	FIRE PUMP CONTROLLER BY FTA 1930 –DIGITAL SOLID–STATE SOFT START/STOP
JP	JOCKEY PUMP	GRUNDFOS MODEL CR3–5 VERTICAL IN–LINE PUMP	CELLAR–UTILITY ROOM	208	1	60	10	55	127	3/4	3500	JOCKEY PUMP BY GROUNDFOS MODEL # CR3–5 –JOCKEY XG PUMP CONTROLLER FTA550F BY FIRETROL

SPRINKLER SCHEDULE

SYMBOL	NAME	COVERAGE	AREA	METAL	TEMP. (°F)	K–FACTOR	NPT	MFG	MODEL#	APPROVALS
●	CONCEALED	STANDARD	LH/OH AREAS WITH CEILING	BRASS	155	5.6	½"	TYCO	SERIES RF–II TY3531	UL NYC MEA 353–01–E
⊙	UPRIGHT	STANDARD	LH/OH OPEN AREAS	BRASS	155	5.6	½"	TYCO	SERIES TY–FRL TY3121	UL NYC MEA 112–04–E

NOTE: COORDINATE ALL SPRINKLER COLOR FINISHES WITH ARCHITECT.

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SPRINKLER SPECIFICATIONS

PART 1 – GENERAL

1.01 REQUIREMENTS

A. THE SPRINKLER CONTRACTOR SHALL BE A LICENSED, AUTHORIZED INSTALLER OF SPRINKLER SYSTEMS AND SHALL HAVE HAD A MINIMUM OF FIVE YEARS EXPERIENCE IN THE INSTALLATION OF SPRINKLER SYSTEMS IN THE CITY OF NEW YORK.

B. BEFORE SUBMITTING HIS BID, THE SPRINKLER CONTRACTOR SHALL VISIT THE SITE AND SHALL FULLY FAMILIARIZE HIMSELF WITH, AND BECOME FAMILIAR WITH THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. CONTRACTOR SHALL PERFORM THIS PRIOR TO SUBMITTING HIS PROPOSAL. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.

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

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

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

1.02 WORK INCLUDED

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

1. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF THE NEW YORK CITY BUILDING CODE, N.F.P.A. STANDARD 13R, N.Y.C. FIRE DEPARTMENT AND OWNERS INSURANCE RATING ORGANIZATION.

2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. ANY DIMENSIONS NOT SHOWN SHALL BE OBTAINED FROM FIELD MEASUREMENTS.

3. PROVIDE COMPUTER GENERATED HYDRAULIC CALCULATIONS IN ACCORDANCE WITH N.Y.C. BUILDING DEPARTMENT AND NFPA STANDARDS.

1.03 SHOP DRAWINGS AND SUBMITTALS

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

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

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

B. ADD APPROPRIATE HOSE ALLOWANCE.

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

1.04 BUILDING DEPARTMENT FILING, PERMITS AND CERTIFICATES

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

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

1.05 INSPECTION AND TESTING

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

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

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

PART 2 – MATERIALS

2.01 GENERAL

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

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

2.02 SPRINKLER PIPING

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

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

C. AS PER NFPA 13R MODIFIED BY APPENDIX Q, PIPE OR TUBE USED IN SPRINKLER SYSTEMS SHALL BE OF THE MATERIALS SPECIFIED IN TABLE 5.2.1.1 OR SHALL BE IN ACCORDANCE WITH 5.2.2.

D. CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE SHALL COMPLY WITH THE PORTIONS OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS SPECIFIED IN ASTM F422 THAT APPLY TO FIRE PROTECTION SERVICE.

E. AS PER NFPA 13R, FITTINGS USED IN SPRINKLER SYSTEMS SHALL BE OF THE MATERIALS LISTED IN TABLE 5.2.5 OR SHALL BE IN ACCORDANCE WITH 5.2.9. FITTING SHALL BE UL/FM APPROVED. CONTRACTOR.

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

2.03 CUTTING AND PATCHING

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

2.04 CUTTING AND PATCHING

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

2. FOR REPLACEMENT OF THE WORK REMOVED, MATCH EXISTING IN NATURE, CONSTRUCTION AND FINISH.

3. MAINTAIN THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH COVERED BY THE WORK, REMOVE ALL SURPLUS MATERIALS, TOOLS ETC. AND LEAVE PREMISES CLEAN.

2.05 FIRE STOPPING

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

2.06 PHASING

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

2.06 ALTERNATES/SUBSTITUTIONS

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

2.07 LEAK DAMAGE

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

2.08 INSERTS, HANGERS, ETC.

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

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

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

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

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

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

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

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

2.09 ESCUTCHEONS

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

2.10 AS–BUILT DRAWINGS

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

2.11 SPRINKLER HEADS

A. SPRINKLERS SHALL BE RATED FOR ORDINARY TEMPERATURES (135/165 DEG. F) EXCEPT AS REQUIRED NEAR HEATERS OR LOCATIONS WHERE ELEVATED TEMPERATURES MAY NORMALLY BE EXPECTED OR AS OTHERWISE INDICATED ON THE CONTRACT DRAWINGS.

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

1. SPRINKLER HEADS IN FINISHED CEILINGS WITH CONCEALED PIPING SHALL BE AUTOMATIC TYCO MODEL TY3531.

2. UPRIGHT SPRINKLER HEADS SHOULD BE AUTOMATIC TYCO MODEL TY3121.

3. PROVIDE SPARE SPRINKLER EMERGENCY CABINETS CONFORMING TO NFPA 13.

4. SPRINKLER EMERGENCY CABINETS SHALL BE OF TYCO SPRINKLER CO., INC. OR APPROVED EQUAL, UL AND FM APPROVED.

5. CABINET SHALL BE CONSTRUCTED OF 22 GAUGE STEEL WITH PRIME COAT AND MANUFACTURER'S BAKED ENAMEL FINISH IN COLOR SELECTED BY THE ARCHITECT.

6. CABINET SHALL CONTAIN A MINIMUM OF 6 SPRINKLER HEADS OF EACH TYPE EMPLOYED.

2.12 PRESSURE GAUGE

A. ASHCROFT SERIES 1079, OR APPROVED OTHER, 4–1/2" DIAMETER, 0–200 P.S.I. RANGE, 20 P.S.I. INTERVALS.

PART 3 – EXECUTION

3.01 GUARANTEE

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

3.02 INSTALLATION

A. PIPING

1. INSTALL PIPING AS SHOWN ON THE CONTRACT DRAWINGS AND STRAIGHT AND DIRECT AS POSSIBLE, FORMING RIGHT ANGLES OR PARALLEL LINES WITH BUILDING WALLS, NEATLY SPACED, WITH RISERS PLUMB AND TRUE.

2. SPRINKLER PIPING SHALL BE INSTALLED SO THAT THE SYSTEM CAN BE DRAINED.

3. PIPE SHALL BE REMOVED BY REAMING.

4. BEFORE INSTALLING PIPE, THOROUGHLY CLEAN THE INSIDE FREE OF CUTTING AND FOREIGN MATTER. CUT ALL PIPE SQUARE AND SMOOTH AND MAKE UP ALL JOINTS TO REQUIRED LIMITS.

B. PIPE JOINTS

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

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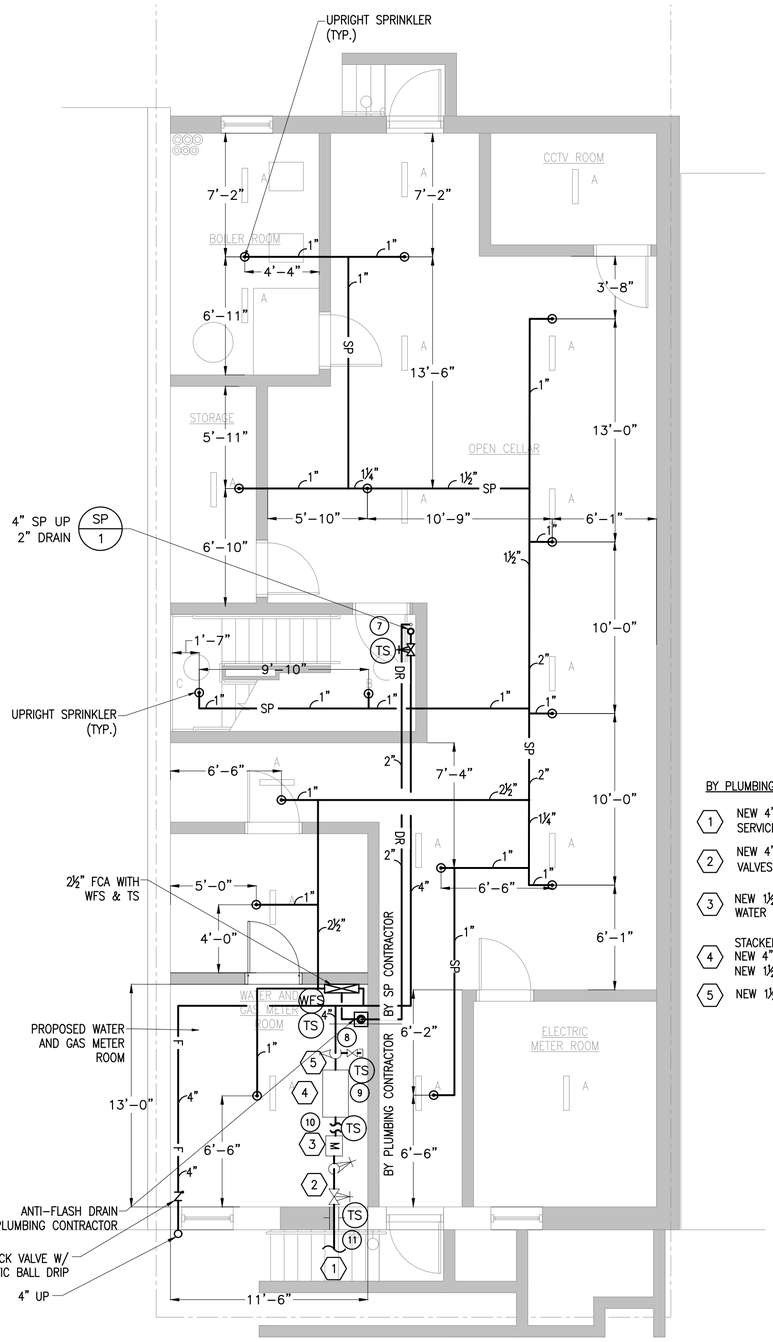


BY PLUMBING CONTRACTOR

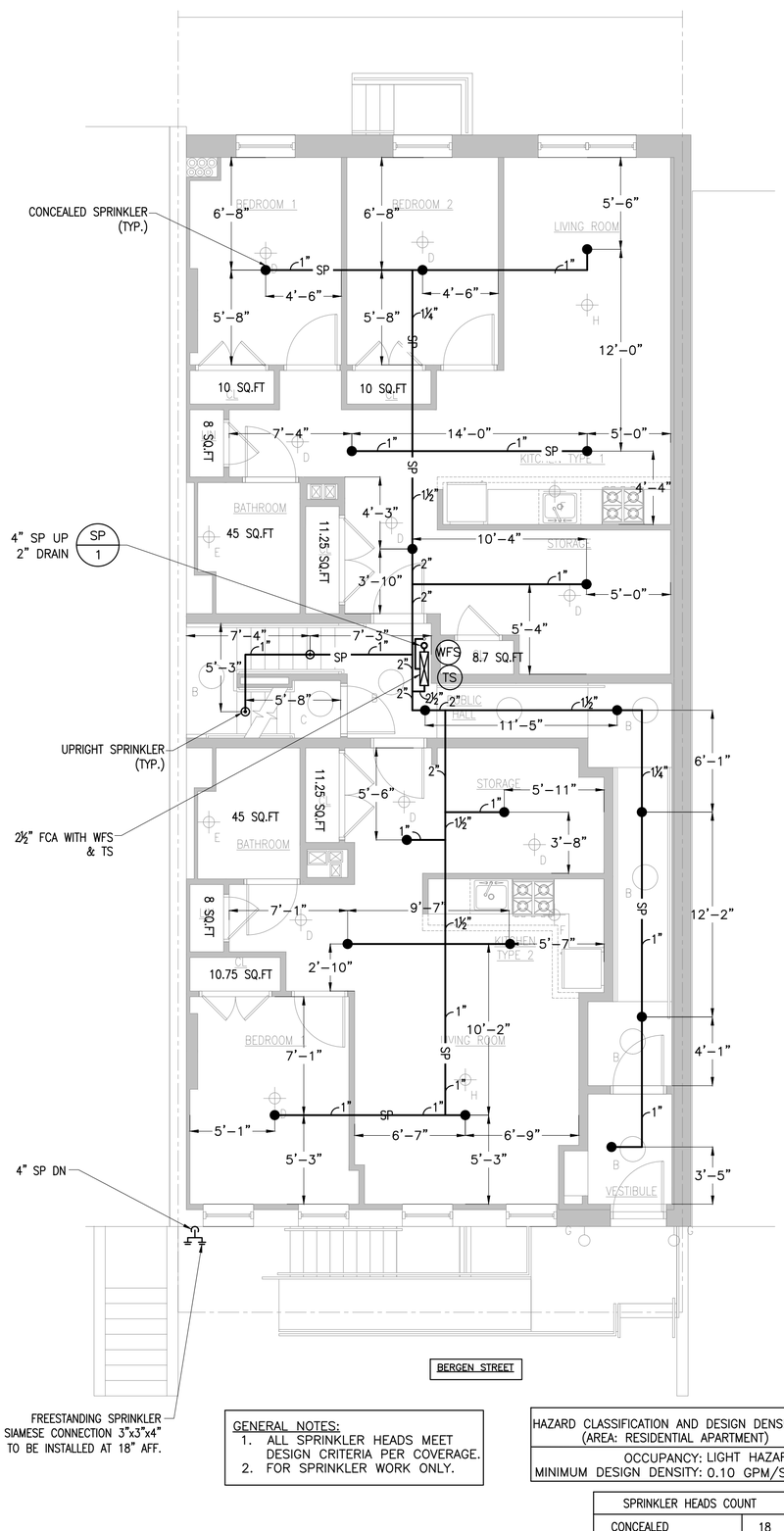
1. NEW 4" COMB. DOMESTIC & FIRE WATER SERVICE
2. NEW 4" HOUSE CONTROL VALVE (OS & Y VALVES) W/ TAMPER SWITCH
3. NEW 1½" MICV & EXIST. 1½" APPROVED NYC WATER METER STACKED ABOVE SPRINKLER BFP
4. STACKED BFP
   NEW 4" DCDA (FOR SPRINKLER)
   NEW 1½" DCVA LEAD FREE(FOR DOMESTIC)
5. NEW 1½" TEST TEE & NEW 1½" MOCV

GENERAL NOTES:
1. ALL SPRINKLER HEADS MEET DESIGN CRITERIA PER COVERAGE.
2. FOR SPRINKLER WORK ONLY.
3. FOR QUANTITY OF TEMPER FLOW SWITCH AND WATER FLOW SWITCH, REFER RISER DIAGRAM.

HAZARD CLASSIFICATION AND DESIGN DENSITY: (AREA: UTILITY, STORAGE AND OPEN SPACE)	
OCCUPANCY:	ORDINARY HAZARD
MINIMUM DESIGN DENSITY:	0.15 GPM/SQ. FT.

SPRINKLER HEADS COUNT	
UPRIGHT	15

1 CELLAR SPRINKLER PLAN
SCALE: 3/16"=1'-0"



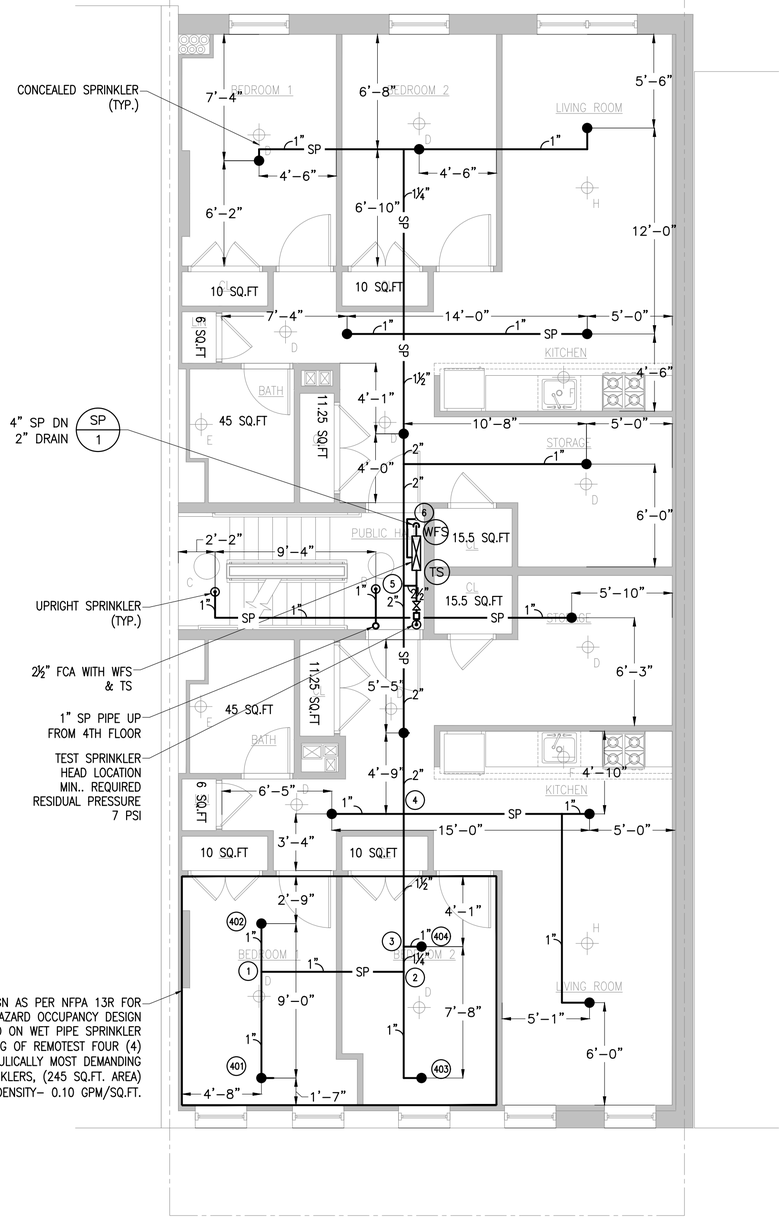
GENERAL NOTES:
1. ALL SPRINKLER HEADS MEET DESIGN CRITERIA PER COVERAGE.
2. FOR SPRINKLER WORK ONLY.

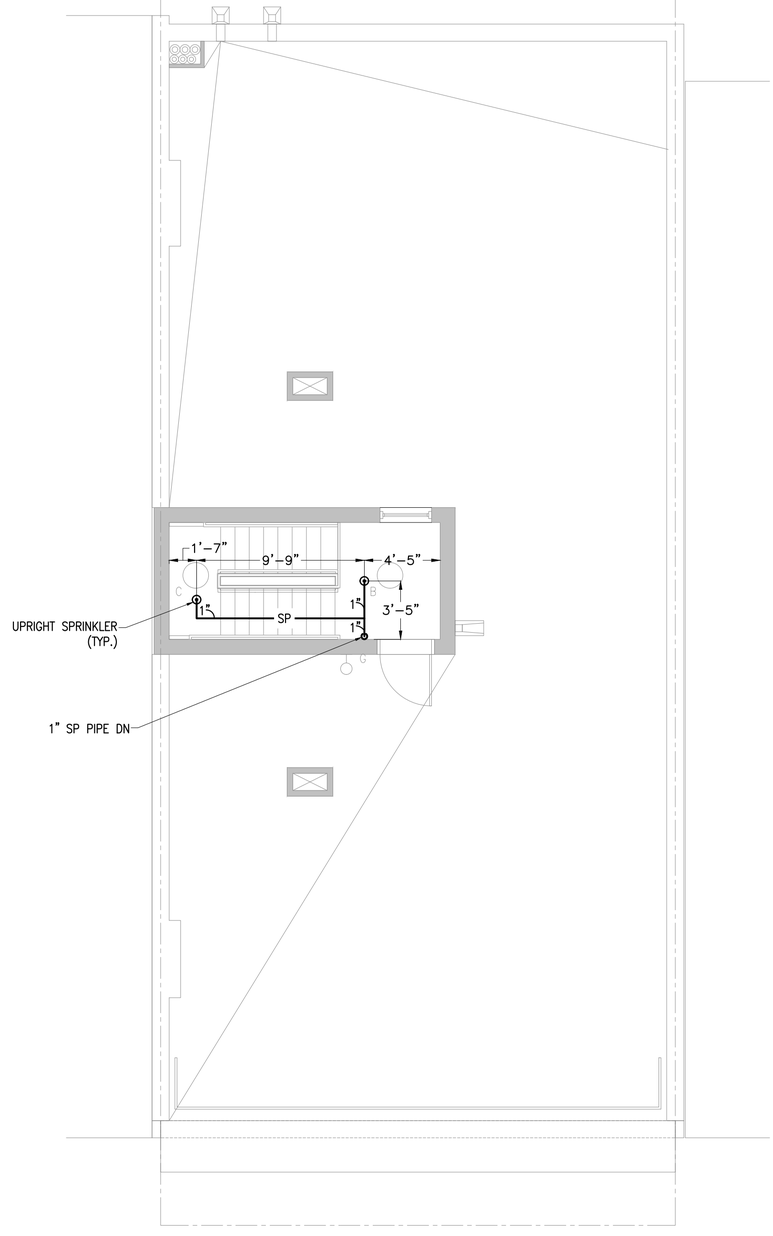
HAZARD CLASSIFICATION AND DESIGN DENSITY: (AREA: RESIDENTIAL APARTMENT)
OCCUPANCY: LIGHT HAZARD
MINIMUM DESIGN DENSITY: 0.10 GPM/SQ. FT.

SPRINKLER HEADS COUNT	
CONCEALED	18
UPRIGHT	02

2 1ST FLOOR SPRINKLER PLAN
SCALE: 3/16"=1'-0"

N





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

HAZARD CLASSIFICATION AND DESIGN DENSITY: (AREA: RESIDENTIAL APARTMENT)
OCCUPANCY: LIGHT HAZARD
MINIMUM DESIGN DENSITY: 0.10 GPM/SQ. FT.

SPRINKLER HEADS COUNT	
CONCEALED	16
UPRIGHT	02

1 2ND TO 4TH FLOOR SPRINKLER PLAN
SCALE: 3/16"=1'-0"

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

HAZARD CLASSIFICATION AND DESIGN DENSITY: (AREA: STAIR BULKHEAD)
OCCUPANCY: LIGHT HAZARD
MINIMUM DESIGN DENSITY: 0.10 GPM/SQ. FT.

SPRINKLER HEADS COUNT	
UPRIGHT	02

2 ROOF SPRINKLER PLAN
SCALE: 3/16"=1'-0"

N

ARCHIT
RK
Archite
150 We
New Yo
T: 212-8

MECHA
NEW YOR
135 WEST
FIFTH FLO
NEW YORK
T: 212-575

STRUCT
CELIN MU
145 SOUTH
SUITE 107
VALLEY ST
T: 516-687-
F: 516-687-

KEYPLA

06.07.19
05.16.19
05.03.19
04.25.19
01.25.19
10.26.18
10.19.18
DATE

PROJECT
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TITLE
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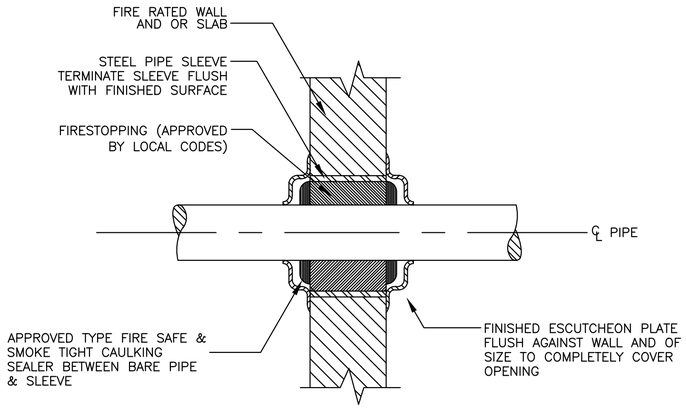
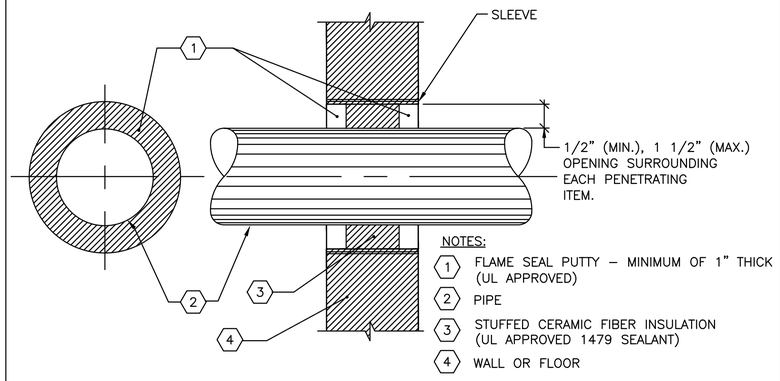
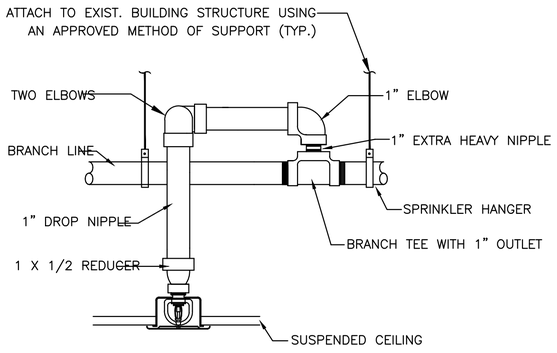


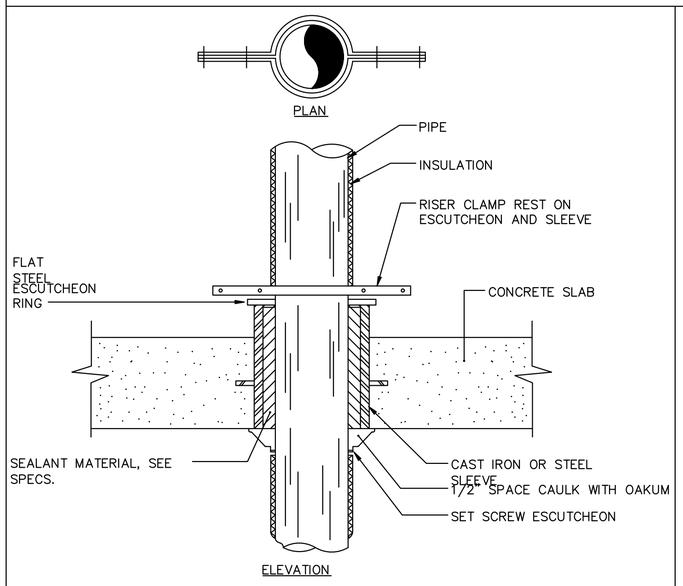
1 SP-501 PIPE THRU RATED WALL TYPICAL DETAIL
N.T.S



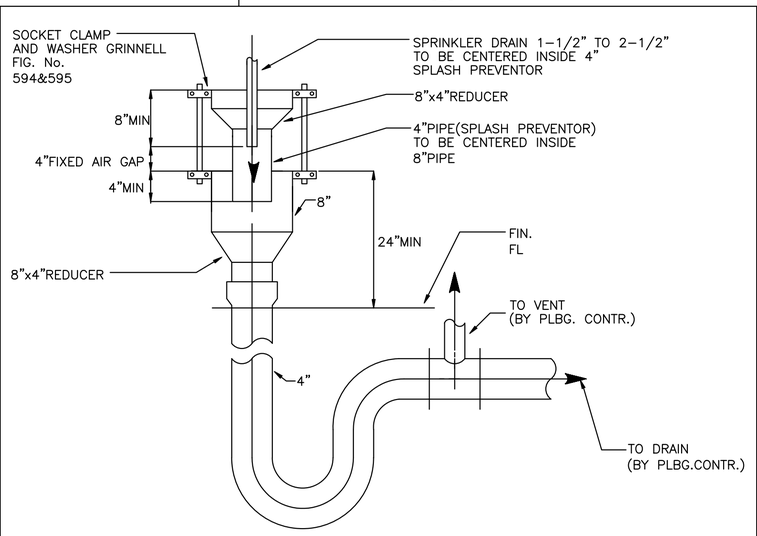
2 SP-501 FIRE STOPPING DETAIL FOR FIRE/SMOKE RATED WALL/FLOOR OPENINGS
N.T.S



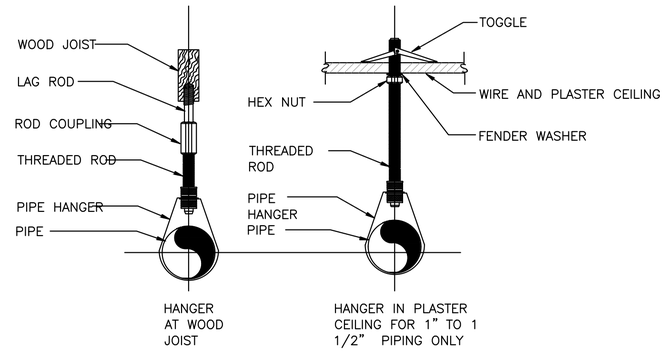
3 SP-501 SPRINKLER HEAD IN SUSPENDED CEILING DETAIL
N.T.S



4 SP-501 SPRINKLER RISER CLAMP DETAIL
N.T.S



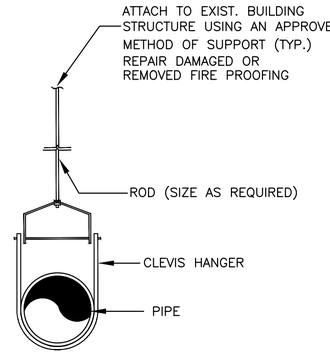
5 SP-501 ANTI-SPLASH STANDPIPE DRAIN DETAIL
N.T.S



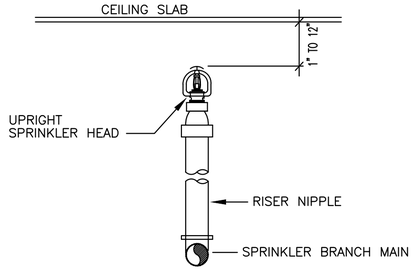
ROD SCHEDULE

PIPE SIZE	ROD SIZE	SPACING	PIPE SIZE	ROD SIZE	SPACING
1"	3/8"	5'-8'	2 1/2"	1/2"	10'-12'
1 1/4"	3/8"	6'-10'	3"	1/2"	10'-12'
1 1/2"	3/8"	8'-10'	4"	5/8"	12'-15'
2"	3/8"	10'-12'			

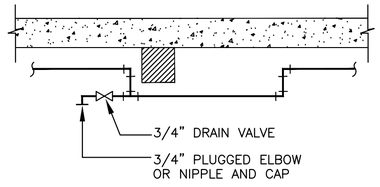
6 SP-501 TYPICAL HANGER DETAIL AND ROD SCHEDULE
N.T.S



7 SP-501 HANGER DETAILS TYPICAL
N.T.S



8 SP-501 SPRINKLER HEAD DETAIL UPRIGHT
N.T.S



9 SP-501 TYPICAL DRAIN CONNECTION FOR TRAPPED LINES ON WET PIPE SPRINKLER SYSTEMS
N.T.S

NOTE- FOR SPRINKLER WORK ONLY.

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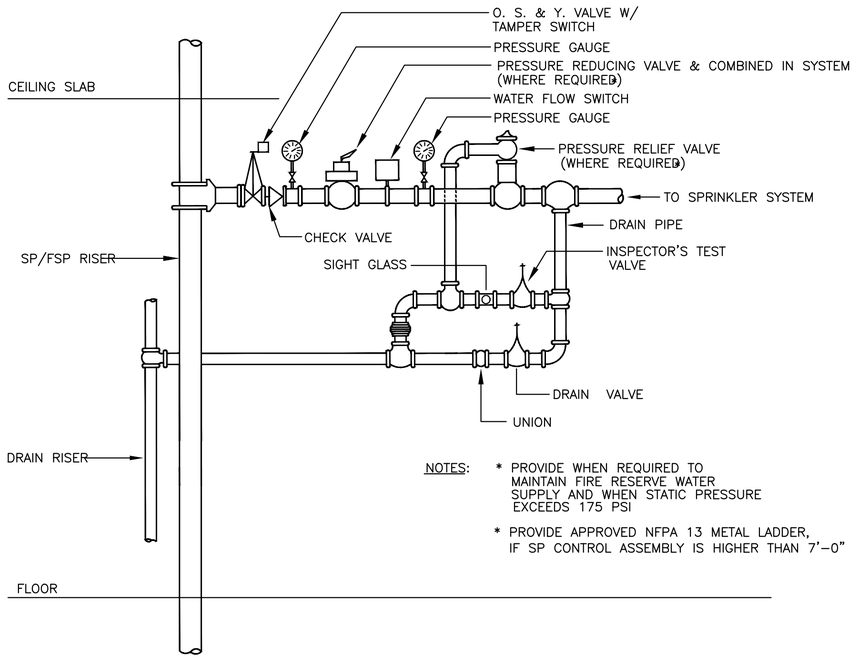

1
SP-502

SPRINKLER CONTROL VALVE ASSEMBLY DETAILS

N.T.S

NOTE- FOR SPRINKLER WORK ONLY.

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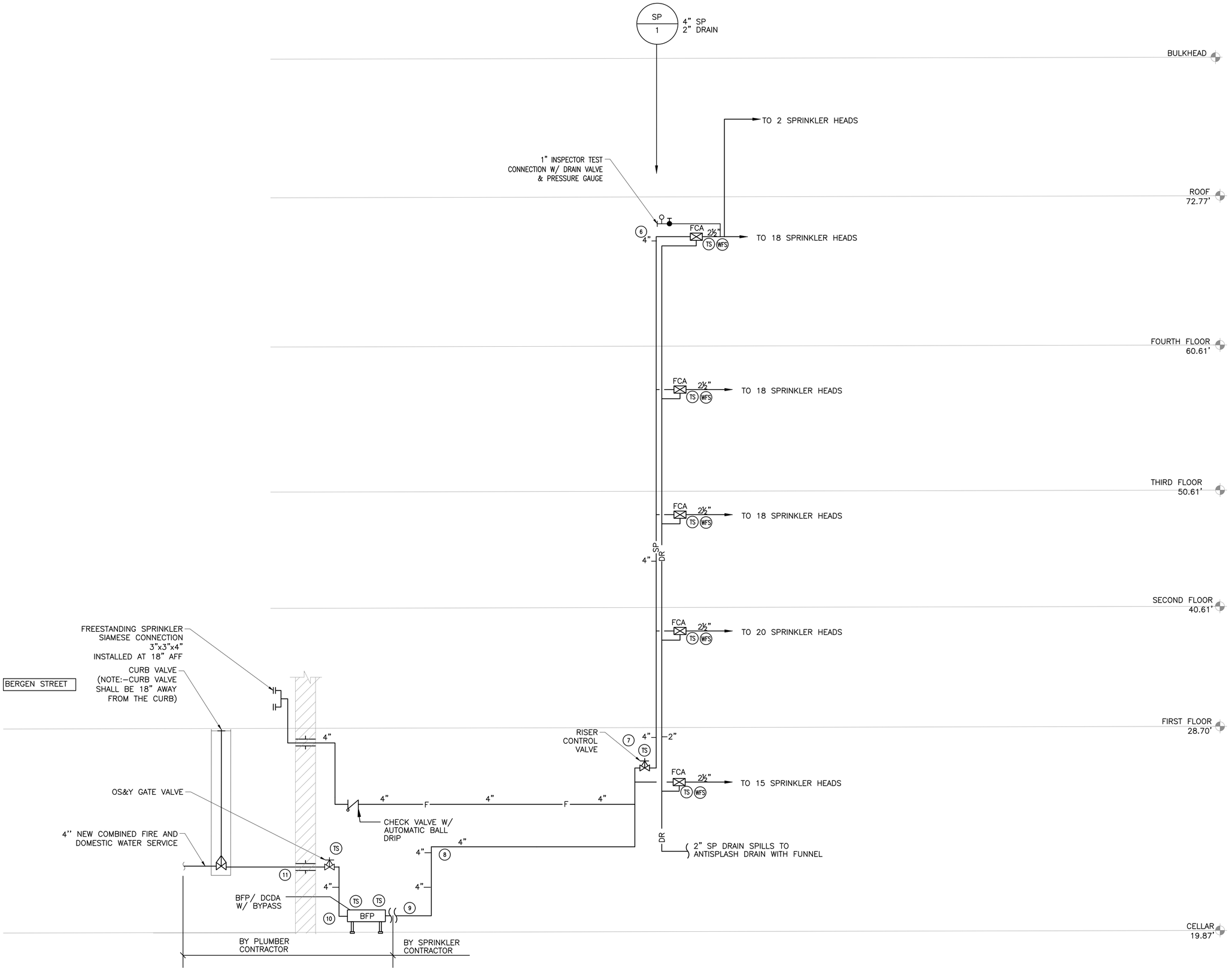

NOTE– FOR SPRINKLER WORK ONLY.

1 SPRINKLER RISER DIAGRAM

SCALE: NTS

N

ELECTRICAL SYMBOLS LIST

LIGHTING

	FLUORESCENT LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.
A 2 a	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE. CIRCUIT NUMBER : INDICATED BY NUMBER SWITCHING INDICATED BY LOWER CASE LETTERS.
EM	DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.
NL	DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS UNSWITCHED CIRCUIT.

SWITCHES AND CONTROLS

$a	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED.
$3a	20A 3–WAY TOGGLE SWITCH U.N.O. "a" DENOTES LIGHTING FIXTURE CONTROLLED
OS A	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM.
PC	WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE.

WIRING SYSTEMS

3 UP–	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 1#12 ø, 1#12 N. & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.
3 5 UP–	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.
3 5 7 UP–	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 ø, 3#12 N. & 3#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.
	NEW
S/CO	COMBINATION OF SMOKE AND CO DETECTOR WITH SOUNDER BASE

POWER DISTRIBUTION

	MAJOR ELECTRICAL COMPONENT OR DEVICE. VOLTAGE AND AMPERAGE AS NOTED.
	LOADCENTER, 208Y/120V–SURFACE OR FLUSH MOUNTED, SIZE AS NOTED.
	DISTRIBUTION PANELBOARD, 208Y/120V–SURFACE OR FLUSH MOUNTED.

ANNOTATION

X	KEYED NOTE REFERENCE
+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.

POWER AND TELECOMMUNICATION

J	JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTE, +18" AFF OR AS NOTED.
J	JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED..
C	CLOCK OUTLET INSTALLED AT TV LOCATIONS. OUTLET SHALL BE DUPLEX RECESSED, 15A, DECORA STYLE, LEVITON MODEL–012–00690–00W OR EQUIVALENT
	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.
	DUPLEX DEDICATED RECEPTACLE, +18" AFF OR AS NOTED.
NID	NETWORK INTERFACE DEVICE. NID IS 'ONT' BOX WHICH INCLUDES BOTH 'ONT' AND ITS SISTER BOX AS PER VERIZON STANDARDS.
	DOUBLE DUPLEX RECEPTACLE – 20A–1P, 120V, NEMA 5–20R.
	TELEPHONE/DATA OUTLET, 4"SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.
TV	CABLE TV OUTLET, WALL–MOUNTED AT 18" AFF UNO.
IC	INTERCOM
ENT	ENTRANCE DOOR STATION.
PL	POSTAL LOCK.
SC	SECURITY CAMERA/CCTV
	DATA OUTLET – (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4" DIAMETER GROMMETED OPENING.

MOTORS AND CONTROLS

M	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.
	NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES AS NOTED.
A	30A/208V NON FUSED DISCONNECT SWITCH
B	60A/208V NON FUSED DISCONNECT SWITCH
S_T	THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS PER MOTOR RATING.
S_M	MANUAL MOTOR SWITCH

NOTES:

1. AUTOMATIC LIGHTING CONTROLS: OCCUPANCY SENSOR SHALL BE CAPABLE OF TURNING OFF LIGHTS WITHIN 20 MINUTES OF ALL OCCUPANT LEAVING THE SPACE.
2. ALL ILLUMINATED EXIT SIGN TO HAVE A MAX WATTAGE OF 5 PER SIDE.
3. SEPARATE METERING IS PROVIDED FOR DWELLING UNIT.
4. SELECT ALL EMERGENCY LIGHTS WITH MINIMUM 90 MINUTES OF BATTERY BACK UP.
5. FINAL LIGHT FIXTURE WATTAGES, MAKE & FINISH TO BE COORDINATED WITH THE ARCHITECT.

ELECTRICAL ABBREVIATIONS

A	AMPERES	EC	EMPTY CONDUIT/ ELECTRICAL CONTRACTOR
A/C, AC	AIR CONDITIONING UNIT	EF	EXHAUST FAN
AF	AMPERE FRAME/AMP FUSE	EM	EMERGENCY
AFF	ABOVE FINISHED FLOOR	EMT	ELECTRICAL METALLIC TUBING
AS	AMP SWITCH	FIXT	FIXTURE
AIC	AMPS INTERRUPTING CAPACITY	G	GROUND
AWG	AMERICAN WIRE GAUGE	GFI	GROUND FAULT INTERRUPTER
C	CONDUIT	GP	GENERAL PURPOSE
C/B,CB	CIRCUIT BREAKER	HP	HORSEPOWER
CT	CURRENT TRANSFORMER	HWHT	HOT WATER HEATER
CU	COPPER	HZ	HERTZ
DP	DISTRIBUTION PANEL	IC	INTERRUPTING CAPACITY
DWH	DOMESTIC WATER HEATER	PP	POWER PANEL
DWG	DRAWING	PVC	POLYVINYL CHLORIDE
JB	JUNCTION BOX	PWR	POWER
KCMIL	ONE THOUSAND CIRCULAR MILS	REC	RECEPTACLE
KV	KILOVOLT	SPDT	SINGLE POLE DOUBLE THROW
KVA	KILOVOLT–AMPERES	SPST	SINGLE POLE SINGLE THROW
KW	KILOWATTS	SPEC	SPECIFICATION
LTG	LIGHTING	SW	SWITCH
MCB	MAIN CIRCUIT BREAKER	TELE	TELEPHONE
MLO	MAIN LUGS ONLY	TEMP	TEMPERATURE
N	NEUTRAL	TXF	TOILET EXHAUST FAN
NL	NIGHT LIGHT	UON	UNLESS OTHERWISE NOTED
NTS	NOT TO SCALE	V	VOLT/VOLTAGE
P	POLES	VA	VOLT AMPERE
ø	PHASE	VP	VAPORPROOF
W	WATT	WP	WEATHER PROOF
W	WIRE	IG	ISOLATED GROUND
JP	JOCKEY PUMP	SBP	SPRINKLER BOOSTER PUMP

ELECTRICAL DRAWING LIST

E–001.00	ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES
E–002.00	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2
E–003.00	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2
E–100.00	CELLAR AND 1ST FLOOR LIGHTING PLAN
E–101.00	2ND TO 4TH FLOOR AND ROOF LIGHTING PLAN
E–200.00	CELLAR AND 1ST FLOOR POWER PLAN
E–201.00	2ND TO 4TH FLOOR AND ROOF POWER PLAN
E–400.00	ELECTRICAL DETAILS SHEET 1 OF 2
E–401.00	ELECTRICAL DETAILS SHEET 2 OF 2
E–500.00	ELECTRICAL RISER DIAGRAM
E–600.00	ELECTRICAL PANEL SCHEDULES

LIGHTING FIXTURE SCHEDULE

FIXTURE SYMBOL	FIXTURE TAG	DISCRIPTION	MANUFACTURER	MODEL NUMBER	BILB TYPE	BULB WATTAGE
A	A	4' LONG, 2LAMP FLUORESCENT INDUSTRIAL LUMINAIRE	MERCURY	MIE6P-2-28-T5-ELB-120V-EMPK	FLUORESCENT	28W
B	B	TBD	TBD	TBD	LED	20W
C	C	TBD	TBD	TBD	LED	20W
D	D	16" BRUSHED NICKEL LIGHT FIXTURE	SUNLIGHT LED	LFX/DCO16/BN/24W/E/D/30K/LED	LED	24W
E	E	16" BRUSHED NICKEL LIGHT FIXTURE	SUNLIGHT LED	LFX/AM/15/BN/E/D/30K/LED	LED	24W
F	F	16" BRUSHED NICKEL LIGHT FIXTURE	SUNLIGHT LED	LFX/DCO16/BN/24W/E/D/30K	LED	24W
H	H	TBD	SUNLIGHT LED	TBD	LED	24W
G	G	LED WALL MOUNTED FIXTURE DUSK TO DOWN	EQATIN ALL PRO	WP1050LPC	LED	18W
H	EXIT	LED EXIT LIGHT	BEST LIGHTING	NYXTEU	LED	5W

LIGHTING CONTROLS SCHEDULE

AREA	FLOOR	CONTROLS	REMARKS
PUBLIC HALL/OPEN CELLAR	CELLAR AND 1ST FLOOR	LIGHTING WILL BE CONTROLLED BY A CEILING MOUNTED OCCUPANCY SENSOR THAT ARE AUTOMATICALLY ACTIVATED TO TURN ON LIGHTS UPON ENTRY. THE LIGHTS CAN BE TURNED OFF WHEN EXITING. THEY WILL TURN OFF AUTOMATICALLY AFTER 20 MINUTES.	REFER E-100.00 SHEET
STAIR-CASE	ALL FLOORS	100% OF LIGHTS TO BE ENERGIZED AT ALL TIMES (i.e. EMERGENCY FIXTURES TO REMAIN ON)	REFER E-100.00 AND E-101.00 SHEETS
WATER AND GAS METER ROOM, ELECTRIC METER ROOM, BOILER ROOM, STORAGE, CCTV ROOM	CELLAR	LIGHTING WILL BE CONTROLLED BY A WALL MOUNTED OCCUPANCY SENSOR ADJACENT TO ENTRY/EXIT DOORS THAT ARE MANUALLY ACTIVATED TO TURN ON LIGHTS UPON ENTRY. THE LIGHTS CAN BE TURNED OFF WHEN EXITING BUT, IF NOT TURNED OFF MANUALLY, THEY WILL TURN OFF AUTOMATICALLY AFTER 20 MINUTES.	REFER E-100.00 SHEET
EXTERIOR AND ROOF	CELLAR, 1ST FLOOR AND ROOF	LIGHTING WILL BE CONTROLLED BY WALL MOUNTED PHOTOCELL, THEY ARE AUTOMATICALLY ACTIVATED TO TURN ON LIGHTS WHEN DARK TIME DETECTED. THE LIGHTS CAN BE TURNED OF MANUALLY BY USING SWITCHES.	REFER E-100.00 AND E-101.00 SHEETS

GENERAL NOTES

(APPLY TO ALL "E" DRAWINGS)

1. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF THE NYC ELECTRICAL CODE, 2008 NEC WITH NYC AMENDMENTS, LOCAL JURISDICTION REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
2. CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
3. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
4. FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
5. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
6. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
8. CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
9. ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
10. CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE–EXISTING CONDITIONS OR BETTER.
11. MINIMUM SIZE OF CONDUIT SHALL BE ¾", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
12. CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
13. PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
14. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
15. FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
16. ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
17. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
18. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
19. ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
20. ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
21. OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE–RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE–RATED BOXES OR PUTTY PADS ARE UTILIZED.
22. COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITRH THE ENGINEER AND OWNER BEFORE INSTALLATION.
23. COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
24. REFER TO ARCHITECTURAL PLANS FOR FINAL LOACTIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
25. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
26. LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
27. NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.

N

ELECTRICAL SPECIFICATIONS

1. GENERAL:

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.

B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.

C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.

D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOROPERATION,MAINTANANCE AND REPAIR, MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.

F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.

I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.

J. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.

K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT ND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

L. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

M. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.

O. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.

2. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. DEFINITIONS:

1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE. AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

5) "WIRING": RACEWAY. FITTINGS, WIRE, BOXES, AND RELATED ITEMS.

6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.

C. QUALITY ASSURANCE

1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.

2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.

3) CURRENT CHARACTERISTICS:

a. SERVICE: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

b. DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

4) HEIGHTS OF OUTLETS:

a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:

– RECEPTACLES AND TELEPHONES: 1 FT–6 IN.

– WALL SWITCHES: 4 FT–0 IN.

– WALL FIXTURES: 7 FT–0 IN.

– MOTOR CONTROLLERS: 5 FT–0 IN.

– CLOCKS: 7 FT 6 IN

b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.

D. PRODUCT DELIVERY, STORAGE AND HANDLING

1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.

2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

E. MATERIALS

1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.

2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.

3) INSERTS AND SUPPORTS:

a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.

– SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.

– MULTI–ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.

– CLIP FORM NAILS FLUSH WITH INSERTS.

– MAXIMUM LOADING 75 PERCENT OF RATING.

b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.

c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.

d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD–APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.

H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.

I. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

3. SCOPE OF WORK:

A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE 2008 NATIONAL ELECTRICAL CODE (NEC) NYC AMENDMENTS, AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.

B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

E. CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE NYC BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.

F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.

4. SHOP DRAWINGS

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

1) PROJECT NAME AND LOCATION

2) NAME OF ARCHITECT AND ENGINEER

3) ITEM IDENTIFICATION

4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS:

1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.

2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.

D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:

1) SAFETY/DISCONNECT SWITCHES

2) FUSES

3) CIRCUIT BREAKERS

4) PANELBOARDS (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).

5) RACEWAYS

6) WIRE AND CABLE

7) WALL SWITCHES

8) INSERTION RECEPTACLES

9) LIGHTING FIXTURES.

E. ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING. PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.

5. AS–BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

B. THESE INSTRUCTIONS SHALL BE TYPED ON 8–1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.

C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.

D. REPRODUCIBLE "AS–BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS–BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.

6. LOW–VOLTAGE DISTRIBUTION EQUIPMENT:

A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.

B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.

C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO–POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE–POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE–BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK–MAKE– QUICK–BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.

7. FUSES:

A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW–PEAK DUAL–ELEMENT TIME–DELAY LPN–RK (AMP)SP (250V) /LPS–RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

B. MOTOR CIRCUITS – ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW–PEAK DUAL–ELEMENT TIME–DELAY LPN–RK (AMP)SP (250V) /LPS–RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.

D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.

E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL–MAGNETIC, QUICK–MAKE–QUICK–BREAK, BOLT–ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP–FREE HANDLE. MULTI–POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT–TRIPPING, OPEN A ND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:

1) 120 VOLTS, 100–AMP FRAME: 10,000 AMPS, 1 POLE.

2) 120/240 VOLTS, 225–AMP FRAME: 22,000 AMPS MINIMUM

8. TELEPHONE/ DATA/ TELEVISION CABLING SYSTEM

A. PROVIDE COMPLETE SYSTEM CONSISTING OF CABLING/ WIRING, OUTLETS BOXES, SLEEVES AND FISHWIRES AS REQUIRED.

B. EQUIPMENT SHALL BE LATEST MODEL YEAR AVAILABLE IN ACCORDANCE WITH UTILITY COMPANY AND TV PROVIDE REQUIREMENTS.

C. OUTLETS SHALL BE:

1) WALL: 4 IN. SQUARE WITH REDUCING COVER

D. CABLE SHALL BE COMPOSITE CABLE, BELDEN 5353GF, MEETING ANSI/TIA/EIA–570–B RESIDENTIAL INFRASTRUCTURE GRADE 2 WIRING REQUIREMENTS CONSISTING OF:

1) COAXIAL: (2) RG6 DUOBOND PLUS SHIELD – 3.0GHZ
2) DATA: (2) CAT6 – 24AWGUTP, NEC CMR RATED, 3RD PARTY VERIFIED TO TIA/EIA–568–B 2.1
3) FIBER OPTIC: 62.5/125 NM MULTIMODE FIBER OPTIC CABLE

E. RUN COMPOSITE CABLE FROM EACH DATA, TELEPHONE OR TELEVISION LOCATION TO 'NID' BOX IN APARTMENT OR AS INDICATED ON DRAWINGS IF DIFFERENT.

9. SMOKE ALARMS/CO:

A. PROVIDE SOLID STATE, HARD–WIRED ALARM WITH 9V BATTERY BACKUP AND INTEGRAL TEMPORAL PATTERN EVACUATION HORN.

B. ALARM SHALL BE TANDEM–WIRED TO ACTUATE ALL SMOKE ALARM HORN UPON SMOKE DETECTION. LATCHING ALARM INDICATOR SHALL REMEMBER WHICH UNIT INITIATED THE ALARM.

C. PROVIDE SHALL BE DUAL PHOTOELECTRIC AND IONIZATION SENSING TECHNOLOGIES (MODEL 3120B) WHEN SPECIFIED ON PLANS AS SMOKE ALARMS. WHEN COMBINATION SMOKE/ CO ALARM IS SPECIFIED, ALTERNATE ADVANCED ELECTROCHEMICAL CO DETECTION WITH INTEGRAL IONIZATION SMOKE SENSING AND CO DETECTION WITH INTEGRAL PHOTOELECTRIC SMOKE SENSING

D. FOR DEDICATED CO: PROVIDE HARDWIRED CARBON MONOXIDE ALARM WITH LCD DIGITAL DISPLAY WITH MEMORY, BRK ELECTRONICS CO5120PDBN WITH ELECTROCHEMICAL CARBON MONOXIDE SENSOR.

E. DEVICE SHALL BE RATED TO OPERATE AT A RANGE OF 40°F TO 100°F.

F. UL LISTED TO UL217 AND UL2034. APPROVED FOR USE IN NEW YORK CITY.

10. RACEWAYS:

A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.

B. MATERIALS

1) RACEWAYS:

a. RIGID STEEL CONDUIT: FULL–WEIGHT PIPE, GALVANIZED, THREADED.

b. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.

c. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.

d. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW–ON.

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ELECTRICAL SPECIFICATIONS (CONT.)

e. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW–ON.

2) FITTINGS AND ACCESSORIES:

a. RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.

b. ELECTROMETALLIC TUBING: COMPRESSION TYPE. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.

c. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.

d. BUSHINGS: METALLIC INSULATED TYPE.

3) BOXES:

a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1–1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2–3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1–1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK–TO–BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.

b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW–ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

C. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U–BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH–THE–FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE–THROUGH–FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U–BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD–THREADED CONDUIT WITH GRAPHITE–BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD–CUT THREADS, CRC–COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS. CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.RACEWAYS PASSING THROUGH FIRE–RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

D. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE–PIECE PLUG WITH POZI–GRIP WEDGING PLUG AS MANUFACTIURED BY OZ–GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

E. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

F. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR–TO–CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

G. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE–PARTITIONS ROOMS.

H. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

11. WIRE AND CABLE:

A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF–2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS–LINKED POLYETHYLENE INSULATION (TYPE XHHW).

E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE 'BX'.

F. COLOR CODING SHALL BE AS FOLLOWS:

120/208 VOLT SYSTEM:	277/480 VOLT SYSTEM:
BLACK FOR A PHASE	BROWN FOR A PHASE
RED FOR B PHASE	ORANGE FOR C PHASE
BLUE FOR C PHASE	YELLOW FOR C PHASE

1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR–CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION–TYPE OF TWIST–ON SPRING–LOADED CONNECTORS AND CLEAR NYLON–INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

12. WIRING DEVICES:

A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.

B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/277 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3–WAY) AND A5624 (4–WAY).

C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.

1) SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2–POLE, 3–WIRE GROUNDING, 15A, 125V, NEMA 5–20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).
2) USB CHARGER/ DUPLEX TAMPER–RESISTANT RECEPTACLE: TAMPER RESISTANT,

2) GROUND FAULT INTERRUPTER RECEPTACLES:

a. 20 AMP DUPLEX FEED–THROUGH TYPE. SIMILAR TO NO. GF8300.

D. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.

E. COLORS: COORDINATE COLORS WITH ARCHITECT.

F. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL):
COORDINATE WITH ARCHITECT.

13. LIGHTING FIXTURES:

A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.

B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.

C. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ET1 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24–INCH LAMPS AND RAPID START FOR 48–INCH. TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.

D. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.

E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE, DIMMABLE LED DRIVERS SHALL BE 0–10V WHERE NOT INDICATED.

F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.

G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.

H. EXIT SIGNS SHALL BE PRECISION DIE–CAST ALUMINUM HOUSING WITH LASER–FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED FOR USE IN NEW YORK CITY. AC POWERED WITH PREMIUM LONG–LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3–HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

14. GROUNDING AND BONDING:

A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (2011 NATIONAL ELECTRICAL CODE WITH NYC AMENDMENTS), AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.

B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.

C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.

D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.

E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:
1) CIRCUITS SERVING ANY WALL BOX DIMMER.

2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE , OR AS OTHER WISE NOTED ON DRAWINGS.

3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES

4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

15. LOAD CENTERS:

A. LOAD CENTERS SHALL COMPLY WITH UL67 AND MEET FEDERAL SPECIFICATION W–P–115c.

B. CIRCUIT BREAKERS SHALL BE OF THE PLUG–IN, THERMAL MAGNETIC, MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. TANDEM OR DUPLEX TYPE CIRCUIT BREAKERS SHALL NOT BE PERMITTED. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG. TIE–BARS SHALL NOT BE USED TO CREATE MULTI–POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.

C. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.

D. ENCLOSURES MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR FLUSH MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE. MINIMUM GUTTER SPACES SHALL BE 5–3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED. ALL LOAD CENTERS SHALL BE 14 ⅜" WIDE AND 3 ¾" DEEP

E. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

F. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 22,000/10,000 AMPERES R.M.S. SYMMETRICAL SERIES RATING FOR 208Y/120 VOLT. SERIES RATED LOAD CENTERS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.

16. PANELBOARDS:

A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE.

B. CIRCUIT BREAKERS SHALL BE OF THE BOLT–ON THERMAL MAGNETIC MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5–3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.

C. LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 SPARE LOCKING TABS SHALL BE FURNISHED TO THE OWNER.

D. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.

E. ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR–IN–DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.

F. DISTRIBUTION AND SUB–DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.

G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.

H. FURNISH ALL PANELBOARDS WITH FEED–THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

I. ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.

J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

K. TIE–BARS SHALL NOT BE USED TO CREATE MULTI–POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.

L. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.

M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM AND 14,000 AMPERES R.M.S. SYMMETRICAL FOR 480Y/277 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.

N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS

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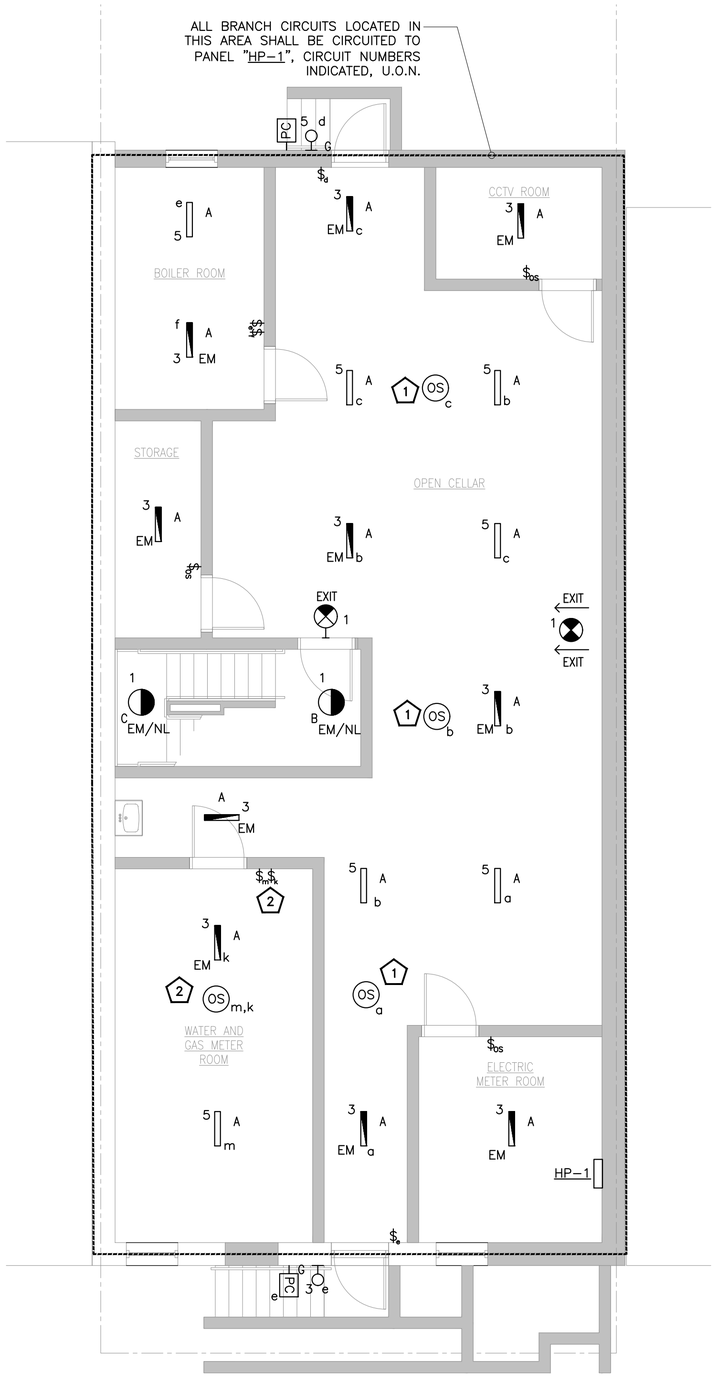
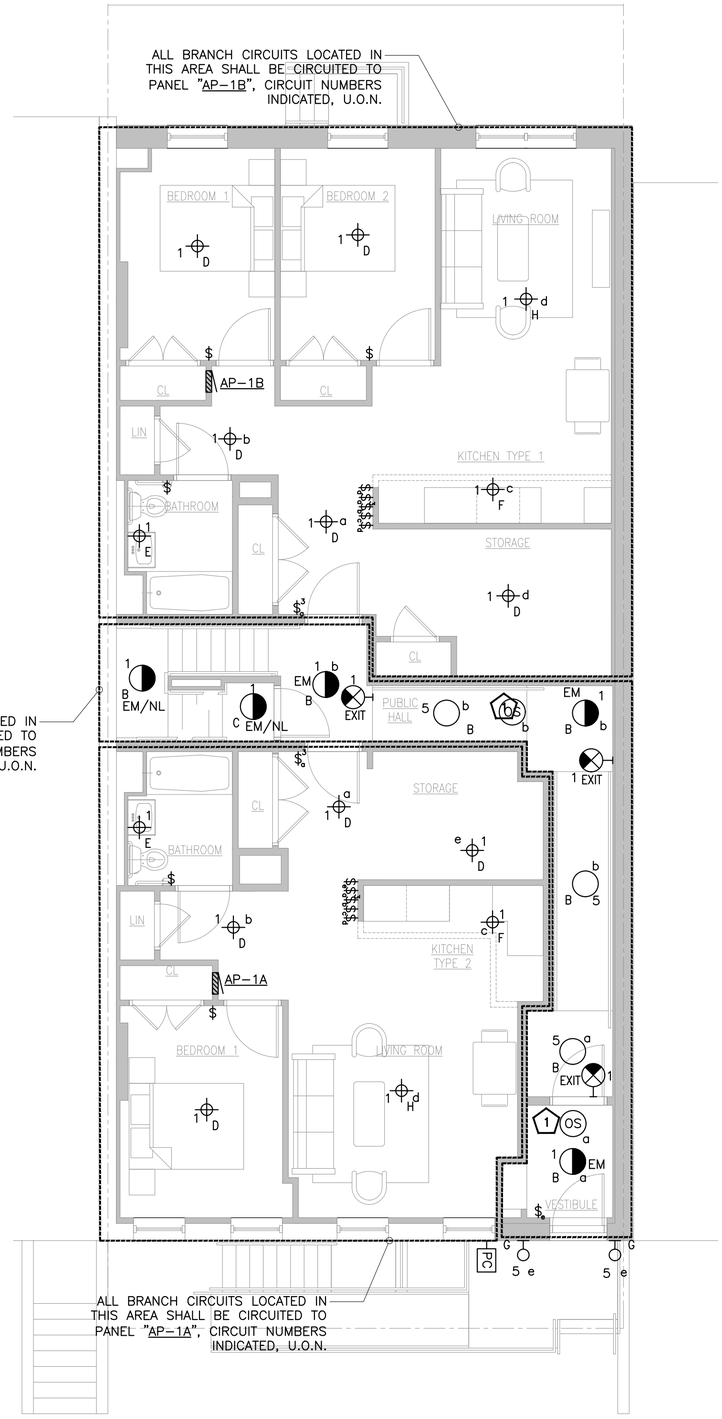


1 CELLAR LIGHTING PLAN
SCALE: 3/16"=1'-0"



2 1ST FLOOR LIGHTING PLAN
SCALE: 3/16"=1'-0"

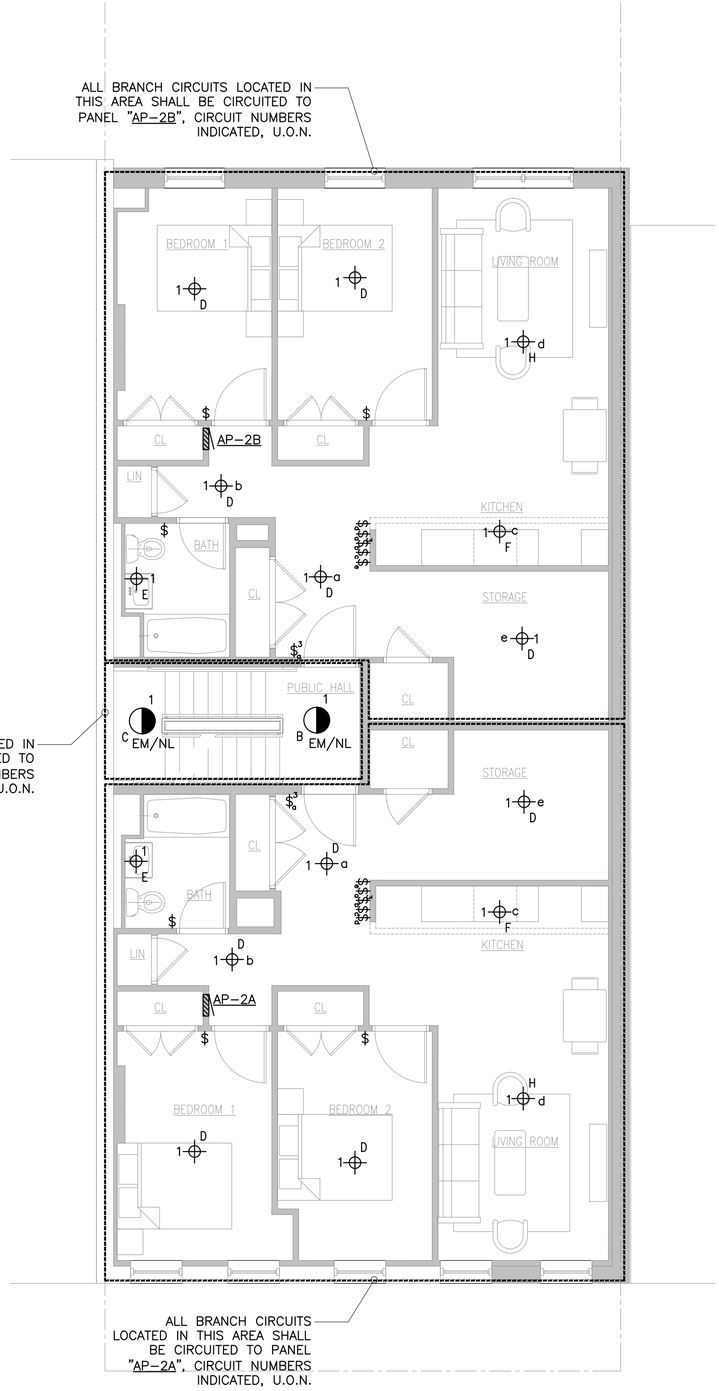
LIGHTING DRAWING NOTES:

1. REFER TO DWG. E–001.00 FOR ELECTRICAL GENERAL NOTES, SYMBOL LIST, ABBREVIATIONS.
2. CIRCUITING FOR LIGHTING FIXTURES IN ROOMS WITH TOGGLE SWITCHES SHALL BE CONTROLLED BY DESIGNATED SWITCHES. IF SPECIFIC DESIGNATION IS NOT INDICATED, ALL LIGHTING FIXTURES IN ROOM/AREA SHALL BE CONTROLLED BY THE SWITCH INDICATED.
3. REFER DWG E–001.00 FOR LIGHT FIXTURE SCHEDULE & LIGHTING CONTROL SCHEDULE.
4. ALL EMERGENCY NIGHT LIGHT FIXTURE (EM/NL) SHALL REMAIN ON ALL THE TIME AND NOT CONTROLLED BY ANY LIGHTING CONTROL DEVICE.
5. ELECTRICAL CONTRACTOR TO COORDINATE SWITCH HEIGHT WITH UFA STANDARDS AND ARCHITECT FOR UFAS APARTMENTS

KEYED WORK NOTES:

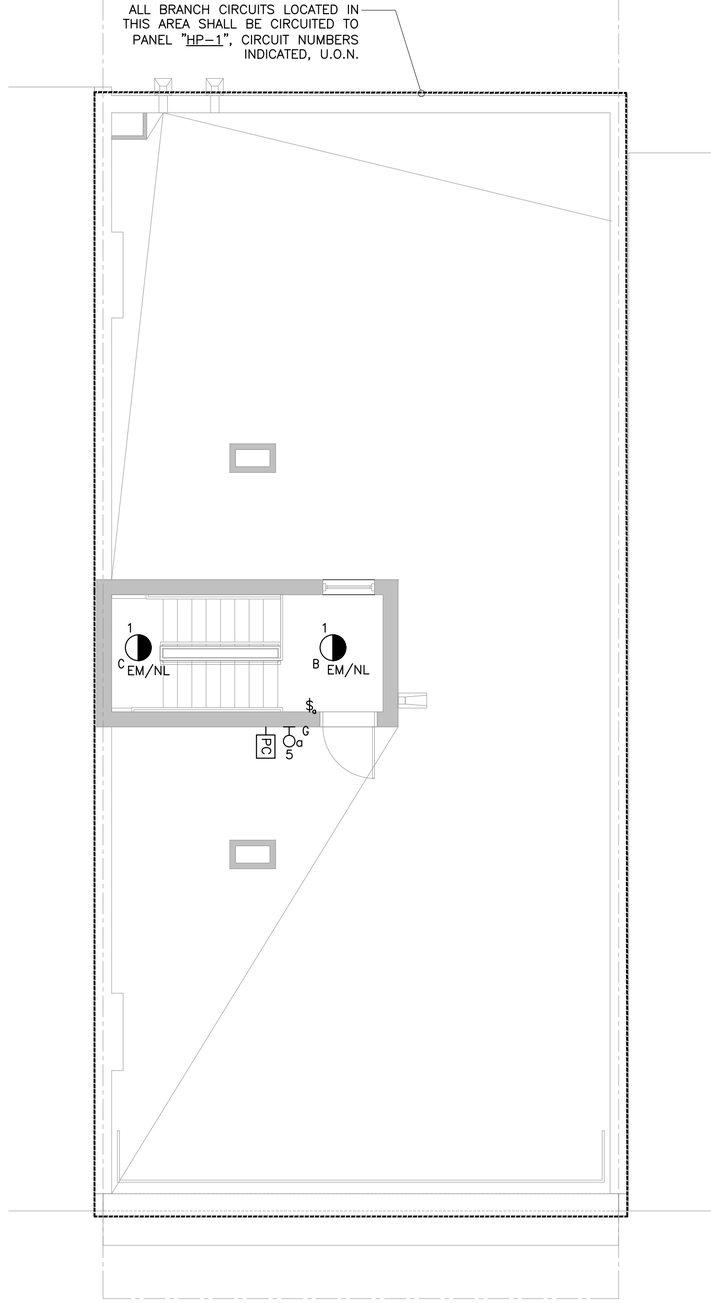
1. TURN ON ALL LIGHTS IN THE CORRIDOR AREA WITH ACTUATION OF ANY OCCUPANCY SENSOR.
2. SWITCHES/LIGHTS USED IN WATER AND GAS METER ROOM SHOULD BE EXPLOSION PROOF AS PER NATIONAL ELECTRICAL CODE ARTICLE–501.

N



1 2ND TO 4TH FLOOR LIGHTING PLAN

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



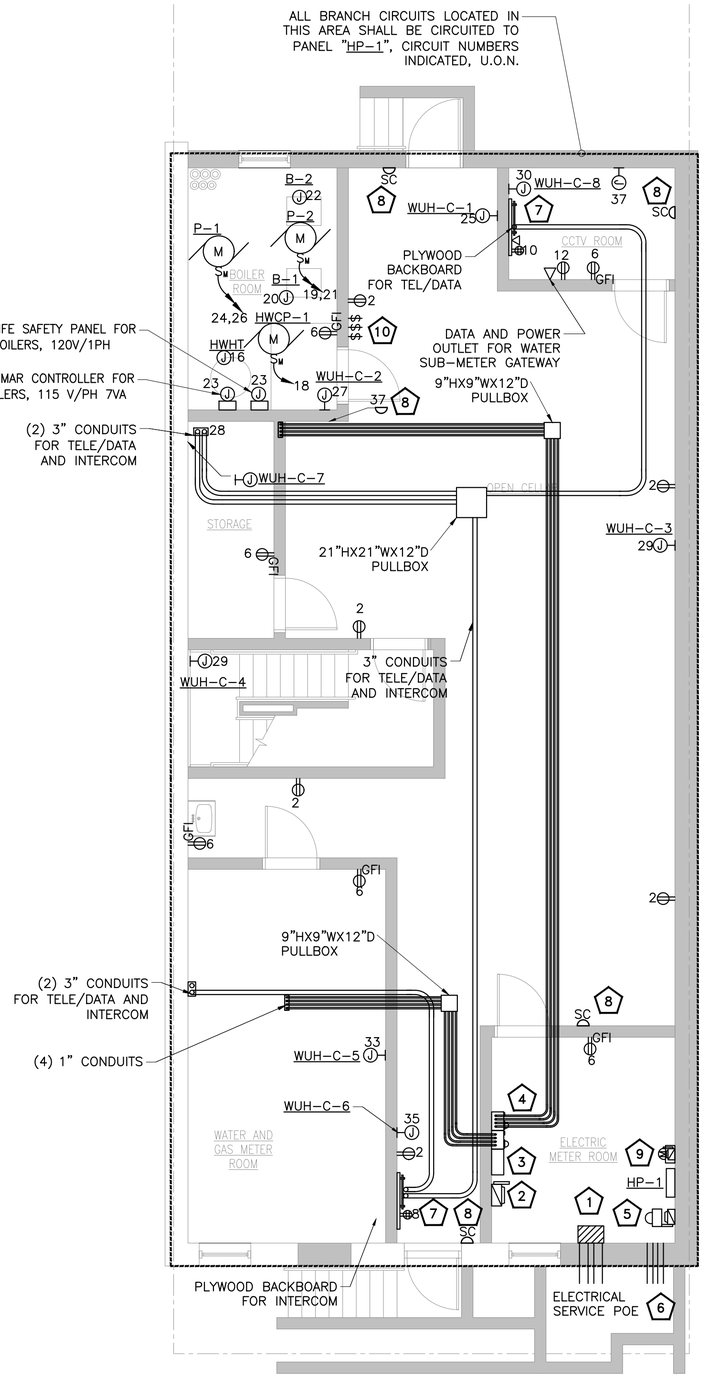
2 ROOF LIGHTING PLAN

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

LIGHTING DRAWING NOTES:

1. REFER TO DWG. E–001.00 FOR ELECTRICAL GENERAL NOTES, SYMBOL LIST, ABBREVIATIONS.
2. CIRCUITING FOR LIGHTING FIXTURES IN ROOMS WITH TOGGLE SWITCHES SHALL BE CONTROLLED BY DESIGNATED SWITCHES. IF SPECIFIC DESIGNATION IS NOT INDICATED, ALL LIGHTING FIXTURES IN ROOM/AREA SHALL BE CONTROLLED BY THE SWITCH INDICATED.
3. REFER DWG E–001.00 FOR LIGHT FIXTURE SCHEDULE & LIGHTING CONTROL SCHEDULE.
4. ALL EMERGENCY NIGHT LIGHT FIXTURE (EM/NL) SHALL REMAIN ON ALL THE TIME AND NOT CONTROLLED BY ANY LIGHTING CONTROL DEVICE.
5. ELECTRICAL CONTRACTOR TO COORDINATE SWITCH HEIGHT WITH UFA STANDARDS AND ARCHITECT FOR UFAS APARTMENTS

N

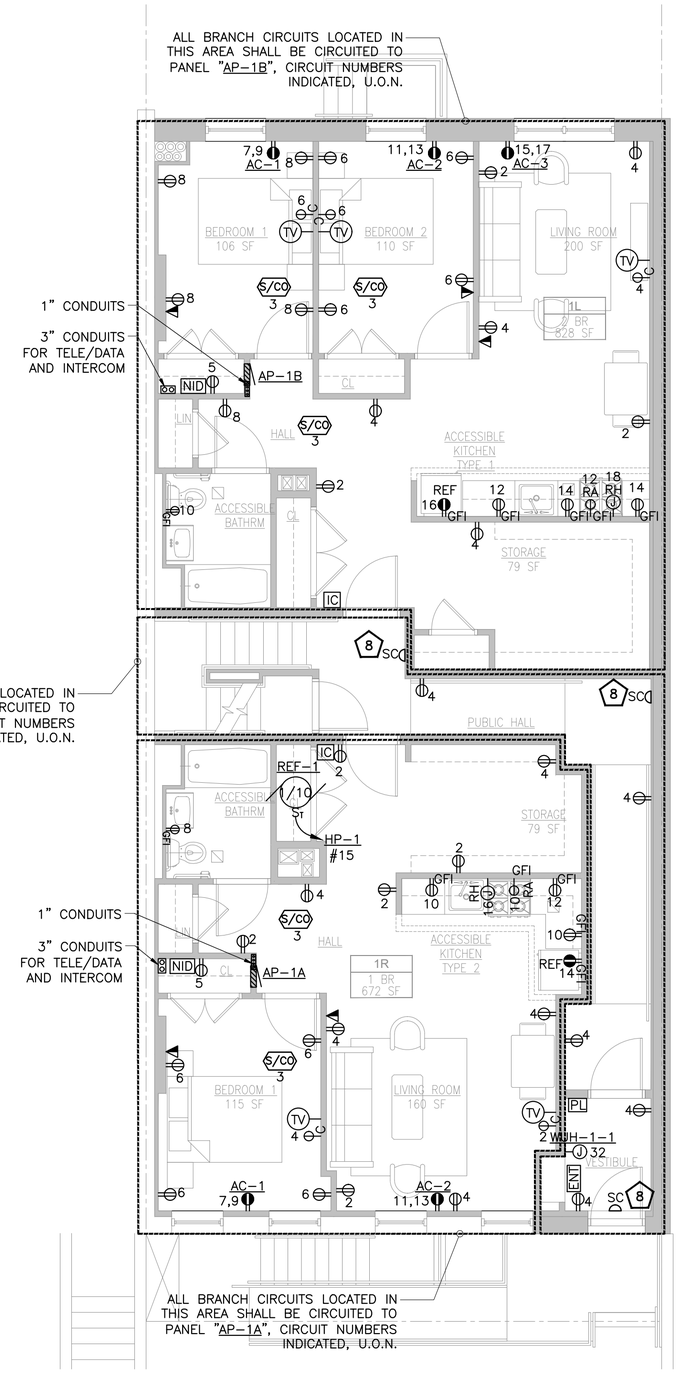


1 CELLAR POWER PLAN

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

ELECTRICAL LEGEND:

1. 400A SERVICE END BOX CON-ED SPEC E-484
2. 200A SS#1 FOR RESIDENTIAL UNITS.
3. 400A MTB-1.
4. METER BANK
5. 100A SS#2 D.S. & METER FOR BASE BUILDING LOAD.
6. ELECTRICAL CONTRACTOR TO RUN (2) 4" CONDUIT UPTO TELECOM EQUIPMENT.
7. INSTALL 4"X12"¼" COPPER GROUND BAR WITH INSULATED STANDOFFS AND PRE-DRILLED WITH ¼" HOLES IN LEFT REAR CORNER.
8. ALL CAMERAS SHOULD BE IP CAMERAS ON NVR AT TODAY'S STANDARD.
9. FUSIBLE DISCONNECT SWITCH FOR FACP AND METER ARE STACKED.
10. SHUT OFF SWITCH FOR BOILERS AND HWHT.



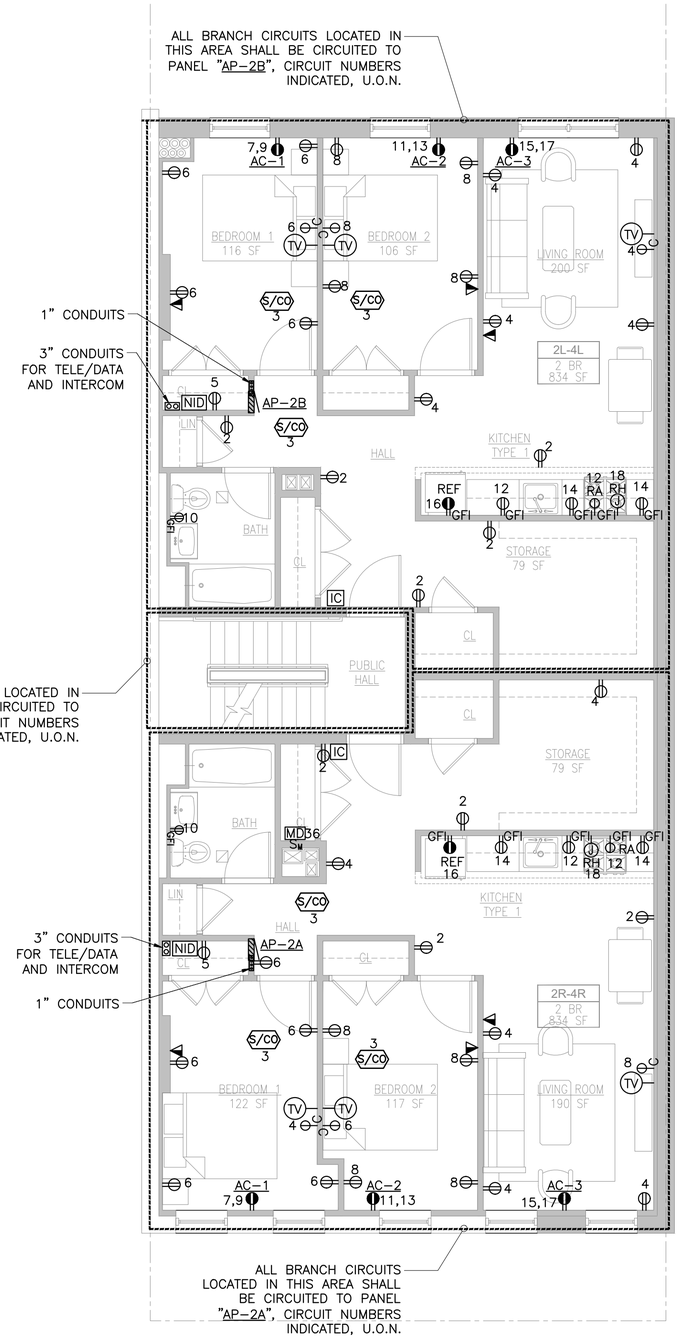
2 1ST FLOOR POWER PLAN

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

POWER DRAWING NOTES:

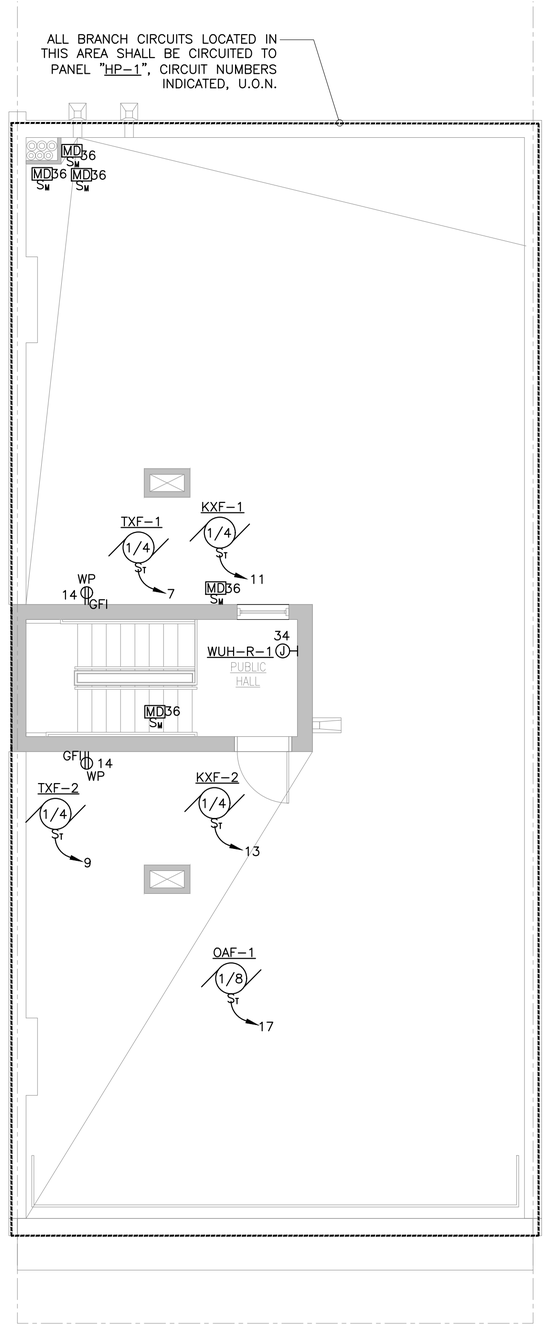
1. ALL BRANCH CIRCUITS HOMERUNS ASSIGN INDICATED ON THIS PLAN SHALL BE CIRCUITED TO PANEL AS MENTIONED ON PLANS, CIRCUIT NUMBER INDICATED, U.O.N.
2. REFER TO DWG. E-001.00 FOR ELECTRICAL GENERAL NOTES, SYMBOL LIST, ABBREVIATIONS.
3. ALL BRANCH CIRCUITS LOCATED IN THIS AREA SHALL BE CIRCUITED TO PANEL AS SHOWN, CIRCUIT NUMBERS INDICATED, U.O.N.
4. ELECTRICAL CONTRACTOR TO COORDINATE SWITCH HEIGHT WITH UFA STANDARDS AND ARCHITECT FOR UFAS APARTMENTS.
5. ELECTRICAL CONTRACTOR TO PROVIDE 120V,20A SINGLE POLE TOGGLE SWITCH FOR SIMULTANEOUS CONTROL OF HOOD FAN AND LIGHT IN THE UFAS APARTMENTS. COORDINATE EXACT LOCATION OF SWITCH WITH ARCHITECT.
6. ELECTRICAL CONTRACTOR TO PROVIDE S/CO DETECTORS WITH STROBES FOR UFAS UNITS

N



1 2ND TO 4TH FLOOR POWER PLAN

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



2 ROOF POWER PLAN

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

POWER DRAWING NOTES:

1. ALL BRANCH CIRCUITS HOMERUNS ASSIGN INDICATED ON THIS PLAN SHALL BE CIRCUITED TO PANEL AS MENTIONED ON PLANS, CIRCUIT NUMBER INDICATED, U.O.N.
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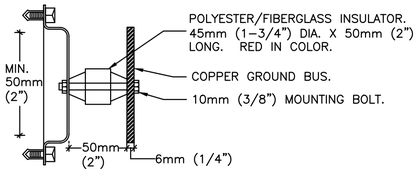
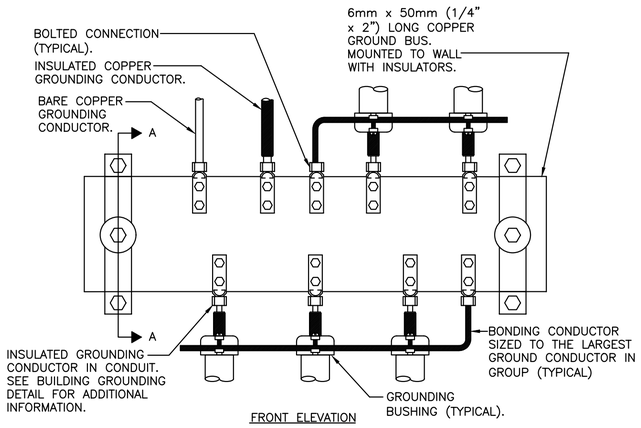
3. ALL BRANCH CIRCUITS LOCATED IN THIS AREA SHALL BE CIRCUITED TO PANEL AS SHOWN, CIRCUIT NUMBERS INDICATED, U.O.N.
4. ELECTRICAL CONTRACTOR TO COORDINATE SWITCH HEIGHT WITH UFA STANDARDS AND ARCHITECT FOR UFAS APARTMENTS.
5. ELECTRICAL CONTRACTOR TO PROVIDE 120V,20A SINGLE POLE TOGGLE SWITCH FOR SIMULTANEOUS CONTROL OF HOOD FAN AND LIGHT IN THE UFAS APARTMENTS. COORDINATE EXACT LOCATION OF SWITCH WITH ARCHITECT.
6. ELECTRICAL CONTRACTOR TO PROVIDE S/CO DETECTORS WITH STROBES FOR UFAS UNITS

N



SECTION "A–A"

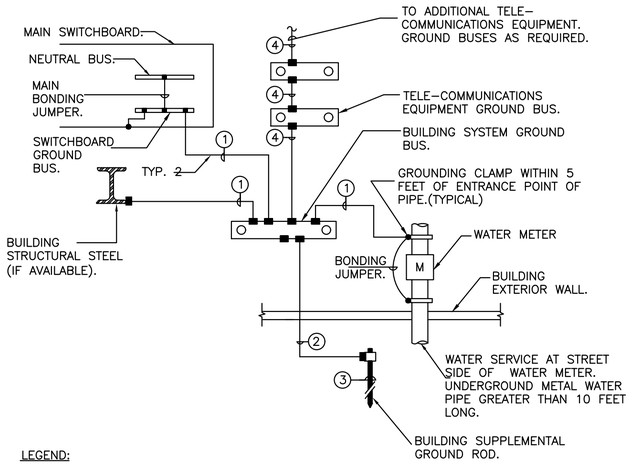


FRONT ELEVATION

NOTES:

1. REFER TO BUILDING GROUNDING ELECTRODE SYSTEM DETAIL FOR EXACT CONFIGURATION.

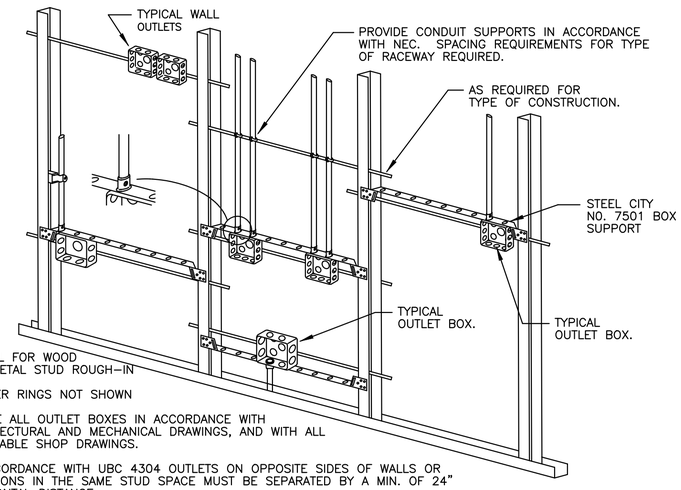
6 / E–400 N.T.S — BUILDING ELECTRICAL SYSTEMS GROUND BUS



LEGEND:

- ● INDICATES BOLTED CONNECTION.
- ■ INDICATES EXOTHERMIC WELD CONNECTION, COMPATIBLE WITH MATERIALS BEING JOINED.
- (1) INSULATED COPPER GROUNDING ELECTRODE CONDUCTOR IN CONDUIT SIZED AS PER NEC ARTICLE 250.66.
- (2) 4/0 AWG BARE COPPER GROUND CONDUCTOR.
- (3) 3/4" x 10'–0" LONG COPPER–CLAD GROUND ROD DRIVEN WITH TOP 12" BELOW GRADE.
- (4) 2/0 AWG INSULATED COPPER GROUND CONDUCTOR IN 30mm CONDUIT.

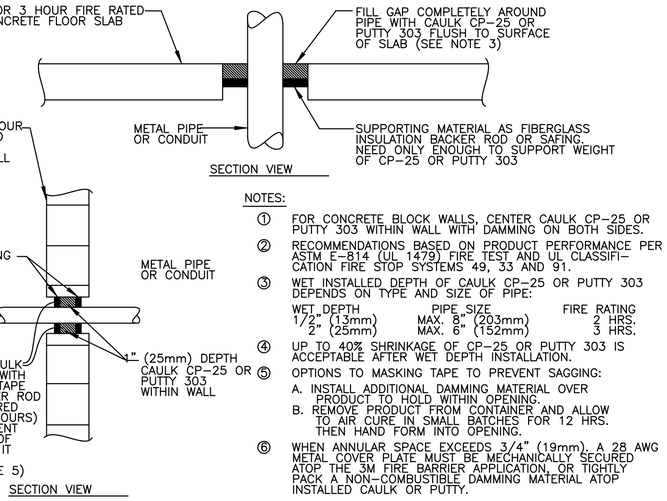
4 / E–400 N.T.S — BUILDING GROUNDING ELECTRODE SYSTEM



NOTES:

1. TYPICAL FOR WOOD AND METAL STUD ROUGH–IN
2. PLASTER RINGS NOT SHOWN
3. LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
4. IN ACCORDANCE WITH UBC 4304 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE.

2 / E–400 N.T.S — DETAIL TYPICAL ROUGH–IN REQUIREMENTS



NOTES:

① FOR CONCRETE BLOCK WALLS, CENTER CAULK CP–25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.

② RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E–814 (UL 1479) FIRE TEST AND UL CLASSIFI–CATION FIRE STOP SYSTEMS 49, 33 AND 91.

③ WET INSTALLED DEPTH OF CAULK CP–25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:

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

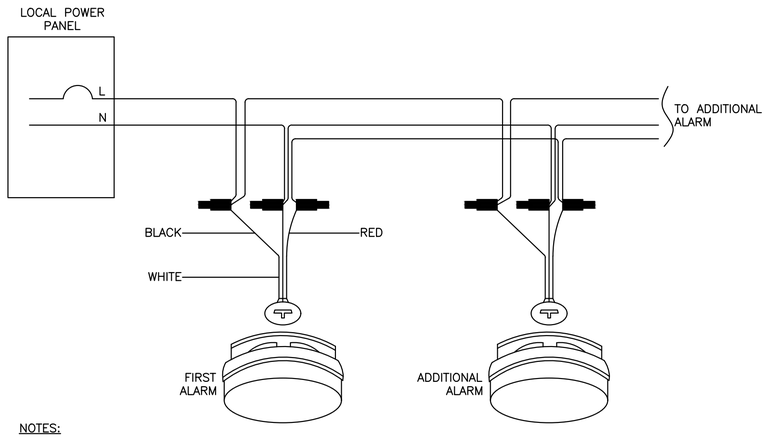
④ UP TO 40% SHRINKAGE OF CP–25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.

⑤ OPTIONS TO MASKING TAPE TO PREVENT SAGGING:

A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.
B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.

⑥ WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm), A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON–COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.

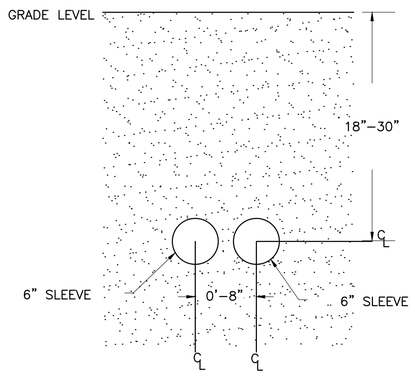
5 / E–400 N.T.S — FIRE STOP DETAIL



NOTES:

1. ALL ALARMS ARE WIRED TO A SINGLE, CONTINUOUS (NON SWITCHED) POWER LINE, WHICH IS NOT PROTECTED BY A GROUND FAULT INTERRUPTER.
2. A MAXIMUM OF 1000 ft OF WIRE CAN BE USED IN THE INTERCONNECT SYSTEM AND MAXIMUM 24 NO. OF KIDDE DEVICES CAN BE CONNECTED.
3. USE STANDARD UL LISTED HOUSEHOLD WIRE AS REQUIRED BY THE CODE.
4. ALL ALARMS IN A TANDEM INSTALLATION MUST BE CONTROLLED BY THE SAME FUSE OR CIRCUIT BREAKER. OTHERWISE TANDEM UNITS WILL NOT OPERATE.

3 / E–400 N.T.S — SMOKE ALARM TANDEM WIRING DIAGRAM

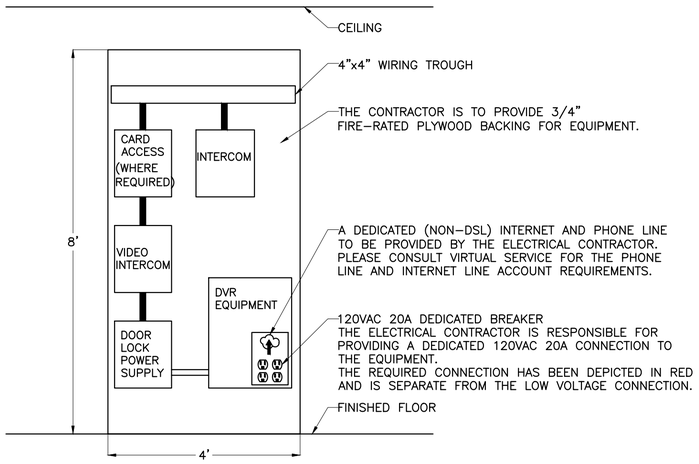


NOTES:

1. COORDINATE EXACT LOCATION WITH CON EDISON.
2. PROVIDE QUANTITY OF SLEEVES AS SHOWN ON DRAWINGS. NOT LESS THAN NUMBER REQUIRED BY UTILITY PLUS 50% SPARE.
3. EXTENND SLEEVES 12" OUTSIDE WALL IN ACCORDANCE WITH UTILITY STANDARDS.

1 / E–400 N.T.S — INCOMING SERVICE SLEEVE DETAILS

N



SYTEM DEPICTED CONSISTS OF THE FOLLOWING COMPONENTS:
1. VIRTUAL DOORMAN AT FRONT ENTRANCE.
2. CARD ACCESS.
3. CCTV.
4. COLOR VIDEO INTERCOM.

6 / E-401 VIDEO INTERCOM EQUIPMENT
N.T.S

MANUAL MODE OPERATION:

1. PUSHBUTTON PRESS IS REQUIRED TO TURN LOAD ON.
2. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR BY PRESSING PUSH BUTTON.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

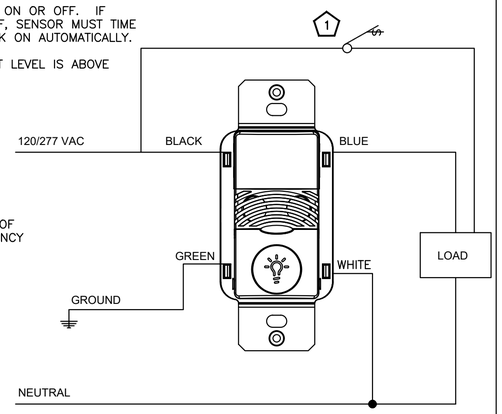
AUTOMATIC MODE OPERATION:

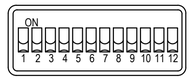
1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. PUSHBUTTON CAN BE USED TO TURN LOAD ON OR OFF. IF PUSHBUTTON IS USED TO TURN LOAD OFF, SENSOR MUST TIME OUT FIRST, BEFORE LOAD CAN TURN BACK ON AUTOMATICALLY.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

SENSOR TYPES INCLUDE:

ONW-D-1001-MV-N

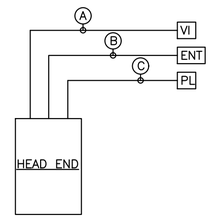
(1) PROVIDE SENSING CONDUCTOR TAPPED AHEAD OF ANY SWITCHES WHERE SWITCH SERVES EMERGENCY FIXTURES.





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

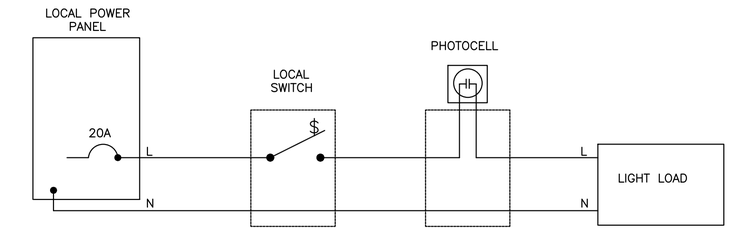
4 / E-401 CONNECTION) OCCUPANCY/VACANCY-SINGLE LEVEL WIRING DIAGRAM-LINE VOLTAGE WALL SWITCH SENSOR(NEUTRAL
N.T.S



SR.NO.	SYSTEM	FROM	TO	QTY	AWG	CONDUCTORS	STRANDING
A	INTERCOM	APARTMENT UNIT (ONE HOME RUN PER APT. UNIT)	HEAD END	1	18	4	7
B	INTERCOM	FRONT ENTRANCE DOOR STATION	HEAD END	1	18	4	7
C	ACCESS CONTROL	POSTAL LOCK (AT FRONT ENTRANCE DOOR ONLY)	HEAD END	1	18	4	7

NOTES:
1. ALL THE CONDUCTORS TO BE NON-SHIELDED.

2 / E-401 VIDEO INTERCOM WIRING
N.T.S



KEYED NOTES:

1. PHOTOCELL SHALL BE MOUNTED ABOVE SNOW LINE (18") ON ROOF OR WALL MOUNTED. EXACT LOCATION SHALL BE FIELD COORDINATED.
2. FOR EXACT CIRCUIT NUMBER, REFER TO LIGHTING PANEL.

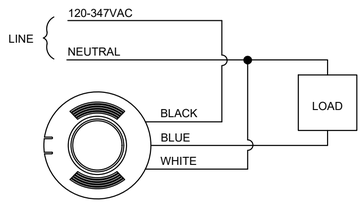
5 / E-401 PHOTOCELL WIRING DETAILS
N.T.S

AUTOMATIC MODE OPERATION:

1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. LOAD TURNS OFF, WHEN SENSOR TIMES OUT.
3. IF DAYLIGHT SENSOR IS ENABLED, AND LIGHT LEVEL IS ABOVE PRESET SETPOINT, LOAD WILL NOT TURN ON.

SENSOR TYPES INCLUDE:

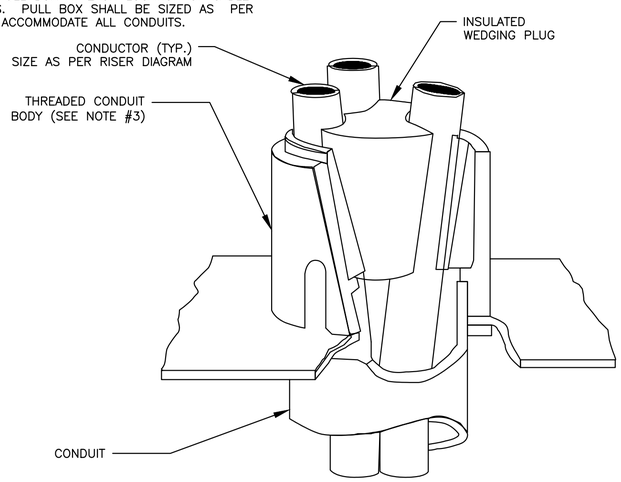
OAC-DT-2000-MV,
OAC-U-2000-MV,
OAC-P-0500-MV, OAC-P-1500-MV



3 / E-401 OCCUPANCY-SINGLE RELAY WIRING DIAGRAM-LINE VOLTAGE CEILING SENSOR
N.T.S

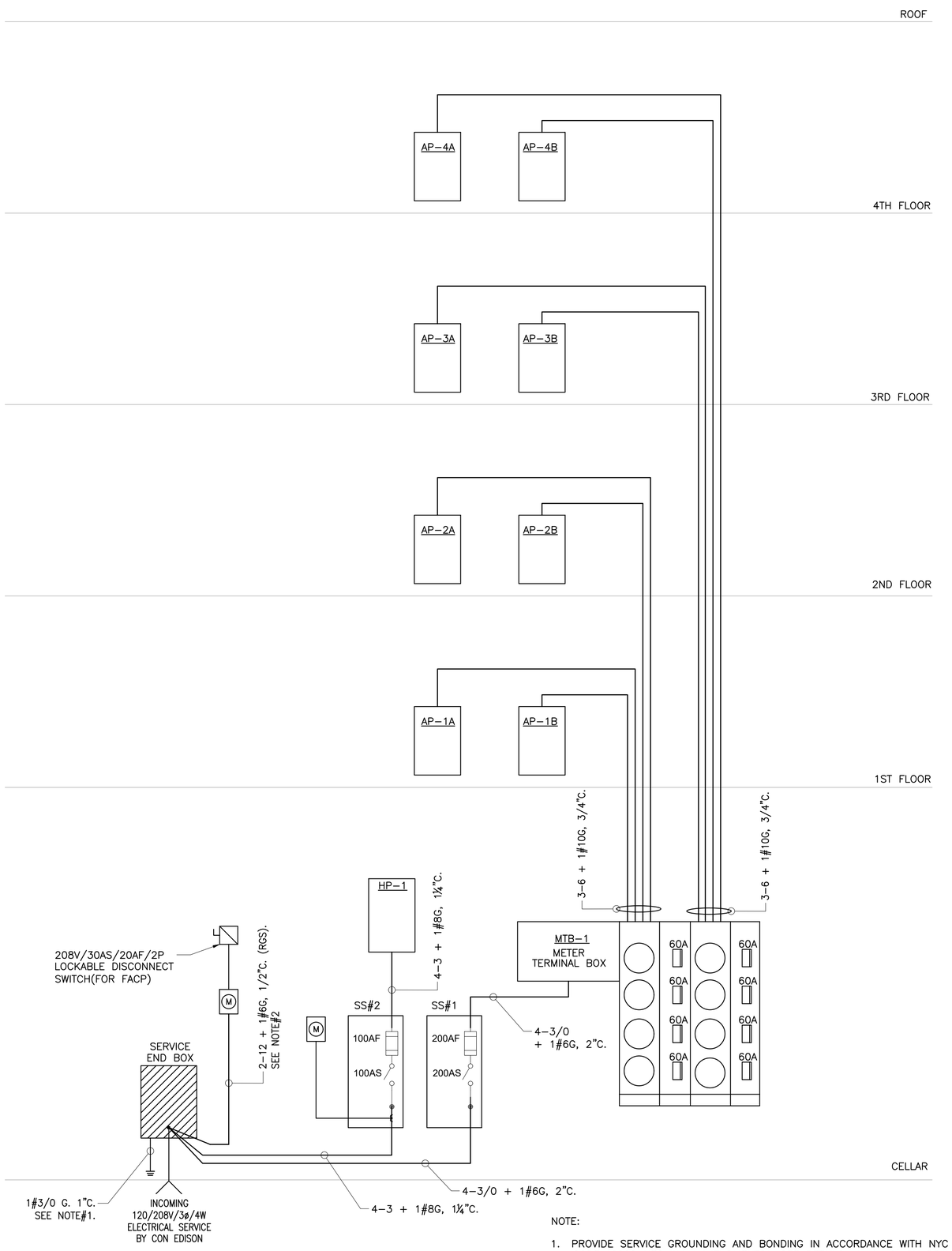
NOTES:

1. ALL CONDUCTORS IN VERTICAL RACEWAYS SHALL BE SUPPORTED IN ACCORDANCE WITH ARTICLE 300.19 OF NEC. CABLE SUPPORTS SHALL BE LOCATED AT THE INTERVALS REQUIRED BY THE NEC.
2. CABLE SUPPORT SYSTEM SHALL BE AS MANUFACTURED BY O-Z GEDNEY WITH pOZi-GRIP "S-STYLE" WEDGING PLUG OR APPROVED EQUAL.
3. FOR THREADLESS CONDUIT (RIGID, IMC OR EMT), ATTACH CONDUIT BODY TO MALE THREADS OF A SET SCREW OR COMPRESSION CONNECT, AS PERMITTED BY SPECIFICATIONS.
4. PROVIDE PULL BOX AT EACH LOCATION OF CABLE SUPPORTS. PULL BOX SHALL BE SIZED AS PER CODE TO ACCOMMODATE ALL CONDUITS.



1 / E-401 VERTICAL CABLE SUPPORT DETAIL
N.T.S

N



NOTE:

1. PROVIDE SERVICE GROUNDING AND BONDING IN ACCORDANCE WITH NYC ELECTRICAL CODE (2008 NEC W/ AMMENDMENTS). SEE DETAILS '4' & '6' ON DRAWING E-400.00.
2. TAP AHEAD OF THE MAIN SWITCH. TAP LENGTH NOT TO EXCEED 10 FEET.

N

PANEL:	AP-1A					Sections:									
208Y/120	VOLTS,		1	PHASE,		3	WIRE								
MAIN CB	60A	MCB		BUS	125A	MIN,	INTERRUPTING RATING			22 KAIC					

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	PER PHASE (KVA) A	PER PHASE (KVA) B	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20*	LIGHTING	L	0.5	1.58		1.08	R	G.P. RECEPTACLE	20*	2
3	20*	S/CO DETECTOR	E	0.2		1.1	0.9	R	G.P. RECEPTACLE	20*	4
5	20*	NID BOX	R	0.18	0.9		0.72	R	G.P. RECEPTACLE	20*	6
7	2P-15	AC-1	M	0.5		0.68	0.18	R	BATH GFI RECEPTACLE	20	8
9			M	0.5	1.04		0.54	R	KITCHEN GFI RECEPTACLE	20	10
11	2P-15	AC-2	M	0.5		0.86	0.36	R	KITCHEN GFI RECEPTACLE	20	12
13			M	0.5	1.8		1.3	E	REFRIGERATOR	20	14
15	20	SPARE				0.5	0.5	E	RANGE HOOD	20	16
17	20	SPARE			0				SPARE	20	18
19	20	SPARE				0			SPACE		20
21	20	SPARE			0				SPACE		22
23	20	SPARE				0			SPACE		24
		TOTAL LOAD (KVA)			5.32	3.14					

PANEL:	AP-1B					Sections:									
208Y/120	VOLTS,		1	PHASE,		3	WIRE								
MAIN CB	60A	MCB		BUS	125A	MIN,	INTERRUPTING RATING			22 KAIC					

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	PER PHASE (KVA) A	PER PHASE (KVA) B	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20*	LIGHTING	L	0.5	1.22		0.72	R	G.P. RECEPTACLE	20*	2
3	20*	S/CO DETECTOR	E	0.2		0.92	0.72	R	G.P. RECEPTACLE	20*	4
5	20*	NID BOX	R	0.18	1.26		1.08	R	G.P. RECEPTACLE	20*	6
7	2P-15	AC-1	M	0.5		1.4	0.9	R	G.P. RECEPTACLE	20*	8
9			M	0.5	0.68		0.18	R	BATH GFI RECEPTACLE	20	10
11	2P-15	AC-2	M	0.5		0.86	0.36	R	KITCHEN GFI RECEPTACLE	20	12
13			M	0.5	0.86		0.36	R	KITCHEN GFI RECEPTACLE	20	14
15	2P-15	AC-3	M	0.5		1.8	1.3	E	REFRIGERATOR	20	16
17			M	0.5	1		0.50	E	RANGE HOOD	20	18
19	20	SPACE				0			SPACE	20	20
21	20	SPACE			0				SPACE	20	22
23	20	SPACE				0			SPACE	20	24
		TOTAL LOAD (KVA)			5.02	4.98					

1

PANEL:	AP-2A					Sections:									
208Y/120	VOLTS,		1	PHASE,		3	WIRE								
MAIN CB	60A	MCB		BUS	125A	MIN,	INTERRUPTING RATING			22 KAIC					

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	PER PHASE (KVA) A	PER PHASE (KVA) B	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20*	LIGHTING	L	0.5	1.58		1.08	R	G.P. RECEPTACLE	20*	2
3	20*	S/CO DETECTOR	E	0.15		1.23	1.08	R	G.P. RECEPTACLE	20*	4
5	20*	NID BOX	R	0.18	1.26		1.08	R	G.P. RECEPTACLE	20*	6
7	2P-15	AC-1	M	0.5		1.4	0.90	R	G.P. RECEPTACLE	20*	8
9			M	0.5	0.68		0.18	R	BATH GFI RECEPTACLE	20	10
11	2P-15	AC-2	M	0.5		0.86	0.36	R	KITCHEN GFI RECEPTACLE	20	12
13			M	0.5	0.86		0.36	R	KITCHEN GFI RECEPTACLE	20	14
15	2P-15	AC-3	M	0.5		1.8	1.3	E	REFRIGERATOR	20	16
17			M	0.5	1		0.5	E	RANGE HOOD	20	18
19	20	SPACE				0			SPACE	20	20
21	20	SPACE			0				SPACE	20	22
23	20	SPACE				0			SPACE	20	24
		TOTAL LOAD (KVA)			5.38	5.29					

2

PANEL:	AP-2B					Sections:									
208Y/120	VOLTS,		1	PHASE,		3	WIRE								
MAIN CB	60A	MCB		BUS	125A	MIN,	INTERRUPTING RATING			22 KAIC					

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	PER PHASE (KVA) A	PER PHASE (KVA) B	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20*	LIGHTING	L	0.5	1.58		1.08	R	G.P. RECEPTACLE	20*	2
3	20*	S/CO DETECTOR	E	0.15		1.23	1.08	R	G.P. RECEPTACLE	20*	4
5	20*	NID BOX	R	0.18	1.08		0.9	R	G.P. RECEPTACLE	20*	6
7	2P-15	AC-1	M	0.5		1.4	0.9	R	G.P. RECEPTACLE	20*	8
9			M	0.5	0.5		0.18	R	BATH GFI RECEPTACLE	20	10
11	2P-15	AC-2	M	0.5		0.86	0.36	R	KITCHEN GFI RECEPTACLE	20	12
13			M	0.5	0.5		0.36	R	KITCHEN GFI RECEPTACLE	20	14
15	2P-15	AC-3	M	0.5		1.8	1.3	E	REFRIGERATOR	20	16
17			M	0.5	0.5		0.5	E	RANGE HOOD	20	18
19	20	SPACE				0			SPACE	20	20
21	20	SPACE			0				SPACE	20	22
23	20	SPACE				0			SPACE	20	24
		TOTAL LOAD (KVA)			4.16	5.29					

PANEL:	HP-1			Sections:												
208Y/120	VOLTS,		3	PHASE,		4	WIRE									
MAIN CB	100A	MLO		BUS	125A	MIN,	INTERRUPTING RATING				22 KAIC					

CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	PER PHASE (KVA) A	PER PHASE (KVA) B	PER PHASE (KVA) C	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
1	20*	LIGHTING	L	0.75	1.83			1.08	R	GP RECEPTACLE	20*	2
3	20*	LIGHTING	L	1.0		1.72		0.72	R	GP RECEPTACLE	20*	4
5	20*	LIGHTING	L	0.75			1.83	1.08	R	GFI RECEPTACLE	20	6
7	15	TXF-1	M	0.67	1.03			0.36	R	GFI RECEPTACLE	20	8
9	15	TXF-2	M	0.67		1.03		0.36	R	GFI RECEPTACLE	20	10
11	15	KXF-1	M	0.67			0.85	0.18	R	GATEWAY RECEPTACLE	20	12
13	15	KXF-2	M	0.67	1.03			0.36	R	WP RECEPTACLE	20	14
15	15	REF-1	M	0.06		0.56		0.5	E	HWHT	15	16
17	15	OAF-1	M	0.67			1.17	0.5	E	HWCP-1	15	18
19	2P-15	P-2	E	0.56	1.26			0.7	E	B-1	15	20
21			E	0.56		1.26		0.7	E	B-2	15	22
23	20	TEKMAR/LIFE SAFETY PANEL	E	0.5			1.06	0.56	E	P-1	2P-15	24
25	15	WUH-C-1	E	0.69	1.25			0.56	E			26
27	15	WUH-C-2	E	0.69		1.38		0.69	E	WUH-C-7	15	28
29	15	WUH-C-3	E	0.69			1.38	0.69	E	WUH-C-8	15	30
31	15	WUH-C-4	E	0.69	1.38			0.69	E	WUH-1-1	15	32
33	15	WUH-C-5	E	0.69		1.38		0.69	E	WUH-R-1	15	34
35	15	WUH-C-6	E	0.69			0.94	0.25	E	MD	15	36
37	20	SECURITY CAMERA SYSTEM	E	0.5	0.5					SPARE	20	38
39	20	SPARE				0				SPARE	20	40
41	20	SPARE					0			SPARE	20	42
		TOTAL LOAD (KVA)			8.28	7.33	7.23					

1 ELECTRICAL PANEL SCHEDULE

SCALE: N.T.S

KEYED WORK NOTES:

1. PANEL SCHEDULE FOR APT. 2A, 3A, 4A ARE TYPICAL.
2. PANEL SCHEDULE FOR APT. 2B, 3B, 4B ARE TYPICAL.

NOTE–

*ASTERISK INDICATES AFCI CIRCUIT BREAKER.

N

BUILDING DATA

PROJECT DESCRIPTION		BUILDING OCCUPANCY				BUILDING DESCRIPTION						FIRE ALARM SYSTEM FEATURES	
X	NEW BUILDING		ASSEMBLY GROUP A (A1,A2,A3,A4 AND A5)	X	RESIDENTIAL GROUP R–2	5	TOTAL NUMBER OF LEVELS		ATRIUM		STAIR PRESSURIZATION		NON–VOICE EVACUATION
	FIRE ALARM SYSTEM UPGRADE		BUSINESS GROUP B		STORAGE GROUP S (S1 AND S2)	4	ABOVE GROUND LEVELS	1ST	FIRE DEPARTMENT ACCESS		POST FIRE SMOKE PURGE		VOICE EVACUATION
	LIFE SAFETY SYSTEM UPGRADE		EDUCATIONAL GROUP E		UTILITY AND MISCELLANEOUS GROUP U	1	BELOW GROUND LEVELS	X	FULLY SPRINKLERED		GENERATOR		PARTIAL/SELECTIVE EVACUATION
	RENOVATION		FACTORY INDUSTRIAL GROUP F (F1 AND F2)		OTHER:	0	NUMBER OF ELEVATOR BANKS		PARTIALLY SPRINKLERED		FIRE PUMP	X	GENERAL EVACUATION
	EMERGENCY REPAIR		HIGH–HAZARD GROUP H (H1,H2,H3,H4 AND H5)			1	NUMBER OF EGRESS STAIRS		NON–SPRINKLERED		OTHER:		DIGITAL ALARM COMMUNICATOR
	TENANT ADDITION		INSTITUTIONAL GROUP I (I1,I2 AND I3)			X	LOW RISE BUILDING		PRE–ACTION SPRINKLER		OTHER:		PRE–SIGNAL SYSTEM
	OTHER:		MERCANTILE GROUP M				HIGH RISE BUILDING						FIRE FIGHTER'S TELEPHONE SYSTEM

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
C	CONDUIT
EMT	ELECTRIC METALLIC TUBING
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
G	GROUND
HC	HUNG CEILING
N	NEW
NTS	NOT TO SCALE
RGS	RIGID GALVANIZED STEEL
UON	UNLESS OTHERWISE NOTED
W	WIRE

FIRE ALARM DRAWING LIST

FA–001.00 FA SYMBOL LIST, BUILDING DATA, ABBREVIATIONS AND I/O MATRIX.
FA–002.00 FIRE ALARM GENERAL NOTES.
FA–003.00 FIRE ALARM SPECIFICATIONS SHEET 1 OF 3.
FA–004.00 FIRE ALARM SPECIFICATIONS SHEET 2 OF 3.
FA–005.00 FIRE ALARM SPECIFICATIONS SHEET 3 OF 3.
FA–006.00 FIRE ALARM DETAILS.
FA–007.00 FIRE ALARM RISER DIAGRAM.
FA–100.00 CELLAR AND 1ST FLOOR FIRE ALARM PLAN.
FA–101.00 2ND TO 4TH FLOOR AND ROOF FIRE ALARM PLAN.

TYPE OF DESIGN

INSTALLATION OF MANUAL, AUTOMATIC SMOKE/CO/HEAT DETECTION AND SPRINKLER ALARM SYSTEM. NO CHANGE IN USE OCCUPANCY OR EGRESS.

FIRE ALARM SYMBOL LIST

SYMBOL	DESCRIPTION
⟨S⟩	CEILING MOUNTED AREA SMOKE DETECTOR
⟨H⟩	CEILING MOUNTED HEAT DETECTOR
⟨CO⟩	CARBON MONOXIDE DETECTOR
FACP	FIRE ALARM CONTROL PANEL
SV	SMOKE VENT
FDS	FUSED DISCONNECT SWITCH, REFER TO RISER DIAGRAM FOR FURTHER INFORMATION.
CM	ADDRESSABLE CONTROL MODULE
TS	TAMPER SWITCH
WF	WATER FLOW SWITCH
MM	MONITOR MODULE
F	FIRE ALARM MANUAL PULL STATION, WALL MOUNTED (48" AFF)
RAP	REMOTE ANNUNCIATOR PANEL

FIRE ALARM NOTES:

1. ALL EQUIPMENT AND WIRING INDICATED ON THESE PLANS IS NEW (U.O.N.).
2. PROVIDE WIRING AS REQUIRED BETWEEN ALL DEVICES AND EQUIPMENT AS REQUIRED TO PERFORM FIRE ALARM SYSTEM FUNCTIONS.
3. WIRING FOR FIRE ALARM DEVICES IN FINISHED SPACES WITHOUT HUNG CEILING SHALL BE INSTALLED IN EMT CONDUIT.
4. FOR WALL MOUNTED F.A. DEVICES PROVIDE 3/4" CONDUIT TERMINATED IN NEAREST ACCESSIBLE CEILING.
5. WIRING FOR FIRE ALARM DEVICES IN UNFINISHED SPACES SHALL BE INSTALLED IN RGS CONDUIT UP TO 8'–0" AFF AND THEN IN EMT CONDUIT ABOVE 8'–0" AFF.
6. FOR LOCATIONS AND QUANTITIES OF DEVICES REFER TO FIRE ALARM FLOOR PLANS. WHERE THERE ARE DISCREPANCIES BETWEEN THE PLANS AND THE RISER DIAGRAM, THE GREATER QUANTITY SHALL BE USED.
7. CONTRACTOR SHALL VERIFY ALL WIRING WITH FIRE ALARM VENDOR AND OBTAIN WIRING DIAGRAMS BEFORE PROCEEDING WITH THE START OF ANY WORK.
8. ALL WIRING SHALL BE IN ACCORDANCE WITH THE NYC ELECTRICAL CODE 760.179(D).
9. PROVIDE ALL REQUIRED EXPANSION PANELS, PC BOARDS, POWER SUPPLIES, BATTERIES, FUSE CUTOUTS AND BRANCH CIRCUITS, ETC, FOR A COMPLETE AND OPERATIONAL FIRE ALARM SYSTEM.
10. CONTRACTOR SHALL PERFORM ALL NYC BUILDING DEPT. FILINGS AND OBTAIN ALL APPROVALS. CONTRACTOR SHALL OBTAIN ALL REQUIRED SIGNED & SEALED NYC BUILDING DEPT. FORMS AND ALL REQUIRED SETS OF DRAWINGS FROM ENGINEER OF RECORD AND BUILDING DEPT. EXPEDITOR.
11. UPON COMPLETION OF INSTALLATION THE SYSTEM SHALL BE 100% PRE–TESTED BY THE FIRE ALARM VENDOR AND THE LICENSED ELECTRICAL CONTRACTOR PRIOR TO FDNY INSPECTION.
12. CONTRACTOR SHALL SUBMIT TO THE ENGINEER A MARKUP OF FA DRAWINGS INDICATING "AS–BUILT" CONDITIONS FOR ENGINEER'S REFERENCE. IN PREPARING "AS–BUILT" DRAWINGS FOR FILING, CONTRACTOR SHALL SIGN "AS–BUILT" STATING A FUNCTIONAL TEST HAS BEEN CONDUCTED OF THE FIRE ALARM SYSTEM AND THE SYSTEM OPERATES AS DESIGNED AND IN ACCORDANCE WITH THE INPUT/OUTPUT PROGRAMMING MATRIX IN ACCORDANCE WITH 3 RCNY & 105–01.

FIRE ALARM SYSTEM OPERATION MATRIX

SYSTEM OUTPUTS / INDICATING/CONTROLLED DEVICES — SYSTEM INPUTS / INITIATING DEVICES

		CONTROL UNIT ANNUNCIATION						NOTIFICATION						REQUIRED FIRE SAFETY CONTROL		
		A: ACTIVATE COMMON ALARM SIGNAL INDICATOR ON LCD OF FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	B: ACTIVATE COMMON SUPERVISORY SIGNAL INDICATOR ON LCD OF FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	C: ACTIVATE COMMON TROUBLE SIGNAL INDICATOR ON LCD OF FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	D: SOUND INTERNAL BUZZER AT FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	E: TEXT MESSAGE DISPLAY DEVICE TYPE & LOCATION OF THE ACTIVATING DEVICES ON LCD OF FIRE ALARM CONTROL PANEL & OUTLYING ANNUNCIATORS.	F: ACTIVATE THE FLASHING 'FIRE' SIGN AT THE FIRE ALARM CONTROL PANEL.	G: DISPLAY/PRINT THE TEXT MESSAGE VIA THE SYSTEM PRINTER.	H: TRANSMIT "MANUAL" ALARM SIGNAL TO FIRE DEPARTMENT VIA AN APPROVED CENTRAL STATION MONITORING COMPANY.	I: TRANSMIT "SMOKE/CO/HEAT" ALARM SIGNAL TO FIRE DEPARTMENT VIA AN APPROVED CENTRAL STATION MONITORING COMPANY.	J: TRANSMIT "WATERFLOW" ALARM SIGNAL TO FIRE DEPARTMENT VIA AN APPROVED CENTRAL STATION MONITORING COMPANY.	K: TRANSMIT "SUPERVISORY" ALARM SIGNAL TO FIRE DEPARTMENT VIA AN APPROVED CENTRAL STATION MONITORING COMPANY.	L: TRANSMIT "TROUBLE" ALARM SIGNAL TO FIRE DEPARTMENT VIA AN APPROVED CENTRAL STATION MONITORING COMPANY.	M: RELEASE/ OPEN ASSOCIATED SMOKE VENTS (AREA DETECTOR ONLY).	N: RELEASE FIRE STAIR SMOKE VENT.	
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	MANUAL PULL STATION	●			●	●	●	●	●							1
2	WATERFLOW SWITCH	●			●	●	●	●			●			●		2
3	AREA SMOKE DETECTOR	●			●	●	●	●		●				●		3
4	HEAT DETECTOR	●			●	●				●				●		4
5	SPRINKLER CONTROL VALVE/TAMPER SWITCH		●		●	●		●				●				5
6	TOP OF STAIR DETECTORS	●	●		●	●		●		●					●	6
7	FIRE ALARM AC POWER FAILURE			●	●	●		●					●			7
8	FIRE ALARM SYSTEM LOW BATTERY			●	●	●		●					●			8
9	OPEN CIRCUIT			●	●	●		●					●			9
10	GROUND CIRCUIT			●	●	●		●					●			10
11	CO DETECTOR	●			●	●				●				●		11

N

FIRE ALARM SYSTEM GENERAL NOTES:

1. ALL EQUIPMENT AND WIRING SHOWN ON THE ABOVE RISER DIAGRAM IS NEW (U.O.N.) AND IS BASED ON THE GAMEWELL FIRE CONTROL INSTRUMENTS. THE ELECTRICAL CONTRACTOR SHALL CONTACT, EDWIN NUNEZ OF SIRINA PROTECTION SYSTEMS CORP, TEL. NO. (212) 929-6800 AND/OR ENUNEZ@SIRINAFIRE.COM FOR THE EXACT SPECIFICATIONS OF ALL FIRE ALARM DEVICES AND EQUIPMENT REQUIRED.
2. ALL WIRING, POWER, CONDUCTORS, CONDUITS ETC. SHALL MEET THE 2011 NYC ELECTRICAL CODE.
3. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2014 NYC BUILDING CODE AND IN ACCORDANCE WITH APPENDIX Q AND K, NYC FIRE ALARM RULES, AND 2010 NFPA 72 AS AMENDED BY APPENDIX Q.
4. ALL FIRE ALARM EQUIPMENT SHALL BE NYC APPROVED (MEA, BSA OR COA APPROVED).
5. ALL FIRE ALARM CIRCUITS SHALL BE SIZED TO A MAXIMUM OF 80% OF CAPACITY.
6. CONDUITS MAY NOT ENTER THE TOP OF ANY FIRE ALARM EQUIPMENT CABINET.
7. ALL FIRE ALARM EQUIPMENT SHALL BE INSTALLED WITH AESTHETICS IN MIND. CABINETS SHALL BE SEMI FLUSH MOUNTED AND CABLE TRAYS SHALL BE HIDDEN.
8. ALL FIRE ALARM CABINETS AND JUNCTION BOXES SHALL BE PAINTED FIRE DEPARTMENT RED. ALL FIRE ALARM CABINETS SHALL BE CLEARLY LABELED WITH A NYC APPROVED LAMINATE ENGRAVED LABEL.
9. ALL FIRE ALARM WIRE SHALL BE CLEARLY LABELED IN JUNCTION BOXES AND CABINETS. ALL TERMINALS SHALL BE NUMBERED AND LABELED. ALL CONNECTIONS SHALL BE EITHER SOLDERED, APPROVED TERMINAL STRIPS OR SCOTCH LOCKS.
10. ALL LOW VOLTAGE FIRE ALARM CONDUCTORS SHALL BE PROTECTED BY EITHER BUILDING CONSTRUCTION OR CONDUIT TO 8 FEET ABOVE THE FINISHED FLOOR. LOADING DOCKS, GARAGES, SUPPRESSION AND EXTINGUISHING SYSTEM WIRING, MECHANICAL AND ELECTRICAL ROOMS AND OTHER LOCATIONS SUBJECT TO MECHANICAL DAMAGE SHALL BE IN FULL RIGID CONDUIT. IN ALL OTHER AREAS, NYC APPROVED WIRE MAY BE RUN WITHOUT CONDUIT ABOVE 8 FT. PROVIDED IT MEETS NYC ARTICLE 760 AND CONNECTS TO BUILDING CONSTRUCTION USING A NYC APPROVED MEANS.
11. FIRE ALARM CABLES SHALL NOT BE MIXED WITH NON FIRE ALARM CABLING. LOW VOLTAGE FIRE ALARM CABLING SHALL NOT BE MIXED OR WIRED NEAR ANY AC CIRCUIT.
12. ALL LOW VOLTAGE WIRING SHALL BE FPLP 150 DEGREE C NYC CERTIFIED WIRE. ALL NOTIFICATION CIRCUITS SHALL BE A MINIMUM OF 14 AWG AND ALL OTHER LOW VOLTAGE FIRE ALARM CIRCUITS SHALL BE 16 AWG MINIMUM.
13. POLARITY SHALL BE OBSERVED ON ALL CIRCUITS. T-TAPPING SHALL NOT BE ALLOWED ON ANY NOTIFICATION CIRCUITS (HORN, STROBE OR SPEAKER). T-TAPPING SHALL NOT BE PERMITTED ON ADDRESSABLE CIRCUITS WITHOUT THE EXPRESS PERMISSION OF THE ENGINEER. DO NOT SPLICE FA CONNECTIONS.
14. ALL WIRING SHALL BE INSPECTED TO ASSURE THERE ARE NO OPENS, SHORTS OR EARTH GROUNDS.
15. SHIELDED CONDUCTORS OR RUNNING IN SEPARATE RACEWAY SHALL BE AS INSTRUCTED BY THE FIRE ALARM MANUFACTURER'S DOCUMENTATION. ALL NON-POWER LIMITED WIRING, INCLUDING CIRCUITS FOR CENTRALIZED AMPLIFIERS SHALL BE RUN IN A SEPARATE RACEWAY (NOTE: CENTRALIZED AMPLIFIERS "AMP RACKS" ARE NOT PERMITTED ON NEW SYSTEMS).
16. FIRE ALARM EQUIPMENT SHALL BE POWERED THROUGH AN APPROVED FUSE DISCONNECT SWITCH (FDS) CONNECTED AHEAD OF THE MAIN SERVICE SWITCH. THE FDS SHALL BE HEAVY DUTY (200,000 RMS SHORT CIRCUIT AMPS) SAFETY SWITCH @60 AMPS MINIMUM, PAINTED RED, INCLUDE A GROUND AND NEUTRAL KIT WITH GROUNDING SCREW (TO BOND NEUTRAL), INCLUDE A PADLOCK WITH Y1 CYLINDER KEYED TO A NYC/FDNY 2642 KEY (USE ABUS RE-KEYABLE 83-45 OR EQUIVALENT LOCK). ALL WIRING SHALL BE #10 MINIMUM THHN OR EQUIVALENT RUN IN ¾ INCH EMT/RGS AND IN ACCORDANCE WITH NYC REQUIREMENTS. THE GROUND TO THE FDS SHALL BE MADE USING A NYC ACCEPTED METHOD (SEE NYC ELECTRICAL CODE), AND THE GROUND WIRE TO THE FDS SHALL BE #8 MINIMUM (LARGER IF NECESSARY TO MEET FEED SIZE). THE EQUIPMENT GROUND LEAVING FROM THE FDS CONNECTING TO THE FIRE ALARM EQUIPMENT SHALL INCLUDE A #10 GREEN GROUND. THE FDS PANEL SHALL BEAR AN ENGRAVED WHITE-CORE PHENOLIC OR BAKELITE IDENTIFICATION NAMEPLATE STATING IN MINIMUM ONE-QUARTER INCH (1/4") HIGH WHITE LETTERS ON A RED BACKGROUND "FIRE ALARM FUSED DISCONNECT".
17. WHERE ADDITIONAL CIRCUITS ARE REQUIRED BY THE FIRE ALARM SYSTEM, A FUSED CUTOUT, PROPERLY SIZED SHALL BE INCLUDED, WIRED AFTER THE FDS. THE SIZE OF THE FUSES SHALL BE SIZED APPROPRIATELY BUT BE TWENTY (20) AMPERES MINIMUM AND EACH CIRCUIT SHALL ONLY FEED ONE "INDIVIDUAL" FIRE ALARM SYSTEM COMPONENT. THE FUSED CUT-OUT PANEL SHALL BEAR AN ENGRAVED WHITE-CORE PHENOLIC OR BAKELITE IDENTIFICATION NAMEPLATE STATING IN MINIMUM ONE-QUARTER INCH (1/4") HIGH WHITE LETTERS ON A RED BACKGROUND "FIRE ALARM FUSED CUT-OUT". THE NEUTRAL SHALL NOT BE BONDED IN THE FUSED CUTOUT.
18. A CENTRAL STATION DIALER AND TWO DEDICATED PHONE LINES SHALL BE PROVIDED INTEGRAL TO THE FIRE ALARM CONTROL PANEL. THE DIALER SHALL BE CAPABLE OF SENDING THE FOLLOWING EVENTS: ALARM, MANUAL STATION, WATERFLOW, SUPERVISORY, CARBON MONOXIDE, TROUBLE, PUMP RUNNING AND PUMP TROUBLE.
19. ALL AREA DETECTORS SHALL BE PHOTO-ELECTRIC TYPE.
20. SMOKE DETECTORS MUST BE MOUNTED AT LEAST 3 FT AWAY FROM ANY AIR REGISTER.
21. ALL CEILING MOUNT DEVICES MUST BE SECURELY FASTENED TO BUILDING CONSTRUCTION.
22. DEVICE LOCATIONS MUST BE READILY ACCESSIBLE TO ALLOW FOR MAINTENANCE AND REPAIR.
23. MANUAL STATIONS SHALL BE MOUNTED 48 INCHES ABOVE THE FINISHED FLOOR TO THE HANDLE OF THE STATION AND SHALL BE PAINTED FIRE DEPARTMENT RED. ALL MANUAL STATION SHALL BE INSTALLED SO THAT THEY ARE KEPT UN-OBSTRUCTED AT ALL TIMES.
24. ALL AUXILIARY RELAYS FOR FAN SHUTDOWN, DOOR RELEASE, DAMPER CONTROL, ELEVATOR CONTROL, ETC SHALL BE WIRED A MAXIMUM OF 3 FT FROM THE CONTROLLED DEVICE. THE AUXILIARY RELAY SHALL FUNCTION WITHIN THE REQUIRED VOLTAGE AND CURRENT OF THE CONTROLLED DEVICE. SLAVE OR INTERPOSING RELAYS SHALL BE INCLUDED AND POWERED BY THE FIRE ALARM CONTROL PANEL IN A FAIL-SAFE (FIRE FUNCTION) POSITION. POWER TO THE INTERPOSING RELAY SHALL BE MONITORED BY THE FIRE ALARM SYSTEM.
25. THE NYC FIRE DEPARTMENT SHALL APPROVE THE PLANS PRIOR TO THE BEGINNING OF ANY WORK.
26. LOCATIONS OF ALL FIRE ALARM EQUIPMENT SHALL BE SUBJECT TO THE NYC DEPARTMENT OF BUILDINGS AND FDNY APPROVAL. NO CHANGE OR MODIFICATION TO THE SYSTEM OR PLANS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER OF RECORD. IF ANY CHANGES ARE MADE TO THE DRAWINGS PRIOR TO OR DURING INSTALLATION, AS BUILT PLANS SHALL BE PREPARED BY THE ENGINEER AND FILED WITH THE APPROPRIATE NYC AGENCIES FOR FINAL ACCEPTANCE.
27. THE CONTRACTOR SHALL RETAIN A NY STATE PE TO SIGN AND SEAL ALL NECESSARY DOCUMENTS REQUIRED FOR INSPECTION AND TO OBTAIN A FINAL LETTER OF APPROVAL. THIS SHALL INCLUDE A SIGNED AND SEALED 11X17 AS-BUILT DRAWING, STATEMENT OF OPERATION, AN NFPA PROGRAMMING MATRIX, AND THE CONTRACTORS SIGNED AND SEALED A-433 FORM. THESE DOCUMENTS SHALL BE SUBMITTED AS NECESSARY TO THE NYC FIRE DEPARTMENT/NYC DEPARTMENT OF BUILDINGS TO OBTAIN A FIRE ALARM INSPECTION. IF A LETTER OF DEFECT IS ISSUED, THE CONTRACTOR SHALL CORRECT ALL ITEMS AND SUBMIT A SIGNED AND SEALED CERTIFICATE OF CORRECTION TO THE NYC FIRE DEPARTMENT TO OBTAIN A FINAL LETTER OF APPROVAL AT NO ADDITIONAL COST.
28. ALL REMOTE FIRE ALARM CONTROL CABINETS (DATA GATHERING PANELS, TTBS ETC) SHALL INCLUDE AN INTERNAL TAMPER SWITCH. EACH SHALL ALSO INCLUDE A SMOKE DETECTOR MOUNTED ON THE CEILING DIRECTLY ABOVE IT SHOULD ONE OR MORE NOT ALREADY BE SHOWN ON THE PLANS IN THE ROOM THE PANEL IS MOUNTED IN.
29. WIRING FOR FIRE ALARM DEVICES IN FINISHED SPACES WITHOUT HUNG CEILING SHALL BE INSTALLED IN EMT CONDUIT.
30. WIRING FOR FIRE ALARM DEVICES IN UNFINISHED SPACES SHALL BE INSTALLED IN RGS CONDUIT UP TO 8'-0" AFF AND THEN IN EMT CONDUIT ABOVE 8'-0" AFF.
31. FOR LOCATIONS AND QUANTITIES OF DEVICES REFER TO FIRE ALARM FLOOR PLANS. WHERE THERE ARE DISCREPANCIES BETWEEN THE PLANS AND THE RISER DIAGRAM, THE GREATER QUANTITY SHALL BE USED.
32. DO NOT SPLICE FIRE ALARM CONDUCTORS.
33. PROVIDE ALL REQUIRED EXPANSION PANELS, PC BOARDS, POWER SUPPLIES, BATTERIES, FUSED DISCONNECT SWITCHES, FUSE CUTOUTS AND BRANCH CIRCUITS, ETC., FOR A COMPLETE AND OPERATIONAL FIRE ALARM SYSTEM.
34. CONTRACTOR SHALL PERFORM ALL NYC BUILDING DEPT. FILINGS AND OBTAIN ALL APPROVALS. CONTRACTOR SHALL OBTAIN ALL REQUIRED SIGNED & SEALED NYC BUILDING DEPT. FORMS AND ALL REQUIRED SETS OF DRAWINGS FROM ENGINEER OF RECORD AND BUILDING DEPT. EXPEDITOR.
35. CONTRACTOR SHALL SUBMIT TO THE ENGINEER THE FIRE ALARM MATRIX AND AN "AS-BUILT" RISER DIAGRAM ON 11"X17" SHEET SIGNED & SEALED BY THE LICENSED ELECTRICIAN OR FIRE ALARM VENDOR STATING THAT THE FIRE ALARM SYSTEM HAS BEEN TESTED AND IS OPERATING IN ACCORDANCE WITH THE SEQUENCE OF OPERATION. THE ENGINEER OF RECORD WILL THEN SIGN & SEAL THE DRAWING FOR FDNY INSPECTION.
36. ALL COMPONENTS REQUIRED TO MAKE SYSTEM WORKABLE SHALL BE INCLUDED IN BID PRICE.
37. FOR WALL MOUNTED F.A. DEVICES PROVIDE 3/4" CONDUIT TERMINATED IN NEAREST ACCESSIBLE CEILING.
38. ALL FIRE ALARM WIRING SHALL BE TEFLON "RED". WIRING INSTALLED IN NON ACCESSIBLE CEILING, EXPOSED BELOW 8' OR IN MECHANICAL ROOM AREA (NO CEILING) ROUTE IN CONDUIT.
39. COORDINATE FINAL MEANS AND METHODS, AND SCOPE OF WORK WITH THE ARCHITECTURAL, MECHANICAL AND PLUMBING DRAWINGS. BASE BID ACCORDINGLY.
40. CONTRACTOR SHALL FURNISH AND INSTALL ALL ROUGH-IN EQUIPMENT AND APPURTENANCES PER THE NYC 2011 ELECTRICAL CODE AS REQUIRED.
41. COORDINATE ALL WORK WITH ALL INVOLVED TRADE CONTRACTORS, EQUIPMENT VENDORS, UTILITIES AND THE OWNER AS REQUIRED. CONTRACTOR SHALL BASE HIS BID ACCORDINGLY.
42. FINAL CONDUIT/CABLE ROUTING SHALL BE DETERMINED IN-FIELD, AND PRIOR TO THE COMMENCEMENT OF WORK, COORDINATED WITH OTHER TRADE CONTRACTORS AND THE OWNER.
43. ALL EQUIPMENT SHALL BE INSTALLED AS PER MANUFACTURER'S INSTRUCTIONS.
44. REFER TO DWG. FA-001.00 FOR FA SYMBOL LIST, BUILDING DATA, ABBREVIATIONS AND I/O MATRIX.
45. REFER TO DWG. FA-004.00 FOR FIRE ALARM RISER DIAGRAM.
46. ALL FIRE ALARM DEVICES ARE NEW, U.O.N.

N

FIRE ALARM SYSTEM SPECIFICATIONS
(2014 NYC BUILDING CODE –
R2 APARTMENT BUILDING SPRINKLER AND SMOKE DETECTION SYSTEM):

PART 1 – GENERAL

1.1 DESCRIPTION

A. THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, INCLUDING THE GENERAL AND SUPPLEMENTARY GENERAL CONDITION AND DIVISION 1 – GENERAL REQUIREMENTS SHALL APPLY TO THE WORK OF THIS SECTION.

B. AT THE TIME OF BID, ALL EXCEPTIONS TAKEN TO THESE SPECIFICATIONS, ALL VARIANCES FROM THESE SPECIFICATION AND ALL SUBSTITUTIONS OF OPERATING CAPABILITIES OR EQUIPMENT CALLED FOR IN THESE SPECIFICATION SHALL BE LISTED IN WRITING AND FORWARDED TO THE ENGINEER. ANY SUCH EXCEPTION, VARIANCES OR SUBSTITUTIONS THAT WERE NOT LISTED AT THE TIME OF BID AND ARE IDENTIFIED IN THE SUBMITTAL, SHALL BE GROUNDS FOR IMMEDIATE DISAPPROVAL WITHOUT COMMENT.

C. THE ENTIRE SYSTEM SHALL BE INSTALLED WITH AESTHETICS IN MIND. ALL CONTROL PANELS AND REMOTE ANNUNCIATORS INSTALLED IN PUBLIC SPACES SHALL BE SEMI–FLUSH MOUNTED WITH NO EXPOSED CONDUIT OR CABLE TRAYS.

1.2 WORK INCLUDED

A. THE WORK COVERED BY THIS SECTION OF THE SPECIFICATION SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS AND SERVICES TO FURNISH AND INSTALL A COMPLETE ADDRESSABLE SPRINKLER AND SMOKE DETECTION SYSTEM. IT SHALL BE COMPLETE WITH ALL NECESSARY HARDWARE, SOFTWARE AND MEMORY SPECIFICALLY TAILORED FOR THIS INSTALLATION. IT SHALL BE POSSIBLE TO PERMANENTLY MODIFY THE SOFTWARE ON SITE BY USING A PLUG–IN PROGRAMMER. THE SYSTEM SHALL CONSIST OF, BUT NOT BE LIMITED TO, THE FOLLOWING:

1. SPRINKLER PANEL AND/OR SMOKE DETECTION SYSTEM.
2. ADDRESSABLE MANUAL FIRE ALARM STATION – ONE LOCATED BY THE SPRINKLER/SMOKE DETECTION SYSTEM. A SECOND SHALL BE LOCATED NEXT TO THE LOBBY REMOTE ANNUNCIATOR, IF PROVIDED.
3. ADDRESSABLE ANALOG AREA SMOKE DETECTORS. SMOKE DETECTOR SHALL BE LOCATED IN EVERY ELECTRICAL, MECHANICAL OR TELEPHONE ROOMS AND OTHER SPACES AS REQUIRED BY NYC CODE CHAPTER 9. BEAM CONSTRUCTION OF > 12 INCHES DEEP SHALL BE ADDRESSED.
4. ADDRESSABLE ANALOG SMOKE DETECTORS FOR THE TOP OF THE ELEVATOR SHAFT, ELEVATOR LOBBIES, AND FOR ELEVATOR EQUIPMENT ROOMS (AS REQUIRED BY NYC CODE CHAPTER 9). PROVIDE ELEVATOR SHUNT TRIP FOR SPRINKLERED ELEVATOR SHAFTS.
5. ADDRESSABLE ANALOG DUCT SMOKE DETECTORS FOR SUPPLY FANS OVER 2,000 CFM. SUPPLY AND RETURN FOR FANS OVER 2,000 CFM.
6. ADDRESSABLE ANALOG HEAT DETECTORS.
7. CENTRAL STATION ALARM CONNECTION CONTROL.
8. AIR HANDLING SYSTEMS SHUTDOWN CONTROL.
9. PUMP SUPERVISION.
10. MAGNETIC DOOR HOLDER RELEASE.
11. DRY PIPE SPRINKLER RELEASE VALVE/DELUGE VALVE CONTROL.
12. SPRINKLER SUPERVISORY SWITCHES AND TAMPER SWITCH SUPERVISION.
13. BATTERY STANDBY.
14. ALL NYC REQUIRED SPRINKLER – SMOKE DETECTION SYSTEM PERIPHERALS, PLACARDS, RISER DIAGRAM, ETC. SHALL BE INCLUDED IN THE SYSTEM PRICE.
15. INCLUDE STAND–ALONE 120 VAC/9VDC SMOKE ALARMS OR COMBINATION SMOKE AND CARBON MONOXIDE (CO) ALARMS FOR SLEEPING ROOMS. SMOKE/CO ALARMS SHALL BE INTERCONNECTED (SOUNDERS WIRED IN TANDEM) WHEN TWO OR MORE ARE IN AN ASSOCIATED APARTMENT.

1.3 APPLICABLE CODES AND STANDARDS

A. ALL EQUIPMENT SHALL BE UL LISTED FOR ITS INTENDED USE AND CONFORM TO THE LATEST UL STANDARDS.

B. UNDERWRITERS LABORATORIES INC.: THE SYSTEM AND ALL COMPONENTS SHALL BE LISTED BY UNDERWRITERS LABORATORIES INC. FOR USE IN FIRE PROTECTIVE SIGNALING SYSTEM UNDER THE FOLLOWING STANDARDS AS APPLICABLE:

UL 864/UOJZ, APOU CONTROL UNITS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
UL 268SMOKE DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
UL 268A SMOKE DETECTORS FOR DUCT APPLICATIONS.
UL 217 SMOKE DETECTORS SINGLE STATION.
UL 521 HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
UL 228 DOOR HOLDERS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
UL 464 AUDIBLE SIGNALING APPLIANCES.
UL 1638 VISUAL SIGNALING APPLIANCES.
UL 38 MANUALLY ACT'IVATED SIGNALING BOXES.
UL 346 WATERFLOW INDICATORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
UL 1971 STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED
UL 1481 POWER SUPPLIES FOR FIRE PROTECTIVE SIGNALING SYSTEMS.
UL 1711 AMPLIFIERS FOR FIRE PROTECTIVE SIGNALING SYSTEMS.

C. THIS INSTALLATION SHALL COMPLY WITH:

1. AMERICANS WITH DISABILITIES ACT (ADA)
2. ALL POWER AND WIRE REQUIREMENTS SHALL FOLLOW THE 2011 NYC ELECTRICAL CODE.
3. NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS: NFPA 72 AS AMENDED BY NYC CODE APPENDIX Q.
4. 2014 NYC BUILDING CODE CHAPTER 4, CHAPTER 9, CHAPTER 10, CHAPTER 30, MECHANICAL CODE, APPENDIX K & Q AND OTHER SECTIONS AS THEY APPLY.
5. INTERNATIONAL STANDARDS ORGANIZATION (ISO): ISO–9001
6. UTILIZE MEA/BSA/OTCR APPROVED FIRE ALARM EQUIPMENT.
7. THE REQUIREMENTS OF THE CITY OF NEW YORK BUILDING DEPARTMENT AND THE CITY OF NEW YORK FIRE DEPARTMENT.
8. LOCAL AND STATE BUILDING CODES AND THE LOCAL AUTHORITIES HAVING JURISDICTION.

1.4 RELATED DOCUMENTS

A. SECURE PERMITS AND APPROVALS PRIOR TO INSTALLATION.

B. PRIOR TO COMMENCEMENT AND AFTER COMPLETION OF WORK NOTIFY AUTHORITIES HAVING JURISDICTION.

C. SUBMIT LETTER OF APPROVAL FOR INSTALLATION BEFORE REQUESTING ACCEPTANCE OF SYSTEM.

1.5 RELATED WORK

A. THE CONTRACTOR SHALL COORDINATE WORK IN THIS SECTION WITH ALL RELATED TRADES. WORK AND/OR EQUIPMENT PROVIDED IN OTHER SECTIONS AND RELATED TO THE ALARM SYSTEM SHALL INCLUDE, BUT NOT BE LIMITED TO:

1. SPRINKLER WATERFLOW AND SUPERVISORY SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR, BUT WIRED AND CONNECTED BY THE ELECTRICAL CONTRACTOR. MODIFICATION OF EXISTING SPRINKLER DEVICES TO ACCOMMODATE MONITORING BY THE NEW SPRINKLER SYSTEM SHALL BE THE RESPONSIBILITY OF THE ALARM SYSTEM INSTALLING CONTRACTOR.
2. DUCT SMOKE DETECTORS SHALL BE FURNISHED, WIRED AND CONNECTED BY THE ELECTRICAL CONTRACTOR. THE HVAC CONTRACTOR SHALL FURNISH NECESSARY DUCT OPENING TO INSTALL THE DUCT SMOKE DETECTORS.
3. NEW AIR HANDLING AND SMOKE EXHAUST SYSTEM FAN CONTROL CIRCUITS AND STATUS CONTACTS TO BE BY THE HVAC CONTROL EQUIPMENT.
4. ELEVATOR RECALL CONTROL CIRCUITS TO BE PROVIDED BY THE ELEVATOR CONTROL EQUIPMENT. THE OPERATION OF THE ELEVATORS SHALL BE IN ACCORDANCE WITH NYC CODE CHAPTER 9 AND 30 AS WELL AS APPENDIX Q AND K.
5. DRY PIPE/DELUGE SPRINKLER SYSTEM RELEASE VALVE CONTROL CIRCUITS AND SUPERVISION CONTACTS SHALL BE PROVIDED BY THE DRY PIPE/DELUGE SPRINKLER SYSTEM CONTROL EQUIPMENT.
6. CONDUIT: SECTION 260533.
7. WIRE AND CABLES: SECTION 260519.

1.6 SUBMITTALS

A. PROVIDE LIST OF ALL TYPES OF EQUIPMENT AND COMPONENTS PROVIDED. THIS SHALL BE INCORPORATED AS PART OF A TABLE OF CONTENTS, WHICH WILL ALSO INDICATE THE MANUFACTURER'S PART NUMBER, THE DESCRIPTION OF THE PART, AND THE PART NUMBER OF THE MANUFACTURER'S PRODUCT DATASHEET ON WHICH THE INFORMATION CAN BE FOUND.

B. PROVIDE DESCRIPTION OF OPERATION OF THE SYSTEM (SEQUENCE OF OPERATION), SIMILAR TO THAT PROVIDED IN PART 2 OF THIS SECTION OF THE SPECIFICATIONS, TO INCLUDE ANY AND ALL EXCEPTIONS, VARIANCES OR SUBSTITUTIONS LISTED AT THE TIME OF BID. ANY SUCH EXCEPTIONS, VARIANCES OR SUBSTITUTIONS THAT WERE NOT LISTED AT THE TIME OF BID AND ARE IDENTIFIED IN THE SUBMITTAL, SHALL BE GROUNDS FOR IMMEDIATE DISAPPROVAL WITHOUT COMMENT. THE SEQUENCE OF OPERATION SHALL BE PROJECT SPECIFIC, AND SHALL PROVIDE INDIVIDUAL SEQUENCES FOR EVERY TYPE OF ALARM, SUPERVISORY, OR TROUBLE CONDITION THAT MAY OCCUR AS PART OF NORMAL OR OFF–NORMAL SYSTEM USE.

C. PROVIDE MANUFACTURER'S PRINTED PRODUCT DATA, CATALOG CUTS AND DESCRIPTION OF ANY SPECIAL INSTALLATION PROCEDURES. POORLY PHOTOCOPIED AND/OR ILLEGIBLE PRODUCT DATA SHEETS SHALL NOT BE ACCEPTABLE AND SHALL BE REJECTED. ALL PRODUCT DATASHEETS SHALL BE HIGHLIGHTED OR STAMPED WITH ARROWS TO INDICATE THE SPECIFIC COMPONENTS BEING SUBMITTED FOR APPROVAL.

D. PROVIDE MANUFACTURER'S INSTALLATION INSTRUCTION MANUAL FOR SPECIFIED SYSTEM.

E. PROVIDE SAMPLES OF VARIOUS ITEMS WHEN REQUESTED.

F. PROVIDE COPY OF NYS LICENSE TO PERFORM SUCH WORK.

G. PROVIDE COPIES OF NICET LEVEL II FIRE ALARM CERTIFICATIONS FOR THE TWO (2) TECHNICIANS ASSIGNED TO THIS PROJECT.

H. PROVIDE SHOP DRAWINGS AS FOLLOWS:

1. COVERSHEET WITH PROJECT NAME, ADDRESS AND DRAWING INDEX.
2. GENERAL NOTES DRAWING WITH PERIPHERAL DEVICE BACKBOX SIZE INFORMATION, PART NUMBERS, DEVICE MOUNTING HEIGHT INFORMATION, AND THE NAMES, ADDRESSES, POINT OF CONTACT, AND TELEPHONE NUMBERS OF ALL CONTRACT PROJECT TEAM MEMBERS.
3. DEVICE RISER DIAGRAM THAT INDIVIDUALLY DEPICTS ALL CONTROL PANELS, ANNUNCIATORS, ADDRESSABLE DEVICES. SHALL INCLUDE A SPECIFIC, PROPOSED POINT DESCRIPTOR ABOVE EACH ADDRESSABLE DEVICE. SHALL INCLUDE A SPECIFIC, DISCRETE POINT ADDRESS THAT SHALL CORRESPOND TO ADDRESSES DEPICTED ON THE DEVICE LAYOUT FLOOR PLANS. DRAWING SHALL PROVIDE WIRE SPECIFICATIONS, AND WIRE TAGS SHOWN ON ALL CONDUCTORS DEPICTED ON THE RISER DIAGRAM. ALL CIRCUITS SHALL HAVE DESIGNATIONS THAT SHALL CORRESPOND WITH THOSE REQUIRE ON THE CONTROL PANEL AND FLOOR PLAN DRAWINGS. END–OF–LINE RESISTORS (AND VALUES) SHALL BE DEPICTED.
4. CONTROL PANEL TERMINATION DRAWING(S). SHALL DEPICT INTERNAL COMPONENT PLACEMENT AND ALL INTERNAL AND FIELD TERMINATION POINTS. DRAWING SHALL PROVIDE A DETAIL INDICATING WHERE CONDUIT PENETRATIONS SHALL BE MADE, SO AS TO AVOID CONFLICTS WITH INTERNALLY MOUNTED BATTERIES. FOR EACH ADDITIONAL DATA GATHERING PANEL, A SEPARATE CONTROL PANEL DRAWING SHALL BE PROVIDED, WHICH CLEARLY INDICATED THE DESIGNATION, SERVICE AND LOCATION OF THE CONTROL ENCLOSURE. END–OF–LINE RESISTORS (AND VALUES) SHALL BE DEPICTED.
5. SEE SECTION <u>3.4 DOCUMENTATION AND TRAINING</u> FOR OTHER DOCUMENTS RELATING TO THIS SECTION.
6. DEVICE TYPICAL WIRING DIAGRAM DRAWING(S) SHALL BE PROVIDED WHICH DEPICT ALL SYSTEM COMPONENTS, AND THEIR RESPECTIVE FIELD WIRING TERMINATION POINTS. WIRE TYPE, GAUGE, AND JACKET SHALL ALSO BE INDICATED. WHEN AN ADDRESSABLE MODULE IS USED IN MULTIPLE CONFIGURATIONS FOR MONITORING OR CONTROLLING VARIOUS TYPES OF EQUIPMENT, DIFFERENT DEVICE TYPICAL DIAGRAMS SHALL BE PROVIDED. END–OF–LINE RESISTORS (AND VALUES) SHALL BE DEPICTED.
7. DEVICE LAYOUT FLOOR PLANS SHALL BE CREATED FOR EVERY AREA SERVED BY THE ALARM SYSTEM. CAD FILES (AUTOCAD – LATEST VERSION) SHALL BE PROVIDED BY THE CONSULTING ENGINEER FOR THE USE OF THE ALARM SYSTEM EQUIPMENT VENDOR IN THE PREPARATION OF THE FLOOR PLANS. FLOOR PLANS SHALL INDICATE ACCURATE LOCATIONS FOR ALL CONTROL AND PERIPHERAL DEVICES. DRAWINGS SHALL BE NO LESS THAN 1/8 INCH SCALE. ALL ADDRESSABLE DEVICES SHALL BE DEPICTED WITH A DISCRETE ADDRESS THAT CORRESPONDS WITH THAT INDICATED ON THE RISER DIAGRAM. ALL NOTIFICATION APPLIANCES SHALL ALSO BE PROVIDED WITH A CIRCUIT ADDRESS THAT CORRESPONDS TO THAT DEPICTED ON THE RISER DIAGRAM. IF INDIVIDUAL FLOORS NEED TO BE SEGMENTED TO ACCOMMODATE THE 1/8" SCALE REQUIREMENTS, KEY PLANS AND BREAK–LINES SHALL BE PROVIDED ON THE PLANS IN AN ORDERLY AND PROFESSIONAL MANNER. END–OF–LINE RESISTORS (AND VALUES) SHALL BE DEPICTED.
8. CONTAINED IN THE TITLE BLOCK OF EACH DRAWING SHALL BE SYMBOL LEGENDS WITH DEVICE COUNTS, WIRE TAG LEGENDS, CIRCUIT SCHEDULES FOR ALL ADDRESSABLE AND NOTIFICATION APPLIANCE CIRCUITS, THE PROJECT NAME/ADDRESS, AND A DRAWING DESCRIPTION WHICH CORRESPONDS TO THAT INDICATED IN THE DRAWING INDEX ON THE COVERSHEET DRAWING. A SECTION OF EACH DRAWING TITLE BLOCK SHALL BE RESERVED FOR REVISION NUMBERS AND NOTES. THE INITIAL SUBMISSION SHALL BE REVISION 0, WITH REVISION A, B, OR C AS PROJECT MODIFICATIONS REQUIRE.

I. BATTERY CALCULATIONS SHALL BE PROVIDED ON A PER POWER SUPPLY/CHARGER BASIS BASED ON 24 HOURS OF SUPERVISION AND 15 MINUTES OF ALARM. THESE CALCULATIONS SHALL CLEARLY INDICATE THE QUANTITY OF DEVICES, THE DEVICE PART NUMBERS, THE SUPERVISORY CURRENT DRAW, THE ALARM CURRENT DRAW, TOTALS FOR ALL CATEGORIES, AND THE CALCULATED BATTERY REQUIREMENTS. BATTERY CALCULATIONS SHALL ALSO REFLECT ALL CONTROL PANEL COMPONENT, REMOTE ANNUNCIATOR, AND AUXILIARY RELAY CURRENT DRAWS. FAILURE TO PROVIDE THESE CALCULATIONS SHALL BE GROUNDS FOR THE COMPLETE REJECTION OF THE SUBMITTAL PACKAGE.

J. TABLE OF CONTENTS, PRODUCT DATA SHEETS, SEQUENCES OF OPERATION, BATTERY CALCULATIONS, INSTALLATION INSTRUCTIONS, LICENSES, NICET CERTIFICATIONS AND B–SIZE (BLACKLINE) REDUCED SHOP DRAWINGS SHALL BE PROVIDED BY THE ALARM VENDOR AS PART OF A SINGLE, SPIRAL BOUND SUBMITTAL BOOK. THE SUBMITTAL BOOK SHALL HAVE LAMINATED COVERS INDICATING THE PROJECT ADDRESS, PROJECT NUMBER, SYSTEM TYPE, AND CONTRACTOR. THE BOOK SHALL CONSIST OF LABELED DIVIDERS, AND SHALL NOT EXCEED 9 ½" IN WIDTH, AND 11 ½" IN HEIGHT. NO LESS THAN THREE (3) SETS OF SUBMITTAL BOOKLETS SHALL BE PROVIDED TO THE CONSULTING ENGINEER FOR REVIEW AND COMMENT. ADDITIONAL COPIES MAY BE REQUIRED AT NO ADDITIONAL COST TO THE PROJECT.

K. SCALE DRAWING SETS SHALL BE SUBMITTED ALONG WITH THE SUBMITTAL BOOKLETS. THESE DRAWINGS MAY BE EITHER D–SIZE OR E–SIZE BLUELINE DRAWINGS AND OF A SUFFICIENT RESOLUTION TO BE COMPLETELY READ. SETS SHALL BE BOUND AND FOLDED SO AS TO NOT TAKE UP MORE THAN 100 SQUARE INCHES OF SPACE. NO LESS THAN THREE (3) SETS OF SCALE DRAWING SETS SHALL BE PROVIDED TO THE CONSULTING ENGINEER FOR REVIEW AND COMMENT. ADDITIONAL COPIES MAY BE REQUIRED AT NO ADDITIONAL COST TO THE PROJECT.

1.7 WARRANTY

A. ALL WORK PERFORMED AND ALL MATERIAL AND EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE FREE FROM DEFECTS AND SHALL REMAIN SO FOR A PERIOD OF AT LEAST ONE (1) YEAR FROM THE DATE OF ACCEPTANCE OR APPROVAL BY AHJ. THE FULL COST OF MAINTENANCE, LABOR AND MATERIALS REQUIRED TO CORRECT ANY DEFECT DURING THIS ONE YEAR PERIOD SHALL BE INCLUDED IN THE SUBMITTAL BID.

PART II – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. THE BASIS OF DESIGN IS NOTIFIER WHICH CONSTITUTES THE TYPE AND QUALITY OF EQUIPMENT TO BE FURNISHED.

B. IF EQUIPMENT OF ANOTHER MANUFACTURER IS TO BE SUBMITTED FOR APPROVAL AS EQUAL, THE CONTRACTOR SHALL, AT THE TIME OF BID, LIST ALL EXCEPTIONS TAKEN TO THESE SPECIFICATIONS, ALL VARIANCES FROM THESE SPECIFICATIONS AND ALL SUBSTITUTIONS OF OPERATING CAPABILITIES OR EQUIPMENT CALLED FOR IN THESE SPECIFICATIONS AND FORWARD SAID LIST TO THE ENGINEER. ANY SUCH EXCEPTIONS, VARIANCES OR SUBSTITUTIONS THAT WERE NOT LISTED AT THE TIME OF BID AND ARE IDENTIFIED IN THE SUBMITTAL, SHALL BE GROUNDS FOR IMMEDIATE DISAPPROVAL WITHOUT COMMENT. FINAL DETERMINATION OF COMPLIANCE WITH THESE SPECIFICATIONS SHALL REST WITH THE ENGINEER, WHO, AT HIS DISCRETION, MAY REQUIRE PROOF OF PERFORMANCE.

C. ALTERNATE PRODUCT SUBMISSIONS MADE WITHOUT PROOF OF NO LESS THAN THREE (3) FACTORY AUTHORIZED AND CERTIFIED MANUFACTURER'S DISTRIBUTORS RESIDING WITHIN 50 MILES OF THE PROJECT JOB SITE SHALL BE REJECTED. THESE DISTRIBUTORS MUST NOT ONLY PROVIDE INSTALLATION SUPPORT, BUT MUST HAVE A SERVICE ORGANIZATION CAPABLE OF 24 HOUR EMERGENCY CALL SERVICE AND MUST HAVE BEEN CONTRACTED AND DELIVERED NO LESS THAN FIVE (5) ACCEPTED PROJECTS USING THE SUBMITTED PRODUCT OVER THE PAST YEAR.

D. ALTERNATE PRODUCT SUBMISSIONS BASED UPON USE OF A PRODUCT LINE CONSIDERED PROPRIETARY IN ITS DISTRIBUTION, DESIGN, APPLICATION SOFTWARE, OR ONGOING MAINTENANCE AND REPAIR SHALL NOT ACCEPTABLE. PROOF OF A PRODUCT'S NON–PROPRIETARY NATURE SHALL BE THE BURDEN OF THE CONTRACTOR AT THE TIME OF BID, AND SHALL BE IN THE FORM OF WRITTEN DOCUMENTATION. THE DETERMINATION OF A PRODUCT'S COMPLIANCE TO THIS REQUIREMENT SHALL BE EXCLUSIVELY THAT OF THE CONSULTING ENGINEER.

F. ALL PRODUCTS USED SHALL BE OF A SINGLE MANUFACTURER. SUBMISSION OF NOTIFICATION APPLIANCES, AUXILIARY RELAYS, OR DOCUMENTATION FROM OTHER THAN A SINGLE MANUFACTURER SHALL NOT BE ACCEPTABLE AND WILL BE GROUNDS FOR IMMEDIATE DISAPPROVAL WITHOUT COMMENT.

G. THE SPRINKLER / SMOKE DETECTION SYSTEM SUPPLIED UNDER THIS SPECIFICATION SHALL BE A MICROPROCESSOR–BASED. ALL CONTROL PANEL ASSEMBLIES AND CONNECTED FIELD APPLIANCES SHALL BE BOTH DESIGNED AND MANUFACTURED BY THE SAME COMPANY, AND SHALL BE TESTED AND CROSS–LISTED AS COMPATIBLE TO ENSURE THAT A FULLY FUNCTIONING LIFE SAFETY SYSTEM IS DESIGNED AND INSTALLED.

2.2 CIRCUITING GUIDELINES

A. EACH SIGNALING LINE CIRCUIT (SLC) SHALL BE CIRCUITED SO DEVICE LOADING IS NOT TO EXCEED 80% OF LOOP CAPACITY IN ORDER TO LEAVE FOR SPACE FOR FUTURE DEVICES. THE LOOP SHALL HAVE CLASS B OPERATION.

B. NAC CIRCUITS SHALL HAVE CLASS B OPERATION. EACH OF THE FOLLOWING TYPES OF ALARM NOTIFICATION APPLIANCES SHALL BE CIRCUITED AS SHOWN ON THE DRAWINGS BUT SHALL BE TYPICALLY AS FOLLOWS:

a. AUDIBLE SIGNALS: PROVIDE SUFFICIENT SPARE CAPACITY TO ASSURE THAT THE ADDITION OF FIVE (5) AUDIBLE DEVICES CAN BE SUPPORTED WITHOUT THE NEED FOR ADDITION CONTROL COMPONENTS (POWER SUPPLIES, SIGNAL CIRCUIT MODULES, AMPLIFIERS, BATTERIES, ETC.)
b. VISUAL SIGNALS PROVIDE SUFFICIENT SPARE CAPACITY TO ASSURE THAT THE ADDITION OF THREE (3) VISUAL DEVICES CAN BE SUPPORTED WITHOUT THE NEED FOR ADDITION CONTROL COMPONENTS (POWER SUPPLIES, SIGNAL CIRCUIT MODULES, BATTERIES, ETC.)
c. DWELLING SPEAKER CIRCUITS SHALL BE CLASS A (STYLE Z).

C. THE NETWORK RISER SHALL BE WIRED NFPA STYLE 7 (CLASS A WITH ISOLATION).

D. WHERE IT IS NECESSARY TO INTERFACE CONVENTIONAL INITIATING DEVICES PROVIDE INTELLIGENT INPUT MODULES TO SUPERVISE CLASS B ZONE WIRING.

E. EACH OF THE FOLLOWING TYPES OF DEVICES OR EQUIPMENT SHALL BE PROVIDED WITH SUPERVISED CIRCUITS AS SHOWN ON THE DRAWINGS BUT SHALL BE TYPICALLY AS FOLLOWS:

a. SPRINKLER VALVE SUPERVISORY SWITCHES: PROVIDE ONE (1) SUPERVISORY MODULE CIRCUIT FOR EACH SPRINKLER VALVE SUPERVISORY SWITCH.
b. WHEN WATERFLOW AND TAMPER SWITCHES EXIST AT THE SAME LOCATION, PROVIDE ONE (1) DUAL INPUT ADDRESSABLE MODULE. WHEN ODD NUMBERS OF DEVICES EXIST AT A SINGLE LOCATION, PROVIDE ADDITIONAL SINGLE INPUT ADDRESSABLE MODULES.

F. EACH OF THE FOLLOWING TYPES OF REMOTE EQUIPMENT ASSOCIATED WITH THE FIRE ALARM SYSTEM SHALL BE PROVIDED WITH A FORM 'C' CONTROL RELAY CONTACT AS SHOWN ON THE DRAWINGS, BUT SHALL BE TYPICALLY AS FOLLOWS:

a. HVAC FAN SYSTEMS: PROVIDE ONE (1) SHUTDOWN CONTROL RELAY CONTACT FOR EACH HVAC FAN SYSTEM.
b. HVAC SUPPLY FANS: PROVIDE ONE (1) SHUTDOWN CONTROL RELAY CONTACT FOR EACH HVAC SUPPLY FAN.
c. HVAC RETURN FANS: PROVIDE ONE (1) SHUTDOWN CONTROL RELAY CONTACT FOR EACH HVAC RETURN FAN.

G. PROVIDE A DEDICATED 24VDC CIRCUIT TO FEED ALL AUXILIARY RELAYS REQUIRED FOR INDUCTIVE LOADS. CIRCUITS SHALL BE SUPERVISED VIA AN END–OF–LINE RELAY AND ADDRESSABLE INPUT MODULE. AUXILIARY RELAYS SHALL NOT DERIVE THEIR POWER FROM THE STARTER OR LOAD BEING CONTROLLED.

H. EACH CONTROL OR DATA GATHERING PANEL SHALL HAVE A DEDICATED MINIMUM 20AMP–120VAC FEED. AN APPROPRIATE FUSE DISCONNECT SHALL BE INCLUDED, WIRED AS INDICATED IN THE ELECTRICAL CODE FOR THE CITY OF NY.

I. IN NO CASE SHALL ANY FIRE ALARM CIRCUIT BE SIZED BEYOND 80% OF CIRCUIT CAPACITY.

2.3 SPRINKLER PANEL – SMOKE DETECTION SYSTEM SEQUENCE OF OPERATION

A. ACTIVATION OF THE MANUAL PULL STATION LOCATED AT THE SPRINKLER ALARM PANEL WILL DO THE FOLLOWING:

a. ANNUNCIATE THE DEVICE IN ALARM ON AN ENGLISH LANGUAGE DISPLAY AT THE SPRINKLER ALARM PANEL
b. CLOSE ALL DAMPERS
c. SEND AN ALARM SIGNAL TO CENTRAL OFFICE

B. ACTIVATION OF AN AREA SMOKE OR DUCT DETECTOR WILL DO THE FOLLOWING:

a. ANNUNCIATE THE DEVICE IN ALARM ON AN ENGLISH LANGUAGE DISPLAY AT THE SPRINKLER ALARM PANEL
b. SHUTDOWN ALL FANS GREATER THAN 2000 C.F.M.
c. CLOSE ALL DAMPERS
d. SEND A SMOKE ALARM SIGNAL TO CENTRAL OFFICE

C. ACTIVATION OF AN ELEVATOR SMOKE DETECTOR WILL DO THE FOLLOWING:

a. ANNUNCIATE THE DEVICE IN ALARM ON AN ENGLISH LANGUAGE DISPLAY AT THE SPRINKLER ALARM PANEL
b. SHUTDOWN ALL FANS GREATER THAN 2000 C.F.M.
c. CLOSE ALL DAMPERS
d. SEND A SMOKE ALARM SIGNAL TO CENTRAL OFFICE
e. RECALL THE ELEVATOR TO THE GROUND FLOOR

D. OPERATION OF A ELEVATOR MACHINE ROOM OR TOP OF SHAFT HEAT DETECTOR WILL DO THE FOLLOWING:

a. SHUNT TRIP THE ELEVATORS COVERED BY THIS EQUIPMENT AFTER THE ELEVATOR RETURNS AND REACHES THE GROUND FLOOR.
b. CLOSE ALL DAMPERS

E. ACTIVATION OF A WATERFLOW SWITCH WILL DO THE FOLLOWING:

a. ANNUNCIATE THE DEVICE IN ALARM ON AN ENGLISH LANGUAGE DISPLAY AT THE SPRINKLER ALARM PANEL
b. SHUTDOWN ALL FANS GREATER THAN 2000 C.F.M.
c. CLOSE ALL DAMPERS
d. SEND A WATERFLOW ALARM SIGNAL TO CENTRAL OFFICE
e. RECALL THE ELEVATOR TO THE GROUND FLOOR

F. ACTIVATION OF A TAMPER SWITCH WILL DO THE FOLLOWING:

a. ANNUNCIATE THE DEVICE IN ALARM ON AN ENGLISH LANGUAGE DISPLAY AT THE SPRINKLER ALARM PANEL
b. SEND A SUPERVISORY SIGNAL TO CENTRAL OFFICE

G. ACTIVATION OF A ROOM SMOKE ALARM, CO ALARM, OR COMBINATION CO/SMOKE ALARM WILL DO THE FOLLOWING:

a. ACTIVATE THE LOCAL INTERNAL SOUNDER
b. SEND A SIGNAL TO OTHER ALARMS IN THE SAME DWELLING AND ACTIVATE THEIR ASSOCIATED INTERNAL SOUNDER

H. OPERATION OF A HANDICAP SLEEPING ROOM SMOKE ALARM OR SMOKE AND CO ALARM WILL DO THE FOLLOWING:

a. ACTIVATE THE LOCAL INTERNAL SOUNDER
b. SEND A SIGNAL TO OTHER ALARMS IN THE SAME DWELLING AND ACTIVATE THEIR ASSOCIATED INTERNAL SOUNDER
c. ACTIVATE THE DWELLING ROOM STROBES

I. OPERATION OF A GENERAL TROUBLE I.E.: OPEN ON FIELD WIRING INTERNAL FAULTS:

a. ACTIVATE LOCAL PIEZO AT THE SPRINKLER ALARM PANEL AND REMOTE ANNUNCIATOR AND SHOW ALPHANUMERIC TEXT MESSAGE ON LCD DISPLAYS.
b. TRANSMIT TROUBLE SIGNAL TO CENTRAL OFFICE VIA CENTRAL OFFICE TRANSMITTER.

J. OPERATION OF A FIRE PUMP MONITORING DEVICE SHALL:

a. PHASE REVERSAL: DISPLAY A TROUBLE CONDITION WITH A "FIRE PUMP PHASE REVERSAL" MESSAGE AT THE SPRINKLER ALARM PANEL LCD DISPLAY.
b. PUMP RUNNING: DISPLAY A TROUBLE CONDITION WITH A "FIRE PUMP RUNNING" MESSAGE AT THE SPRINKLER ALARM PANEL LCD DISPLAY.
c. PUMP FAIL/TROUBLE: DISPLAY A TROUBLE CONDITION WITH A "PUMP TROUBLE" MESSAGE AT THE SPRINKLER ALARM PANEL LCD DISPLAY.

2.4 SUPPORT FOR INSTALLER AND OWNER MAINTENANCE

A. PROVIDE A CODED ONE–MAN WALK TEST FEATURE. ALLOW AUDIBLE OR SILENT TESTING. SIGNAL ALARMS AND TROUBLES DURING TEST. ALLOW RECEIPT OF ALARMS AND PROGRAMMED OPERATIONS FOR ALARMS FROM AREAS NOT UNDER TEST.

B. PROVIDE INTERNAL SYSTEM DIAGNOSTICS AND MAINTENANCE USER INTERFACE CONTROLS TO DISPLAY/REPORT THE POWER, COMMUNICATION, AND GENERAL STATUS OF SPECIFIC PANEL COMPONENTS, DETECTORS, AND MODULES.

C. PROVIDE LOOP CONTROLLER DIAGNOSTICS TO IDENTIFY COMMON ALARM, TROUBLE, GROUND FAULT, CLASS A FAULT, AND MAP FAULTS. MAP FAULTS INCLUDE WIRE CHANGES, DEVICE TYPE CHANGES BY LOCATION, DEVICE ADDITIONS/DELETIONS AND CONVENTIONAL OPEN, SHORT, AND GROUND CONDITIONS. GROUND FAULTS ON THE CIRCUIT WIRING OF REMOTE MODULE SHALL BE IDENTIFIED BY DEVICE ADDRESS.

D. ALLOW THE USER TO DISPLAY/REPORT THE CONDITION OF ADDRESSABLE ANALOG DETECTORS. INCLUDE DEVICE ADDRESS, DEVICE TYPE, PERCENT OBSCURATION, AND MAINTENANCE INDICATOR. THE MAINTENANCE INDICATOR SHALL PROVIDE THE USER WITH A MEASURE OF CONTAMINATION OF A DEVICE UPON WHICH CLEANING DECISIONS CAN CONFIDENTLY BE MADE.

E. ALLOW THE USER TO REPORT HISTORY FOR ALARM, SUPERVISORY, MONITOR, TROUBLE, SMOKE VERIFICATION, WATCHDOG, AND RESTORE ACTIVITY. INCLUDE FACILITY NAME, LICENSEE, PROJECT PROGRAM COMPILATION DATE, COMPILER VERSION, PROJECT REVISION NUMBER, AND THE TIME AND DATE OF THE HISTORY REPORT.

F. ALLOW THE USER TO DISABLE/ENABLE DEVICES, ZONES, ACTIONS, TIMERS AND SEQUENCES. PROTECT THE DISABLE FUNCTION WITH A PASSWORD.

G. ALLOW THE USER TO ACTIVATE/RESTORE OUTPUTS, ACTIONS, SEQUENCES, AND SIMULATE DETECTOR SMOKE LEVELS.

H. ALLOW THE SERVICE USER TO ENTER TIME AND DATE, RECONFIGURE AN EXTERNAL PORT FOR DOWNLOAD PROGRAMMING, INITIATE AUTO PROGRAMMING AND CHANGE PASSWORDS. PROTECT THESE FUNCTIONS WITH A PASSWORD.

I. THE END–USER SHALL RETAIN COMPLETE RIGHTS AND OWNERSHIP TO ALL SOFTWARE RUNNING IN THE SYSTEM. THE ALARM EQUIPMENT VENDOR SHALL PROVIDE USEABLE HARD AND SOFT COPIES OF THE SOFTWARE DATABASE TO THE END–USER AT THE END OF THE WARRANTY PERIOD. THE DATABASE PROVIDED SHALL BE USEABLE BY ANY AUTHORIZED AND CERTIFIED DISTRIBUTOR OF THE PRODUCT LINE, AND SHALL INCLUDE ALL APPLICABLE PASSWORDS NECESSARY FOR TOTAL AND UNRESTRICTED USE AND MODIFICATION OF THE DATABASE. THE CONSULTING ENGINEER SHALL DEFINE THE EXTENT OF HARDCOPY DATABASE DOCUMENTATION TO BE PROVIDED.

2.5 UL LISTED AND APPROVED EQUIPMENT

A. CONTROL PANEL REQUIREMENTS: THE CONTROL PANEL OR PANELS AND ALL SYSTEM DEVICES (PULL STATIONS, SMOKE AND HEAT DETECTORS, ETC. SHALL BE AN EDWARDS EST TYPE EST3 SERIES (OR EQUAL). ALL UNDER ONE LABEL "<u>UL LISTED AND APPROVED</u>" FOR THE USE OF FIRE ALARM SYSTEMS IN THIS AREA OF THE UNITED STATES OF AMERICA. THE OPERATING CONTROLS SHALL BE LOCATED BEHIND LOCKED DOOR WITH VIEWING WINDOW. ALL CONTROL MODULES SHALL BE LABELED, AND ALL ZONE LOCATIONS SHALL BE IDENTIFIED.

NOTE: THE FIRE ALARM VENDOR MAY SUBSTITUTE THE EDWARDS EST IO SERIES PANEL FOR SYSTEMS UNDER 200 FIRE ALARM DEVICES.

B. SYSTEM CONTROLLERS: THE MAIN CONTROLLER 3–CPU SHALL BE SUPERVISED, SITE PROGRAMMABLE, AND OF MODULAR DESIGN SUPPORTING UP TO 125 DETECTORS AND 125 REMOTE MODULES PER ADDRESSABLE SIGNALING LINE CIRCUIT (SLC). THE CPU SHALL SUPPORT UP TO 10 SLC'S PER PANEL FOR A TOTAL SYSTEM CAPACITY OF 2500 INTELLIGENT ADDRESSABLE POINTS. THE SYSTEM SHALL BE DESIGNED WITH PEER–TO–PEER NETWORKING CAPABILITY FOR ENHANCED SURVIVABILITY, WITH SUPPORT FOR UP TO 64 MODES, EACH WITH UP TO 2500 POINTS AND AN OVERALL CAPACITY OF 160,000 POINTS. THE CABINETS SHALL BE STEEL, WITH A RED FINISH. THE CABINETS SHALL BE STEEL WITH A RED FINISH.

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C. THE SYSTEM SHALL STORE ALL BASIC SYSTEM FUNCTIONALITY AND JOB SPECIFIC DATA IN NON-VOLATILE MEMORY. ALL SITE SPECIFIC AND OPERATING DATA SHALL SURVIVE A COMPLETE POWER FAILURE INTACT. PASSWORDS SHALL PROTECT ANY CHANGES TO SYSTEM OPERATIONS.

D. THE MAIN CONTROLLER MODULE SHALL CONTROL AND MONITOR ALL LOCAL OR REMOTE PERIPHERALS. IT SHALL SUPPORT A LARGE 960 CHARACTER LCD, POWER SUPPLY, REMOTE LCD AND ZONE DISPLAY ANNUNCIATORS, PRINTERS, AND SUPPORT COMMUNICATION INTERFACE STANDARD PROTOCOL (CSI) DEVICES SUCH AS COLOR COMPUTER ANNUNCIATORS AND COLOR GRAPHIC DISPLAYS. REMOTE LCD ANNUNCIATORS SHALL ALSO DISPLAY EACH AND EVERY POINT IN THE SYSTEM AND BE SIZED WITH THE SAME NUMBER OF CHARACTERS AS IN THE MAIN FACP DISPLAY.

E. THE PANEL SHALL HAVE AN INTERFACE MODULE FOR REMOTE SITE MONITORING. THE CONTROL PANEL SHALL INCLUDE BUILT-IN (PART OF THE FIRE ALARM CONTROL PANEL) DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT)) MODULE TO TRANSMIT SMOKE, SUPERVISORY, WATERFLOW, TROUBLE, CO ALARM (IF INCLUDED), PUMP RUNNING, AND PUMP TROUBLE EVENTS TO A CENTRAL MONITORING STATION (CMS) COMPANY. THE DACT SHALL SUPPORT DUAL TELEPHONES LINES, CONTACT I.D. COMMUNICATIONS, AND CONFIGURED FOR DUAL TONE MULTI-FREQUENCY (DTMF) OR PULSE MODES. IT SHALL BE POSSIBLE TO DELAY AC POWER FAILURE REPORTS, AUTO TEST CALL, AND BE SITE PROGRAMMABLE. THE DACT SHALL BE CAPABLE OF TRANSMITTING EVERY INDIVIDUAL CONDITION TO THE CENTRAL STATION VIA CONTACT I.D. FORMAT. SELECTION OF CONTACT I.D. FORMAT SHALL BE OF THE DISCRETION OF THE ENGINEER AND BUILDING OWNER BUT SHALL BE AN AVAILABLE OPTION. CONTRACTORS WHO CHOOSE A SEPARATE DIALER MUST MEET ALL OF THE ABOVE OPTIONS AND ARE RESPONSIBLE FOR ALL NECESSARY ADDED CONNECTIONS SUCH AS POWER (WITH FCO/FDS), CONDUIT, WIRE, ADDRESSABLE INTERFACE MODULES ETC.

F. THE SYSTEM SHALL HAVE BUILT-IN AUTOMATIC SYSTEM PROGRAMMING TO AUTOMATICALLY ADDRESS AND MAP ALL SYSTEM DEVICES ATTACHED TO THE MAIN CONTROLLER. A MINIMUM DEFAULT SINGLE STAGE ALARM SYSTEM OPERATION SHALL BE SUPPORTED WITH ALARM SILENCE, EVENT SILENCE,DRILL, LAMP TEST, AND RESET COMMON CONTROLS.

G. ADVANCED WINDOWS-BASED SYSTEM DEFINITION UTILITY WITH PROGRAM VERSION REPORTING TO DOCUMENT ANY AND ALL CHANGES MADE DURING SYSTEM START-UP OR SYSTEM COMMISSIONING SHALL BE USED TO MAINTAIN SITE SPECIFIC PROGRAMMING. TIME AND DATE STAMPS OF ALL MODIFICATIONS MADE TO THE PROGRAM MUST BE INCLUDED TO ALLOW FULL RETENTION OF ALL PREVIOUS PROGRAM VERSION DATA. IT SHALL SUPPORT PROGRAMMING OF ANY INPUT POINT TO ANY OUTPUT POINT. THE SYSTEM SHALL SUPPORT THE USE OF BAR CODE READERS TO ASSIST CUSTOM PROGRAMMING FUNCTIONS. IT SHALL ALLOW AUTHORIZED CUSTOMIZATION OF FUNDAMENTAL SYSTEM OPERATIONS USING INITIATING EVENTS TO START ACTIONS, TIMERS, SEQUENCES AND LOGICAL ALGORITHMS. THE SYSTEM PROGRAM SHALL MEET THE REQUIREMENTS OF THIS PROJECT, CURRENT CODES AND STANDARDS, AND SATISFY THE LOCAL AUTHORITY HAVING JURISDICTION.

H. THE SYSTEM SHALL SUPPORT DISTRIBUTED PROCESSOR INTELLIGENT DETECTORS WITH THE FOLLOWING OPERATIONAL ATTRIBUTES; INTEGRAL MULTIPLE DIFFERENTIAL SENSORS, AUTOMATIC DEVICE MAPPING, ELECTRONIC ADDRESSING, ENVIRONMENTAL COMPENSATION, PRE-ALARM, DIRTY DETECTOR IDENTIFICATION, AUTOMATIC DAY/NIGHT SENSITIVITY ADJUSTMENT, NORMAL/ALARM LEDS, RELAY BASES, SOUNDER BASES AND ISOLATOR BASES.

I. THE SYSTEM SHALL USE FULL DIGITAL COMMUNICATIONS TO SUPERVISE ALL ADDRESSABLE LOOP DEVICES FOR PLACEMENT, CORRECT LOCATION, AND OPERATION. IT SHALL ALLOW SWAPPING OF "SAME TYPE" DEVICES WITHOUT THE NEED OF ADDRESSING AND IMPOSE THE "LOCATION" PARAMETERS ON REPLACEMENT DEVICE. IT SHALL INITIATE AND MAINTAIN A TROUBLE IF A DEVICE IS ADDED TO A LOOP AND CLEAR THE TROUBLE WHEN THE NEW DEVICE IS MAPPED AND DEFINED INTO THE SYSTEM.

J. EACH CONTROLLER SHALL CONTAIN A RS232 PRINTER/PROGRAMMING PORT FOR PROGRAMMING LOCALLY VIA AN IBM PC. WHEN OPERATIONAL, EACH CONTROLLER SHALL SUPPORT A PRINTER THROUGH THE RS232 PORT AND BE CAPABLE OF MESSAGE ROUTING.

K. SINGLE STAGE OPERATION SHALL BE PROVIDED.

L. THE SYSTEM SHALL HAVE A UL LISTED DETECTOR SENSITIVITY TEST FEATURE, WHICH WILL BE A FUNCTION OF THE SMOKE DETECTORS AND PERFORMED AUTOMATICALLY EVERY 4 HOURS.

M. THE SYSTEM SHALL SUPPORT 100% OF ALL REMOTE DEVICES IN ALARM AND PROVIDE SUPPORT FOR A 100% COMPLIMENT OF DETECTOR ISOLATOR BASES.

N. ALL PANEL MODULES SHALL BE SUPERVISED FOR PLACEMENT AND RETURN TROUBLE IF DAMAGED OR REMOVED.

O. THE SYSTEM SHALL HAVE A CPU WATCHDOG CIRCUIT TO INITIATE TROUBLE SHOULD THE CPU FAIL.

P. THE FIRE ALARM / LIFE SAFETY SYSTEM SHALL INCORPORATE THE ABILITY TO CODE NOTIFICATION APPLIANCE CIRCUITS PER THE NYC BUILDING CODE.

Q. AUDIBLE NOTIFICATION APPLIANCES SHALL BE AFFECTED BY SIGNAL SILENCE FEATURES. VISUAL SIGNAL APPLIANCE SHALL NOT BE AFFECTED BY SIGNAL SILENCE FEATURES.

R. USER INTERFACE: THE 3-LCDXL DISPLAY MODULE SHALL BE OF MEMBRANE STYLE CONSTRUCTION WITH A 24 LINE BY 40-CHARACTER (960 TOTAL CHARACTERS) LIQUID CRYSTAL DISPLAY (LCD). THE LCD SHALL USE SUPER-TWIST TECHNOLOGY AND BACKLIGHTING FOR HIGH CONTRAST VISUAL CLARITY AND A COLORED GRAY/BLACK AND WHITE DISPLAY. IN THE NORMAL MODE THE LCD SHALL DISPLAY THE TIME, A CUSTOMER FACILITY NAME, AND THE NUMBER OF HISTORY EVENTS. IN THE ALARM MODE THE LCD DISPLAY THE TOTAL NUMBER OF EVENTS AND THE TYPE OF EVENT ON DISPLAY. THE LCD SHALL RESERVE 42 CHARACTERS OF DISPLAY SPACE FOR EACH USER CUSTOM MESSAGE BY ADDRESSABLE DEVICE. THE MODULE SHALL HAVE VISUAL INDICATORS FOR THE FOLLOWING COMMON CONTROL FUNCTIONS; POWER, ALARM, SUPERVISORY, MONITOR, TROUBLE, DISABLE, GROUND FAULT, CPU FAIL, AND TEST. THERE SHALL BE COMMON CONTROL KEYS AND VISUAL INDICATORS FOR RESET, ALARM SILENCE, PANEL SILENCE, AND DRILL. PROVIDE FOUR PAIRS OF DISPLAY CONTROL KEYS FOR SELECTION OF EVENT DISPLAY BY TYPE (ALARM, SUPERVISORY, MONITOR AND TROUBLE) AND FORWARD / BACKWARD SCROLLING THROUGH EVENT LISTINGS. THE OPERATION OF THESE KEYS SHALL BE INTEGRATED WITH THE RELATED COMMON CONTROL INDICATORS TO FLASH THE INDICATORS WHEN UNDISPLAYED EVENTS ARE AVAILABLE FOR DISPLAY AND TURN ON STEADY WHEN ALL EVENTS HAVE BEEN DISPLAYED. THE LCD SHALL DISPLAY THE FIRST EVENT OF THE HIGHEST PRIORITY AS WELL AS THE PREVIOUS SEVEN (7) ALARM EVENTS "HANDS FREE" IN CHRONOLOGICAL ORDER SO THAT THE ARRIVING FIREFIGHTER MAY TRACK THE FIRES PROGRESSION. PROVIDE SYSTEM FUNCTION KEYS; STATUS, REPORTS, ENABLE, DISABLE, ACTIVATE, RESTORE, PROGRAM, AND TEST. THE MODULE SHALL HAVE A NUMERIC KEYPAD, ZERO THROUGH NINE WITH DELETE AND ENTER KEYS.

S. POWER SUPPLIES: THE POWER SUPPLY SHALL BE A HIGH EFFICIENCY SWITCH MODE TYPE WITH LINE MONITORING TO AUTOMATICALLY SWITCH TO BATTERIES FOR POWER FAILURE OR BROWN OUT CONDITIONS. THE AUTOMATIC BATTERY CHARGER SHALL HAVE LOW BATTERY DISCHARGE PROTECTION. THE POWER SUPPLY SHALL PROVIDE INTERNAL POWER AND 24 VDC AT 7.0A CONTINUOUS FOR NOTIFICATION APPLIANCE CIRCUITS. THE POWER SUPPLY SHALL BE CAPABLE OF PROVIDING 7A TO OUTPUT CIRCUITS FOR A MAXIMUM PERIOD OF 100 MS. ALL OUTPUTS SHALL BE POWER LIMITED. THE BATTERY SHALL BE SIZED TO SUPPORT THE SYSTEM FOR 24 HOURS OF SUPERVISORY AND TROUBLE SIGNAL CURRENT PLUS GENERAL ALARM FOR 15 MINUTES.

T. AUXILIARY POWER SUPPLIES SHALL BE A HIGH EFFICIENCY SWITCH MODE TYPE WITH LINE MONITORING TO AUTOMATICALLY SWITCH TO BATTERIES FOR POWER FAILURE OR BROWN OUT CONDITIONS. THE AUTOMATIC BATTERY CHARGER SHALL HAVE LOW BATTERY DISCHARGE PROTECTION. THE POWER SUPPLY SHALL PROVIDE INTERNAL POWER AND 24 VDC AT 7.0A CONTINUOUS FOR NOTIFICATION APPLIANCE CIRCUITS. THE POWER SUPPLY SHALL BE CAPABLE OF PROVIDING 7A TO OUTPUT CIRCUITS FOR A MAXIMUM PERIOD OF 100 MS. ALL OUTPUTS SHALL BE POWER LIMITED. THE BATTERY SHALL BE SIZED TO SUPPORT THE SYSTEM FOR 24 HOURS OF SUPERVISORY AND TROUBLE SIGNAL CURRENT PLUS GENERAL ALARM FOR 15 MINUTES.

U. NETWORK ALPHANUMERIC ANNUNCIATORS SHALL BE LOCATED THROUGHOUT THE FACILITY AS INDICATED ON THE PLANS. THE SYSTEM SHALL HAVE THE CAPACITY TO SUPPORT 64 NETWORK ANNUNCIATORS OR EST3 NETWORK PANEL NODES. EACH ANNUNCIATOR SHALL CONTAIN A SUPERVISED, BACK LIT, LIQUID CRYSTAL WITH A MINIMUM OF 8 LINE WITH 21 CHARACTERS PER LINE. WHERE REQUIRED, THE ANNUNCIATOR SHALL INCLUDE ADDITIONAL ZONAL ANNUNCIATION AND MANUAL CONTROL WITHOUT ADDITIONAL ENCLOSURES. THE ANNUNCIATOR SHALL SUPPORT FULL ABILITY TO SERVE AS THE OPERATING INTERFACE TO THE SYSTEM AND SHALL INCLUDE THE FOLLOWING FEATURES; MATCHED APPEARANCE WITH OTHER SYSTEM DISPLAYS. EACH LCD DISPLAY ON
EACH NODE (CABINET) IN THE SYSTEM SHALL BE CONFIGURABLE TO SHOW THE STATUS OF ANY OR ALL OF THE FOLLOWING FUNCTIONS ANYWHERE IN THE SYSTEM: ALARM, SUPERVISORY, TROUBLE, MONITOR.

V. EACH ANNUNCIATOR MUST BE CAPABLE OF SUPPORTING CUSTOM MESSAGES AS WELL AS SYSTEM EVENT ANNUNCIATION. IT MUST BE POSSIBLE TO FILTER UNWANTED ANNUNCIATION OF TROUBLE, ALARM OR SUPERVISORY FUNCTIONS ON A BY POINT OR BY GEOGRAPHIC AREA. THE ANNUNCIATORS SHALL BE MOUNTED IN STAND-ALONE ENCLOSURES OR INTEGRATED INTO THE NETWORK PANELS AS INDICATED ON THE PLANS.

2.6 COMPONENTS

A. INTELLIGENT DEVICES -- GENERAL: EACH REMOTE DEVICE SHALL HAVE A MICROPROCESSOR WITH NON-VOLATILE MEMORY TO SUPPORT ITS FUNCTIONALITY AND SERVICEABILITY. EACH DEVICE SHALL STORE AS REQUIRED FOR ITS FUNCTIONALITY THE FOLLOWING DATA: DEVICE SERIAL NUMBER, DEVICE ADDRESS, DEVICE TYPE, PERSONALITY CODE, DATE OF MANUFACTURE, HOURS IN USE, TIME AND DATE OF LAST ALARM, AMOUNT OF ENVIRONMENTAL COMPENSATION LEFT/USED, LAST MAINTENANCE DATE, JOB/PROJECT NUMBER, CURRENT DETECTOR SENSITIVITY VALUES, DIAGNOSTIC INFORMATION (TROUBLE CODES) AND ALGORITHMS REQUIRED TO PROCESS SENSOR DATA AND PERFORM COMMUNICATIONS WITH THE LOOP CONTROLLER. EACH DEVICE SHALL BE CAPABLE OF ELECTRONIC ADDRESSING, EITHER AUTOMATICALLY OR APPLICATION PROGRAMMED ASSIGNED, TO SUPPORT PHYSICAL/ELECTRICAL MAPPING AND SUPERVISION BY LOCATION. SETTING A DEVICE'S ADDRESS BY PHYSICAL MEANS SHALL NOT BE NECESSARY.

B. INTELLIGENT DETECTORS -- GENERAL: THE SYSTEM INTELLIGENT DETECTORS SHALL BE CAPABLE OF FULL DIGITAL COMMUNICATIONS USING BOTH BROADCAST AND POLLING PROTOCOL. EACH DETECTOR SHALL BE CAPABLE OF PERFORMING INDEPENDENT FIRE DETECTION ALGORITHMS. THE FIRE DETECTION ALGORITHM SHALL MEASURE SENSOR SIGNAL DIMENSIONS, TIME PATTERNS AND COMBINE DIFFERENT FIRE PARAMETERS TO INCREASE RELIABILITY AND DISTINGUISH REAL FIRE CONDITIONS FROM UNWANTED DECEPTIVE NUISANCE ALARMS. SIGNAL PATTERNS THAT ARE NOT TYPICAL OF FIRES SHALL BE ELIMINATED BY DIGITAL FILTERS. DEVICES NOT CAPABLE OF COMBINING DIFFERENT FIRE PARAMETERS OR EMPLOYING DIGITAL FILTERS SHALL NOT BE ACCEPTABLE. EACH DETECTOR SHALL HAVE AN INTEGRAL MICROPROCESSOR CAPABLE OF MAKING ALARM DECISIONS BASED ON FIRE PARAMETER INFORMATION STORED IN THE DETECTOR HEAD. DISTRIBUTED INTELLIGENCE SHALL IMPROVE RESPONSE TIME BY DECREASING THE DATA FLOW BETWEEN DETECTOR AND ANALOG LOOP CONTROLLER. DETECTORS NOT CAPABLE OF MAKING INDEPENDENT ALARM DECISIONS SHALL NOT BE ACCEPTABLE. MAXIMUM TOTAL ANALOG LOOP RESPONSE TIME FOR DETECTORS CHANGING STATE SHALL BE 0.5 SECONDS. EACH DETECTOR SHALL HAVE A SEPARATE MEANS OF DISPLAYING COMMUNICATION AND ALARM STATUS. A GREEN LED SHALL FLASH TO CONFIRM COMMUNICATION WITH THE ANALOG LOOP CONTROLLER. A RED LED SHALL FLASH TO DISPLAY ALARM STATUS. THE DETECTOR SHALL BE CAPABLE OF IDENTIFYING UP TO 32 DIAGNOSTIC CODES. THIS INFORMATION SHALL BE AVAILABLE FOR SYSTEM MAINTENANCE. THE DIAGNOSTIC CODE SHALL BE STORED AT THE DETECTOR. EACH SMOKE DETECTOR SHALL BE CAPABLE OF TRANSMITTING PRE-ALARM AND ALARM SIGNALS IN ADDITION TO THE NORMAL, TROUBLE AND NEED CLEANING INFORMATION. IT SHALL BE POSSIBLE TO PROGRAM CONTROL PANEL ACTIVITY TO EACH LEVEL. EACH SMOKE DETECTOR MAY BE INDIVIDUALLY PROGRAMMED TO OPERATE AT ANY ONE OF FIVE (5) SENSITIVITY SETTINGS. EACH DETECTOR MICROPROCESSOR SHALL CONTAIN AN ENVIRONMENTAL COMPENSATION ALGORITHM THAT IDENTIFIES AND SETS AMBIENT "ENVIRONMENTAL THRESHOLDS" APPROXIMATELY SIX TIMES AN HOUR. THE MICROPROCESSOR SHALL CONTINUALLY MONITOR THE ENVIRONMENTAL IMPACT OF TEMPERATURE, HUMIDITY, OTHER CONTAMINATES AS WELL AS DETECTOR AGING. THE PROCESS SHALL EMPLOY DIGITAL COMPENSATION TO ADAPT THE DETECTOR TO BOTH 24-HOUR LONG TERM AND 4-HOUR SHORT-TERM ENVIRONMENTAL CHANGES. THE MICROPROCESSOR SHALL MONITOR THE ENVIRONMENTAL COMPENSATION VALUE AND ALERT THE SYSTEM OPERATOR WHEN THE DETECTOR APPROACHES 80% AND 100% OF THE ALLOWABLE ENVIRONMENTAL COMPENSATION VALUE. DIFFERENTIAL SENSING ALGORITHMS SHALL MAINTAIN A CONSTANT DIFFERENTIAL BETWEEN SELECTED DETECTOR SENSITIVITY AND THE "LEARNED" BASE LINE SENSITIVITY. THE BASE LINE SENSITIVITY INFORMATION SHALL BE UPDATED AND PERMANENTLY STORED AT THE DETECTOR APPROXIMATELY ONCE EVERY HOUR. THE INTELLIGENT ANALOG DETECTORS SHALL BE SUITABLE FOR MOUNTING ON ANY SIGNATURE SERIES DETECTOR MOUNTING BASE.

C. FIXED TEMPERATURE/RATE OF RISE HEAT DETECTOR, SIGA2-HRS: PROVIDE INTELLIGENT COMBINATION FIXED TEMPERATURE/RATE-OF-RISE HEAT DETECTORS SIGA2-HRS. THE HEAT DETECTOR SHALL HAVE A LOW MASS THERMISTOR HEAT SENSOR AND OPERATE AT A FIXED TEMPERATURE AND AT A TEMPERATURE RATE-OF-RISE. IT SHALL CONTINUALLY MONITOR THE TEMPERATURE OF THE AIR IN ITS SURROUNDINGS TO MINIMIZE THERMAL LAG TO THE TIME REQUIRED TO PROCESS AN ALARM. THE INTEGRAL MICROPROCESSOR SHALL DETERMINE IF AN ALARM CONDITION EXISTS AND INITIATE AN ALARM BASED ON THE ANALYSIS OF THE DATA. SYSTEMS USING CENTRAL INTELLIGENCE FOR ALARM DECISIONS SHALL NOT BE ACCEPTABLE. THE INTELLIGENT HEAT DETECTOR SHALL HAVE A NOMINAL FIXED TEMPERATURE ALARM POINT RATING OF 1350F (570C) AND A RATE-OF-RISE ALARM POINT OF 150F (90C) PER MINUTE. THE HEAT DETECTOR SHALL BE RATED FOR CEILING INSTALLATION AT A MINIMUM OF 70 FT (21.3M) CENTERS AND BE SUITABLE FOR WALL MOUNT APPLICATIONS.

D. PHOTOELECTRIC SMOKE DETECTOR, SIGA2-PS: PROVIDE INTELLIGENT PHOTOELECTRIC SMOKE DETECTORS SIGA2-PS. THE ANALOG PHOTOELECTRIC DETECTOR SHALL UTILIZE A LIGHT SCATTERING TYPE PHOTOELECTRIC SMOKE SENSOR TO SENSE CHANGES IN AIR SAMPLES FROM ITS SURROUNDINGS. THE INTEGRAL MICROPROCESSOR SHALL DYNAMICALLY EXAMINE VALUES FROM THE SENSOR AND INITIATE AN ALARM BASED ON THE ANALYSIS OF DATA. SYSTEMS USING CENTRAL INTELLIGENCE FOR ALARM DECISIONS SHALL NOT BE ACCEPTABLE. THE DETECTOR SHALL CONTINUALLY MONITOR ANY CHANGES IN SENSITIVITY DUE TO THE ENVIRONMENTAL AFFECTS OF DIRT, SMOKE, TEMPERATURE, AGING AND HUMIDITY. THE INFORMATION SHALL BE STORED IN THE INTEGRAL PROCESSOR AND TRANSFERRED TO THE ANALOG LOOP CONTROLLER FOR RETRIEVAL USING A LAPTOP PC OR THE SIGA-PRO SIGNATURE PROGRAM/SERVICE TOOL. THE PHOTO DETECTOR SHALL BE RATED FOR CEILING INSTALLATION AT A MINIMUM OF 30 FT (9.1M) CENTERS AND BE SUITABLE FOR WALL MOUNT APPLICATIONS. THE PHOTOELECTRIC SMOKE DETECTOR SHALL BE SUITABLE FOR DIRECT INSERTION INTO AIR DUCTS UP TO 3 FT (0.91M) HIGH AND 3 FT (0.91M) WIDE WITH AIR VELOCITIES UP TO 5,000 FT/MIN. (0-25.39 M/SEC) WITHOUT REQUIRING SPECIFIC DUCT DETECTOR HOUSINGS OR SUPPLY TUBES. THE PERCENT SMOKE OBSCURATION PER FOOT ALARM SET POINT SHALL BE FIELD SELECTABLE TO ANY OF FIVE SENSITIVITY SETTINGS RANGING FROM 1.0% TO 3.5%. THE PHOTO DETECTOR SHALL BE SUITABLE FOR OPERATION IN THE FOLLOWING ENVIRONMENT: TEMPERATURE: 320F TO 1200F (00C TO 490C), HUMIDITY: 0-93% RH, NON-CONDENSING, ELEVATION: NO LIMIT.

E. STANDARD DETECTOR MOUNTING BASES, SIGA-SB / SIGA-SB4: PROVIDE STANDARD DETECTOR MOUNTING BASES SIGA-SB SUITABLE FOR MOUNTING ON NORTH AMERICAN 1-GANG, 3½" OR 4" OCTAGON BOX AND 4" SQUARE BOX. THE BASE SHALL, CONTAIN NO ELECTRONICS, SUPPORT ALL SIGNATURE SERIES DETECTOR TYPES AND HAVE THE FOLLOWING MINIMUM REQUIREMENTS: REMOVAL OF THE RESPECTIVE DETECTOR SHALL NOT AFFECT COMMUNICATIONS WITH OTHER DETECTORS, TERMINAL CONNECTIONS SHALL BE MADE ON THE ROOM SIDE OF THE BASE, BASES THAT MUST BE REMOVED TO GAIN ACCESS TO THE TERMINALS SHALL NOT BE ACCEPTABLE. THE BASE SHALL BE CAPABLE OF SUPPORTING ONE (1) SIGNATURE SERIES SIGA-LED REMOTE ALARM LED INDICATOR. PROVIDE REMOTE LED ALARM INDICATORS WHERE SHOWN ON THE PLANS.

F. AUDIBLE DETECTOR MOUNTING BASE, SIGA-AB4GT. WHERE SHOWN ON THE PROJECT PLANS INCLUDE DETECTOR AUDIBLE/SOUNDER BASE MODEL SIGA-AB4GT. THE SOUNDER BASE SHALL BE CAPABLE OF TWO TONES, TEMPORAL 3 FOR A FIRE CONDITION AND TEMPORAL 4 FOR A CARBON MONOXIDE CONDITION. THE TONES SHALL BE FULLY PROGRAMMABLE AND ALSO SYNCHRONIZE THE SOUND WITH OTHER SOUNDER BASES. THE SYSTEM SHALL BE UL2017 LISTED FOR DUAL SIGNALING FOR THIS PURPOSE.

G. DUCT DETECTOR HOUSING, SIGA-SD: PROVIDE MODEL SIGA-SD LOW PROFILE INTELLIGENT ADDRESSABLE DUCT SMOKE DETECTOR AS INDICATED ON THE PROJECT PLANS. PROVIDE FOR VARIATIONS IN DUCT AIR VELOCITY BETWEEN 100 AND 4,000 FEET PER MINUTE AND INCLUDE A WIDE SENSITIVITY RANGE OF .79 TO 2.46%/FT. OBSCURATION. INCLUDE ONE FORM-C SHUT DOWN RELAY RATED 2.0 AMPS @ 30 VDC AND ALSO INCLUDE SLAVE HIGH CONTACT RELAYS IF REQUIRED. PROVIDE AN AIR EXHAUST TUBE AND AN AIR SAMPLING INLET TUBE THAT EXTENDS INTO THE DUCT AIR STREAM UP TO TEN FEET. THE ADDRESSABLE DUCT HOUSING SHALL BE SUITABLE FOR EXTREME ENVIRONMENTS, INCLUDING A TEMPERATURE RANGE OF -20 TO 158 DEGREES F (-29 TO 70 DEGREES CELSIUS) AND OFFER A HARSH ENVIRONMENT GASKET OPTION. PROVIDE REMOTE ALARM LED INDICATORS SIGA-LED AND/OR REMOTE TEST STATION MODEL SD-TRK AS INDICATED ON THE PROJECT PLANS.

I. INTELLIGENT MODULES -- GENERAL: IT SHALL BE POSSIBLE TO ADDRESS EACH INTELLIGENT SIGNATURE SERIES MODULE WITHOUT THE USE OF DIP OR ROTARY SWITCHES. DEVICES USING DIP SWITCHES FOR ADDRESSING SHALL NOT BE ACCEPTABLE. THE PERSONALITY OF MULTIFUNCTION MODULES SHALL BE PROGRAMMABLE AT SITE TO SUIT CONDITIONS AND MAY BE CHANGED AT ANY TIME USING A PERSONALITY CODE DOWNLOADED FROM THE ANALOG LOOP CONTROLLER. MODULES REQUIRING EPROM, PROM, ROM CHANGES OR DIP SWITCH AND/OR JUMPER CHANGES SHALL NOT BE ACCEPTABLE. THE MODULES SHALL HAVE A MINIMUM OF 2 DIAGNOSTIC LEDS MOUNTED BEHIND A FINISHED COVER PLATE. A GREEN LED SHALL FLASH TO CONFIRM COMMUNICATION WITH THE LOOP CONTROLLER. A RED LED SHALL FLASH TO DISPLAY ALARM STATUS. THE MODULE SHALL BE CAPABLE OF STORING UP TO 24 DIAGNOSTIC CODES WHICH CAN BE RETRIEVED FOR TROUBLESHOOTING ASSISTANCE. INPUT AND OUTPUT CIRCUIT WIRING SHALL BE SUPERVISED FOR OPEN AND GROUND FAULTS. THE MODULE SHALL BE SUITABLE FOR OPERATION IN THE FOLLOWING ENVIRONMENT: TEMPERATURE: 320F TO 1200F (00C TO 490C), HUMIDITY: 0-93% RH, NON-CONDENSING.

J. SINGLE INPUT MODULE, SIGA-CT1 (WATERFLOW DETECTORS, TAMPER SWITCHES ETC.): PROVIDE INTELLIGENT SINGLE INPUT MODULES SIGA-CT1. THE SINGLE INPUT MODULE SHALL PROVIDE ONE (1) SUPERVISED CLASS B INPUT CIRCUIT CAPABLE OF A MINIMUM OF 4 PERSONALITIES, EACH WITH A DISTINCT OPERATION. THE MODULE SHALL BE SUITABLE FOR MOUNTING ON NORTH AMERICAN 2 ½" (64MM) DEEP 1-GANG BOXES AND 1 ½" (38MM) DEEP 4" SQUARE BOXES WITH 1-GANG COVERS. THE SINGLE INPUT MODULE SHALL SUPPORT THE FOLLOWING CIRCUIT TYPES: NORMALLY-OPEN ALARM LATCHING (MANUAL STATIONS, HEAT DETECTORS, ETC.), NORMALLY-OPEN ALARM DELAYED LATCHING (WATERFLOW SWITCHES), NORMALLY-OPEN ACTIVE NON-LATCHING (MONITOR, FANS, DAMPERS, DOORS, ETC.), NORMALLY-OPEN ACTIVE LATCHING (SUPERVISORY, TAMPER SWITCHES).

K. DUAL INPUT MODULE, SIGA-CT2: PROVIDE INTELLIGENT DUAL INPUT MODULES SIGA-CT2. THE DUAL INPUT MODULE SHALL PROVIDE TWO (2) SUPERVISED CLASS B INPUT CIRCUITS EACH CAPABLE OF A MINIMUM OF 4 PERSONALITIES, EACH WITH A DISTINCT OPERATION. THE MODULE SHALL BE SUITABLE FOR MOUNTING ON NORTH AMERICAN 2 ½" DEEP 1-GANG BOXES AND 1 ½" (38MM) DEEP 4" SQUARE BOXES WITH 1-GANG COVERS. THE DUAL INPUT MODULE SHALL SUPPORT THE FOLLOWING CIRCUIT TYPES: NORMALLY-OPEN ALARM LATCHING (MANUAL STATIONS, HEAT DETECTORS, ETC.), NORMALLY-OPEN ALARM DELAYED LATCHING (WATERFLOW SWITCHES), NORMALLY-OPEN ACTIVE NON-LATCHING (MONITOR, FANS, DAMPERS, DOORS, ETC.), NORMALLY-OPEN ACTIVE LATCHING (SUPERVISORY, TAMPER SWITCHES).
L.SINGLE INPUT SIGNAL MODULE, SIGA-CC1: PROVIDE INTELLIGENT SINGLE INPUT SIGNAL MODULES SIGA-CC1. THE SINGLE INPUT (SINGLE RISER SELECT) SIGNAL MODULE SHALL PROVIDE ONE (1) SUPERVISED CLASS B OUTPUT CIRCUIT CAPABLE OF A MINIMUM OF 2 PERSONALITIES, EACH WITH A DISTINCT OPERATION. WHEN SELECTED AS A TELEPHONE POWER SELECTOR, THE MODULE SHALL BE CAPABLE OF GENERATING ITS OWN "RING TONE". THE MODULE SHALL BE SUITABLE FOR MOUNTING ON NORTH AMERICAN 2 ½" (64MM) DEEP 2-GANG BOXES AND 1 ½" (38MM) DEEP 4" SQUARE BOXES WITH 2-GANG COVERS, OR EUROPEAN 100MM SQUARE BOXES. THE SINGLE INPUT SIGNAL MODULE SHALL SUPPORT THE FOLLOWING OPERATIONS: AUDIBLE/VISIBLE SIGNAL POWER SELECTOR (POLARIZED 24 VDC @ 2A).

M. CONTROL RELAY MODULE, SIGA-CR: PROVIDE INTELLIGENT CONTROL RELAY MODULES SIGA-CR. THE CONTROL RELAY MODULE SHALL PROVIDE ONE FORM "R" DRY RELAY CONTACT RATED AT 2 AMPS @ 24 VDC TO CONTROL EXTERNAL APPLIANCES OR EQUIPMENT SHUTDOWN. THE CONTROL RELAY SHALL BE RATED FOR PILOT DUTY AND RELEASING SYSTEMS. THE POSITION OF THE RELAY CONTACT SHALL BE CONFIRMED BY THE SYSTEM FIRMWARE. THE CONTROL RELAY MODULE SHALL BE SUITABLE FOR MOUNTING ON NORTH AMERICAN 2 ½" (64MM) DEEP 1-GANG BOXES AND 1 ½" DEEP 4" SQUARE BOXES WITH 1-GANG COVERS.

N. INTELLIGENT MANUAL PULL STATIONS -- GENERAL: IT SHALL BE POSSIBLE TO ADDRESS EACH SIGNATURE SERIES FIRE ALARM PULL STATION WITHOUT THE USE OF DIP OR ROTARY SWITCHES. DEVICES USING DIP SWITCHES FOR ADDRESSING SHALL NOT BE ACCEPTABLE. THE MANUAL STATIONS SHALL HAVE A MINIMUM OF 2 DIAGNOSTIC LEDS MOUNTED ON THEIR INTEGRAL, FACTORY ASSEMBLED SINGLE OR TWO STAGE INPUT MODULE. A GREEN LED SHALL FLASH TO CONFIRM COMMUNICATION WITH THE LOOP CONTROLLER. A RED LED SHALL FLASH TO DISPLAY ALARM STATUS. THE STATION SHALL BE CAPABLE OF STORING UP TO 24 DIAGNOSTIC CODES THAT CAN BE RETRIEVED FOR TROUBLESHOOTING ASSISTANCE. INPUT CIRCUIT WIRING SHALL BE SUPERVISED FOR OPEN AND GROUND FAULTS. THE FIRE ALARM PULL STATION SHALL BE SUITABLE FOR OPERATION IN THE FOLLOWING ENVIRONMENT: TEMPERATURE: 320F TO 1200F (00C TO 490C), HUMIDITY: 0-93% RH, NON-CONDENSING.

O. MANUAL PULL STATION, SIGA-270: PROVIDE INTELLIGENT SINGLE ACTION, SINGLE STAGE FIRE ALARM STATIONS SIGA-270. THE FIRE ALARM STATION SHALL BE OF METAL CONSTRUCTION WITH AN INTERNAL TOGGLE SWITCH. PROVIDE A LOCKED TEST FEATURE. FINISH THE STATION IN RED WITH SILVER "PULL IN CASE OF FIRE" ENGLISH LETTERING. THE MANUAL STATION SHALL BE SUITABLE FOR MOUNTING ON NORTH AMERICAN 2 ½" (64MM) DEEP 1-GANG BOXES AND 1 ½" (38MM) DEEP 4" SQUARE BOXES WITH 1-GANG COVERS.

P. MULTI-VOLTAGE CONTROL RELAYS, MR-200 SERIES: PROVIDE REMOTE CONTROL RELAYS CONNECTED TO SUPERVISED ANCILLARY CIRCUITS FOR CONTROL OF FANS, DAMPERS, DOOR RELEASES, ETC. RELAY CONTACT RATINGS SHALL BE DPDT AND RATED FOR 10 AMPERES AT 115 VAC. A SINGLE RELAY MAY BE ENERGIZED FROM A VOLTAGE SOURCE OF 24 VDC, 24 VAC, 115 VAC, OR 230 VAC. A RED LED SHALL INDICATE THE RELAY IS ENERGIZED. A METAL ENCLOSURE SHALL BE PROVIDED.

Q. ELECTROMAGNETIC DOORHOLDERS – GENERAL: ELECTROMAGNETIC DOORHOLDERS SUBMITTED FOR USE MUST HAVE WRITTEN PROOF OF THEIR COMPATIBILITY FOR THE PURPOSES INTENDED. SUCH PROOF SHALL BE IN THE FORM OF DOCUMENTATION FROM ALL MANUFACTURERS THAT CLEARLY STATES THAT THEIR EQUIPMENT (AS SUBMITTED) IS 100% COMPATIBLE WITH EACH OTHER FOR THE PURPOSES INTENDED.

R. WALL MOUNTED, 1504/1505/1508/1509 SERIES: PROVIDE FLUSH, SEMI-FLUSH OR SURFACE WALL MOUNTED ELECTROMAGNETIC DOORHOLDER/RELEASES RATED AT 24 VAC/DC AS DIRECTED BY THE CONSULTING ENGINEER. FINISH SHALL BE BRUSHED ZINC.

S. STI STOPPER II LEXAN GUARDS: MANUAL PULL STATIONS THAT ARE PROVIDED WITH STI STOPPER II LEXAN GUARDS SHALL INCLUDE NON-AUDIBLE ALARMS AS REQUIRED ON THE PLANS. THEY SHALL BE SURFACE OR FLUSH MOUNTING, AS REQUIRED FOR EACH INDIVIDUAL DEVICE. STOPPER COVERS SHALL ONLY BE INCLUDED ON DEVICES SHOWN ON THE PLANS TO INCLUDE THEM.

T. FUSE CUT OUT/FUSED DISCONNECT SWITCH: THE PRIMARY SOURCE OF POWER AND THE SECONDARY SOURCE OF POWER SHALL EACH BE PROVIDED WITH A MEANS OF DISCONNECT FROM THE FIRE ALARM SYSTEM. EACH DISCONNECT SHALL CONSIST OF A FUSED DISCONNECT SWITCH, LOCKED IN THE ON POSITION WITH KEY KEPT ON PREMISES ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL. SUCH DISCONNECT SHALL BE PAINTED RED AND PERMANENTLY IDENTIFIED AS FIRE ALARM CIRCUIT AND LABELED AS TO SYSTEM/LOCATION SERVED, WITH A MEANS OF INTERRUPTING THE UNFUSED NEUTRAL AND ALL UNGROUNDED CONDUCTORS. FOR BUILDINGS SERVED AT UP TO 300 VOLTS TO GROUND, THE SERVICE VOLTAGE SHALL BE TRANSFORMED TO 120/208 VOLTS AND A FIRE ALARM FUSED DISCONNECT PROVIDED WITHIN A CIRCUIT LENGTH OF TEN 3.05 M (10 FT.), SHALL BE CONNECTED AT THE TRANSFORMER SECONDARY ON THE 120/208 VOLT SIDE. THE FIRE ALARM SYSTEM FUSED DISCONNECT SWITCH ON THE TRANSFORMER SECONDARY SIDE SHALL COMPLY WITH THE REQUIREMENTS OF THE PRIMARY AND SECONDARY POWER SOURCE FUSED DISCONNECT SWITCHES SPECIFIED ABOVE. FUSED CUTOUTS SHALL BE PROVIDED WHERE MULTIPLE CIRCUITS ARE REQUIRED TO SUPPORT THE FIRE ALARM SYSTEM AND RELATED AUXILIARIES MOUNTED IN A FUSED CUTOUT PANEL SUITABLE FOR THE NUMBER OF CIRCUITS NEEDED. THE CONTRACTOR SHALL PROVIDE AN INDIVIDUAL CARTRIDGE FUSED CUT-OUT PANEL WITH THREE (3) POLES AND A REMOVABLE, SOLID COPPER, NEUTRAL BAR IN FUSE GAP FOR THE FCS, REMOTE DATA GATHERING PANELS (DGPS), BOOSTER POWER SUPPLIES AND OTHER FIRE ALARM EQUIPMENT. FUSED CUT-OUTS SHALL BE PROVIDED WITH SILVER SAND FUSES, CURRENT LIMITING TYPE WITH AN INTERRUPTING CAPACITY RATING OF 200,000 AMPS (R.M.S. SYMMETRICAL). THE SIZE OF THE FUSES SHALL BE SIZED APPROPRIATELY BUT BE THIRTY (30) AMPERES MINIMUM. THE FUSED CUT-OUT PANEL SHALL BEAR AN ENGRAVED WHITE-CORE PHENOLIC OR BAKELITE IDENTIFICATION NAMEPLATE STATING IN MINIMUM ONE-QUARTER INCH (1/4") HIGH WHITE LETTERS ON A RED BACKGROUND "FIRE ALARM FUSED CUT-OUT". A FOUR (4) WIRE FEEDER SHALL BRING THREE PHASE 120/208 VOLT SERVICE TO THE FUSED CUT-OUT. THE FEEDER SHALL BE TAPPED OFF THE MAIN BUILDING SERVICE AHEAD OF THE MAIN SERVICE SWITCH BUT AFTER THE CURRENT TRANSFORMERS (METERING TRANSFORMERS).

V. STAND-ALONE 120 VAC/9 VDC SMOKE ALARMS, KIDDE MODEL P12040. PROVIDE STAND-ALONE 120 VOLT LINE OPERATED SMOKE ALARMS WITH 9 VDC BATTERY BACK UP. SMOKE ALARMS SHALL BE INSTALLED IN EACH SLEEPING ROOM, 15 FT FROM ANY SLEEPING ROOM, AND ON EVERY LEVEL OF EACH APARTMENT AS REQUIRED BY NYC CODE CHAPTER 9. SMOKE ALARMS SHALL BE INTERCONNECTED AND WIRED IN TANDEM SO THAT ALL SMOKE ALARM SOUNDERS WITHIN THE APARTMENT ACTIVATE TOGETHER. SMOKE ALARMS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF NYC CODE.

W. STAND-ALONE COMBINATION SMOKE AND CARBON MONOXIDE (CO) ALARMS, KIDDE MODEL KN-COPE-I. PROVIDE STAND-ALONE COMBINATION 120 VAC LINE OPERATED SMOKE ALARMS WITH 9 VDC BATTERY BACK UP. SMOKE AND CO ALARMS SHALL BE INSTALLED IN EACH SLEEPING ROOM, 15 FT FROM ANY SLEEPING ROOM, AND IN THE PATH OF EGRESS AS REQUIRED BY NYC CODE CHAPTER 9. SMOKE ALARMS SHALL BE MEA APPROVED, INTERCONNECTED AND INSTALLED IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF NYC CODE.

N

PART III – EXECUTION

1.1 INSTALLATION

A. THE ENTIRE SYSTEM SHALL BE INSTALLED IN A WORKMANLIKE MANNER, IN ACCORDANCE WITH APPROVED MANUFACTURER'S WIRING DIAGRAM. THE CONTRACTOR SHALL FURNISH ALL CONDUIT, WIRING, OUTLET BOXES, JUNCTION BOXES, CABINETS AND SIMILAR DEVICES NECESSARY FOR THE COMPLETE INSTALLATION. ALL WIRING SHALL BE OF THE TYPE RECOMMENDED BY THE MANUFACTURER, APPROVED BY THE NYC FIRE DEPARTMENT, NYC FIRE CODE, NYC ELECTRICAL CODE, AND SPECIFIED WITH IN.

B. ALL PENETRATION OF FLOOR SLABS AND FIREWALLS SHALL BE SLEEVED (1" CONDUIT MINIMUM) FIRE STOPPED IN ACCORDANCE WITH ALL LOCAL FIRE CODES.

C. END OF LINE RESISTORS SHALL BE FURNISHED AS REQUIRED FOR MOUNTING AS DIRECTED BY THE MANUFACTURER. DEVICES CONTAINING END–OF–LINE RESISTORS SHALL BE APPROPRIATELY LABELED. DEVICES SHOULD BE LABELED SO REMOVAL OF THE DEVICE IS NOT REQUIRED TO IDENTIFY THE EOL DEVICE.

D. ALL MANUAL PULL STATIONS SHALL BE MOUNTED 42 – 48 INCHES ABOVE THE FINISHED FLOOR, AS MEASURED TO THE HANDLE.

E. ALL AUDIO/VISUAL DEVICES SHALL BE MOUNTED 80 INCHES ABOVE THE FINISHED FLOOR, AS MEASURED TO THE BOTTOM OF THE LENS. DEVICES SHALL BE MOUNTED NO LESS THAN 6 INCHES FROM THE CEILING. AUDIO VISUAL DEVICES SHALL BE MOUNTED PER NFPA 72.

F. NO AREA SMOKE DETECTORS SHALL BE MOUNTED WITHIN 36 INCHES OF ANY HVAC SUPPLY, RETURN AIR REGISTER OR LIGHTING FIXTURE.

G. NO AREA SMOKE OR HEAT DETECTOR SHALL BE MOUNTED WITHIN 12 INCHES OF ANY WALL. ALL DETECTORS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH NFPA 72 AS AMENDED IN APPENDIX Q GUIDELINES FOR SUCH DEVICES.

H. ALL MECHANICAL ROOMS, BOILER ROOMS, GYMNASIUMS, WIRING CLOSETS, CUSTODIAN ROOMS, ATTIC SPACES, ETC. OR AREAS WITH NO HUNG CEILINGS SHALL BE PIPED WITH 3/4" CONDUIT AND INSTALLED AS NECESSARY BY THE ELECTRICAL CODE. ALL AREAS IN PUBLIC VIEW SHALL BE IN METAL CONDUIT. ALL BOXES MUST BE PAINTED RED AND LABELED "FIRE ALARM".

I. ALL ADDRESSABLE MODULES SHALL BE MOUNTED WITHIN 36 INCHES OF THE MONITORED OR CONTROLLED POINT OF TERMINATION. THIS SHALL INCLUDE, BUT IS NOT NECESSARILY LIMITED TO, FAN SHUTDOWN, ELEVATOR RECALL, SHUNT TRIP, SPRINKLER STATUS POINTS, OR DOOR RELEASE. LABEL ALL ADDRESSABLE MODULES AS TO THEIR FUNCTION.

J. NEW DOOR HOLDERS SHALL DERIVE THEIR 24VAC/VDC POWER FROM A SEPARATE POWER SUPPLY HOUSED IN A DEDICATED, METAL ENCLOSURE. THE POWER SUPPLY SHALL HAVE A 120VAC FEED, AND IS TO BE CENTRALLY LOCATED TO SERVE DOOR HOLDERS ON A PER FLOOR OR AREA BASIS. ALL EXISTING DOOR HOLDERS SHALL BE CONNECTED TO NEW FACP. E.C. SHALL EXTEND ALL EXISTING WIRING IN ORDER TO MAKE THIS WORK. LOCATIONS AND QUANTITIES OF DOOR HOLDER POWER SUPPLIES SHALL BE REFERENCED AND SUBMITTED IN THE SUBMISSION PACKAGE FOR APPROVAL BY THE CONSULTING ENGINEER.

K. ALL LOW VOLTAGE WIRING TERMINATED TO THE FIRE ALARM SYSTEM SHALL BE PLENUM RATED WITH NO EXCEPTIONS AND NO LESS THAN NO. 12 AWG IN SIZE FOR NAC CIRCUITS AND 16 AWG FOR INITIATING CIRCUITS, AND SOLID COPPER PER THE NYC ELECTRICAL CODE. EXPOSED WIRE ABOVE 8FT AFF SHALL BE 150 DEGREES C AND AS SPECIFIED IN THE ELECTRICAL CODE.

L. ALL LINE VOLTAGE (120VAC) WIRING SHALL BE NO LESS THAN NO. 12 AWG IN SIZE, AND SOLID COPPER. THIS SHALL INCLUDE ALL SYSTEM GROUNDING. FACP MUST HAVE A DEDICATED FUSED DISCONNECT ARRANGED PER THE NYC ELECTRICAL CODE.

M. ALL WIRING SHALL BE COLOR–CODED THROUGHOUT, TO NATIONAL ELECTRICAL CODE STANDARDS.

N. POWER–LIMITED/NON–POWER–LIMITED NEC WIRING STANDARDS SHALL BE OBSERVED.

O. ALL JUNCTION BOX COVERS SHALL BE PAINTED RED AND LABELED FIRE ALARM SYSTEM.

P. FIRE ALARM SYSTEM WIRING SHALL NOT CO–MINGLE WITH ANY OTHER SYSTEM WIRING IN THE FACILITY. CONDUITS SHALL NOT BE SHARED UNDER ANY CIRCUMSTANCE. ONLY WHEN FIRE ALARM WIRING ENTERS THE ENCLOSURE OF A MONITORED OR CONTROLLED SYSTEM WILL CO–HABITATION BE PERMITTED (I.E. AT FAN STARTERS OR ELEVATOR CONTROLLERS). THIS WILL BE FIELD INSPECTED BY THE PROJECT ENGINEER.

Q. FIRE ALARM CONTROL PANEL ENCLOSURES SHALL HAVE ENGRAVED LABELS INDICATING, "FIRE ALARM SYSTEM", AND THE AREAS OF THE BUILDING SERVED BY THAT PANEL.

R. AUXILIARY RELAYS SHALL BE APPROPRIATELY LABELED TO INDICATE "FIRE ALARM SYSTEM" AND THEIR SPECIFIC FUNCTION (I.E. FAN S–1 SHUTDOWN).

S. ALL FIRE ALARM WIRING SHALL BE CONTINUOUS AND UNSPLICED. TERMINATIONS SHALL ONLY OCCUR AT FIRE ALARM DEVICES OR CONTROL PANEL ENCLOSURES UNDER TERMINAL SCREWS. ALL OTHER SPLICING METHODS ARE SPECIFICALLY DISALLOWED (I.E. PLASTIC WIRENUTS).

T. ALL FIRE ALARM WIRING SHALL BE INSTALLED USING A DEDICATED SYSTEM OF SUPPORTS (I.E. BRIDLE RINGS). FIRE ALARM WIRING SHALL NOT BE BUNDLED OR STRAPPED TO EXISTING CONDUIT, PIPE OR WIRE IN THE FACILITY. THIS WILL BE FIELD INSPECTED BY THE PROJECT ENGINEER.

U. ALL FIRE ALARM WIRING SHALL BE SLEEVED WHEN PASSING THROUGH ANY WALL, USING CONDUIT SLEEVES (1" MIN.) WITH BUSHINGS, AND FIRE STOPPED IN ACCORDANCE WITH CODE.

V. ALL LOW VOLTAGE OPERATION SHALL BE PROVIDED FROM THE FIRE ALARM CONTROL PANEL.

W. ALL FIRE ALARM DEVICES SHALL BE ACCESSIBLE FOR PERIODIC MAINTENANCE. SHOULD A DEVICE LOCATION INDICATED ON THE CONTRACT DRAWINGS NOT MEET THIS REQUIREMENT, IT SHALL BE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO BRING IT, IN WRITING, TO THE ATTENTION OF THE PROJECT ENGINEER. FAILURE TO BRING SUCH ISSUES TO THE ATTENTION OF THE PROJECT ENGINEER SHALL BE THE EXCLUSIVE LIABILITY OF THE INSTALLING ELECTRICAL CONTRACTOR.

X. THE INSTALLING ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ENTIRE EXISTING FIRE ALARM SYSTEM COMPONENTS AND CONTROLS ON THE DEMOLITION DRAWING SHOWN OR NOT, UPON APPROVAL OF THE AHJ AND THE CONSULTING ENGINEER. THE END–USER RESERVES THE RIGHT TO RETAIN ANY EXISTING FIRE ALARM SYSTEM COMPONENTS, UPON THEIR REQUEST. ALL EXISTING FIRE ALARM SYSTEM COMPONENTS REQUIRING SPECIAL HANDLING FOR DISPOSAL (DUE TO RADIOACTIVITY) SHALL BE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR. WRITTEN PROOF OF PROPER DISPOSAL BY THE INSTALLING CONTRACTOR SHALL BE REQUIRED PRIOR TO RELEASE OF OUTSTANDING RETAINAGE.

3.2 FIELD QUALITY CONTROL

A. THE SYSTEM SHALL BE INSTALLED AND FULLY TESTED UNDER THE SUPERVISION OF A TRAINED MANUFACTURER'S REPRESENTATIVE. THE SYSTEM SHALL BE DEMONSTRATED TO PERFORM ALL OF THE FUNCTION AS SPECIFIED.

B. THE INSTALLING CONTRACTOR OR FIRE ALARM EQUIPMENT VENDOR SHALL HAVE NO LESS THAN TWO (2) NICET LEVEL II FIRE ALARM TECHNICIANS DEDICATED TO THIS PROJECT.

C. THE INSTALLING CONTRACT AND THE ALARM SYSTEM VENDOR SHALL, UPON THE REQUEST OF THE CONSULTING ENGINEER OR END–USER, ATTEND ANY AND ALL PROJECT MEETINGS FOR THE PURPOSE OF ACCURATELY DETERMINING PROGRESS.

D. IT SHALL BE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ASSURE THAT CONSTRUCTION DEBRIS DOES NOT ADVERSELY AFFECT ANY SENSING DEVICES INSTALLED AS PART OF THIS PROJECT. SHOULD IT BE DEEMED NECESSARY BY THE CONSULTING ENGINEER, END–USER OR AHJ, THE INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANING OF ALL SMOKE DETECTORS PRIOR TO FINAL ACCEPTANCE.

3.3 TESTS

A. THE ALARM SYSTEM VENDOR SHALL TEST THE SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND NFPA 72 AS AMENDED BY THE NYC BUILDING CODE AND NYC FIRE CODE. THE VENDOR SHALL PROVIDE COMPLETED REPORTS TO THE CONSULTING ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FINAL ACCEPTANCE.

B. EACH INDIVIDUAL SYSTEM OPERATION ON A CIRCUIT BY CIRCUIT BASIS SHALL BE TESTED FOR ITS COMPLETE OPERATION. THE PROCEDURE FOR TESTING THE ENTIRE ALARM SYSTEM SHALL BE SET FORTH WITH THE CONSENT OF THE CODE ENFORCEMENT OFFICIAL, THE ENGINEER AND THE MANUFACTURER.

3.4 DOCUMENTATION AND TRAINING

A. THE CONTRACTOR SHALL COMPILE AND PROVIDE TO THE OWNERS THREE (3) COMPLETE MANUAL ON THE COMPLETED SYSTEM TO INCLUDE SITE SPECIFIC OPERATING AND MAINTENANCE INSTRUCTION, CATALOG CUTS OF ALL EQUIPMENT AND COMPONENTS, AS–BUILT WIRING DIAGRAMS AND A MANUFACTURER'S SUGGESTED SPARE PARTS LIST.

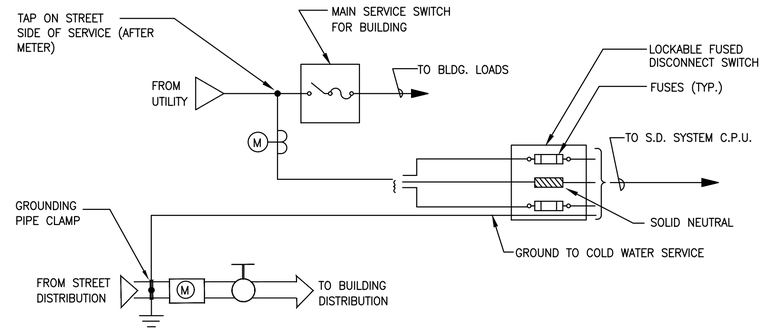
B. IN ADDITION TO THE ABOVE MANUALS, THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SERVICES OF THE MANUFACTURER'S TRAINED REPRESENTATIVE FOR TWO (2) SEPARATE CALENDAR DAYS FOR A PERIOD OF FOUR (4) HOURS PER DAY TO INSTRUCT THE OWNERS' DESIGNATED PERSONNEL ON THE OPERATION AND MAINTENANCE OF THE ENTIRE SYSTEM.

C. AS–BUILT DRAWINGS SHALL CONSIST OF THE FOLLOWING:
   1. COMPLETE REVISION OF ALL PREVIOUSLY SUBMITTED DRAWINGS.
   2. POINT–TO–POINT DEPICTION OF ALL DEVICE WIRING ON THE DEVICE LAYOUT FLOOR PLANS.
   3. ONE (1) SET OF B–SIZE – 11 X 17 LAMINATED AS–BUILT DRAWINGS.
   4. TWO (2) SETS OF 30"X42"INCH 1\16"=1' SCALE DRAWING SHOWING ALL POINTS OF ALARM. ONE SET SHALL BE SUBMITTED WITH THE CLOSE–OUT DOCUMENTS. SECOND SET SHALL BE MOUNTED IN FRAME WITH A LEXAN COVER. THESE DRAWING MUST BE SUBMITTED TO PROJECT ENGINEER OR APPROVAL.
   5. FIRE ALARM MATRIX DESIGNED PER NFPA 72: FIGURE A.14.6.2.3(9).

D. TURNOVER OF ALL SOFTWARE DATABASE HARD/SOFT COPIES SHALL BE REQUIRED. THIS SHALL INCLUDE ALL POSSIBLE PROGRAMMING SOFTWARE LOGS, DISKETTES OR CDS CONTAINING EXPORTED PROJECT FILES, HARD COPIES OF ALL DEVICE MAPS, THE REVISION NUMBER OF THE VERSION OF PROGRAMMING UTILITY USED, AND ALL REQUIRED PASSWORDS. THE TURNOVER OF ALL DATABASE INFORMATION SHALL OCCUR PRIOR TO THE END OF THE ONE (1) WARRANTY PERIOD (OR PERIOD AS AMENDED EARLIER IN THIS SPECIFICATION).

END OF SECTION

N

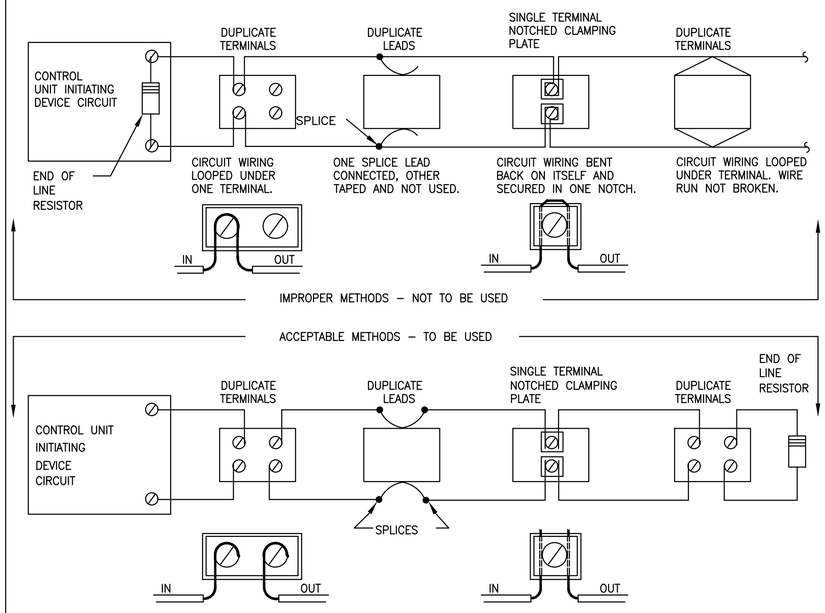


NOTES:

1. ALL CONDUCTORS (INCLUDING SERVICE TAP) MUST BE IN RIGID CONDUIT.
2. PROVIDE ENGRAVED LABELS FOR ALL EQUIPMENT.

2 / FA–003 FIRE ALARM CONTROL PANEL ELECTRICAL SERVICE DETAILS

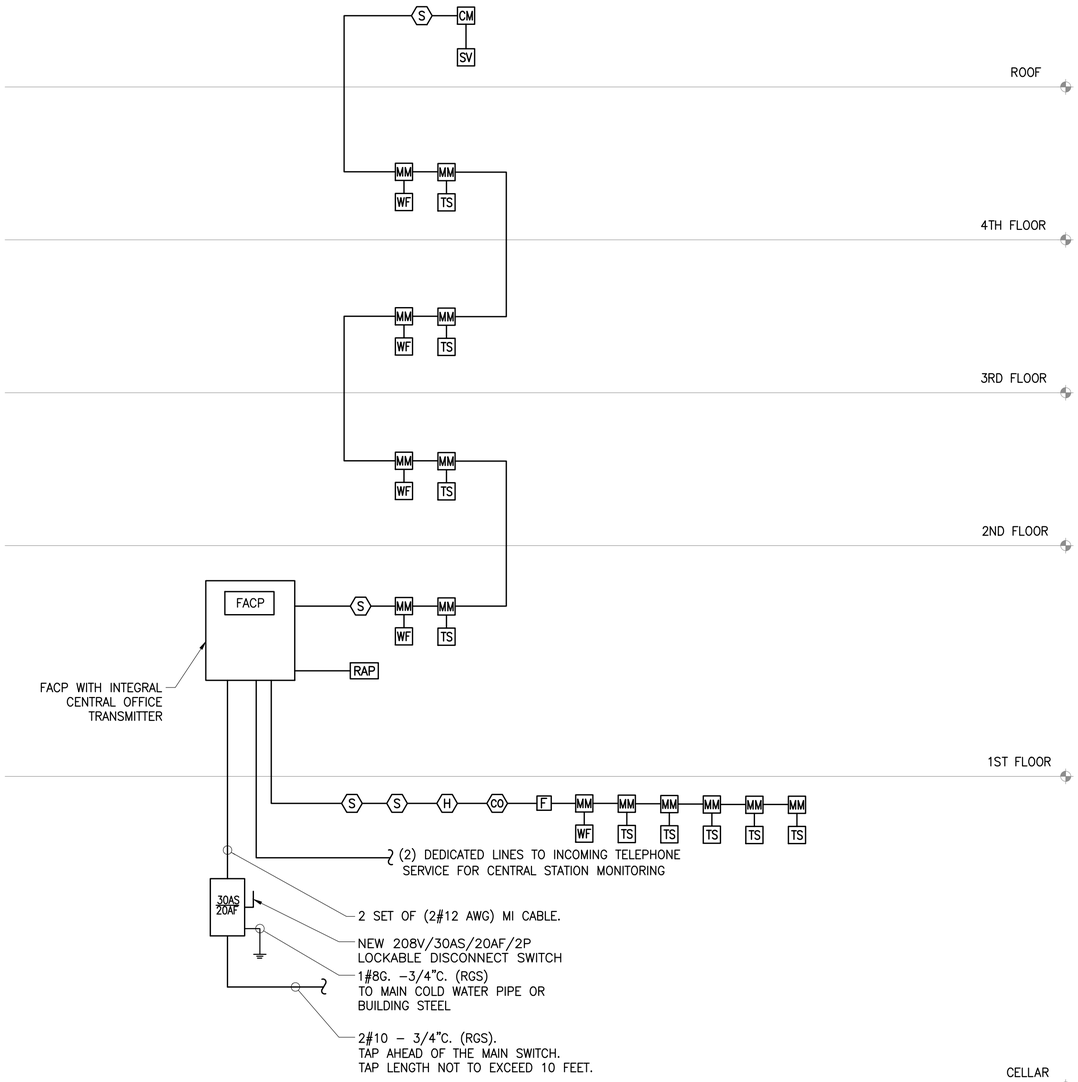
N.T.S



1 / FA–003 WIRING TERMINATION METHOD

N.T.S

N



FIRE ALARM RISER DIAGRAM
N.T.S.

FIRE ALARM RISER NOTES:

1. ALL COMPONENTS REQUIRED TO MAKE SYSTEM WORKABLE SHALL BE INCLUDED IN BID PRICE. VERIFY AVAILABILITY OF INPUT/OUTPUT POINTS AT FACP & ROUTE WIRING RESPECTIVELY.
2. ALL FIRE ALARM WIRING SHALL BE INSTALLED IN CONDUIT WHERE REQUIRED BY NYC ELECTRICAL CODE 760.131.
3. THIS RISER DIAGRAM IS A SCHEMATIC REPRESENTATION OF THE FIRE ALARM SYSTEM. REFER TO FLOOR PLANS FOR EXACT QUANTITY OF DEVICES.
4. ALL FIRE ALARM CONDUITS SHALL BE MINIMUM ¾".
5. ALL FIRE ALARM CIRCUITS SHALL BE WIRED NFPA STYLE 4/Y/B (CLASS B) WITH THE EXCEPTION OF THE NETWORK CIRCUIT WHICH SHALL BE NFPA STYLE 7 (CLASS A WITH ISOLATION). DUAL CLASS B NETWORKING IS NOT STYLE 7 AND WILL NOT BE APPROVED.
6. ALL FIRE ALARM WIRING SHALL BE TEFLON "RED". WIRING INSTALLED IN NON ACCESSIBLE CEILING, EXPOSED BELOW 8' OR IN MECHANICAL ROOM AREA (NO CEILING) ROUTE IN CONDUIT.

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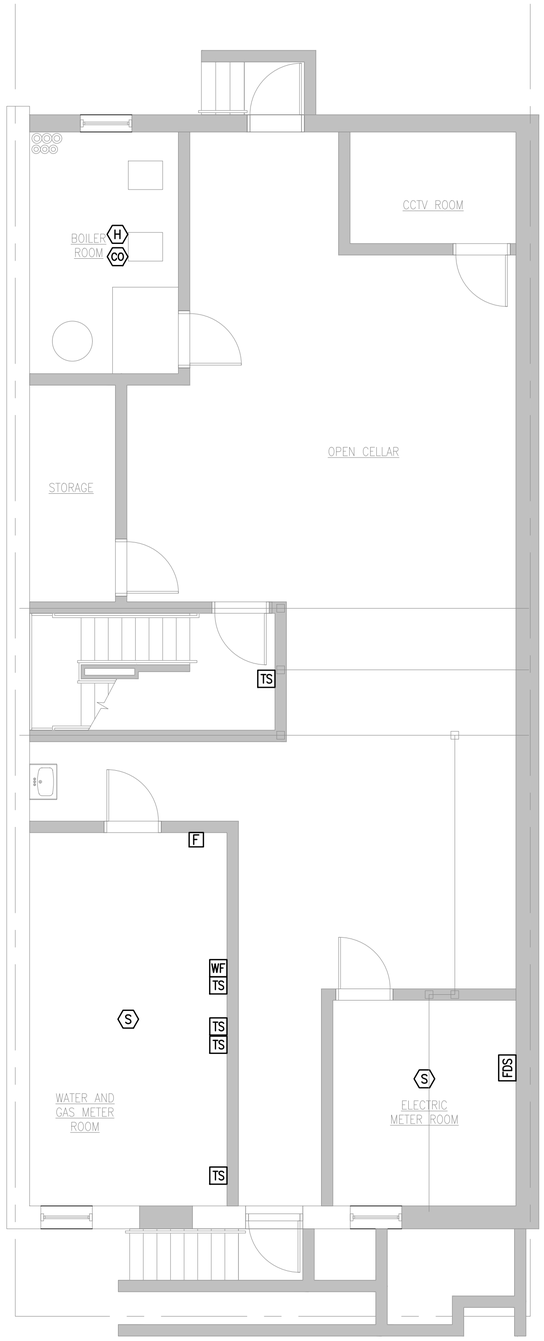
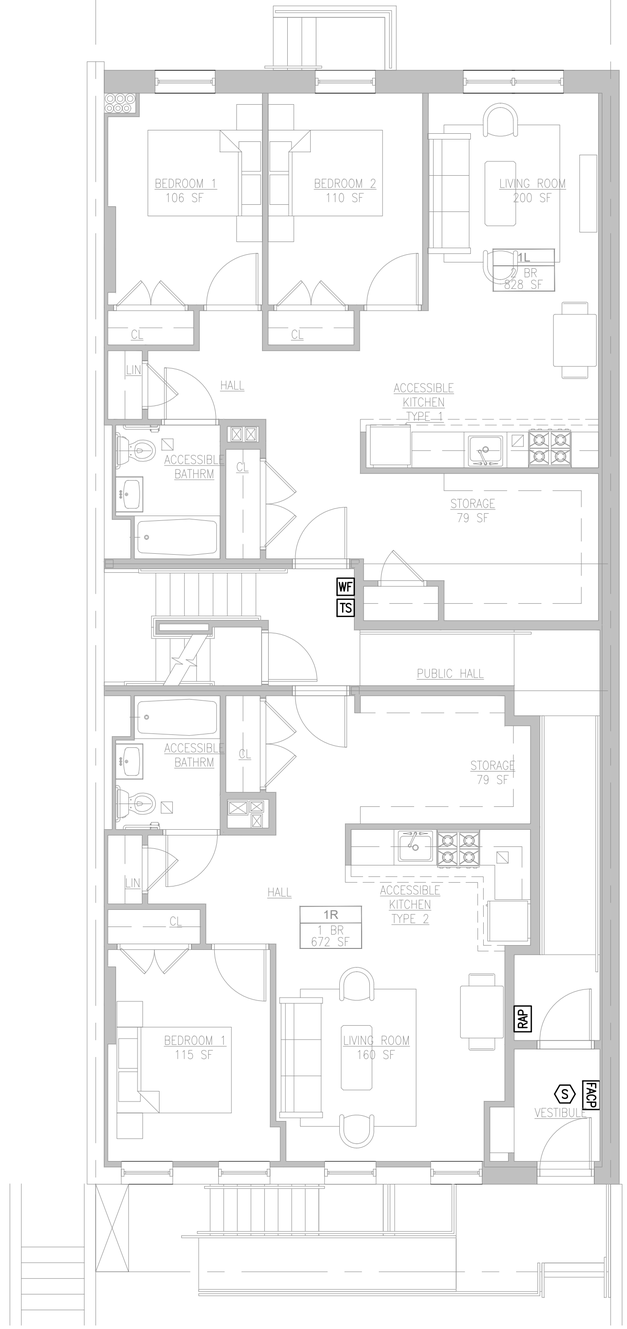


1 CELLAR FIRE ALARM PLAN

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



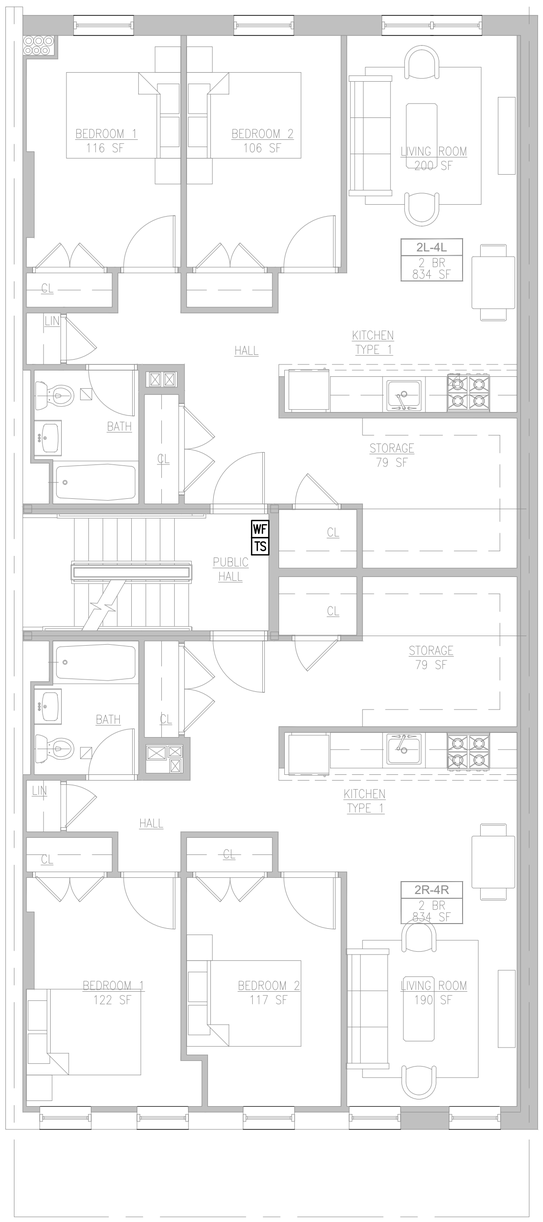
2 1ST FLOOR FIRE ALARM PLAN

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

FIRE ALARM DRAWING NOTES:

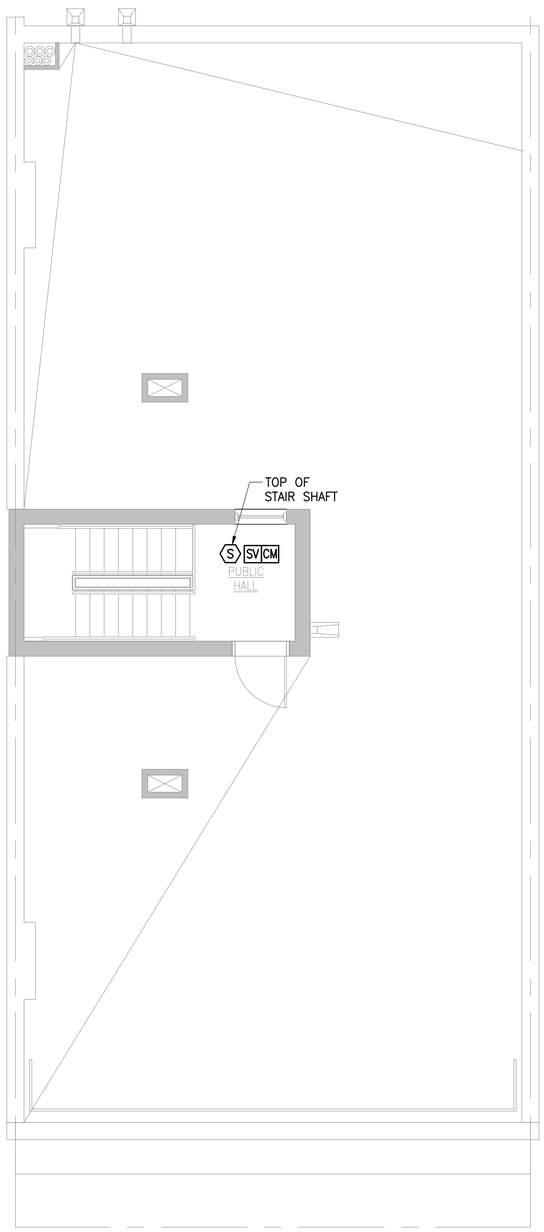
1. REFER TO DWG. FA–001.00 FOR FA SYMBOL LIST, BUILDING DATA, ABBREVIATIONS AND I/O MATRIX.
2. REFER TO DWG. FA–004.00 FOR FIRE ALARM RISER DIAGRAM.
3. FINAL CONDUIT/CABLE ROUTING SHALL BE DETERMINED IN–FIELD, AND PRIOR TO THE COMMENCEMENT OF WORK, COORDINATED WITH OTHER TRADE CONTRACTORS AND THE OWNER.

N



1 2ND TO 4TH FLOOR FIRE ALARM PLAN

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



2 ROOF FIRE ALARM PLAN

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

FIRE ALARM DRAWING NOTES:

1. REFER TO DWG. FA–001.00 FOR FA SYMBOL LIST, BUILDING DATA, ABBREVIATIONS AND I/O MATRIX.
2. REFER TO DWG. FA–004.00 FOR FIRE ALARM RISER DIAGRAM.
3. FINAL CONDUIT/CABLE ROUTING SHALL BE DETERMINED IN–FIELD, AND PRIOR TO THE COMMENCEMENT OF WORK, COORDINATED WITH OTHER TRADE CONTRACTORS AND THE OWNER.

N

FAN SCHEDULES

BASIS OF DESIGN: GREENHECK

MARK	TYPE	SERVICE	MODEL	CFM	SP (IN W.G.)	ELEC. V/~/ø	MOTOR SIZE NEMA (HP)	FAN SPEED (RPM)	WEIGHT LBS	INLET dBA (dB)	REMARKS
TXF-1	ROOF MOUNTED	TOILET	G-097-VG	100	0.5	115/60/1	1/4	1120	35	47	PROVIDE SOUND ROOF CURB W/ LINER, HINGED CURB CAP KIT W/CABLES,ALUMINIUM BIRDSCREEN,CURB SEAL. ACCESSORIES: MOTOR- VARI-GREEN EC MOTOR W/MOUNTED POTENTIOMETER DIAL. SWITCH, NEMA-3R, TOGGLE, JUNCTION BOX MOUNTED & WIRED.
TXF-2	ROOF MOUNTED	TOILET	G-097-VG	100	0.5	115/60/1	1/4	1120	35	47	PROVIDE SOUND ROOF CURB W/ LINER, HINGED CURB CAP KIT W/CABLES,ALUMINIUM BIRDSCREEN,CURB SEAL. ACCESSORIES: MOTOR- VARI-GREEN EC MOTOR W/MOUNTED POTENTIOMETER DIAL. SWITCH, NEMA-3R, TOGGLE, JUNCTION BOX MOUNTED & WIRED.
KXF-1	ROOF MOUNTED	KITCHEN	G-097-VG	120	0.5	115/60/1	1/4	1120	35	47	PROVIDE SOUND ROOF CURB W/ LINER, HINGED CURB CAP KIT W/CABLES,ALUMINIUM BIRDSCREEN,CURB SEAL. ACCESSORIES: MOTOR- VARI-GREEN EC MOTOR W/MOUNTED POTENTIOMETER DIAL. SWITCH, NEMA-3R, TOGGLE, JUNCTION BOX MOUNTED & WIRED.
KXF-2	ROOF MOUNTED	KITCHEN	G-097-VG	120	0.5	115/60/1	1/4	1120	35	47	PROVIDE SOUND ROOF CURB W/ LINER, HINGED CURB CAP KIT W/CABLES,ALUMINIUM BIRDSCREEN,CURB SEAL. ACCESSORIES: MOTOR- VARI-GREEN EC MOTOR W/MOUNTED POTENTIOMETER DIAL. SWITCH, NEMA-3R, TOGGLE, JUNCTION BOX MOUNTED & WIRED.
OAF-1	ROOF MOUNTED	OUTSIDE AIR INTAKE	AS-10-420-A8	305	0.463	115/60/1	1/8	1750	37	47	PROVIDE SOUND ROOF CURB W/ LINER, HINGED CURB CAP KIT W/CABLES,ALUMINIUM BIRDSCREEN,CURB SEAL. ACCESSORIES: MOTOR- VARI-GREEN EC MOTOR W/MOUNTED POTENTIOMETER DIAL. SWITCH, NEMA-3R, TOGGLE, JUNCTION BOX MOUNTED & WIRED.

NOTES FOR FANS:

1. PROVIDE INSULATED HOUSING -1IN. THICK: FAN HOUSING, FILTER
2. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
3. FAN WITH EXCEED OF 0.5HP LOCATED ON ROOF, SHALL BE MOUNTED ON VIBRATION ISOLATOR.
4. PROVIDE FANS WITH ACCOUSTIC SOUND ATTENUATING ROOF CURB WITH NEOPRENE ISOLATORS, SEE VIBRATION ISOLATION SPECIFICATIONS AND DETAIL ON MECHANICAL DETAILS, DISCONNECT SWITCH, GRAVITY DAMPER, THERMAL OVERLOAD PROTECTION.
5. COORDINATE WITH ARCH./G.C. ACCESS DOORS FPR SERVICING ALL FANS WITHIN CEILINGS.
6. ALL DIRECT DRIVE FANS SHALL BE FURNISHED WITH VARI-GREEN MOTOR CONTROL.
7. PROVIDE THERMAL OVERLOAD DISCONNECT SWITCH AND ACCESSORIES FOR CEILING MOUNTING.
8. PROVIDE FAN WITH STARTER
9. FAN SPEED SHALL BE EASILY FIELD ADJUSTABLE.
10. PROVIDE MOTOR STARTERS, DISCONNECTS (IF NOT FACTORY PROVIDED). ALL EQUIPMENT NORMAL POWER WIRING BY ELECT. CONTRACTOR. COORDINATE POWER REQUIRMENTS.
11. PROVIDE 2" MERV 8 FILTER FOR OUTSIDE AIR FAN.

B BOILER SCHEDULES

BASIS OF DESIGN: PEERLESS BOILERS

BOILER NO.	QTY.	HOT STEAM DATA			HEATING DATA		FLUE SIZE (IN.)	WATER CONTENT GAL (WATER)	WATER CONTENT GAL (STEAM)	COMBUS-TION EFF %	THERMAL EFF %	ELECTRICAL DATA		DIMENSIONS (DXWXH)	WEIGHT	MODEL NO.
		STEAM (SQFT)	STEAM MBH	WATER MBH	INPUT MBH	SPACE HEATING OUTPUT MBH						VOLT/ PH/ HZ	BOILER H.P.			
B-1	1	1647	395	458	649	527	9	39.03	29.76	82.8	81.1	120/1/60	15.8	38" X 22" X 44"	1100	SC/SCT-08

NOTES:

1. INSTALL BOILER AS PER MANUFACTURER'S RECOMMENDATION.
2. PROVIDE ALL ACCESSORIES SUCH AS DIRECT SPARK IGNITION, AIR FLOW SWITCH, HIGH AND LOW GAS PRESSURE SWITCHES, ON/OFF WITH LOW FIRE START, FLAME ROD FLAME DETECTOR.

STEAM UNIT HEATER

BASIS OF DESIGN: MODINE

UNIT NO.	LOCATION	SERVING	BTU/HR	AIR DATA			MOTOR DATA			MODEL	MANUF.	WT. LBS
				MAXIMUM MOUNTING HEIGHT(FT.)	CFM	FINAL AIR TEMP.(°F)	HP	APPROX RPM	ELECTRICAL DATA (V/PH/HZ)			
SUH-1-1 SUH-R-1	SEE PLANS	SEE PLANS	14000	8	220	118	1/60	1000	115/60/1	HSB/HC18L	MODINE	16

GENERAL NOTES:

1) INSTALL UNIT AS PER MANUFACTURER'S RECOMMENDATIONS.

GRILLE SCHEDULES

BASIS OF DESIGN:TITUS

SYMBOL	TAG NAME	SERVICE	TYPE	CFM RANGE	DUCT WIDTH SIZE	MODULATE SIZE	DEFLECTION	MODEL NO.	SPACING WIDTH (IN.)	THICK BAR INCHES	MAX NC (dBA)	MANUFACTURER
EXHAUST GRILLE	EG	EXHAUST	SIDEWALL	0-50	-	6X6	0°	350FS	3/4"	-	-	TITUS
SUPPLY	SG-1	SUPPLY	SIDEWALL	0-100 100-150	- -	6X6	0° 0°	300FL 300FL	3/4" 3/4"	- -	- 10	TITUS

NOTES

1. ALL DIFFUSERS: CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO ENSURE PROPER AIR DEVICE BORDER SELECTION.
2. PROVIDE REMOTE CORD OPERATED OPPOSED BLADE DAMPERS FOR ALL DIFFUSERS LOCATED IN INACCESSIBLE CEILINGS (e.g. CORRIDORS, ETC.) TYPICAL ALL.
3. COORDINATE COLOR/FINISH/BORDER WITH ARCHITECT.

EXPANSION TANK SCHEDULE

BASIS OF DESIGN: ARMSTRONG

TAG	QTY.	SERVICE	TANK CAPACITY GAL.	TANK DIMENSION	MAX. WORKING PRESSURE PSI.	MAX. WORKING TEMP. °F	WEIGHT LBS	NPT CONNECTION INCH.	MODEL
ET-1	1	CIRCULATION SYSTEM	13	14øX26H	125	240	50	1	50-L

NOTES:

1) PROVIDE LOCKABLE SHUTOFF VALVE AT CONNECTIONS TO EXPANSION TANK.VALVES SHALL BE LOCKED IN OPEN POSITION.
2) PRESSURIZE TANK BEFORE PIPING.

PUMP SCHEDULE

BASIS OF DESIGN: ARMSTRONG

UNIT NO.	SERVICE	GPM	HEAD FT.	FLUID	MAX		HP	ELEC. DATA V/PH	PART NUMBER	INLET/OUTLET CONNECTION (INCH)	WEIGHT (LBS)	DIMENSIONS LXW (INCH)
					PRE. PSI	TEMP. °F						
P-1 & 2	BOILERS	50	15	100% WATER	175	225	0.5	230/60/1	1050-1.5B-0.5 HP	1.5	64	20X12

NOTES:

1. CONTRACTOR TO PROVIDE DISCONNECT/MOTOR STARTES OR VFD DRIVES, CONTROL WIRING, PIPING AND INSULATION AS REQUIRED BY EQUIPMENT.
2. INCREASE THE SIZE OF BOTH SUCTION AND DISCHARGE PIPES AT PUMP NOZZLE TO SUIT PUMP CAPACITY AND PARTICULAR CONDITIONS OF INSTALLATION.
3. TEST SUCTION LINE FOR AIR LEAKS BEFORE STARTING.
4. CONTRACTOR TO INSTALL,
   - AT PUMP SUCTION, A STRAIGHT PIPE OF LENGTH EQUIVALENT TO 4 OR 5 TIMES ITS DIAMETER.
   - GATE VALVE CLOSE TO PUMP IN BOTH SUCTION AND DISCHARGE LINES ON FLOODED SUCTION APPLICATION.
   - A CHECK VALVE IN DISCHARGE LINE BETWEEN PUMP AND GATE VALVE TO PROTECT PUMP FROM EXCESSIVE PRESSURE AND TO PREVENT WATER RUNNING BACK THROUGH THE PUMP IN CASE OF DRIVER FAILURE.
   - A FOOT VALVE BOTTOM OF THE SUCTION PIPE TO FACILITATE PRIMING OF PUMP FOR OPERATION UNDER SUCTION LIFT. A SMALL BY PASS LINE AROUND THE DISCHARGE CHECK VALVE WILL COMPENSATE FOR FOOT VALVE LEAKS.
   - A SUCTION STRAINER TO PROTECT PUMP AGAINST FOREIGN MATTER IN INITIAL START UP AS WELL AS IN NORMAL OPERATION.
   - PRESSURE GAUGES ON BOTH SIDES OF STRAINER TO INDICATE PRESSURE DROP THROUGH THE STRAINER.
   - VENT VALVE AT HIGH POINT OF PUMP CASING TO VENT CASING AND SUCTION PIPING OF AIR AND VAPOR BEFORE START UP.
5. IMPELLER SECTION SHALL BE MADE TO PROVIDE AN ADDITIONAL 25% FLOW OR 10% PRESSURE LOSS THAN DESIGN REQUIREMENT.
6. PUMPS SHALL BE PROPERLY GROUTED TO BASE AND BE ALIGNED.
8. PUMPS SHALL BE PROVIDED WITH MECHANICAL SEALS AND OSHA APPROVED GUARD.
9. WHERE MULTIPLE PUMPS ARE INDICATED IN SCHEDULE ONE SHALL OPERATE AS STANDBY. ACTUAL STANDBY PUMP SHALL CHANGE TO PROVIDE EQUAL RUN TIME ON EQUIPMENT.

BASEBOARD RADIATORS

MANUFACTURER : GOVERNALE

MARK	LOCATION	TYPE	DEPTH (INCHES)	HEIGHT (INCHES)	BTU/LINEAR FT	MODEL #
RAD-1	SEE PLAN	BASEBOARD RADIATOR	3	10	860	GOV-BOARD

NOTES:

1. PROVIDE THERMOSTATIC CONTROL (DANFOSS) VALVES AT EACH RADIATOR ELEMENT.
2. PROVIDE AIR BLEED VALVES AT EACH RADIATOR.
3. PROVIDE CIRCUIT SETTER IN THE RETURN LINE OF EACH RADIATOR.

EUH ELECTRIC UNIT HEATER SCHEDULE

BASIS OF DESIGN: QMARK

UNIT ID	MODEL	SERVING	TYPE	CFM	kW	EAT °F	LAT °F	ELECTRICAL				WEIGHT LBS.	DIMENSIONS INCH.
								HZ.	VOLTS	ø	AMPS		
EUH-1	CWH1101DSF	SEE PLAN	ARCHITECTURAL WALL MOUNTED	65	1.0	40	85	60	120	1	8.4	12	4"DX10"WX12"H
EUH-2	CWH1208DSF	SEE PLAN	ARCHITECTURAL WALL MOUNTED	65	2.0	40	85	60	208	1	9.6	12	4"DX10"WX12"H

NOTES:

1. INSTALLATION CLARENCE SHOULD BE MINIMUM 4" FROM TOP, 8" FROM BACK AND 4" FROM SIDE.
2. UNIT HEATER SHALL BE INSTALLED IN ACCORDANCE WITH THE LISTING AND THE MANUFACTURES INSTALLATION INSTRUCTIONS.
3. CONTEMPORARY, COMMERCIAL-GRADE STEEL GRILLE, DESIGNED TO PROVIDE COMFORT THROUGH OPTIMIZED AIRFLOW.
4. COLOR:- NORTHERN WHITE

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